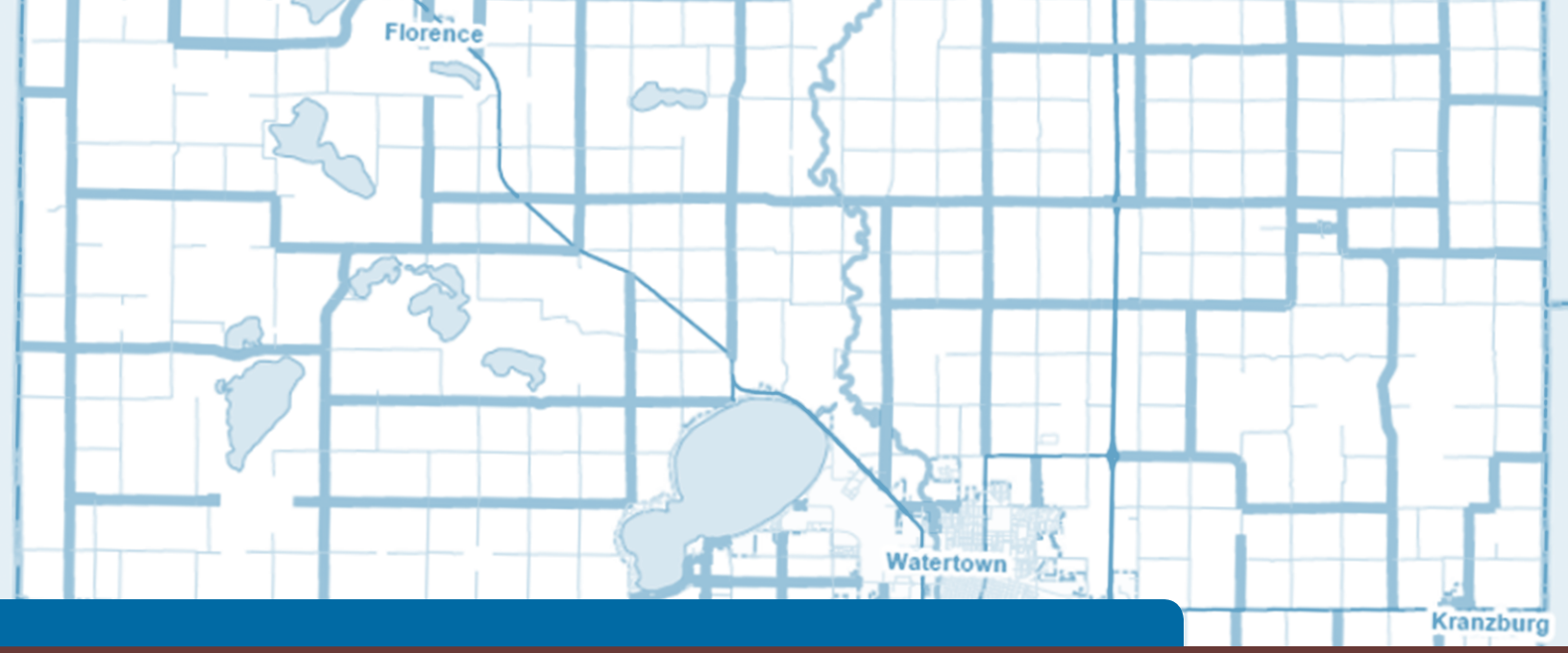

CODINGTON COUNTY

MASTER TRANSPORTATION PLAN

South Dakota Department of Transportation In Conjunction With
Codington County, South Dakota and The Federal Highway Administration




September 2014

SRF Consulting Group, Inc.

Master Transportation Plan

Report Subtitle

August 7, 2014 Final Draft

Codington County, South Dakota

SRF Consulting Group, Inc. | Engineers Planners Designers

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FHWA Disclaimer

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Chapter 1: Introduction

Overview

The transportation network of any given place is not only a means of travel; it can come to represent the character and economic strength of a region. It is important that the transportation network be representative of the type of traffic using the system and provide ample connectivity, support economic growth, and be in a state of good repair.

The purpose of this plan is to evaluate the transportation system including all components that affect the system in order to respond to current needs as well as anticipate system needs 20 years in the future.

This Plan will ultimately guide investments in the transportation system and guide elected officials through the incorporation of policies to address the system as a whole. This Plan follows the process described below in order to produce a document that addresses emerging issues, identifies future transportation system needs, and develops a future system plan that meets the needs of the County, its townships, its municipalities, and the traveling public.

Location

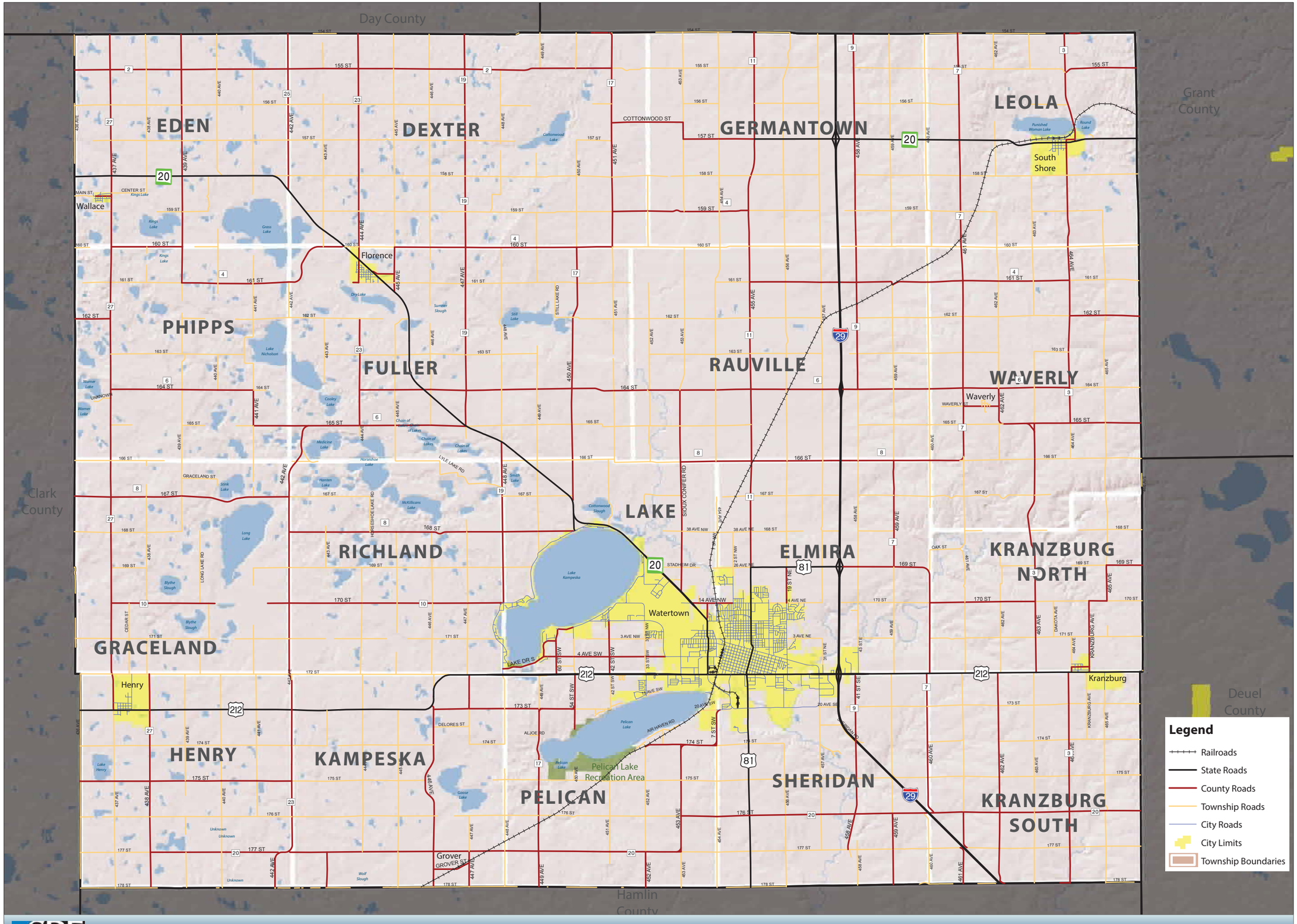
Codington County is located in northeastern South Dakota. Interstate Highway 29 traverses the eastern half of the County, and US Highway 212 traverses the southern half of the County. The county, seat as well as the largest city, is Watertown. Other smaller municipalities include South Shore, Wallace, Henry, and Florence. Another small town is Kranzburg which is located on the eastern edge of the County but is unincorporated and governed by the township.

Other significant places within the County are Waverly and Grover. They are unincorporated but have a particular bearing on the transportation system. A grain elevator and school are located in Waverly and Grover has been identified as having characteristics suitable for a prime economic development area. Figure 1 gives an overview of Codington County including townships, municipalities, and roadways.

Codington County is largely an agricultural region although some of the agricultural uses in the county are more intense than traditional family farming operations. Codington County has several large-scale animal feeding operations including dairies, regional grain elevators, and agricultural supply

companies that generate a significant amount of heavy truck traffic on rural roadways.

Codington County's location at the junction of I-29 and US Highway 212 presents many opportunities and challenges. Opportunities for economic growth are enhanced by the presence of these two major transportation corridors, while challenges are presented in the form of roadway connectivity across I-29.



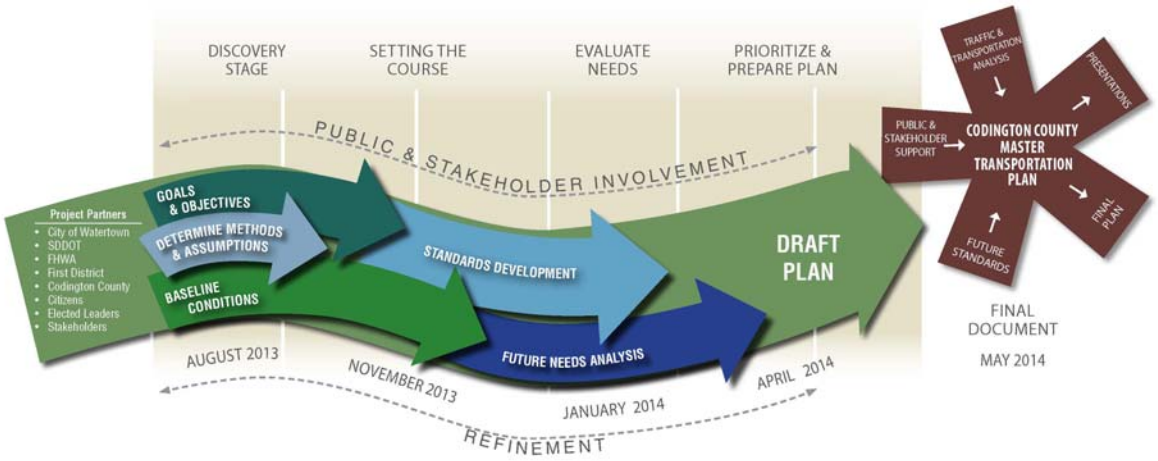
SRF Figure 1

Codington County Study Area Overview

Study Process

Public participation and agency coordination were an important element in identifying issues and needs, and in building support for the overall Master Transportation Plan. Below is a summary of the key groups and their role in the Plan's development.

Figure 2: Study Process



Study Advisory Team

A Study Advisory Team (SAT) was established to actively guide the development of the plan. SAT membership is listed in Table 1. The SAT played an important role in guiding the development of the Master Transportation Plan and met throughout the process to review materials, provide insight, and to guide the development of the Plan.

Table 1: Study Advisory Team Members

Name	Agency
Steve Gramm	SDDOT
Doug Kinniburgh	SDDOT
Jeff Brosz	SDDOT
Mark Hoines	FHWA
Rick Small	Codington County Highway Department
Brenda Hanten	Codington County Commissioner
Tyler McElhany	Codington County Commissioner
Luke Muller	First District Association of Local Governments
Ryan Hartley	First District Association of Local Governments
Thomas Drake	City of Watertown

Public Involvement

Public participation and agency coordination were an important element in identifying issues, needs, and in building support for the overall Master Transportation Plan. Below is a summary of public participation opportunities provided during the Plan's development.

Public Meetings

SRF held two public meetings which members of the general public were invited to attend. One public meeting occurred at the early in planning process to gather input from the public regarding transportation issues and concerns, and to inform citizens of the efforts that were going to be taking place and ways in which they could be involved. The second public meeting was held at the end of the process in order to present the final document, with all of its components and recommendations, to the public for comment and approval.

County Commission Meetings

Reports on the progress of the plan were provided at regularly scheduled county commission meetings at various stages in the process. Project progress was discussed at county commission meetings prior to scheduled public meetings to provide an opportunity for elected leaders to ask questions, gain a better understanding of the materials, and to study findings and potential outcomes. Attendance at the commission meetings also helped to notify the public on when meetings were going to be held.

Stakeholder Group Meetings

Stakeholder group meetings were held to assess current transportation issues and specific groups' use of the transportation system. A total of eight stakeholder group meetings were conducted. These stakeholder groups each saw the transportation system in different ways and sought varying changes. The stakeholder groups included representatives from local organizations and agencies such as:

- Agricultural and Mineral Extraction Operations
- Dakota Sioux Casino and Sisseton Wahpeton Oyate (Tribe)
- Codington County Townships
- School Districts and Municipalities
- City of Watertown Departments
- Watertown Bicycle Club
- Economic Development Agencies
- Emergency Responders

Internet Survey

A short internet survey was utilized as part of the Plan's public involvement process to gain insight about and identify issues the general public may have with respect to the transportation system. The survey consisted of 29 questions grouped by category. Question categories included demographic information, funding, freight movement, roadway conditions, multimodal transportation, and safety concerns.

The survey was open for approximately two months and notification of the survey's availability was sent out via email to commissioners (who then forwarded it to constituents), posted on the project website and Facebook page, and placed in multiple newspaper notices. It was also made available at the initial public meeting. In all, 32 people responded to the survey, many respondents took the time to make additional written comments where there was opportunity to do so.

Methods and Assumptions

The SDDOT required a methods and assumptions document be completed at the outset of the project. This document identifies the approach and data that was used during the analysis as well as the methodology behind various technical elements of the study. This document ensures the technical analyses and information used are consistent with those utilized by the SDDOT.

Goals and Objectives

In order to be effective, the Plan must address the County's stated transportation goals and filter those goals down into actionable objectives. Draft goals and objectives were developed early in the planning process using the Federal Highway Administration's (FHWA) SMART guidance included in the most recent transportation bill, MAP-21. SMART stands for specific, measurable, agreed, realistic, and time bound. Applying SMART principals to the formation of the goals and objectives creates a basis for measure progress as this document is reevaluated in the future. Goals and objectives were refined and expanded upon as the Plan was developed.

Analysis of Future Transportation Needs

Over the next 20 years, Codington County will experience changes in land use patterns and traffic growth that will necessitate changes in the transportation system. It is important to anticipate and recognize these changes to determine their possible impacts on the transportation system in order to make modifications to the system that will maintain its efficiency and connectivity.

This analysis of future transportation needs evaluated future impacts and provided future traffic volume forecasts, identified areas where safety concerns may manifest in the future, and identified capacity issues that may arise.

Roadway System Plan

The roadway system element of the Plan considered all previous analyses, public input, and goals and objectives to synthesize a coordinated set of system recommendations regarding future functional classification, jurisdiction, and designation. For all purposed system changes, a justification and rationale were documented to assure understanding and transparency.

Roadway design standards for the transportation system in Codington County, were also addressed, with a strong linkage to the 2011 SDDOT Local Roads Plan. These standards address items such as typical cross-sections, shoulder widths, inslope gradients, and other relevant attributes.

Chapter 2: Existing Conditions

Demographics

Population

Codington County has a population of 27,227 according 2010 US Decennial Census. The population growth over the last 50 years has remained fairly constant with approximately a one percent growth occurring per year since 1970. The City of Watertown comprises approximately 80 percent of the population of Codington County with the other smaller municipalities comprising around 4 percent. The remainder, approximately 17 percent, represents the portion of the County's population living in rural areas.

Table 2: Codington County Population Analysis[1]

	Population 2000	Proportion of Codington County 2000	Population 2010	Proportion of Codington County 2010	Change in Proportion 2000-2010
Florence	299	1.2%	374	1.4%	0.2%
Henry	268	1.0%	267	1.0%	-0.1%
Kranzburg	185	0.7%	172	0.6%	-0.1%
South Shore	270	1.0%	225	0.8%	-0.2%
Wallace	86	0.3%	85	0.3%	0.0%
Watertown	20,237	78.1%	21,482	78.9%	0.8%
Rural	4,552	17.6%	4,622	17.0%	-0.6%
Total	25,897		27,227		

According to the 2012 Codington County Comprehensive Plan, the total population in 2030 is projected to be 33,273 people, with most of that growth occurring in the City of Watertown. This projection continues the one percent per year growth factor observed in the historic census data.

Age

As mentioned above, Codington County has a population that is growing by approximately one percent per year. This population growth can mainly be attributed to births rather than in-migration. As shown in Figure 3, the 0-5,

[1] Source: US Census Bureau, Population Census 2000, 2010

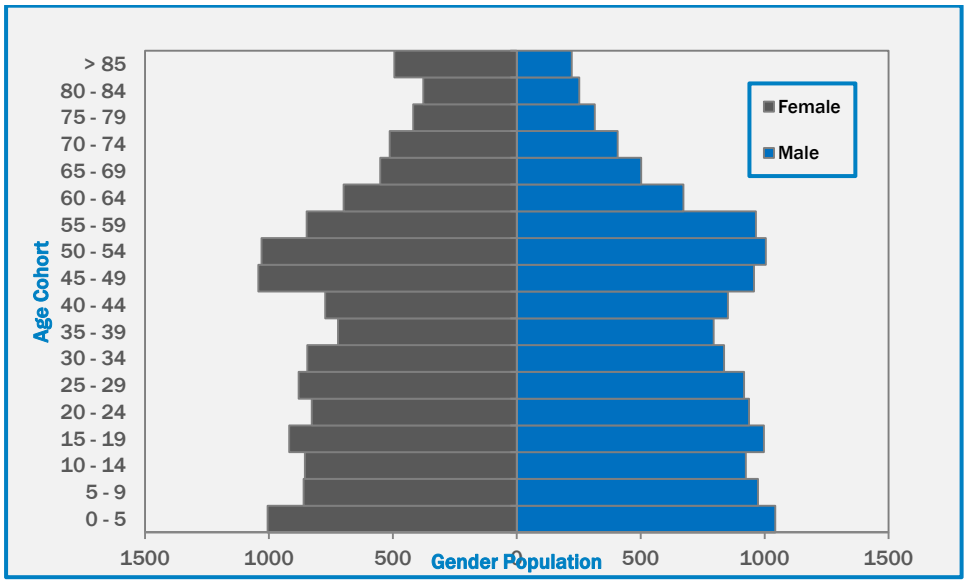
5-9, 10-14, and 15-19 age cohorts are very robust as compared to other age cohorts. The age of the populous on a national scale skews toward older age cohorts. In Codington County, the percentage of people in each age cohort is fairly similar.

The population pyramid represented in Figure 3, has more pronounced younger age cohorts than those seen in national trends, which tend to skew towards the Baby Boom and Echo Boom generations. That trend can still be seen in the 45-49 and 50-54 age cohorts in Codington County. Age cohorts above the age of 60 decrease dramatically in Codington County. One possible explanation could be the out-migration of older age cohorts to warmer climates.

The economy of Codington County may also play a role in the presence of the younger age groups that reside there. There is a large manufacturing sector presence in Codington County and the employees of those companies tend to be younger to middle aged people.

The relative equality in the number of younger age cohorts and middle aged cohorts seems to signal that Codington County is retaining its population. The exception may be in the 20-24 age cohort. The 20-24 age cohort has a slightly decreases as compared to the younger age cohorts. A possible explanation for this decrease could be the lack of a four-year educational institution in Codington County.

Figure 3: Population by Age Cohort[2]



[2] Source: US Census Bureau, Population Census 2010

Economy

The Comprehensive Economic Development Study (CEDS) completed in 2011for an 11 county region including Codington County, details the economic climate of northeast South Dakota. The major strength of this region, as stated in the document, is the I-29 corridor which provides great opportunity for the movement of goods throughout the region. This is especially poignant because much of the economy of Codington County is comprised of agricultural and manufacturing employment sectors that that require access to transportation facilities.

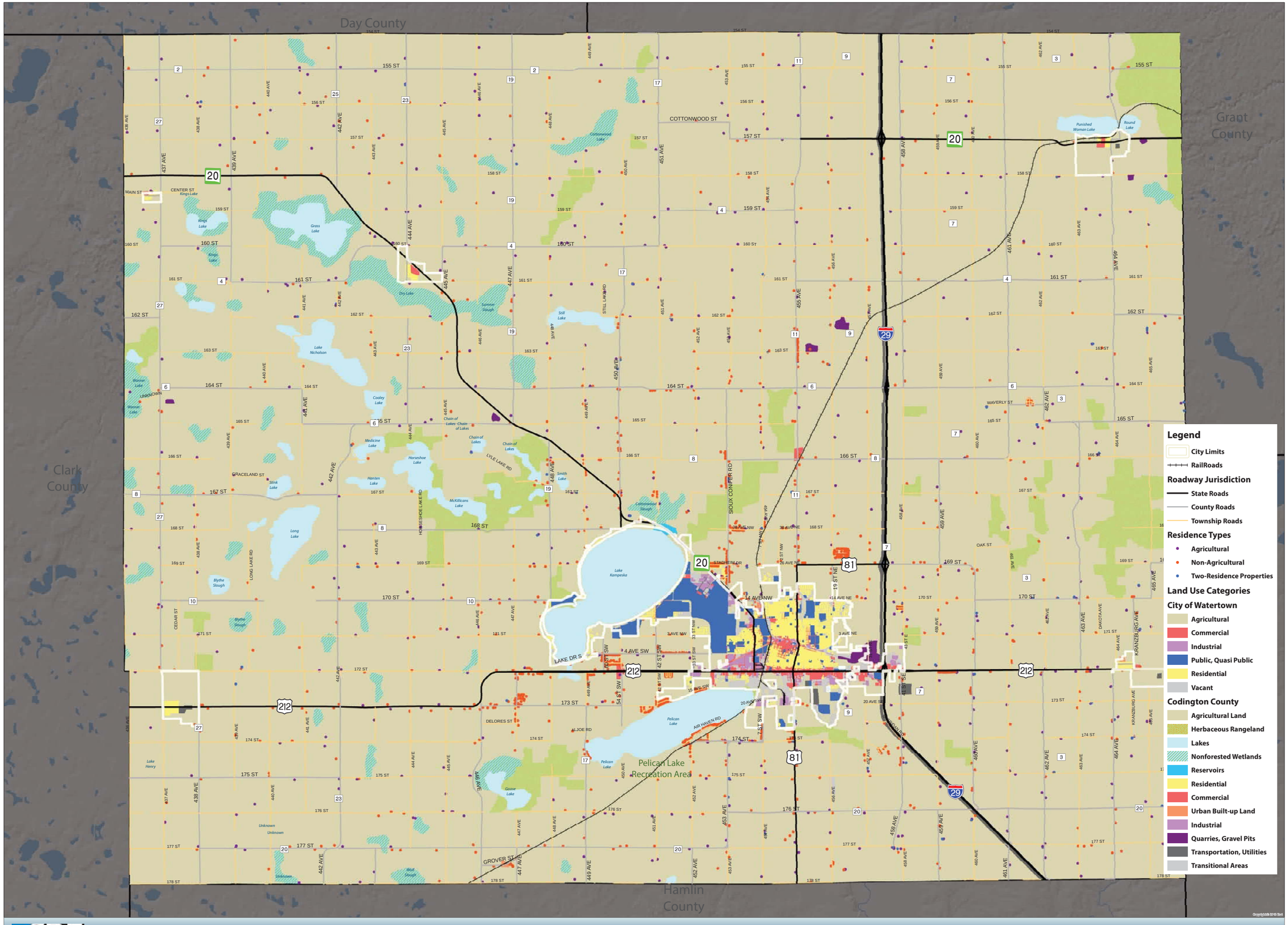
The City of Watertown has expressed its desire for a new interchange at 20th Avenue S (approximately one mile south of US 212) for the purposes of opening up lands in that area for commercial/industrial development. However, the SDDOT has not listed this project in the State Transportation Improvement Program (STIP) as there has been no preliminary analysis of the potential for an interchange at this location and there are other priorities for this corridor.

An investment such as this, along with the existing transportation network of Codington County consisting of Interstate Highway 29, US Highway 212, US Highway 81, SD 20, and 393 miles of county roadways, could continue to incent the agricultural and manufacturing employment sector to locate facilities in Codington County.

Land Use

The land use in much of the rural areas of Codington County consists of tilled agricultural land, herbaceous rangeland, or features such as lakes, rivers, and wetlands. As mentioned under the Economy sub-heading, the major economic force in Codington County is agriculture. There are many elevators throughout the county, typically one being located in every municipality. The largest elevator is located in Watertown at the intersection of US 212 and SD 20. The elevator in Wallace has been expanding in recent years and is also of significant size. There are also a number of large scale feeding operations located throughout the county such as dairies, chicken/turkey hatcheries, and hog confinement facilities. These uses require large amounts of feed typically delivered by truck, in some cases multiple times a week.

Figure 4 shows the various land uses in both rural and urban areas of Codington County. (Each of the following headings will refer to Figure 4.)



SRF Figure 4

Codington County Existing Land Use

Housing

The majority of the residences within a three-mile radius of Watertown are non-agricultural, with residents commuting into Watertown for work purposes. Areas where there are high concentrations of non-agricultural residences include north of Watertown along Sioux Conifer Road and northwest of Watertown along 19th Ave. These are prime growth areas identified in the Watertown Comprehensive Plan. Another area where rural non-agricultural residences exist in significant concentrations is around Pelican Lake. In response to the intense amount and intensity of development, the City of Watertown completely annexed all properties around Lake Kampeska. It has yet to do so around Pelican Lake.

Mining

There are a number of mining activities located throughout Codington County entirely consisting of aggregate quarries. Codington County has a large quantity of till that was deposited after the glacial retreat of the last ice age. The "river rock" is used in many applications from concrete to decorative landscaping rock. These uses are mainly located in rural areas of the county and are shown in dark purple in Figure 4. During spring, summer, and fall months when construction projects are underway, these quarries generate large volumes of truck traffic. This is particularly evident on 455th Avenue (CH-11) north of Watertown. There are a large volume of gravel trucks that use CH-11 and CH-6 to access I-29 or use CH-11 to continue south into Watertown. Typical gravel trucks vary from 15 ton dump trucks to semi-trucks hauling side dumps. Also, because of state laws these trucks can operate with extra trailers in tow commonly known as "pups".

Industrial and Manufacturing

Most of the industrial areas in Codington County are located within the municipal boundaries of Watertown. Some of the largest industries, such as the ethanol plant and the grain elevator in Watertown, are agricultural product processing facilities. Therefore, they generate significant numbers of freight trips to and from the surrounding rural area. The Codington County roadway network is a critical component of transporting agricultural commodities to these facilities.

Figure 4 shows the location of these industrial areas (shown in light purple). The industrial areas are mainly located on the south side of Watertown. Trucks that are traveling in and out of the region use SD 20, US 212 and I-29. Local deliveries or those traveling south or southwest typically use CH-11 for north/south travel and CH-20 for east/west.

Traffic originating in Hamlin County and having a destination in Codington County would likely have used 446th Avenue prior to the roadway being inundated in three locations. This traffic is now diverting onto other roadways such as CH-20 to access a route that allows them to travel north, especially if the destination is in Watertown.

Grover, located southwest of Pelican Lake in Kampeska Township, has been identified as a potential location for future industrial development. This area was specifically identified by the First District Association of Local Governments (FDALG) as a prime industrial location because of its location next to the BNSF mainline. Codington County currently has jurisdiction of all of the roadways surrounding Grover.

Environmental

Lakes, Rivers, Wetlands, & Streams

Codington County has an extensive system of rivers and lakes, especially concentrated in the western and southwestern part of the county. The Big Sioux River traverses from the County's northern boundary continuing through Watertown and exiting the County in the southeast corner. Numerous tributaries to the river provide drainage to much of the County. The river is a natural transportation barrier, and as such there are limited opportunities to cross, particularly in the northern part of the County.

In some areas there are crossings over the Big Sioux River that are in close proximity to one another. This Plan analyzes those crossings to determine if bridge spacing is reasonable or if there is a redundancy in crossing opportunities. This analysis accounts for the condition and structural adequacy of the bridges as well.

Lake Kampeska, Pelican Lake, Grass Lake, and Goose Lake are water bodies of notable size in Codington County; although, there are many other smaller lakes that dot the landscape in the western and southern portions of the County, too numerous to name. Lake Kampeska and Pelican Lake are large enough that they represent a regional recreational opportunity for boating and fishing. Much of the growth over the past decade or so has been located along these lakes and as such has been annexed by the City of Watertown, as in the case of development around Lake Kampeska.

Flooding

Many of the lakes in western Codington County are closed basin systems, meaning that there are no natural inlets or outlets for excess water to drain.

The lake areas of western and southwestern Codington County are a drainage sump for the surrounding watersheds since they are lower in elevation.

As a result, water levels have continued to rise or remain high over the past five years with very little reduction in water levels. This phenomenon is occurring quite frequently in the larger region as well.

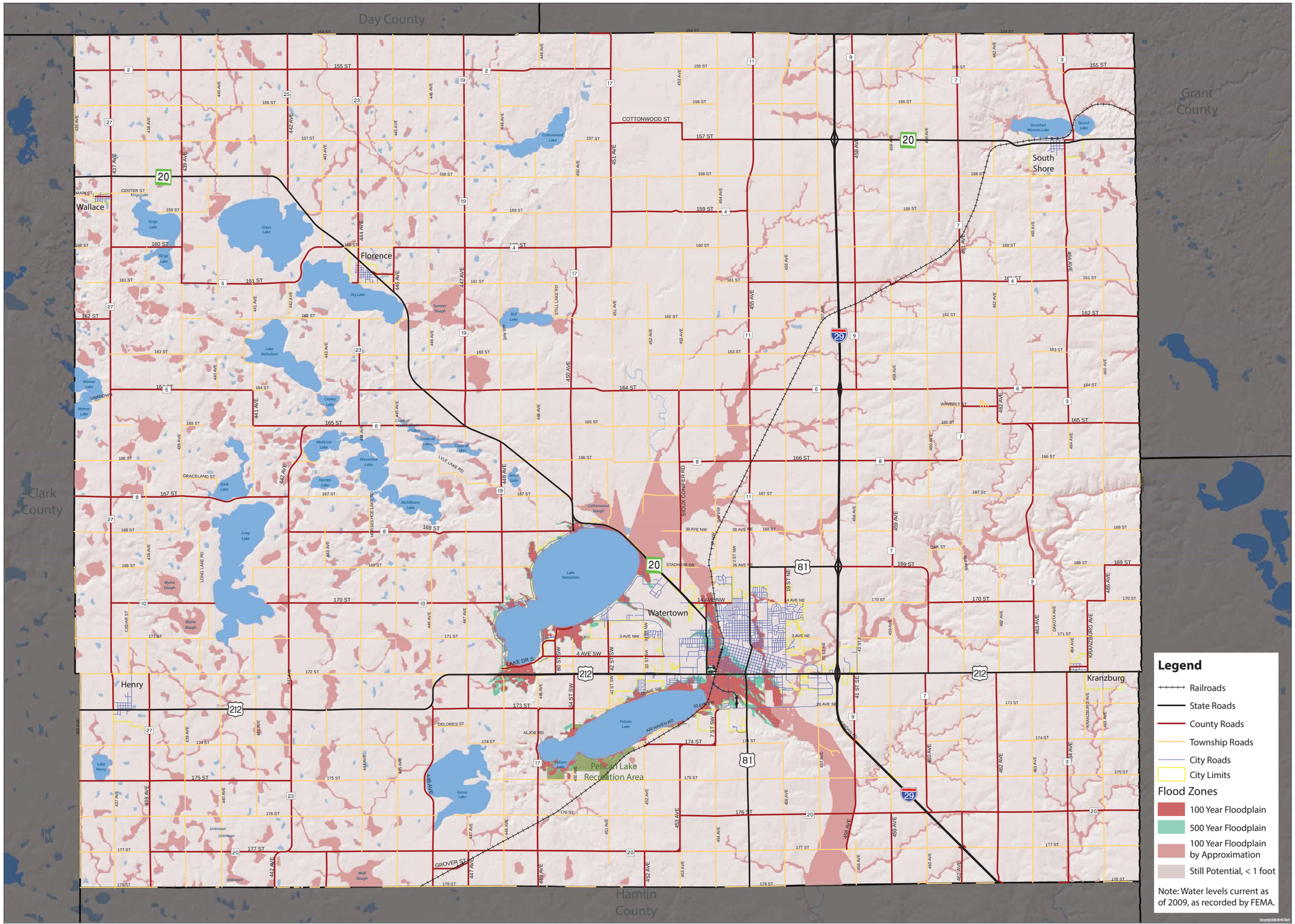
Typically the Federal Emergency Management Administration (FEMA) is in charge of delineating ordinary flood levels and the probability for flood events to occur through its Flood Insurance Rate Mapping (FIRM) efforts. Due to the dramatic rise in water levels in Codington County and the fact that water levels have not subsided, FEMA has been unable to set ordinary high water level marks which delineate areas prone to flooding. This has left local officials unsure of the security of transportation assets as water levels remain higher than in the past.

Many roadways within Codington County have been inundated and submerged for long periods of time. This has hampered the movement of people and goods to and from the southern and southwestern parts of the county in particular. Figure 5 represents the most current efforts to map water levels and delineate flood prone areas within Codington County which took place in 2009. It must be noted however, that this map does not accurately show the amount of water within these basins. Water features shown on the map greatly exceed what is shown.

Snow Removal

Codington County is in charge of maintenance on its roadways and also contracts with the local townships to provide maintenance activities such as snow removal. The Codington County Highway Department has five facilities throughout the county to provide for a quick and efficient response to maintenance activities such as snow removal. Below is a listing of the location of County maintenance operations and the equipment housed there:

- Watertown – Motorgrader with V-plow and wing (1), Plow Trucks (7 total, 5 with sanders), snow blowers (2)
- Kranzburg – Motorgrader with V-plow and wing (1)
- Henry – Motorgrader with V-plow and wing (1)
- Florence – Motorgrader with V-plow and wing (1)
- South Shore – Motorgrader with V-pow and wing (1)



SRF Figure 5

Codington County Existing Flood Hazard Areas

Transportation System

Jurisdiction

Roadways within Codington County are administered according to their jurisdictional classification. The jurisdiction of roadways is an important component of the Plan, because it defines regulatory, maintenance, construction, and financial obligations of each governmental unit.

The South Dakota Department of Transportation (SDDOT) maintains portions the State Highway System that goes through Codington County. These facilities include US Highway 212, US Highway 81, SD Highway 20, and I-29. These roadways have various cross-sections changing from four-lanes with turn-lanes within the City of Watertown to two-lanes on rural sections.

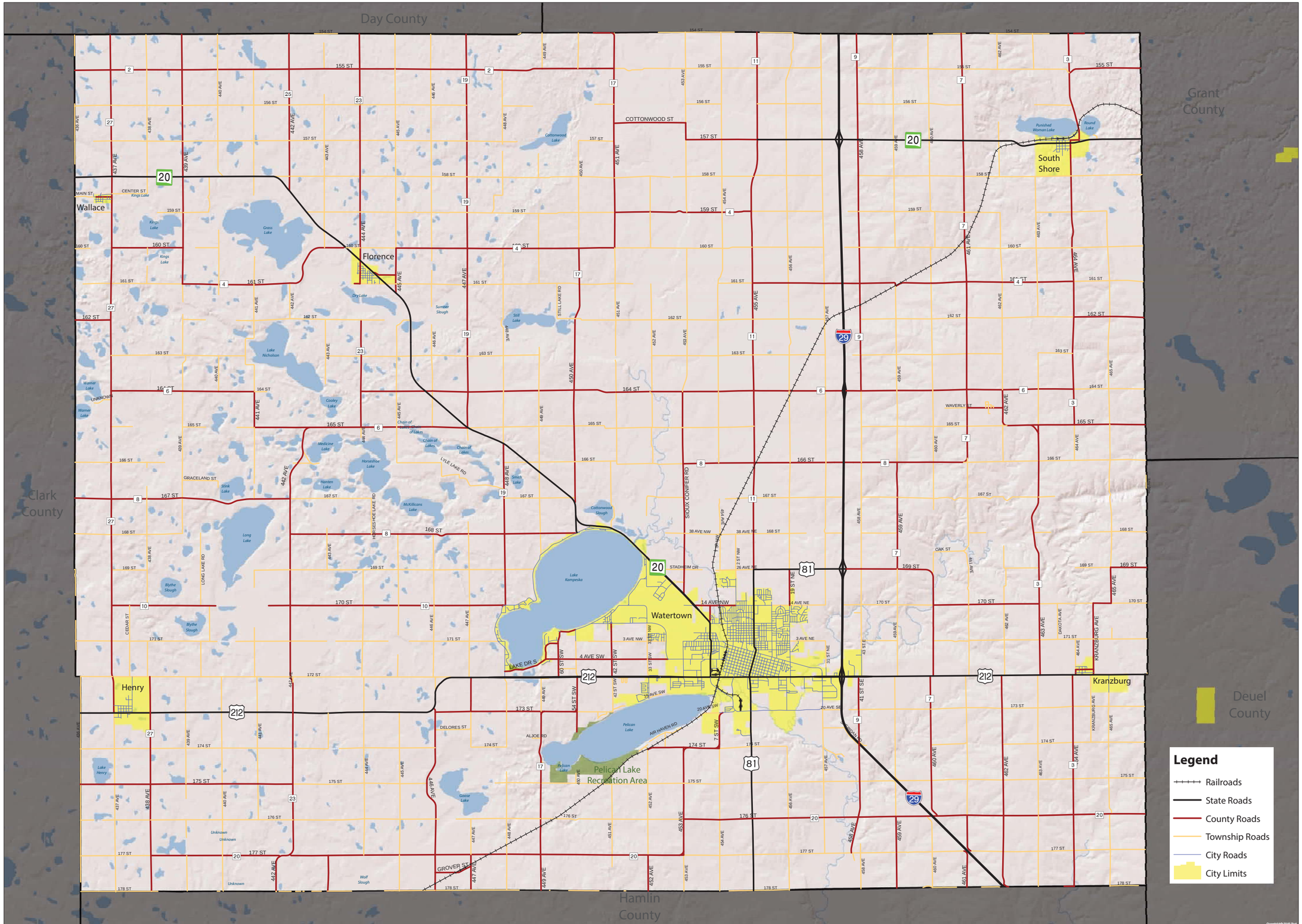
Figure 6 shows roadways in the County and their applicable jurisdiction. There are four main jurisdictions: State, County, Township, and Municipal. Roadways are often transferred between jurisdictions. One common example is when land is within or adjacent to a municipality. The agency once in control of that roadway when it was outside of city limits, such as the County or Township, will generally jurisdictionally transfer that roadway to the annexing municipality. Exceptions to this happen quite frequently and as Codington County retains jurisdiction of roadways within Watertown, South Shore, Kranzburg, Florence, and Henry.

Functional Classification

The functional classification system (Table 3) defines both the function and the role of a roadway within the hierarchy of the overall roadway system. The functional classification system is used to define a roadway network that collects and distributes traffic from localized areas like neighborhoods to arterial roadways and ultimately to the state highway system. In the case of Codington County the functional classification systems cues users to the connectivity and capacity of the individual roadway in order to efficiently move goods and traffic throughout the county.

A roadway's functional classification is based on a number of factors, including:

- Trip characteristics: length of route, type and size of activity centers and route continuity
- Access to regional population centers, activity centers, and major traffic generators
- Proportional balance of access and mobility



SRF Figure 6

Codington County Existing Roadway Jurisdictions

- Continuity between or through travelsheds
- Relationship with contiguous land uses

The County's functional classification system (Figure 7) is broken down into four categories – principal arterials, minor arterials, collectors and local roadways. Principal arterial roadways generally serve statewide and interstate travel. They connect large activity centers and attract relatively long trips. Minor arterial roadways connect cities and larger towns. Collector roadways mainly serve intra-county travel and connect local roadways to the arterial network. Collector roadways are further classified into major, minor and urban collectors based on their location and the type of service they provide. Lastly, local roadways provide direct access to individual land uses and connect to collector roadways. These four classification categories and their typical characteristics, as applied to the Codington County roadway system, are listed below:

Principal Arterials

- Connect major activity centers
- Significant continuity at a regional level
- Serves long distance trips
- Limited access and high speeds
- Serves large travelsheds

Minor Arterials

- Connects key activity centers
- Provides significant continuity on a sub-regional level
- Serves medium to long distance trips
- Limited access and high speeds
- Serves large travelsheds

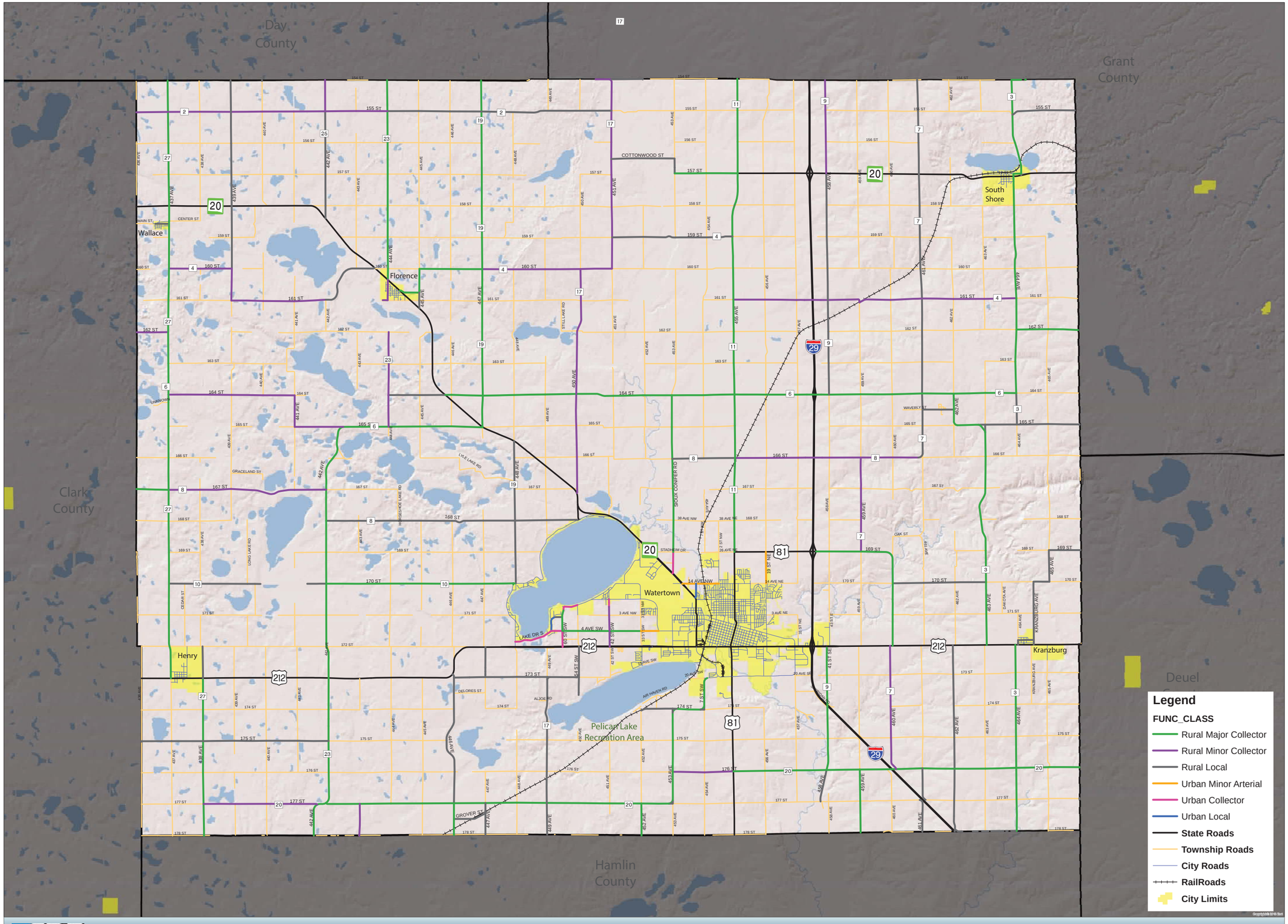
Collectors

- Connects local activity centers to arterials
- Increased continuity at a local level
- Serves short to medium length trips
- Equal emphasis on access and mobility
- Provides access to localized areas
- Serves a variety of uses at a variety of speeds

Local Routes

- Connects neighborhoods, stores, farms, schools and high-order roadways
- Lowest degree of continuity
- Closely spaced access points
- Provides direct access to property
- Serves a limited travelsheds

State and US Highways are designated as principal or minor arterials in Codington County. County roadways are split into two classifications, major and minor collectors. Generally, major collectors in Codington County are paved as they are designed for heavier vehicular trip in order to funnel traffic to arterial routes. Minor collectors in rural areas of the County are usually gravel, providing access to the township roadway network. These roadways are maintained to a level so that farm equipment and agricultural products can be moved efficiently across rural locales.



SRF Figure 7

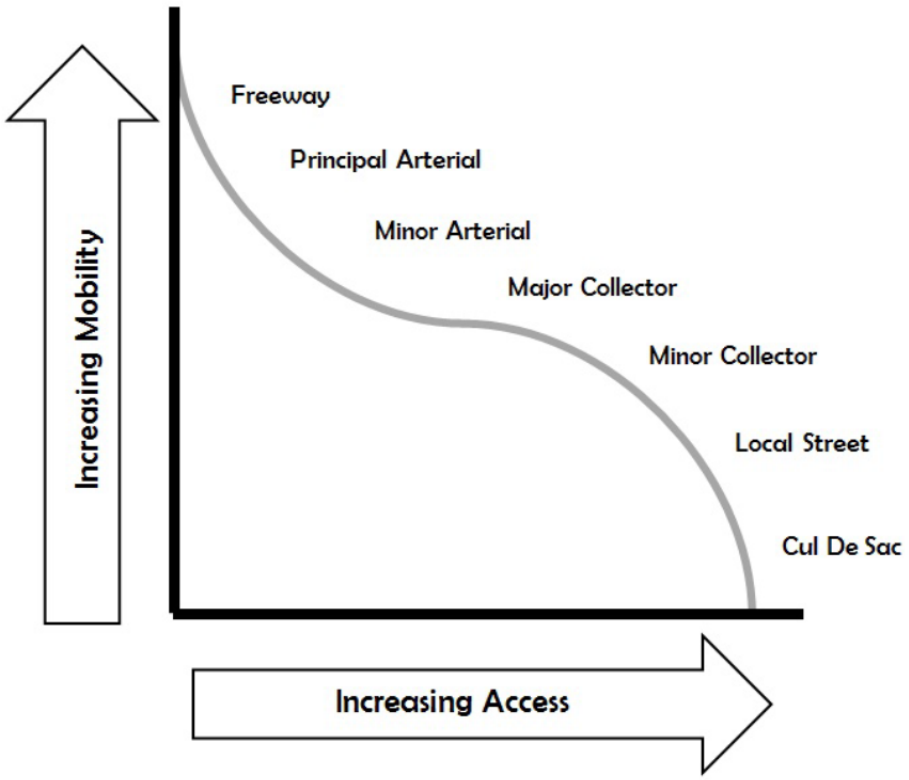
Codington County Existing Functional Classification System

Table 3: Functional Classification Overview

Functional Classification	Services Provided
Arterials (Principal & Minor)	Provides the highest level of service at the greatest speed for the longest uninterrupted distance, with some degree of access control.
Collectors (Major-Rural Areas & Urban)	Provides a less highly developed level of service at a lower speed for shorter distances by collecting traffic from local roads and connecting them with arterials.
Local	Consists of all roads not defined as arterials or collectors; primarily provides access to land with little or no through movement.

By maintaining and periodically updating the county's functional classification system, local agencies and planning officials are able to manage access, promote mobility and design the roadways appropriately for their intended function. The formal process of determining urban and rural functional classification is outlined in FHWA's manual, *Highway Functional Classification – Concepts, Criteria and Procedures*, 2013. Figure 8 illustrates the relationship between access and mobility in reference to the functional classification of a roadway.

Figure 8: Access Mobility Relationship



An important element of this Plan is the review of the current functional classification system. It is the objective of functional classification planning to achieve better performing and better alignment of routes, where functional classification designations match current and future land use and roadway purpose.

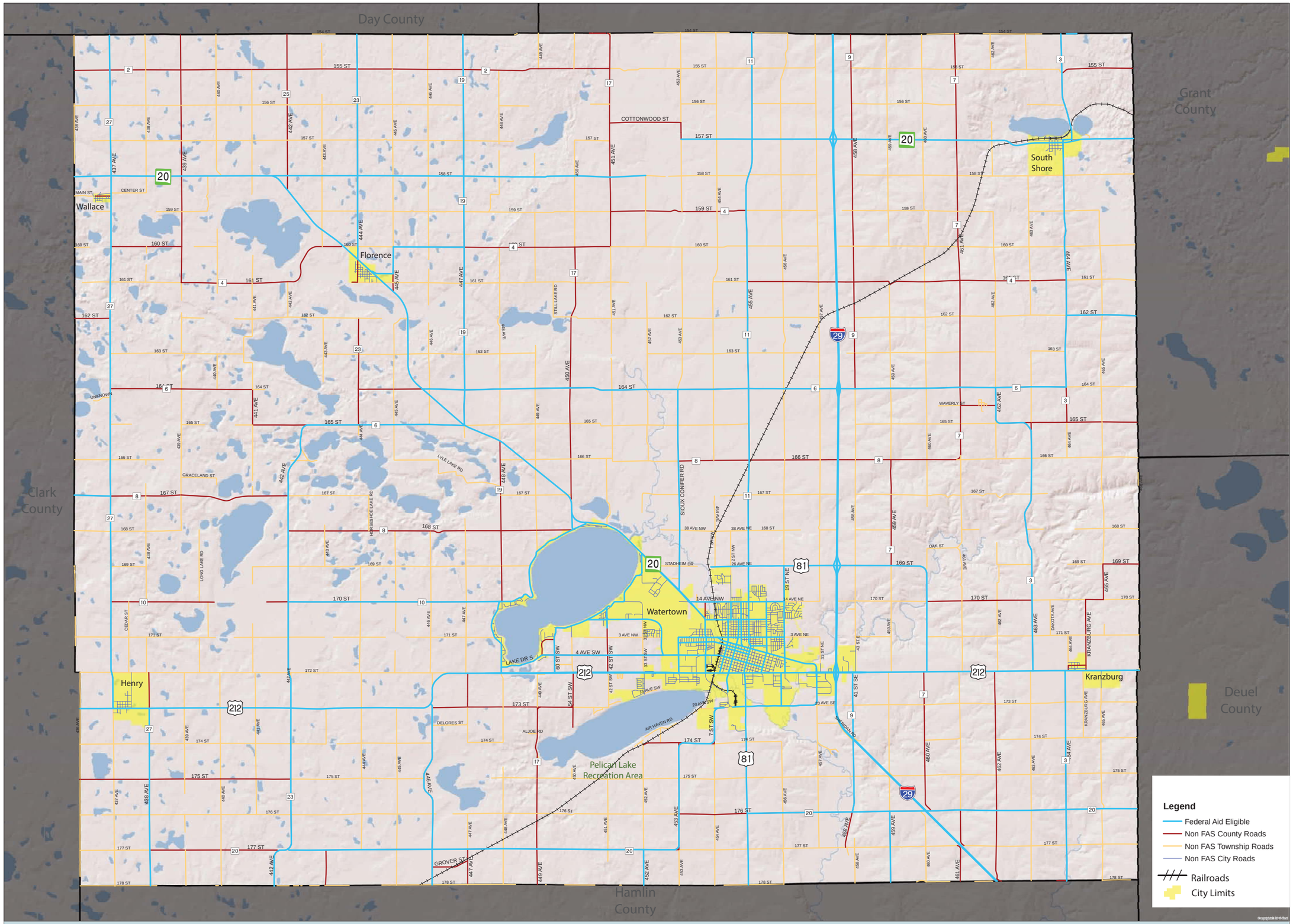
Federal Aid Routes

The Federal Aid System (FAS) was a historic system utilized to direct federal funding to roadways across the nation. Routes were designated as FAS for a variety of reasons independent of the jurisdiction of the roadway. This system is no longer used to direct federal funding, rather, the functional classification of an individual roadway is utilized. Roadways that were designated as FAS routes were given grandfathered status and can still receive federal funding and as such those routes on the system can receive federal funding in perpetuity. Historic FAS routes in Codington County are shown in Figure 9.

Primary Routes

Codington County manifests its functional classification system in the form of primary and secondary routes. Primary routes are those roadways that are paved; whereas, secondary routes are gravel roadways. Primary roadways provide a high degree of connectivity to other primary roadways along with the state routes and also serve as emergency/snow routes. These roadways are designed to handle heavier weights than secondary roads and are often paved because of higher traffic volumes.

Figure 10 shows those roadways in Codington County that are considered primary and secondary routes. As part of this Plan, the Primary Route network was analyzed. A new "Roads Plan" with revised roadway hierarchy was devised. Recommendations can be found later in this document as to roadways that should either receive or lose primary route designation.



SRF Figure 9

Codington County Federal Aid Eligible Routes

Day County

Grant County

Clark County

Deuel County

Hamlin County

Wallace

Florence

South Shore

Watertown

Henry

Kranzburg

Pelican Lake Recreation Area

COTTONWOOD ST

SIOUX CONIFER RD

LYLE LAKE RD

HERSEYSHOE LAKE RD

LONG LAKE RD

GRACELAND ST

STADHEIM DR

AIR HAVEN RD

GROVER ST

DELORES ST

ALJOE RD

WAVERLY ST

OAK ST

CENTER ST

MAIN ST

CEDAR ST

DAKOTA AVE

KRANZBURG AVE

STILL LAKE RD

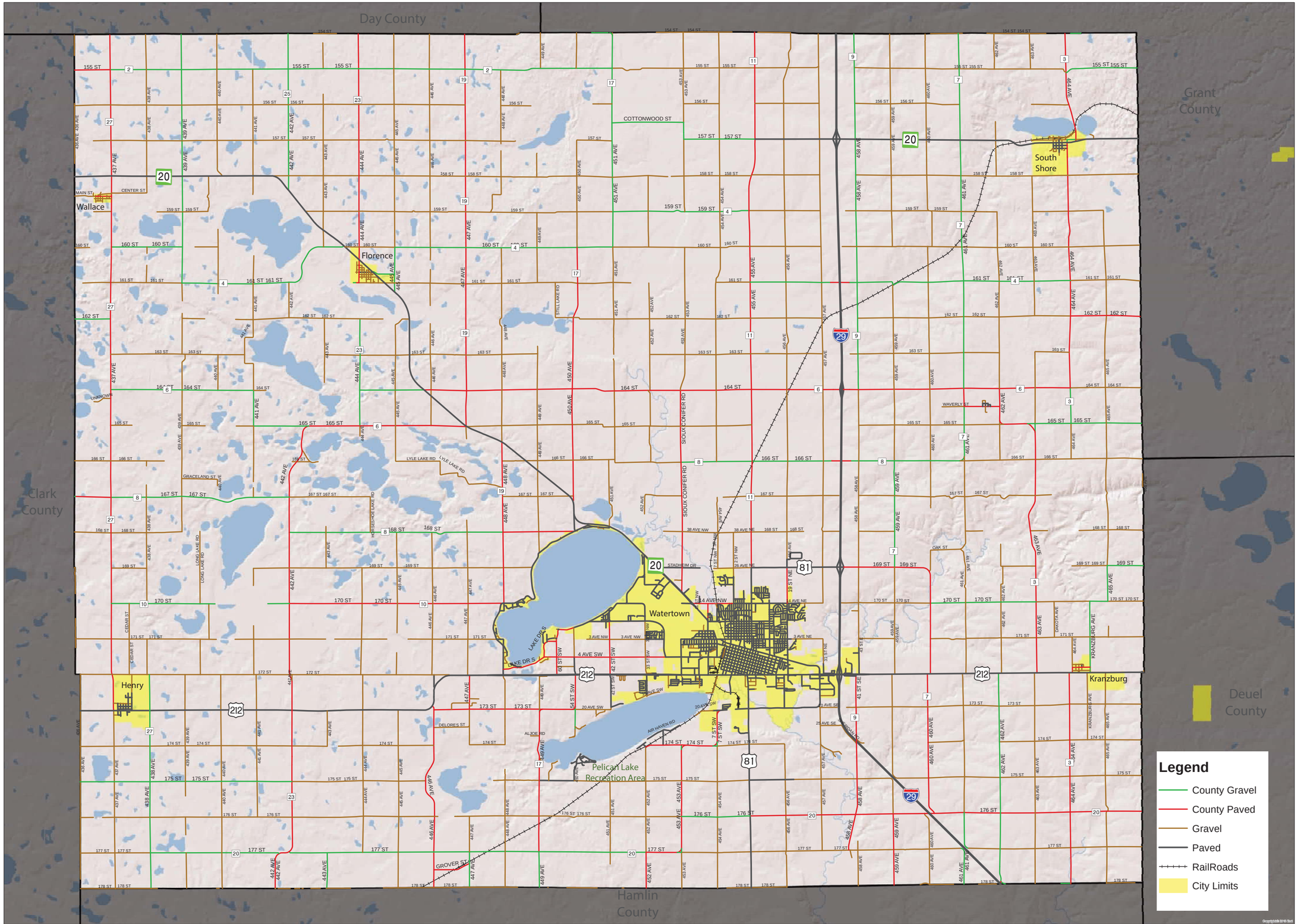
LAKE DR S

Legend

- Secondary Routes
- Primary Routes
- State Roads
- City Roads
- RailRoads
- City Limits

0 1 2 3 Miles

SRF Figure 10 Codington County Existing Primary and Secondary Routes



SRF Figure 11 Codington County Existing Roadway Surface Type

Roadway Surface Type

The Codington County Highway Department is responsible for a total of 383.9 miles of roadway, of which approximately 204.3 miles are asphalt paved roadways, 179.6 miles are gravel roadways, and 42 bridges. That responsibility includes all aspects of the roadway from repair to signage and on-going seasonal maintenance. Figure 11 shows the surface type of the roadways in Codington County.

As traffic increases on gravel roadways, the cost/benefit leans towards paving the facility. This Plan will look at the projected traffic volumes on County roadways to determine if future paving is recommended given the forecasted increase in ADT and provide guidance on when costs of maintenance outweigh those of paving.

Roadway Geometrics

Travel throughout Codington County is not hampered due to individual roadway geometrics because of the low traffic volumes on County roadways. Higher traveled roadways within Codington County tend to be on the primary road network which is almost an entirely paved system. These two lane roadways can handle significantly more traffic than is currently using the system.

The cross-sections of primary and secondary roadways seem to be similar to that found in other rural areas except for the absence of shoulders. Typically, primary (arterial) roadways have at least a two and a half foot gravel shoulder in rural areas followed by a 4:1 or 6:1 gradient inslope. Most of the roadways in the County do not have a shoulder and in some areas inslopes are steeper than ideal.

As part of this plan, roadway geometrics are addressed and applicable standards are identified. The goal in establishing such criteria is to create consistency and continuity in the transportation system that is safe for all users.

Truck Routes and Weight Restrictions

During spring months when the ground is soft due to thawing and precipitation, the county places load restrictions on all asphalt roadways under county jurisdiction. Codington County's ordinance addressing spring load restrictions is worded as follows:

- Any vehicle cannot exceed seven tons per axle on any asphalt surfaced Codington County highway during spring load restriction.

- No vehicle exceeding posted gross weight may use posted restriction bridges.
- No oversized movement between sunset and sunrise.

One of the primary concerns from the agricultural and mining community in Codington County is the weight restrictions placed on county roadways. These restrictions tend to occur during the early part of the construction season and the planting season when it is necessary for farmers to haul seed and equipment on county roads.

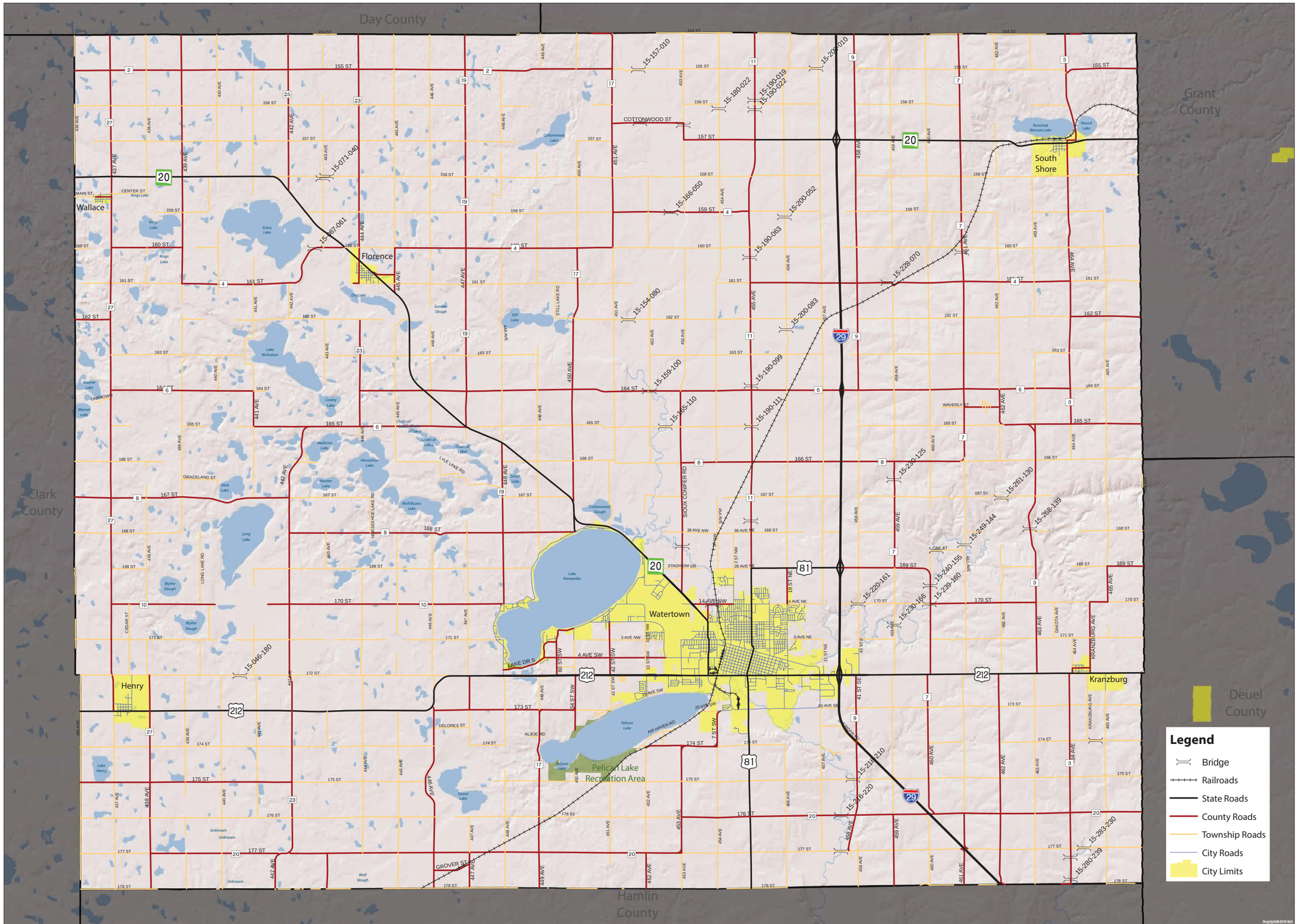
Roadways of particular concern were those that provided direct connections from state roadways to grain elevators. Also, some elevators are located in areas where there are no alternate facilities available to access the state highway system, which does not have weight restrictions, making it difficult to efficiently and cost effectively haul necessary materials.

The agricultural community would like to see Codington County create a truck route network consisting of roadways that are designed to a standard that can handle heavier loads during all months of the year.

Structures

Codington County has jurisdiction over 42 structures throughout the county, 20 of which are on county roadways and 22 that are on township controlled roadways. By statute, Codington County is responsible for any structure spanning over 20 feet regardless of whether the roadway itself is under county or township jurisdiction. This includes bridges as well as culverts. These structures are shown in Figure 12 and labeled with a unique identification number. These structure numbers then correspond to the table located in Appendix 1 which provides further information about each individual structure.

The Codington County Highway Department inspects all structures biannually. Each structure is given a sufficiency rating based upon the condition of the bridge. When the sufficiency rating falls below 65, the bridge becomes eligible for rehabilitation or replacement funding.



SRF Figure 12 Codington County Existing Structures

Safety and Crash Analysis

A crash analysis was performed for roadways under Codington County jurisdiction. This analysis used traffic incident data from the past five years that was compiled by the SDDOT. A map of the locations of the crashes listed by severity is shown in Figure 13.

The intersection of CH-6 (164th Street) and CH-11 (455th Avenue) had been previously studied because of multiple accidents resulting in fatalities prior to initiating this transportation planning effort. This report was taken into consideration during the crash analysis. The project team also talked to multiple stakeholders (County Sheriff, residents, Highway Superintendent) to assess intersection geometrics, characteristics, and/or driver behaviors that may be contributing to severe at this particular intersection.

After reviewing the crashes on the county roadway system, three corridors were chosen for further analysis. These three corridors were chosen because of the number and severity of crashes on the roadway segments was higher than others in the county.

Analysis

The crash data was reviewed and broken down to identify any common trends or causes of he identified crashes. A total of 690 crashes occurred within the county during the five year period. Of these crashes, 27 of them are classified as severe. A crash resulting in a fatality or serious injury is classified as a severe crash. Codington County's Rural County Road system averages about three severe crashes per year. Details about the characteristics of these crashes are shown in Figure 14 and highlights include:

Day County

Grant County

Clark County

Deuel County

Hamlin County

Wallace

Florence

Watertown

Henry

Kranzburg

South Shore

Pelican Lake Recreation Area

COTTONWOOD ST

STILL LAKE RD

LONG LAKE RD

HORSESHOE LAKE RD

LYLE LAKE RD

STOCK CONFER RD

LAKE DR S

AIR HAVEN RD

GRACELAND ST

DELORES ST

ALICE RD

STADHEIM DR

OAK ST

WAVERLY ST

GROVER ST

CENTER ST

MAIN ST

CEDAR ST

DAKOTA AVE

KRANZBURG AVE

Kings Lake

Grass Lake

Dry Lake

Sumner Slough

Still Lake

Lake Nicholson

Warner Lake

Cooley Lake

Chain of Lakes

Medicine Lake

Horseshoe Lake

Hanten Lake

Sink Lake

McKillicans Lake

Cottonwood Lake

Long Lake

Blythe Slough

Lake Kampeska

Pelican Lake

Smith Lake

Lake Henry

Goose Lake

Wolf Slough

Punished Woman Lake

Round Lake

Cottonwood Slough

Unknown

Legend

Crash Severity

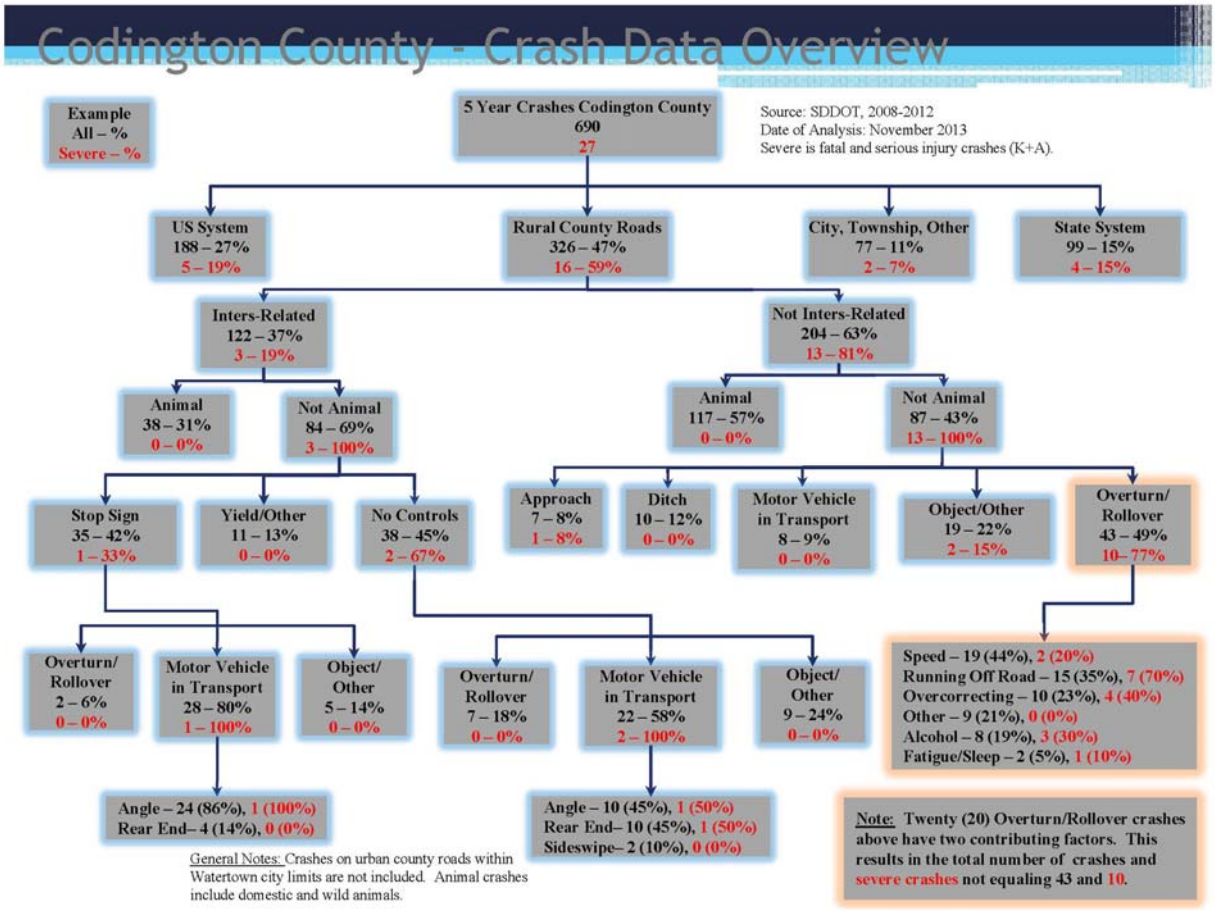
- Fatal
- Incapacitating Injury
- Non-Incapacitating Injury
- Possible Injury
- No Injury, Other
- Railroads
- State Roads
- County Roads
- Township Roads
- City Roads
- City Limits

SRF Figure 13

Codington County Crashes (2008-2012)

0 1 2 3 Miles

Figure 14: Crash Data Overview



Rural Crashes on the County Road System

- 47 percent of all of the crashes in Codington County occurred on rural county roads.
- 59 percent of the severe crashes in Codington County occurred on rural county roads.

Non-Intersection Related Crashes

- 81 percent of the county road rural severe crashes were non-intersection related.
- 77 percent of the severe rural, non-intersection related crashes were severe overturn/rollover crashes.

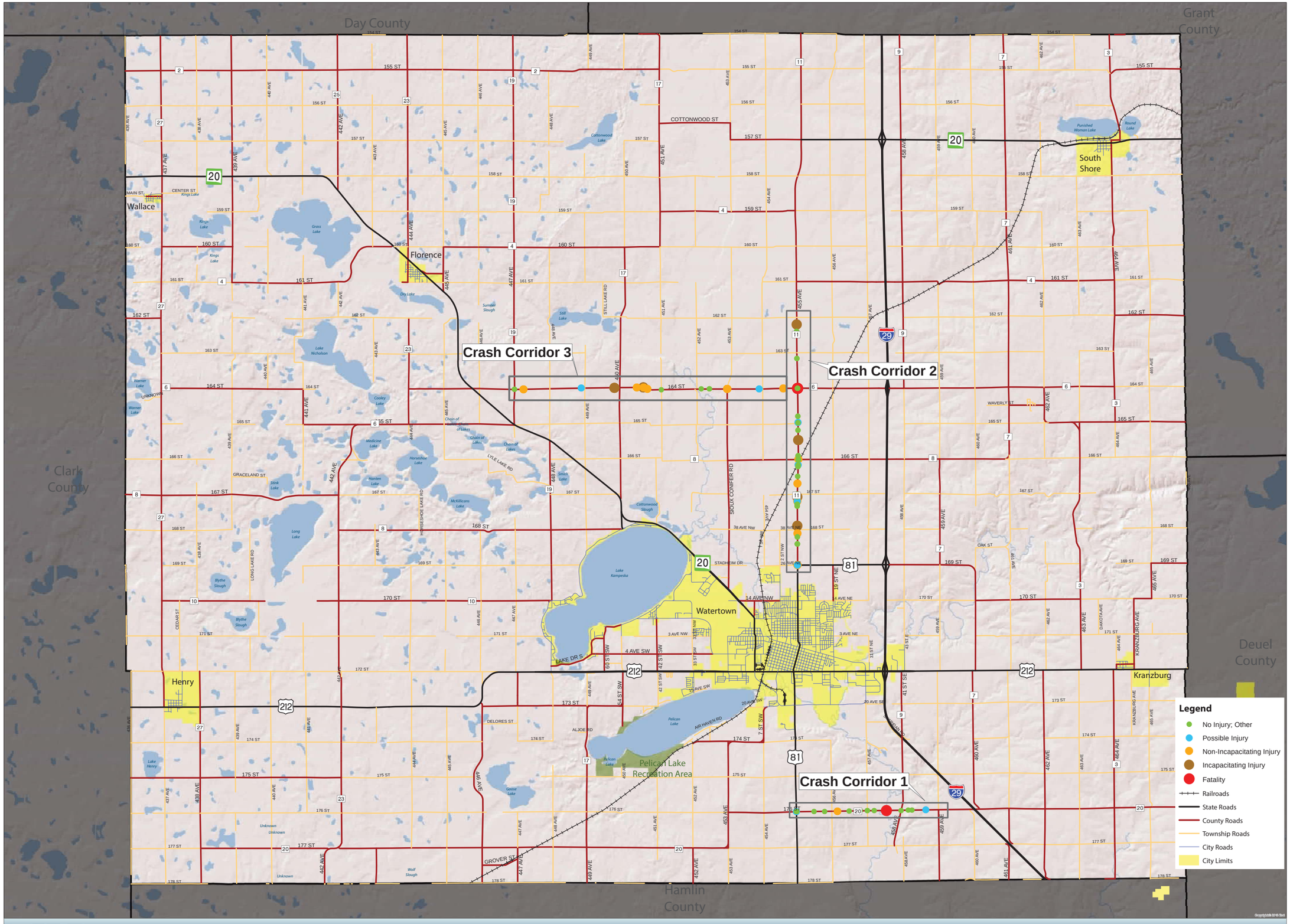
Intersection Related Crashes

- 19 percent of the county road rural severe crashes were intersection related.
- 67 percent of the severe rural, intersection related crashes occurred where no controls were present.

Animal Related Crashes

- 57 percent of the non-intersection related crashes were animal related (117 crashes).
- 31 percent of intersection related crashes were animal related (38 crashes).

After reviewing the crashes on the county roadway system, three corridors were chosen for further analysis. These corridors are County Road 20 (176th Street) from US Highway 81 to 459th Avenue, County Road 11 (455th Avenue) from US Highway 81 to 162nd Street, and County Road 6 (164th Street) from 447th Avenue to 455th Avenue, shown in Figure 15. These segments were chosen because the number and severity of crashes were higher than others in the county. The overall segment crash rates were calculated to determine the statistical significance of the crashes along the segment. These overall crash rates were then compared to typical crash rates for segments with similar characteristics. Since the SDDOT does not publish crash rates by type of roadway or traffic control, typical crash rates published from the Minnesota Department of Transportation (MnDOT) were used for comparison purposes.



SRF Figure 15

Codington County - Crash Corridors Selected for Analysis

Table 4: Critical Crash Rate

Segments	# of Crashes	ADT	Segment Length (Miles)	Calculated Crash Rate (Million Entering Vehicles)	*Typical Crash Rate	Critical Crash Rate Per MVM
Corridor 1	15	482	4.0	4.26	0.6	2.53
Corridor 2	32	1689	7.0	1.48	0.5	1.33
Corridor 3	16	673	8.0	1.63	0.6	2.16

**Two crashes occurred at the intersection of County Road 11 and County Road 6, which were included in the County Road 11 segment

*Used Detroit Lakes, MN as a MN District to compare to Codington County, SD for the Average Crash Rates

Table 4 summarizes the corresponding crash rates that were calculated based on the reported crashes that occurred along the three chosen segments within Codington County. It should be noted that the crash rates are per million vehicle miles (MVM) for the segment analysis. Results shown in Table 4 indicate that all three segments show the existing crash rate is above the typical crash rate for segments with similar characteristics. However, it should be noted that a higher than typical crash rate does not necessarily indicate a significant crash problem. Therefore, existing critical crash rates were calculated.

The critical crash rates were calculated to determine the statistical significance of the above average crash rates. If the calculated crash rate is below the critical crash rate, crashes that occurred are typically due to the random nature of crashes and are not necessarily a geometric design or traffic control issue. However, if the existing crash rate is above the critical crash rate, there is generally a significant amount of crashes above normal to warrant further review or mitigation. Based on the calculated critical crash rates, there are two segments where the existing crash rates exceed the critical crash rates. Those corridors that exceed the critical crash rate threshold are highlighted in red in Table 4.

Table 5: Crash Type Summary

Segment	Angle	Rear End	Animal	Non-Coll w/ Motor Vehicle		Total
				Overturn/ Rollover	Object/ Other	
County Road 20 (176th Street)	2	1	6	2	4 [1]	**15 [1]**
County Road 11 (455th	5 [1]	1	10	11	5	**32 [1]**
County Road 6 (164th Street)	3	---	3	3	7	**16**
Segment Total	**10 [1]**	**2**	**19**	**16**	**16 [1]**	**63 [2]**

Note 1: [#] Indicates a fatality at the segment of roadway

The crashes along these segments were further reviewed and divided into crash types, shown in Table 5. The majority of the crashes were angle, animal, and non-collision with motor vehicle (overturn/rollover and object/other). These types of crashes are often associated with rural roadways with limited shoulder areas.

A summary of predominant crash statistics include:

- County Road 20 (176th Street) from US Highway 81 to 459th Avenue
  - 40 percent of the total crashes were animal crashes
  - 1 fatality occurred (hit bridge rail and exceeded posted speed limit)
- County Road 11 (455th Avenue) from US Highway 81 to 162nd Street
  - Approximately 20 percent of the total crashes occurred about 0.3 miles south of 167th Street
  - 34 percent of the total crashes were overturn/rollover
  - 31 percent of the total crashes were animal crashes
  - 1 fatality occurred at the intersection of County Road 11 and 164th Street
- County Road 6 (164th Street) from 447th Avenue to 455th Avenue
  - 25 percent of the total crashes occurred within approximately 0.3 miles of each other (on/near the curve east of 450th Avenue).
    - 50 percent of crashes were on a curve and level portion of the roadway
    - 50 percent of crashes were on a straight and level portion of the roadway

There were four other fatalities that occurred over the course of the last five years. Three were on the Codington County road system and one was on a township roadway. The roadway segments where these fatalities occurred were not analyzed further because of the singular nature and the circumstances surrounding these crashes.

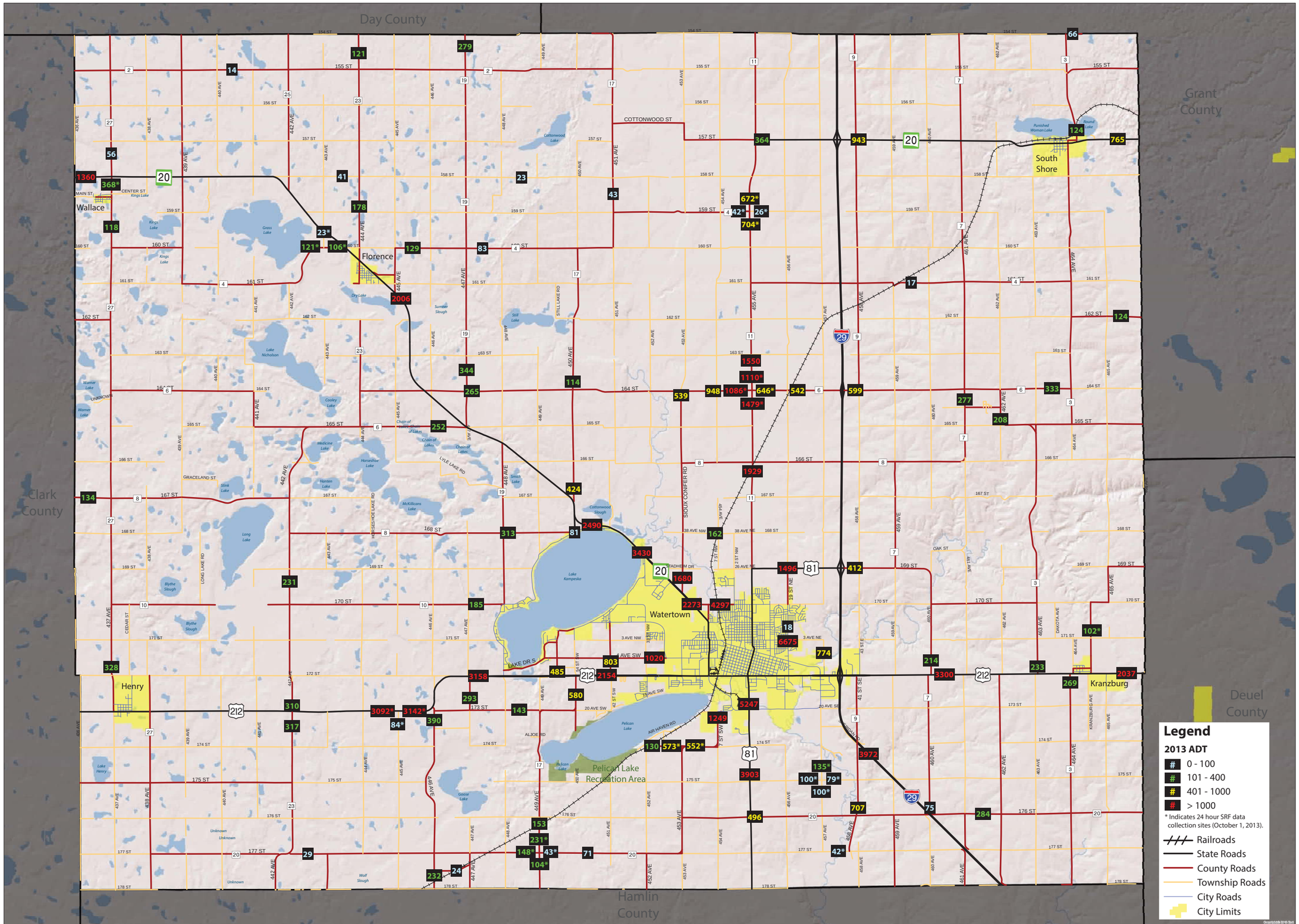
The intersection of County Road 6 (164th Street) and County Road 11 (455th Avenue) was previously studied by the SDDOT in January 2012 because of multiple crashes resulting in fatalities prior to the initiation of the Master Transportation Plan. This report was taken into consideration during this analysis. The project team also talked to multiple stakeholders (County Sherriff, residents, Highway Superintendent) to assess intersection geometrics, characteristics, and/or driver behaviors that may be contributing to crashes that result in a high level of severity at this particular intersection.

Traffic Volumes

Given the rural nature of Codington County, the traffic volumes outside of urban areas on county roadways were observed to be low. Traffic predominantly uses state routes to travel throughout the region using county and township roads to gain access to individual properties and to circulate within areas that do not have nearby state routes.

In order to stratify the County's roadway network, roadways were placed into four categories for analysis based on ADT: 0-100, 101-400, 401-1000, and greater than 1000 vehicles per day. Most County roadways had traffic volumes in the 101-400 category; although, there are a few roadways that fall into the higher volume categories. These roadways usually were routes to destinations throughout the county such as the roadways leading from Watertown to the Dakota Sioux Casino.

Figure 16 shows the locations where recent traffic counts were taken by the SDDOT. The traffic counts shown in Figure 14 were adjusted to 2013 levels by adding a growth factor of one-percent per year to counts that were taken in 2012 and 2010. 24-hour counts were also conducted at ten locations throughout the County. The locations were correlated with known issue areas that the study team wanted to focus on. Those counts are denoted with an asterisk on Figure 16.



SRF Figure 16 — Codington County Traffic Volumes (2013)

Roadway Capacity and Congestion

Table 6: Roadway Planning Level Capacity Thresholds[3]

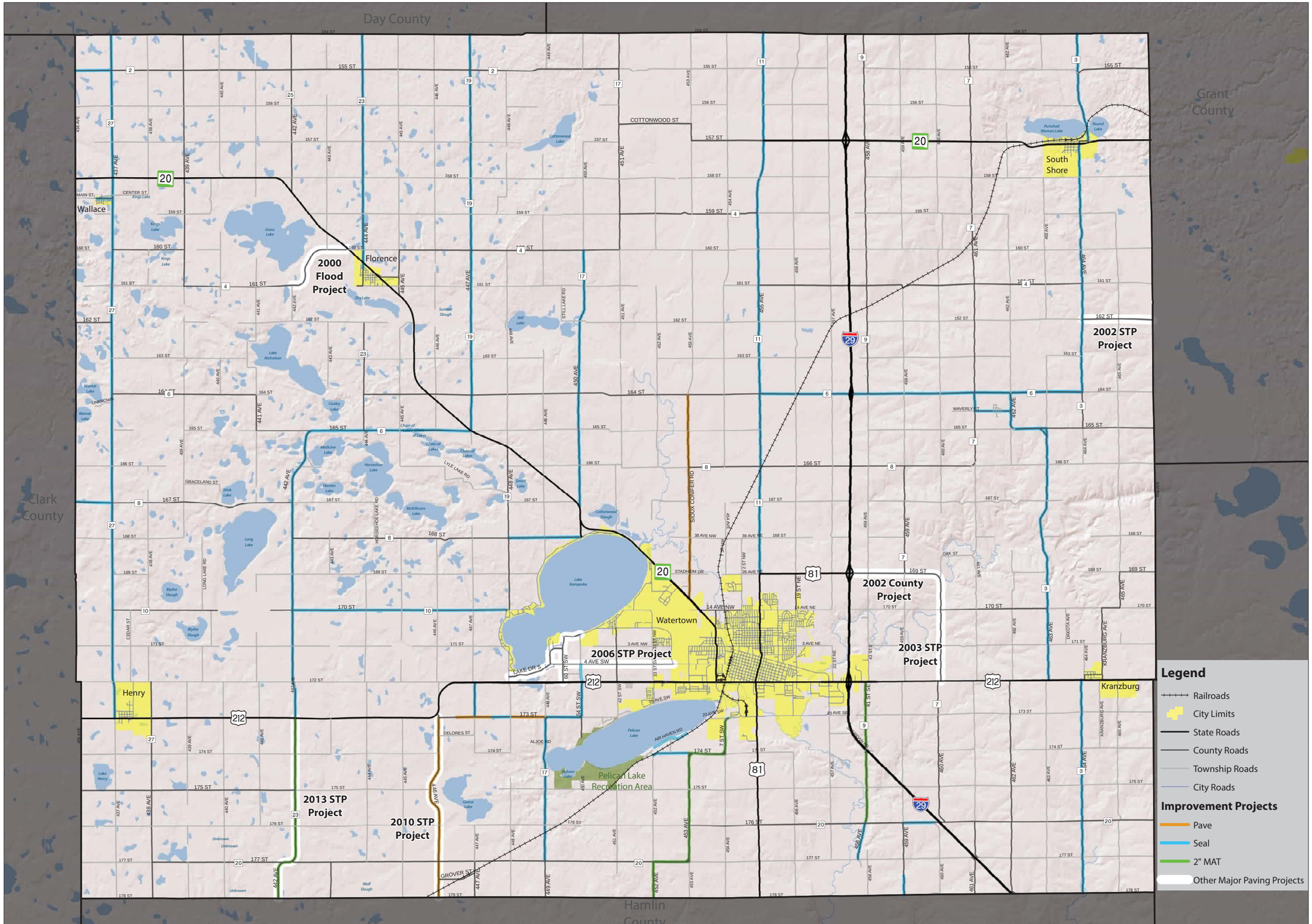
Facility Type	Approximate Daily Capacity (ADT)*	Approaching Capacity (85% of ADT)
• Two-Lane undivided rural (Non-Highway, Limited Shoulders)	6,500	5,500
• Two-Lane undivided urban	8,000	6,750
• Two-Lane undivided rural (Highway with Shoulders)	12,000	10,250
• Three-Lane undivided urban (i.e. Two-Lane divided with turn lanes)	14,000	12,000
• Four-Lane undivided urban	18,000	15,250

*The ADT shown represents the LOS C/D threshold

Table 6 contains planning level capacity thresholds for various roadway facility types. This table was used to determine the levels of congestion on the Codington County roadway network. This was done by comparing existing and future ADT volumes to the capacity threshold for the type of roadway facility being analyzed. When ADT volumes exceed 85% of roadway capacity, congestion on that roadway becomes more and more untenable.

Congestion on Codington County roadways is negligible. ADT volumes on County facilities in rural parts of the county do not approach roadway capacity thresholds. The majority of County roadways have ADT volumes between 101-400 cars per day. Major arterial roadways such as CH-11 (455th Avenue) or CH-6 (164th Street) have traffic volumes between 1000-1500 cars per day. Even traffic volumes of these facilities, which represent two of the most heavily traveled County roadways, do not have sufficient traffic volumes to cause significant congestion warranting capacity improvements.

[3] Roadway Planning Level Thresholds were developed using a combination of the Highway Capacity Manual and engineering judgment by SRF Consulting Group staff. These values were identified to account for area roadway characteristics and driver behavior.



SRF Figure 17 Codington County 5-Year Roadway Improvements (2009-2013)

Past Program of Transportation Projects

Transportation projects within Codington County over the course of the last decade were mainly state of good repair projects, which encompasses road resurfacing, bridge repair, and other minor maintenance related projects. There were a few major reconstructions projects of newly paved roads within the County in the last decade. Those projects were FEMA funded road reconstruction efforts in order to repair roads that were inundated by high water.

Figure 17 shows the Codington County Highway Department's past program of projects dating back to 2000 and the major reconstruction projects respectively.

Planned Improvements

Codington County is planning on paving six miles of roadways in the upcoming 2014 and 2015 construction season. The first three miles to be paved in 2014 is on CH-20 (177th Street) between CH-21 (446th Avenue) and CH-17 (449th Avenue). In the subsequent construction season the county has plans to pave CH-20 (177th Street) between CH-17 (449th Avenue) and CH-11 (452nd Avenue). This is in response to the roadway inundation on 446th Ave.

Multimodal Transportation

Rail

Codington County is serviced by the Burlington Northern and Santa Fe (BNSF) Railroad. The rail line runs through the county from the southwest to the northeast passing directly through the cities of Watertown and South Shore.

Over the past few decades, companies that use rail facilities were dwindling. However, since the rise in fuel prices over the last decade, many companies are once again seeking commercial/industrial lands with rail access. This is primarily for manufacturing and agricultural sector businesses that have heavy freight that cannot be cost-effectively moved by truck.

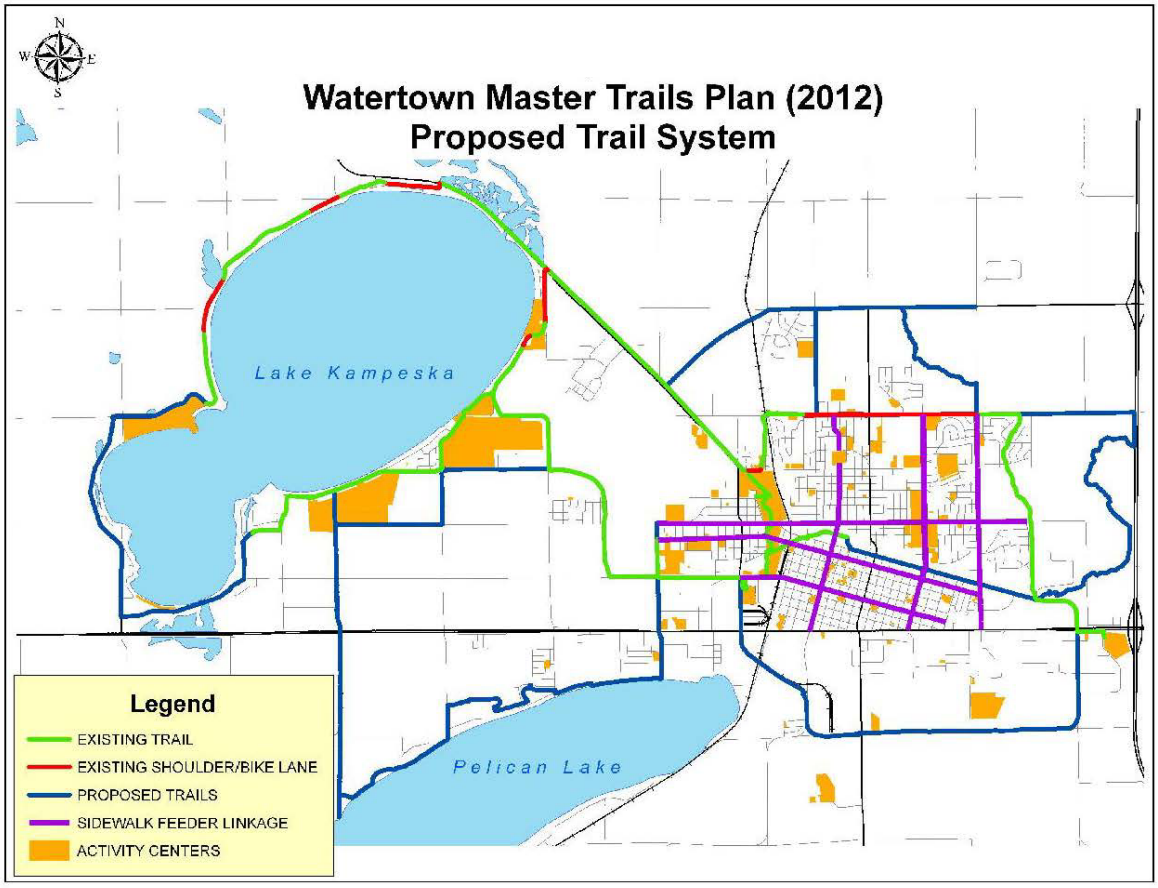
Codington County recently underwent an economic development study that identified prime rail access sites. The county expects that in the near future these sites will be occupied by industries that need to utilize rail shipping or specialize in rail transloading. It is important that these future development sites be serviced by an adequate roadway system in order to facilitate the

efficient movement of those goods to and from industrial sites that depend on rail for freight transportation throughout the region.

Bicycle and Pedestrian

The bicycle and pedestrian network in Codington County mainly exists within the municipal boundaries of the Watertown. Most of the shared use paths in the County are around Lake Kampeska as they lead to the parks located along the lake shore. The map below, from the City of Watertown Master Trail Plan (2012), shows the existing and proposed trail system.

Figure 18: Watertown Recreational Trail Map



Source: City of Watertown Master Trail Plan – September 28, 2014

The Watertown Bicycle Club has a wide range of membership from recreational bikers to competitive cyclists. This organization conducts organized rides and advocates for bicycle amenities within the region. According to club leadership and survey results, the majority of the bicycle community in Codington County rides their bicycle for recreational and leisure; however, there is a small contingent of riders within the Watertown

Bicycle Club who ride for distances between 30-100 miles on a single trip. Those riders often use state or county roadways in order to achieve such mileage.

Public Transit

Watertown Area Transit (WAT) provides demand/response transit service within Watertown. It provides rides for a fee to passengers who make a reservation at least 24 hours in advance of the trip. The service does not provide trips outside of Watertown due to the restrictions/lack of funding coming from the Federal Transit Administration (FTA). Watertown Area Transit does; however, allow their service to provide trips to and from schools. WAT coordinates with regional school districts to pickup/drop off children at designated points so that children who live outside of Watertown can use the service to get to school. This is done because of the open enrollment policy of the various school districts in Codington County.

Issues and Opportunities

The identification and confirmation of transportation related issues was an early focus point in the development of the Plan. An early emphasis was placed on understanding issues areas that were known prior to the start of the effort. Field reviews of these locations were conducted with the County Highway Superintendent in order to gain specific site related information about known issue areas and gain insight into the transportation system as a whole within Codington County.

To both gain insight into the known issues and identify unknown issues, outreach and coordination efforts were made with elected officials, agency staff, residents, economic development agencies, various levels of government, transit operators, tribal entities, school districts, and public safety officials. The input given at these meetings was crucial in providing context to the known issues areas as well as bringing other issues affecting the County's transportation system to the forefront.

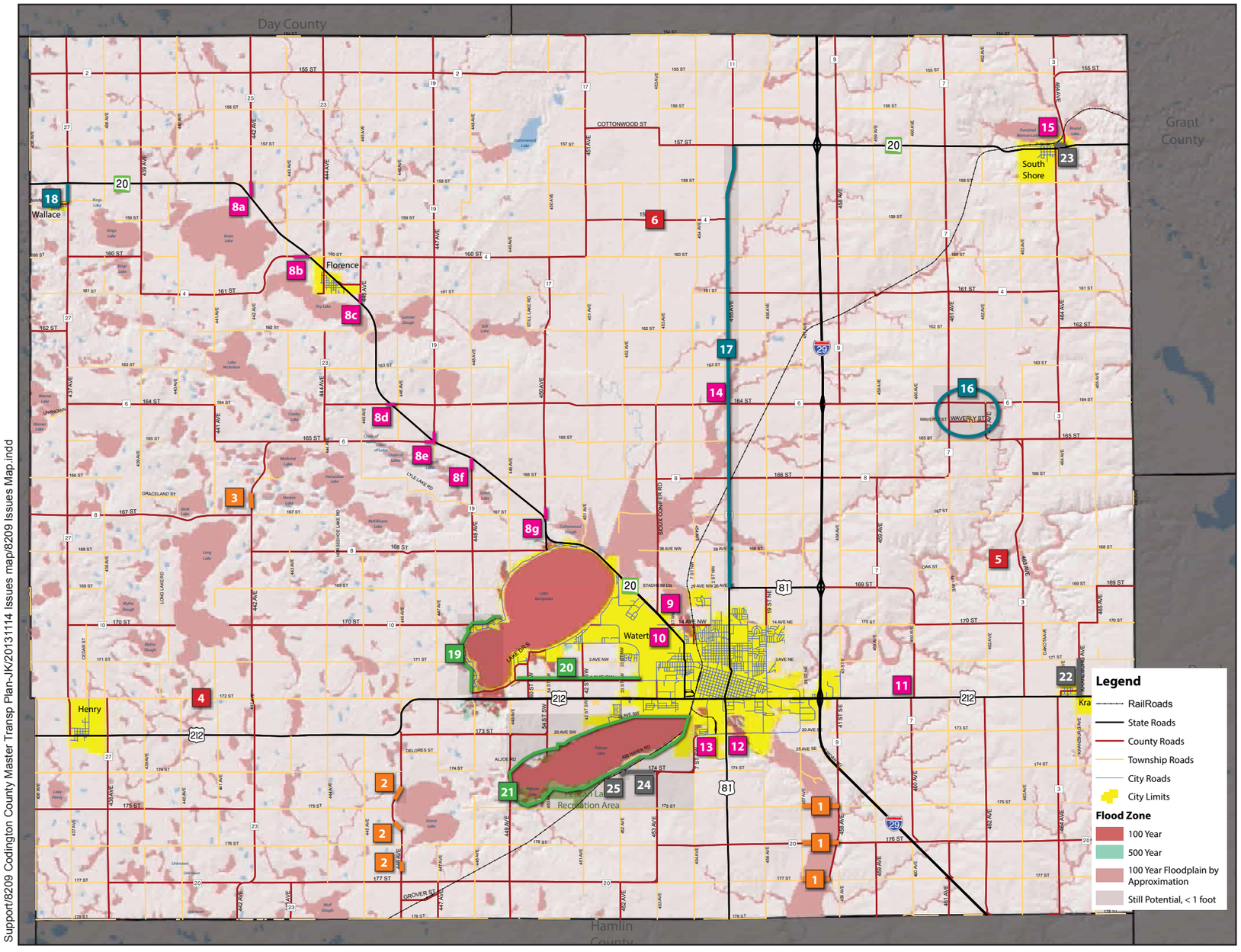
A public meeting was conducted on September 24, 2013 to kick-off the start of the Codington County Master Transportation Plan process. A presentation was made to inform participants about the study process. Opportunities to identify transportation issues were provided at this meeting. These opportunities included filling out a comment form, delineating issue areas on a map, talking with county, SDDOT, and other study team members, and the option to complete the on-line survey.

In addition to the public meeting, eight stakeholder group meetings were conducted with various groups having particular use of the transportation system. Stakeholder group meetings were conducted and representatives from the following groups were invited because of their particular reliance, use of, and impact on the transportation system:

- City of Watertown Departments
- Rural County Municipalities (Henry, Wallace, Florence, Kranzburg, South Shore)
- Sisseton Wahpeton Oyate (Tribe) and Dakota Sioux Casino
- Economic Development Agencies
- First Responders (fire, ambulance, police)
- Agricultural and Mining Representatives
- School Districts in the County
- Codington County Townships
- Watertown Area Transit
- Watertown Bicycle Club

Figure 19 represents a consolidated version of the comments made at the public meeting, the stakeholder group meetings, and all previously known issues.

CODINGTON COUNTY EXISTING ISSUES



Support/8209 Codington County Master Transp Plan-JK/20131114 Issues map/8209 Issues Map.indd

Roadway Inundation

1. Bridges on section line roadways provide redundant access across the Big Sioux River. Bridges are maintained by Codington County. Two bridges are on township roadways. Roadways on either side of the bridges flood during high water events. County cannot afford to maintain all three bridges. Two of the three bridges (and streets) are eligible for replacement.
2. 446th Ave is closed in these locations because the roadway has been overtopped by water and increased water levels have been eroding the roadway bed. In some locations as much as half of the roadway width has been undermined.
3. 442nd Ave in this location has consistently been inundated over the course of several years. The grade of this portion of roadway has been elevated and rock has been used to stabilize roadway edges and protect them from erosion, but water still surrounds the roadway making it difficult to fully restore this segment of roadway.

Bridges

4. The township has closed a portion of 172nd street due to high water. East of the closure there is a county maintained bridge over a wetland. The structure is also load restricted and has no guardrails.
5. Old truss bridge off of the county system. The structure is load restricted and does not provide continuity to other county roads. Candidate for abandonment or removal.
6. The bridge structure maybe in need of replacement.
7. The bridge on 174th St may require modification due to lack of guard rail and approach road realignment.

Intersections

8. The following intersections of county roads with SD 20 are less than 90 degrees. This combined with passing zones on SD 20, has been raised as a safety concern.
   a. Intersection of 442nd Ave and SD 20.
   b. Intersection of 444th Ave and SD 20.
   c. Intersection of 445th Ave and SD 20.
   d. Intersection of 164th ST and SD 20
   e. Intersection of 165th St and SD 20.
   f. Intersection of 448th Ave and SD 20.
   g. Intersection of 450th Ave and SD 20.
9. Intersection of Sioux Conifer Rd and SD 20.
10. Intersection of 14th Ave NW and SD 20. Traffic counts in this location confirm that half of the traffic diverts south before coming to this intersection because of the awkward angle of the intersection.
11. Intersection of 460th Ave and US 212. Offset intersection of county roadways causes traffic operations concerns.
12. Intersection of US 81 and 20th Ave SE. Identified as a possible location for a traffic signal.
13. The traffic operations and design of the signal need to be looked at. Respondents say that the signal timing is not sufficient and large trucks do not have the room to turn. This is located in an industrial growth area.
14. Intersection of 164th St and 455th Ave. Fatal crashes have occurred at this intersection. Vehicle classification affects the severity of crashes as many gravel trucks use this roadway. Stop sign violations and near-crashes have been observed.
15. Intersection of 464th Ave and BNSF railroad tracks. Limited sight distance of on-coming trains due to angle of crossing. Also the condition and angle of the crossing has been identified as a concern for motorcyclists.

Weight Restrictions

16. The Waverly Grain Elevator is boxed in by county roads with spring load restrictions. Investments in the elevator have been delayed because of the lack of access during times of load restrictions.
17. County Road 11 - County residents question the need for weight restrictions, since this is a former state route that was designed to handle heavier loads.
18. Trucks on route to/from the Wallace Grain Elevator have difficulty accessing SD 20 with full loads during spring load restrictions on County Road 27.

Bicycle and Pedestrian

19. Bike trail between Memorial Park and Lake Dr. Scheduled to be constructed within the next few years.
20. Survey respondents indicated a desire for a bike trail along 4th Ave SW.
21. Survey respondents indicated that a bike trail around Pelican Lake would be desired.

Other

22. Survey respondents mentioned impediments and lots of truck traffic on Kranzburg Ave.
23. City of South Shore would like to keep trucks off of this roadway.
24. Township representative mentioned that there is a lot of development on this roadways as well as lots of traffic especially from garbage trucks. The township has had a hard time maintaining the roadway and resorted in the past to putting clay on the road to stabilize the surface. Though the clay has caused the road to be slippery and mucky. Also there is a box culvert on the roadway that constantly floods.
25. 174th St – possible need for regarding of inslopes to improve safety, particularly in slippery roadway conditions.

SRF

Figure 19

Chapter 3: Goals & Objectives

A crucial component to the development and success of a Transportation Plan is the establishment of goals and objectives. These key elements provide guidance to elected officials, city staff, and the community for achieving the future vision of Codington County's transportation system. Codington County's transportation system consists of multiple modes of transportation (e.g., roads, rail, freight routes, and air services) and facility types. The County's goals and objectives will assist in providing direction in the development of an integrated multimodal transportation system, which will serve future growth within the County.

Goals

Goals are broad statements of desired direction, representing big ideas and visions for Codington County.

Safety

- Develop and maintain a transportation system in Codington County that provides safe travel for all users.

Economic Vitality

- Codington County's transportation system supports the economic vitality of the region by providing sufficient routes for the movement of goods and agricultural equipment.

System Preservation and Connectivity

- Maintain and improve upon a transportation system within Codington County that emphasizes connectivity and mobility.

- Maintain a state of good repair on all county facilities while also maintaining fiscal sustainability.

Bicycle and Pedestrian

- The Codington County roadway network considers all users and modes of transportation.

Objectives

Objectives are specific statements of action that help to accomplish goals and can be measured over time. Future decisions and actions that affect the transportation system should be consistent with the Transportation Plan's objectives.

Safety

1. Install recommended improvements at the intersection of CH-11 (455th Avenue) and CH-6 (164th Street) within one year after adoption of the Plan to increase the attention of drivers approaching the intersection and reduce the number of stop sign violations.

2. Seek opportunities to add shoulders to paved county roadways, focusing on those with the highest volumes and incidences of crashes.

3. Implement and enforce access management policies along county roadways to minimize points of conflict and preserve mobility.

Economic Vitality

1. Improve CH-27 (437th Avenue) between Wallace and SD 20 to eliminate seasonal weight restrictions within five years.

2. Seek public/private funding opportunities to reconstruct CH-11 (455th Avenue) between US 81 and the Grant County line as a year-round freight route with increased shoulder widths, focusing on the portion between US 81 and 162nd Street as a priority within five years of plan adoption.

3. Require traffic and freight impact studies for industrial and large animal feeding operations that are proposed within Codington County to identify the resulting impacts on the surrounding roadway network, anticipated costs of improving the roadways providing ingress and egress to the operation, and the annual cost of ongoing maintenance as a result of the increased traffic.

System Preservation and Connectivity

1. Maintain reasonable, convenient spacing (i.e. up to 5-6 miles) of river crossings, interstate highway crossings, and crossing of other natural

and manmade barriers, seeking opportunities to improve upon priority crossings while phasing out County responsibility for others.

2. Design county roadways to standards that represent both intended and actual travel on that facility.

3. Establish criteria for jurisdictional transfers of roadways, and work with other local government units to gain mutual understanding of those criteria.

4. Work with applicable local government units to transfer roadways inside municipal limits to the applicable municipality.

5. Ensure the County's continued ability to maintain and preserve the system by phasing out County responsibility for bridges and roadways that carry extremely low volumes of traffic (i.e. less than 100 vehicles/day), are in poor state of repair, and where reasonably close alternative routes are available.

6. Monitor and replace aging infrastructure (e.g., bridges and culverts) and program improvements as needed.

7. Address repeated inundation of roadway segments within the county by raising roadway elevations where it is feasible to do so, or removing the roadway from the County's system.

8. Utilize pavement condition data to determine roadway repairs and maintenance needs.

9. Develop a five-year Capital Improvements Plan (CIP) listing desired projects, costs for projects, and forecasted revenues and expenditures.

10. Link the mileage of Codington County's transportation system with its ability to maintain those facilities.

11. Monitor bridge conditions annually after flood events. Based on this information, identify structures in need of repair or appropriate for removal based on age, condition, and level of use.

12. Review the functional classification of roadways within Codington County at least every five years to identify roadway segments that

could have a designation change due to system modifications, environmental impacts, or changes in traffic patterns.

13. Utilize the SDDOT Local Roads Plan as minimum design criteria for Codington County roadways.

Bicycle and Pedestrian

1. Evaluate roadway reconstruction projects to determine if paved shoulder improvements would help fulfill a need in that particular area, and if improvements can be made part of a continuous looped system that accommodates pedestrians and bicyclists on roadway shoulders.

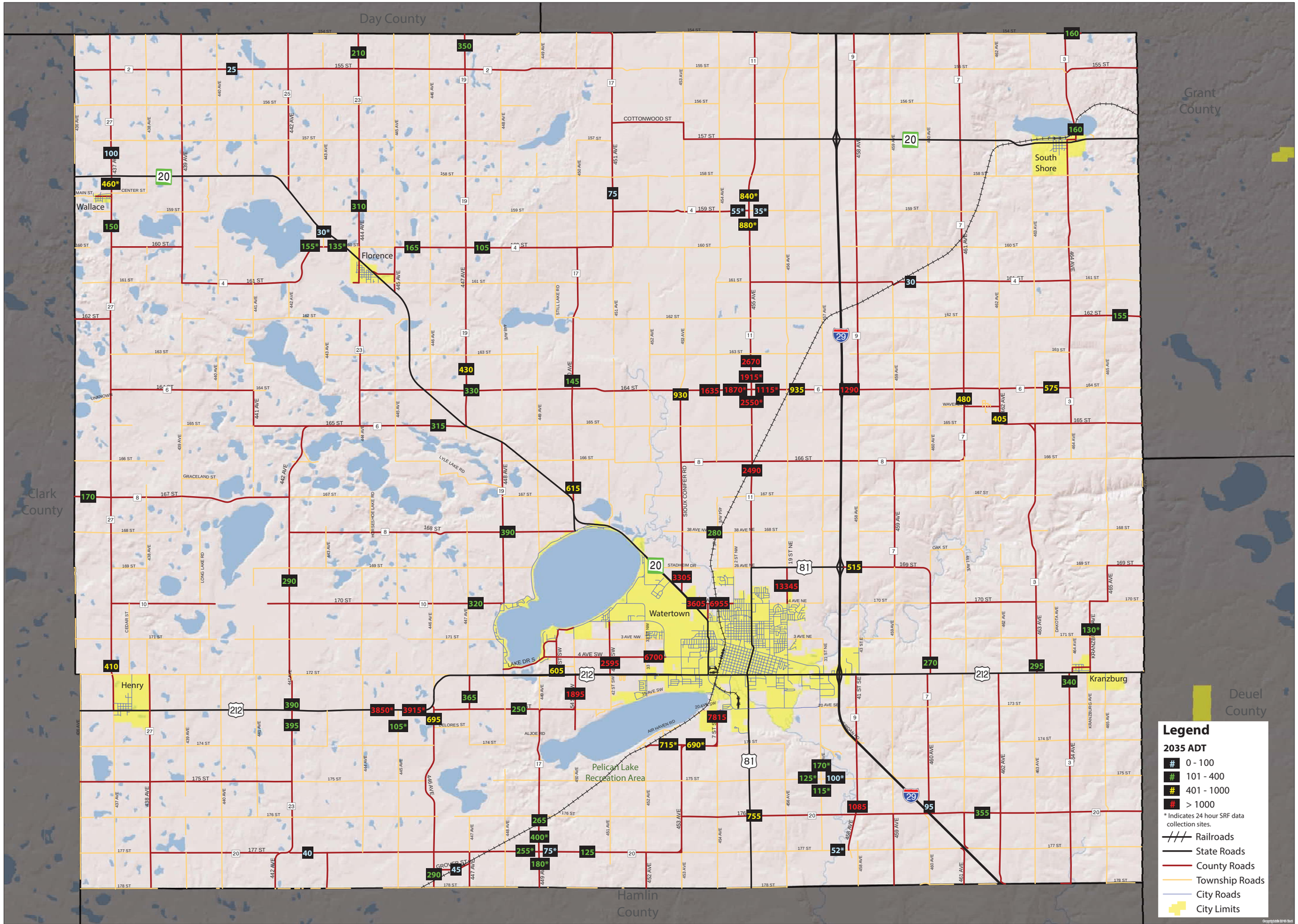
Chapter 4: Analysis of Future Transportation Needs

Existing Trends and Traffic Forecasts

This chapter documents the preparation of the traffic forecasts for the Codington County roadway system. The traffic volumes were forecasted to 2035 (Figure 20), which is slightly beyond a 20 year horizon. The traffic forecasts serve a two-fold purpose. First, they serve to identify future capacity or Level Of Service (LOS) deficiencies. Secondly, future ADT volumes show where future traffic will be concentrated based upon future land use and development timing assumptions. Historical trends, emerging growth areas, and previously completed comprehensive plans and economic development studies were analyzed in order to gain a greater understanding of local traffic trends.

The inundation of key rural arterial roadways in Codington County made it necessary to make assumptions about the routes that traffic utilizes as a detour. The decision to either raise the grade of these inundated roadways to make them passable or allow them to remain inundated and remove the county classification of those roadways will affect the future ADT of the roadways serving as alternative routes to those facilities. This is especially true of 446th Avenue south of US212 to the county line. CH-20 has emerged as at least one new route that may be capturing the traffic that once used that facility, and roadway improvements planned for 2014-2015 will encourage the use of this alternative route.

Codington County is largely rural and as such the ADT volumes as documented in Figure 16 in Chapter 2 are low compared to the volumes within urbanized areas such as Watertown. Existing traffic patterns in these rural areas predominantly utilize state controlled routes in order the traverse the County reflected by their elevated ADT volumes. The population growth in Codington County has kept its steady trend for 40 years. This being true, it is expected the traffic volumes will gradually rise in the County, keeping pace with the increase in population. Development around Watertown and in other projected growth areas was considered during the development of the countywide future traffic forecasts.


Day County
Grant County
Clark County
Deuel County
Hamlin County
Wallace
Florence
Henry
Watertown
South Shore
Kranzburg
Pelican Lake Recreation Area
COTTONWOOD ST
STADIUM DR
LAKE DR S
AIR HAVEN RD
SIOUX CONIFER RD
LYLE LAKE RD
GRACELAND ST
ALJOE RD
DELORES ST
Legend
2035 ADT
0 - 100
101 - 400
401 - 1000
> 1000
* Indicates 24 hour SRF data collection sites.
Railroads
State Roads
County Roads
Township Roads
City Roads
City Limits
SRF
Figure 20
Codington County Traffic Volumes (2035)
0 1 2 3 Miles

Data Collection and Assessment of Future Growth Areas

The first step in forecasting future traffic levels was to collect historic traffic count data. SDDOT conducted counts throughout Codington County in 2010-2012. The majority of these counts were collected in 2010 with only two counts being collected in 2012. In order to make these counts relevant to 2013, a growth factor of one percent per year was applied, thus factoring in any traffic growth that may have occurred in the last three years.

Many of the traffic count locations had never been counted before. The lack of historical count data made it difficult to establish a clear trend as to the increase or decrease in traffic volumes in those situations.

Future growth and development scenarios that were shown or described in the Codington County Comprehensive Plan, Watertown Comprehensive Plan, and the Comprehensive Economic Development Study conducted by the First District Association of Local Governments (FDALG) were taken into consideration as part of the analysis.

New residential and commercial development will be concentrated northeast of Watertown along the US 81 corridor. Future industrial growth is anticipated south of Watertown on 20th Street SW. City growth is also anticipated west of Watertown, both north and south of US Highway 212. Grover has been identified as a prime location for future industrial development because the access to the BNSF Railroad. The development of these areas would cause a dramatic increase in the traffic volumes on the roadways leading to these areas.

Traffic Forecast Methodology

Four forecasting methods were utilized during the development of the Codington County traffic projections, including, linear regression, compound growth rate, 1 percent annual growth and 2.5 percent annual growth. These methods were developed to provide a range of projected volumes that could reflect the development patterns specific to the County. The linear regression and compound growth rate method relied on historic growth rates, whereas the 1 percent and 2.5 percent growth methods were based on static growth rates.

Traffic projections were based in part on a comprehensive review of the land use within the county. Short-term land use changes were identified through a series of meetings with local stakeholders. Long-term land use trends were identified by city and county comprehensive plans as described above. All

land use impacts were classified by intensity to characterize the potential influence on future traffic volumes.

With the land use component incorporated into the historical volume dataset, count locations were stratified by volume group to determine the "best fit" projected volumes. Just like the existing traffic volumes, the forecasted traffic volume groups were broken into four distinct groups: <100, 100-400, 400-1,000 and > 1,000. These groupings allowed for different ranges of reasonable growth rates. For example, a low volume roadway and a high volume roadway with the same growth rate will result in vastly different magnitudes of ADT growth.

The four projection methods were simultaneously reviewed on a site-by-site basis, with previous studies, development potential, recent construction activity, future land uses, and volume grouping information considered. Wherever possible, projections between adjacent or nearby count locations with similar characteristics were developed to be analogous.

In areas where fringe area growth was anticipated in the Watertown Comprehensive Plan, a trip generation estimate was made based upon the acreages of residential, commercial, or industrial land uses shown on the future land use plan.

Institute of Transportation Engineer's (ITE) trip generation rates were applied and traffic generated by the anticipated growth was distributed to the adjacent roadway network. This methodology allowed for a more accurate assessment of the dramatic increases in traffic volumes on county roadways that are directly affected by urban growth.

Figure 18 shows traffic volumes forecasted to 2035. As you can see, growth areas such as 19th Street NE show an exponential increase in traffic volumes because of the estimated development that will occur there in the next 20 years.

Traffic Forecast Methodology Example

In order to provide a better understanding of the forecast methodology, the process used to determine the forecasts for count locations shown in Table 7 (in this table only the 2013 count year is shown). The locations shown are at various places throughout the county and have different ADT volumes.

It is important to note that each roadway within the County has different growth trends and development assumptions resulting in forecasts that were uniquely developed on a site-by-site basis using the best data available. Area that were listed in the Watertown Comprehensive Plan as prime growth areas were calculated differently than the example shown. Areas, in which growth

was assigned by land use type, were factored using trip generation tables denoting average trip volumes for the specific use on the site, which greatly differs from the statistical method used in the Table 7.

Table 7: Forecast Examples

*

Location	Existing ADT	Forecast Method					
		1%	2.5%	Compound		Linear	
				ADT	Rate	ADT	Rate
154th St	66.66	82.97	114.76	119.68	2.70%	158.07	*4%
444th Ave	178.77	222.52	*307.77	225.14	1.05%	266.97	2%
60th St SW	485.96	*604.88	836.62	62.45	-8.90%	239.04	-3%

***Preferred forecast method highlighted for each site**

Because of the low traffic volumes seen throughout the rural portions of Codington County, the four methods generally did not have significant variation. In a few cases, the regression based forecast method could not be utilized because of declining traffic volumes on individual roadways. In these instances a 20 year forecast would dramatically decrease traffic to unrealistic levels. The one-percent growth assumption was applied to most count locations because of the lack of supporting historic data needed to run a regression based analysis.

After traffic forecasts were completed, each count location was evaluated and a forecasted ADT was assigned. This analysis took into consideration historic ADT growth trends, current and future development patterns, the goals of local planning documents, environmental impacts, and foreseen system modifications.

Future Congestion

Forecast data and the volume-to-capacity analysis process, as previously described, was used to identify the County's future transportation system deficiencies. For the purpose of this analysis, the planning-level capacity thresholds established for the County's roadways, based upon facility type, were used. The capacity thresholds were used as a metric to evaluate future roadway congestion; however, it should be noted that they do not take into account special traffic conditions or unique roadway characteristics (e.g., rail crossings, intersection design, access controls, etc.).

Based upon the year 2035 traffic forecasts and capacity analysis, roadways within Codington County are all projected to fall into the category of "uncongested". The following describes the three categories into which roadways can fall when carrying out this analysis:

- Uncongested – forecast volume is less than 85 percent of the threshold volume, suggesting a low probability of operational problems due to traffic volume on the facility
- Approaching Congestion – forecast volumes is between 85 percent and 100 percent of the threshold volume, suggesting a moderate probability of operational problems due to traffic volume on the facility
- Congested – forecast volumes exceed 100 percent of the threshold volume, suggesting a high probability of operational problems due to traffic volume on the facility

Given Codington County's low population density and agricultural character, all county roadways are expected to remain uncongested in 2035.

Chapter 5: Roadway System Plan

This chapter of the plan presents recommendations for the County's future roadway network and lays out changes such as jurisdictional transfers, functional classification, roadway improvements, and safety treatments that can be made to the transportation network moving forward.

Included in each section is the justification and rationale behind these improvements. These specific elements are a culmination of the other plan components and constitute critical features of the County's future roadway system.

Future Functional Classification

Codington County's roadway system connects places and people within the county and across its borders. The roadway network has been developed for many different travel objectives, ranging from lengthy regional passenger and freight trips to short distance local trips. The functional classification of roadways is meant to reflect the role that each roadway serves in meeting the public's travel needs.

As traffic patterns throughout Codington County change because of future development patterns, environmental characteristics such as flooding, or the placement of businesses that generate high levels of traffic, the functionality of County roadways must also evolve. In response to these types of future stimuli, Codington County will work with the SDDOT to change the functional classification of effected roadways.

Codington County has identified roadways in which the functionality has already changed or will change after improvements identified in this Plan are made. As such, those roadways would need to be reflected in the SDDOT database. These roads are identified in Figure 21. In the future, Codington County will continue to work with SDDOT representatives in adjusting the functional classification of roadways when the need/opportunity arises. Typically the SDDOT conducts their functional classification updates once every ten years in response to the US Decennial Census.

The goal of the functional classification plan is to achieve a better performing system that responds to changes in roadway functionality and aligns the functional classification of routes with current and future land uses and the intended purpose of the roadway.

Further, the functional classification recommendations considered the following factors

- Past roadway functionality
- Comments from Codington County, Stakeholders, SDDOT, Cities, Townships, SAT members, and the public
- New land use and economic development plans
- Existing and future ADT
- Consistency and continuity of routes especially with adjacent counties' roadway networks

It is important to note that these changes are expected to occur over the next 20 years; however, these changes may not occur if the assumptions made for this analysis change in the future. County policies, rural development, city growth, environmental impacts, and other issues may arise that can alter the functionality of roadways in the interim.

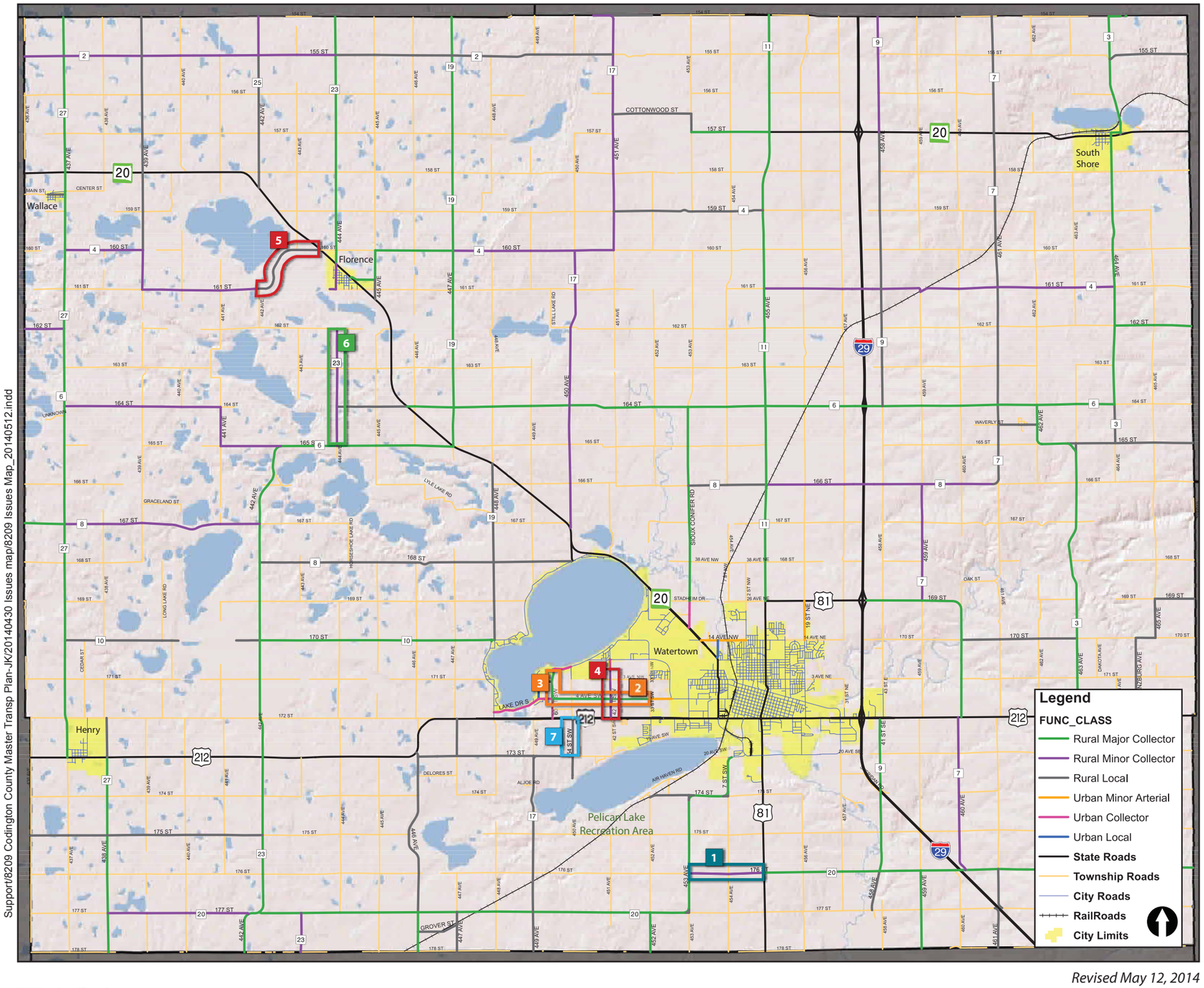
Codington County should resist public pressure totake on additional roadway segments that do not meet the intent of a connected, continuous, and efficient County road network. The addition of such roadways adds revenue expenditures that detract from the ability to strive towards stated goals. Roadway segments considered for addition to the County system should further the intent of the County's transportation goals, meet or exceed functionality requirements, and be within the fiscal constraint of the system.

Future Classification Plan

Many of the planned future changes to the functional classification of roadways within Codington County stem from the recent or planned annexation of areas into Watertown's jurisdiction. Therefore, the function of the roadway would transition from a rural to an urban classification.

As the County develops a system of roadways designed to handle year-round truck loads, those identified routes will become functionally classified as minor arterials. This functional classification will be a new designation for roadways under Codington County's jurisdiction. Coordination with the SDDOT will be paramount in establishing an arterial system, to ensure that the County's arterial system is seamlessly integrated with the state highway system.

CODINGTON COUNTY: Potential Future Functional Classification Changes



Support/8209 Codington County Master Transp Plan-JK/20140430 Issues map/8209 Issues Map_20140512.indd

Revised May 12, 2014

Rural Major Collectors

1. CH 20 (176th St) between 453rd Ave and US 81 from Rural Minor Collector to Rural Minor Arterial

Urban Major Collector

2. 4th Ave SW between 60th St SW and 33rd St SW from Rural Major Collector to Urban Major Collector
3. 60th St SW between Lake Dr S and 4th Ave SW from Rural Major Collector to Urban Major Collector

Urban Minor Collector

4. 42nd St SW between US 212 and .25 N of 3rd Ave NW from Rural Minor Collector to Urban Minor Collector
5. 161st St between 442nd Ave and SD 20 from Rural Local to Rural Minor Collector

Rural Local

6. 444th Ave between 162nd St and 165th St from Rural Minor Collector to Rural Local

Urban Local

7. 54th St SW between US 212 and 173rd St from Rural Local to Urban Local

SRF **Figure 21**

Jurisdictional Transfers

The jurisdiction of roads is an important element of the Plan as it affects a number of organizational functions and obligations. As roadways are brought onto the system, the County must balance that with the ability to affordably maintain its roadway system. The County must respond to new traffic demands, system deficiencies, and pavement standards all while maintaining fiscal prudence.

The system analysis goal in analyzing and proposing future changes to jurisdictional control was to match the management of roadways with their intended function. This meant transferring jurisdiction of certain roadways to the entity is provided the most service by the roadway. This also took into account the jurisdiction best suited to maintain the roadway.

The potential for roadways to be transferred to alternate jurisdictions was evaluated by establishing a set of objectives that guided the analysis, which were as follows:

- Fair and prudent use of County tax payer dollars in maintaining roads and bridges
- Maintaining reasonable, convenient spacing of river, interstate highway, and other natural and manmade barrier crossings
- Ability of existing roadways and bridges to handle existing and future traffic demands
- Ensuring opportunities for mobility for all system users including farm and freight traffic

Furthermore, the future roadway jurisdiction recommendations considered the following factors:

- Analysis and recommendations of other local planning documents
- Jurisdictional transfers that recently occurred
- Comments from Cities, townships, SDDOT, citizens, SAT members, and other stakeholders
- Roadway characteristics including
    - Existing functional classification
    - ADT
    - Types of trips served
    - Roadway or bridge condition
    - System continuity

The changes enumerated have the potential to occur over the course of the next 20 years, although, some of the transfers implemented on a shorter term basis. It is important to make clear that the transfers that are listed simply have the potential to be further considered by the County for implementation given the criteria listed above. This list does not imply that each is mandated to occur. Rather, jurisdictional transfers are negotiated between two willing entities and the grantee agency must agree to take over jurisdictional control of the roadway before a transfer can occur.

Future Jurisdictional Plan

Some roadways within Codington County are proposed to be taken off the County system because of low traffic volumes or redundant connections. This is especially true of underutilized bridges within the County. The cost to maintain those facilities is not feasible given the extremely low volume of traffic utilizing those facilities.

The County will not transfer bridges that this Plan deems redundant to the townships. By Statute, Codington County has jurisdiction over all bridges over 20 feet in length regardless of county or township roadway jurisdiction. Instead, these bridges will not be prioritized for rehabilitation or replacement. As they age, designated bridges will be progressively posted as weight restricted until a point at which the bridge can no longer be safely used by vehicles. At that point, Codington County will either close the bridge off to traffic or remove the bridge completely.

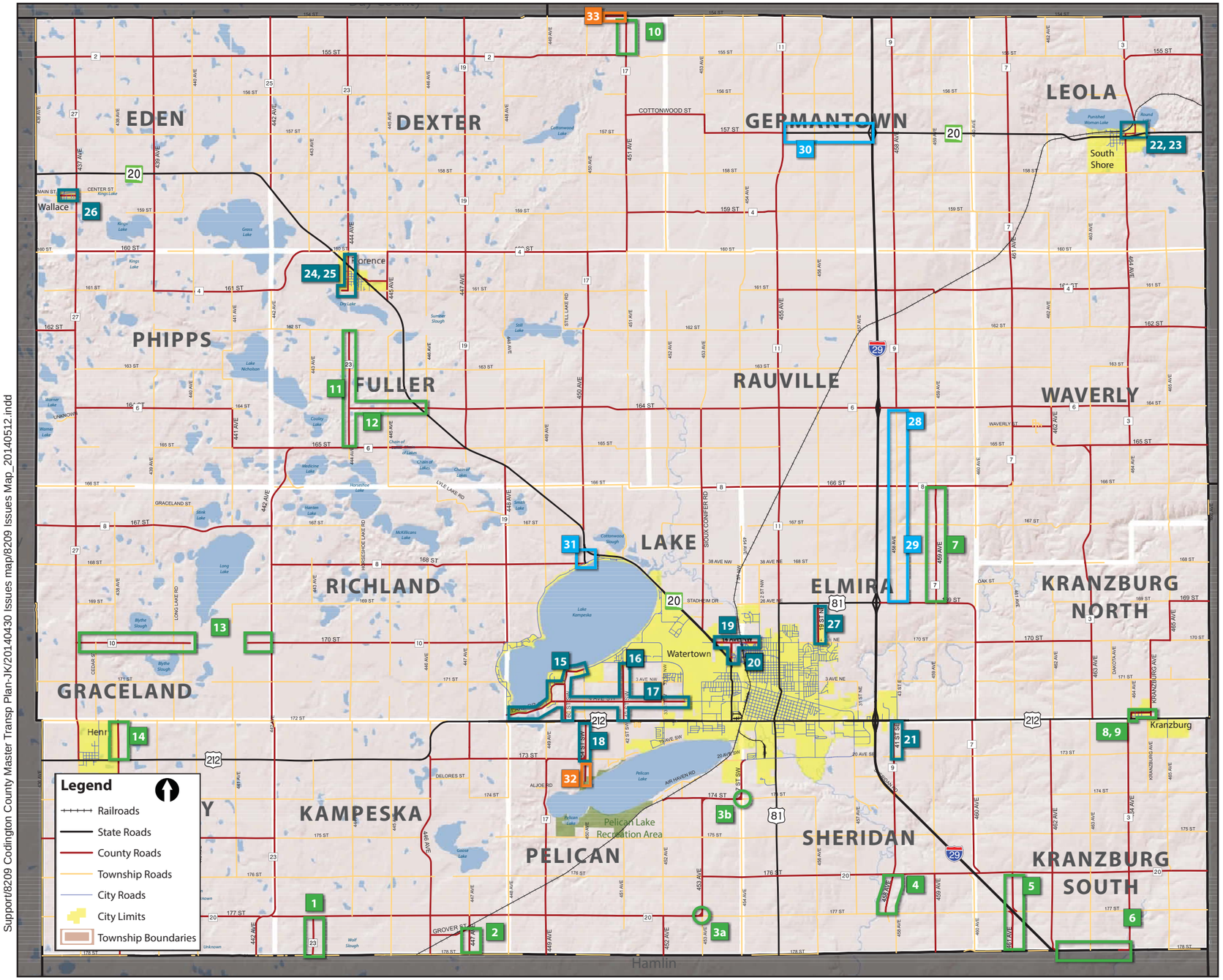
A large number of the purposed transfers to occur are located within current municipal boundaries or areas likely to be annexed by municipalities. By state statute, roadways that are encompassed on both sides by a municipality fall under the jurisdiction of said municipality. There are several roadways under County jurisdiction that are wholly in municipal limits. It is proposed that those roadways become the jurisdiction of the applicable municipality.

The rising water features in Codington County have inundated many roadways cutting off the connectivity of some routes. Routes that no longer possess the connectivity expected of a county roadway system are proposed to be transferred to, in most cases, township jurisdiction.

A listing of the potential future jurisdictional transfers can be seen in Figure 22 and are described in Table 8. The table provides the route, termini, existing and future jurisdiction, mileage, and a brief explanation on the rationale behind the transfer.

The future Codington County roadway system can then be seen in Figure 23. This map would represent all county roadways if the entirety of the jurisdictional transfers outlined in this section were completed.

CODINGTON COUNTY: Jurisdictional Transfers



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Revised May 12, 2014

SRF Figure 22

Transfer to Townships

1. 443rd Avenue (County Road 23) between 177th Street and County Line to Kampeska Township.
2. 447th Avenue (County Road 19) between Grover Street and County Line to Kampeska Township.
3. Remaining section line roadway segments where horizontal curves have been constructed to the applicable township.
4. 458th Avenue (County Road 9) between 176th Street and 177th Street to Sheridan Township.
5. 461st Avenue between 176th Street and I-29 and between I-29 and the County Line to Kranzburg South Township.
6. 178th Street between 462nd Avenue and 464th Avenue to Kranzburg South Township.
7. 459th Avenue (County Highway 7) between 166th Street and 169th Street to Elmira Township.
8. Saint Peter Street in Kranzburg between New Trier Avenue and Kranzburg Avenue to Kranzburg North Township.
9. New Trier Avenue in Kranzburg between Saint Peter Street West to US Highway 212 to Kranzburg North Township.
10. 451th Avenue (County Road 17) between 155th Street and County Line to Dexter Township.
11. 444th Avenue (County Road 23) between 162nd Street and 165th Street to Fuller Township.
12. 164th Street (County Road 6) between 444th Avenue and SD Highway 20 to Fuller Township.
13. 170th Street (County Road 10) between 437th Avenue (County Road 27) and western edge of Long Lake and between eastern edge of Long Lake and 442nd Avenue (County Road 23) to Graceland Township.
14. 438th Avenue (County Road 27B) between 172nd Street and 4th Avenue Southwest to Henry Township (or to the City of Henry).

Transfer to Municipalities

15. Lake Drive between 54th Street Northwest and 7th Street West and 60th Street Southwest to the City of Watertown.
16. 42nd Street Northwest between Golf Course Road and 4th Avenue Southwest to the City of Watertown when annexed or when development occurs on both sides of the roadway.
17. 4th Avenue SW between 26th Street Northwest and 42nd Street Northwest to the City of Watertown when annexed or when development occurs on both sides of the roadway.
18. 54th Street SW to the City of Watertown when annexed or development encompasses both sides of the roadway.
19. 14th Avenue Northwest between SD Highway 20 and 2nd Street Northwest to the City of Watertown.
20. 10th Street Northwest between 14th Avenue Northwest and SD Highway 20 to the City of Watertown.
21. In the event that an additional interchange is constructed at 20th Street Southeast, transfer 41st Street Southeast (County Road 9) to the City of Watertown.
22. Lakeview Avenue in South Shore between 464th Avenue and County Road 3 to the Town of South Shore.
23. 464th Avenue in South Shore between Lakeview Avenue and SD Highway 20 to the Town of South Shore.
24. 6th Street in Florence between SD Highway 20 and Thorson Avenue to the Town of Florence.
25. Thorson Avenue in Florence between 6th Street and end at Dry Lake to the Town of Florence.
26. Main Street in Wallace between 8th Avenue and 437th Avenue to the Town of Wallace.
27. 19th Street NE between 14th Avenue and US Highway 81

Transfer to Codington County

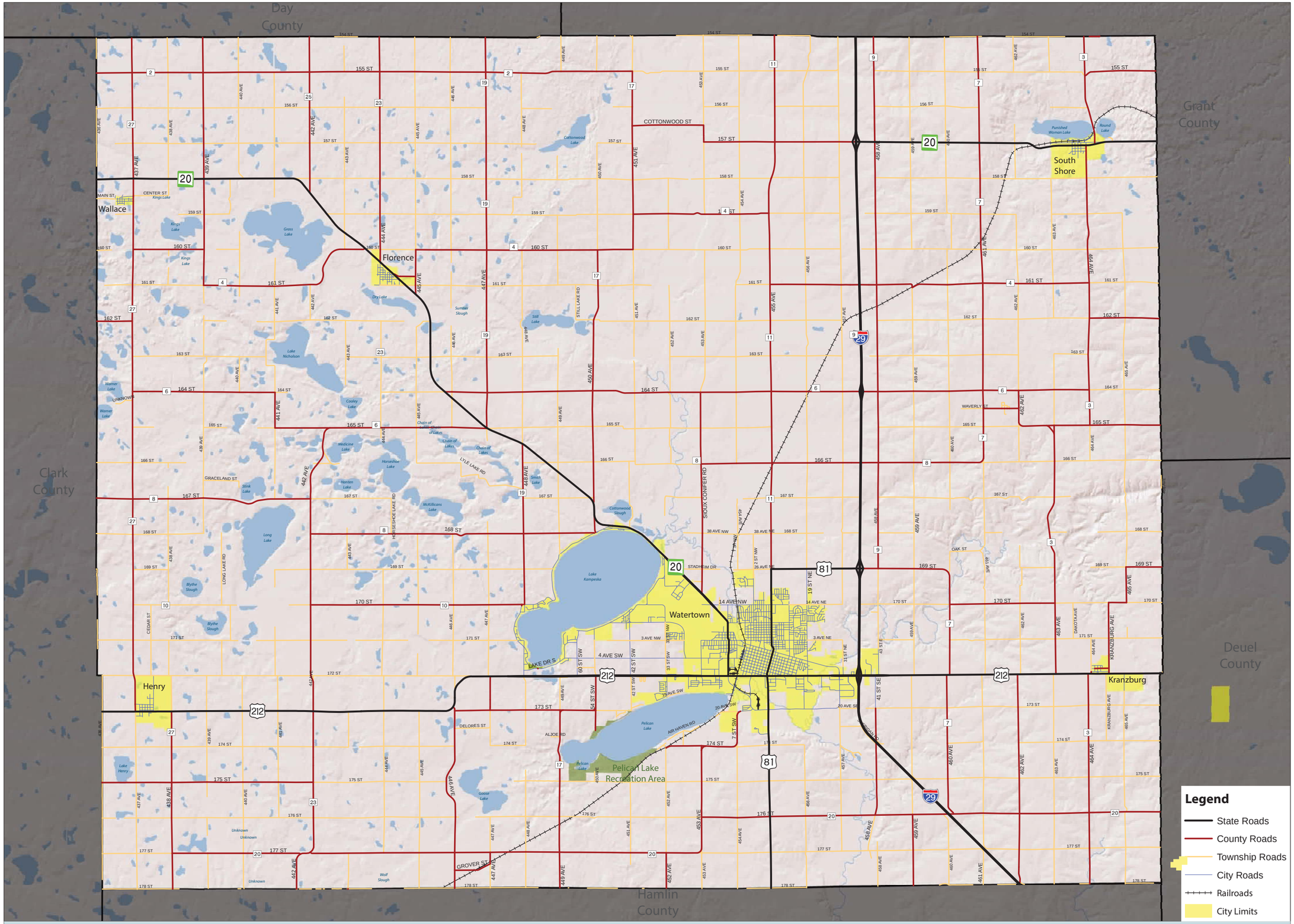
28. 458th Avenue between 164th Street and 166th Street from Rauville Township.
29. 458th Avenue between 166th Street and 169th Street from Elmira Township.
30. SD Highway 20 between 755th Avenue to I-29 from SDDOT
31. SD Highway 20P between SD Highway 20 and 168th Street from SDDOT

To Other Agencies

32. Transfer 450th Avenue south of 173rd Street to the South Dakota Game, Fish, and Parks Department.
33. 154th Street between 451st Avenue and .5 miles to 450th Avenue to Grant County.

MAP ID	Road Name	Termini		Jurisdiction		Timeframe	Length	Rationale
		From	To	Existing	Future			
1	443 AVE	177TH_ST	178TH_ST	Codington County	Kampeska TWP	SHORT	1.0	Route provides a duplicative connection into Hamline County as CR-25 (a paved facility) is approximately one-mile to the west.
2	447 AVE	GROVER_ST	CO_LINE	Codington County	Kampeska TWP	SHORT	0.7	Route provides a duplicative connection into Hamline County as a paved facility is one-mile to the west.
5	458 AVE	176TH_ST	177TH_ST	Codington County	Sheridan TWP	LONG	1.0	Extension of county route that abruptly ends and does not connect to another county route
6	461 AVE	176TH_ST	177TH_ST	Codington County	Kranzburg South TWP	SHORT	1.0	Route no longer provides connectivity to other county system since Interstate Highway 29 bisects the roadway. Duplicative route as another county facility is one-mile to the east.
6	461 AVE	177TH_ST	178TH_ST	Codington County	Kranzburg South TWP	SHORT	1.1	
7	178 ST	462ND_AVE	464TH_AVE	Codington County	Kranzburg South TWP	SHORT	2.0	Route does not meet the intended purpose of a county roadway and has low traffic volumes.
8	459 AVE	166TH_ST	169TH_ST	Codington County	Elmira TWP	MEDIUM	3.0	Creation of a new county route one-mile to the west creates a duplicative route
9	ST PETER ST	464TH_AVE/NEW_TRIER_RD	KRANZBURG_RD	Codington County	Kranzburg North TWP	SHORT	0.5	County route is within the municipal limits of Kranzburg, but as Kranzburg is governed by Kranzburg North Township, jurisdiction reverts to the township.
10	NEW TRIER AVE	US212	STPETER_ST	Codington County	Kranzburg North TWP	SHORT	0.1	County route is within the municipal limits of Kranzburg, but as Kranzburg is governed by Kranzburg North Township, jurisdiction reverts to the township.
11	451 AVE	154TH_ST	155TH_ST	Codington County	Dexter TWP	MEDIUM	1.0	Route does not provide connectivity to other routes
12	444 AVE	162ND_ST	165TH_ST	Codington County	Fuller TWP	MEDIUM	3.0	The roadway no longer connects because of high water
13	164 ST	444TH_AVE	447TH_AVE	Codington County	Fuller TWP	MEDIUM	3.0	Duplicative connection with an alternate county route one-mile to the south which also connects to SD 20
14	170 ST	437TH_AVE	442ND_AVE	Codington County	Graceland TWP	SHORT	3.5	The roadway no longer connects because of high water
15	438 AVE	US212	172ND_ST	Codington County	Henry TWP	SHORT	1.0	The roadway does not connect to another county routes and does not meet the intended purpose of county routes
16	LAKE DR S	54TH_ST_SW	78TH_ST_SW	Codington County	Watertown	MEDIUM	2.7	Lake Drive is mainly utilized by homes along Lake Kampeska which are within the City of Watertown. Future growth is projected to encompass the roadway.
17	42 ST NW	US212	GOLF_COURSE_RD	Codington County	Watertown	MEDIUM	1.5	Future growth of the City of Watertown is projected to encompass both sides of the roadway.
18	4 AVE SW	LAKE_DR_S	GOLF_COURSE_RD	Codington County	Watertown	MEDIUM	3.4	Future growth of the City of Watertown is projected to encompass both sides of the roadway.
19	54 ST SW	US212	450TH_AVE	Codington County	Watertown	MEDIUM	1.0	Future growth of the City of Watertown is projected to encompass both sides of the roadway.
20	14 AVE NW	SD20	2ND_ST_NW	Codington County	Watertown	SHORT	1.2	County route is within the municipal limits of Watertown.
21	10 ST NW	14TH_AVE_NW	SD20	Codington County	Watertown	SHORT	0.5	County route is within the municipal limits of Watertown.
22	41 ST SE	SD20	173RD_ST	Codington County	Watertown	LONG	0.9	Future growth of the City of Watertown is projected to encompass both sides of the roadway.

MAP ID	Road Name	Termini		Jurisdiction		Timeframe	Length	Rationale
		From	To	Existing	Future			
23	LAKEVIEW AVE	464TH_AVE	464TH_AVE	Codington County	South Shore	SHORT	0.2	County route is within the municipal limits of South Shore.
24	464 AVE	SD20	LAKEVIEW_AVE	Codington County	South Shore	SHORT	0.1	County route is within the municipal limits of South Shore.
25	SIXTH ST	SD20	161ST_ST	Codington County	Florence	SHORT	0.6	County route is within the municipal limits of Florence.
26	Thorson Ave	6TH_ST	END	Codington County	Florence	SHORT	0.2	County route is within the municipal limits of Florence.
27	MAIN ST	437TH_AVE	8TH_AVE	Codington County	Wallace	SHORT	0.4	County route is within the municipal limits of Wallace.
28	458 AVE	164TH_ST	166TH_ST	Rauville TWP	Codington County	MEDIUM	2.0	In order to create a uninterrupted connection of CR-9, this segment of roadways could be added to replace CR-7 one-mile to the east. CR-9 provides an alternative route to I-29 and continues into Grant County.
29	458 AVE	166TH_ST	169TH_ST	Elmira TWP	Codington County	MEDIUM	3.0	
30	SD HWY 20	I29	455TH_AVE	SDDOT	Codington County	LONG	2.3	The SDDOT is interested in tranferring jurisdiction of this roadway to the county because of the rerouting of US 81 and the prioritization of an alternate SD 20 route is no longer planned.
31	SD HWY 20 P	SD20	NORTH_LAKE_DR	SDDOT	Codington County	LONG	0.5	A small segment of an old alignment of SD 20 still remains and the SDDOT is interested in tranferring this segment because it does not connect to another state route.
32	450 AVE	54TH_ST	PARK	Codington County	SD Game, Fish, and Parks	MEDIUM	0.7	This segment of roadway is utilized solely to provide access to a state park and as such the county would like to transfer the roadway to SD Game, Fish, and Parks.
33	154 ST	451ST_AVE	.5MILES_WEST	Codington County	Grant County	MEDIUM	0.5	The roadway does not provide connection to other marked routes and has low traffic volumes.
4a	453 AVE	453RD_AVE	177TH_ST	Codington County	Pelican TWP	SHORT	0.1	After the construction of horizontal curves on this county route, stub ends of section line roads remained under county jurisdiciton because the county owned a small triangle of ROW between the curve and the section line roads. These roadways are in essence township roads with access to the county route and could be transferred back to the township.
4a	177 ST	177TH_ST	453RD_AVE	Codington County	Pelican TWP	SHORT	0.1	
4b	7 ST SW	7TH_ST_SW	174TH_ST	Codington County	Pelican TWP	SHORT	0.1	
4b	174 ST	174TH_ST	7TH_ST_SW	Codington County	Pelican TWP	SHORT	0.1	
	19 ST NE	14TH_AVE_NE	US81	Codington County	Watertown	SHORT	1.0	County route is within the prime growth area of the City of Watertown an is projected to be encompassed by Watertown in the near future. Development has already started to occur in this area.
16	60 ST SW	LAKE_DR_S	SD20	Codington County	Watertown	LONG	0.9	Future growth of the City of Watertown is projected to encompass both sides of the roadway.



SRF Figure 23

Codington County Future Roadway Jurisdictions

System Designation

The highway system in Codington County has historically been divided into two categories, primary and secondary routes. For the most part, primary routes have been paved and secondary have been gravel. Paved roadways generally were those that have served a higher function in distributing traffic throughout the County and serving as farm-to-market routes. As such, these routes tend to have higher traffic volumes than other County roadways.

Codington County Master Roadway Plan

A new classification system has been devised for the Codington County highway system. This new system divides county roadways into three categories: unpaved collector, paved collector, and county arterial. Below are the descriptions of these route classifications:

- Unpaved Collector – Gravel roadways under county jurisdiction that were once designated as secondary.
- Paved Collector – Roadways under county jurisdiction that are paved, but because of the pavement design must have seasonal load limits applied.
- County Arterial – A new classification of roadway to be designed so that no seasonal load limits need to be applied. These routes are intended to provide trucks carrying a full legal load with routes from state highways to large agricultural, industrial, and freight terminal uses.

The proposed Codington County Master Roadway Plan can be seen in Figure 24. The county arterial network was designed to allow for heavy truck movement to areas of the county where current uses exist that rely on such truck traffic, or areas that have been designated as having potential for such users to locate. The county arterial network was formulated to be an interconnected system allowing for direct access to state highways with limited interference and delay from urban traffic.

Proposed Codington County Master Road Plan

Figure 24

Day County

Grant County

Clark County

Deuel County

Hamlin County

Wallace

Florence

South Shore

Watertown

Henry

Kranzburg

Pelican Lake Recreation Area

COTTONWOOD ST

CENTER ST

MAIN ST

UNKNOWN

GRACELAND ST

LYLE LAKE RD

HORSESHOE LAKE RD

LONG LAKE RD

CEDAR ST

STADHEIM DR

LAKE DR S

DELORES ST

ALJOE RD

AIR HAVEN RD

STILL LAKE RD

SIOUX CONIFER RD

WAVERLY ST

OAK ST

DAKOTA AVE

KRANZBURG AVE

GROVER ST

155 ST

156 ST

157 ST

158 ST

159 ST

160 ST

161 ST

162 ST

163 ST

164 ST

165 ST

166 ST

167 ST

168 ST

169 ST

170 ST

171 ST

172 ST

173 ST

174 ST

175 ST

176 ST

177 ST

178 ST

437 AVE

438 AVE

439 AVE

440 AVE

441 AVE

442 AVE

443 AVE

444 AVE

445 AVE

446 AVE

447 AVE

448 AVE

449 AVE

450 AVE

451 AVE

452 AVE

453 AVE

454 AVE

455 AVE

456 AVE

457 AVE

458 AVE

459 AVE

460 AVE

461 AVE

462 AVE

463 AVE

464 AVE

465 AVE

466 AVE

468 AVE

469 AVE

60 ST SW

54 ST SW

42 ST SW

33 ST SW

31 ST NE

19 ST NE

7 ST SW

43 ST SE

41 ST SE

38 AVE NW

38 AVE NE

14 AVE NW

14 AVE NE

4 AVE SW

3 AVE NW

3 AVE NE

20 AVE SW

20 AVE SE

28 AVE NE

2 ST NW

464 AVE

KRANZBURG AVE

20

212

81

29

Legend

- County Arterial
- Paved Collector
- Unpaved Collector
- Township
- Local
- RailRoads
- City Limits

0 1 2 3 Miles

Minimum Roadway Design Standards

County policies that support the use of the standards identified in the SDDOT Local Roads Plan as minimum are included in Chapter 3, Goals and Objectives. Also noted is the importance of ensuring that the County Highway Superintendent has the authority to establish requirements that exceed minimum standards based upon identified existing or future needs, or demonstrated experience with similar situations where the minimum standards have proven inadequate.

Typical Cross Sections

It is important for any road authority to adopt and utilize a consistent set of road design standards to ensure uniformity in the transportation system, while considering safety and future needs. As existing rural roadways and rural collectors under Codington County jurisdiction are upgraded, or as new roadways are constructed, the minimum standards identified in the"2011 South Dakota Department of Transportation Local Roads Plan" should be utilized as a reference to identify minimum standards. Specific characteristics of each roadway will be used to determine design features required.

The Local Roads Plan is a document prepared by the South Dakota Department of Transportation, through its office of Local Transportation Programs, and is for use by the counties and cities throughout South Dakota. The Local Roads Plan is a guideline for use in planning, designing, and constructing roads and bridges on local government highway systems and should be considered "minimum" design standards by Codington County officials. However, this is not a stand-alone document, and should be used in conjunction with the AASHTO publication, "A Policy on Geometric Design of Highways and Streets," the SDDOT Road Design Manual, and other applicable policies and publications. Where special facilities for bicycles are desired, they should be in accordance with the AASHTO Guide for the Development of Bicycle Facilities. AASHTO's Chapter 5: Geometric Design of Very Low-Volume Local Roads (ADT ≤ 400) may also be a useful reference.

The following are some excerpts from the Local Roads Plan that pertain to minimum roadway design standards for Codington County rural roadways and rural collectors:

- The number of lanes on a given roadway should be sufficient to accommodate the design volumes for the desired level of service.

- The typical section will include a crown slope of 0.03 ft/ft for gravel surfaces, or 0.02 ft/ft for paved surfaces, 4:1 inslopes, 5:1 backslopes, and a standard 10' ditch at 20:1.
- The provision of right-of-way widths that accommodate construction, adequate drainage, and proper maintenance of a highway is an important part of the overall design. The right-of-way width should not be less than that needed for all elements of the design cross section, utility accommodation, and appropriate border areas.

Table 9 summarizes the minimum design standards for future County routes. The table lists roadway design standards in ascending order according to the projected 20 year ADT and the number of lanes the facility will have.

Table 9: Rural Highway Recommendations

Rural Highway Type	Projected 20 Year ADT	Lane Width [Ft]	Shoulder Width [Ft]	Total Surfaced Width [Ft]	Shoulder Type
2 Lane	0-250	12	6	28	Same as Mainline
	251-550	12	6	32	Same as Mainline
	551-1500	12	6	36	Gravel
	1501-2500	12	8	40	Gravel
	2500+	12	8	40	Minimum 2" AC
4 Lane Divided	< 4000	12	4 Inside 8 Outside	72	Gravel Outside & Minimum 3" AC Inside
	> 4000	12	4 Inside 8 Outside	72	Minimum 3" AC

Note 2: South Dakota Road Design Manual, Chapter 7: Table 7-1

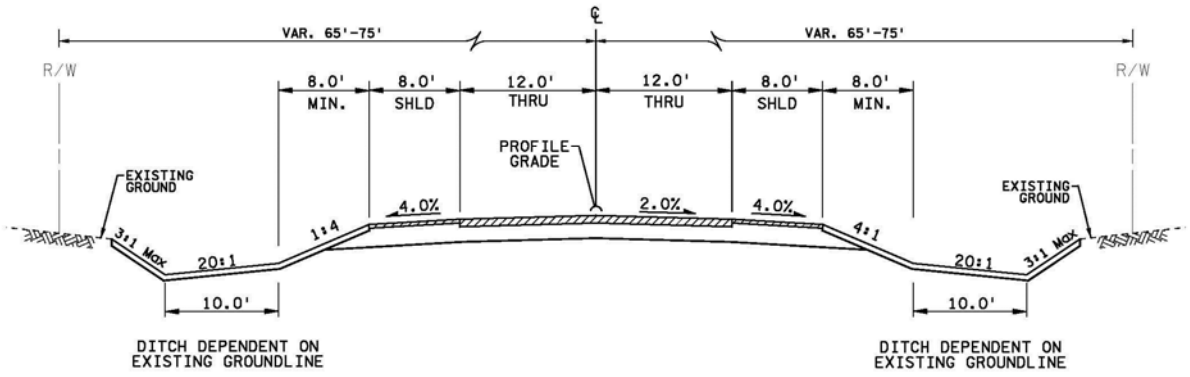
Currently, Codington County does not maintain any urban roadways, however should that change in the future, the current version of the South Dakota Department of Transportation Local Roads Plan should again be utilized as a resource for minimum design standards for urban roadways.

County Arterial

With the addition of arterial roadways to Codington County's roadway system, it is important for the County to create its own independent set of design standards for such roadways. These roadways should use best possible established road designs considering safety, existing and future needs, economy, reasonable maintenance costs and available funding. In restricted areas, or where there are other unusual considerations, it may not be possible to meet all minimum design values. Exceptions to applicable design criteria will be considered on a project by project basis when in the public interest and subject to approval by the SDDOT.

The cross-section of any proposed county arterial roadway should meet the minimum standards set forth in the example shown in Figure 25.

Figure 25: County Arterial Typical Cross-Section



Paved Collector

Those roadways that are paved but are seasonally load restricted constitute the major collector roadways in the County's future system. Through the analysis of this Plan, it was found that many of these facilities are lacking a shoulder. The lack of a roadway shoulder likely contributed to the number of run-off-the-road and rollover crashes reported on County routes as documented in the crash analysis. The relatively high speed limits posted on these routes necessitates that some room be reserved for correction due to driver error. Figure 26 shows the recommended typical cross-section for County paved collector routes.

Figure 26: Paved Collector Roadway Typical Cross-Section

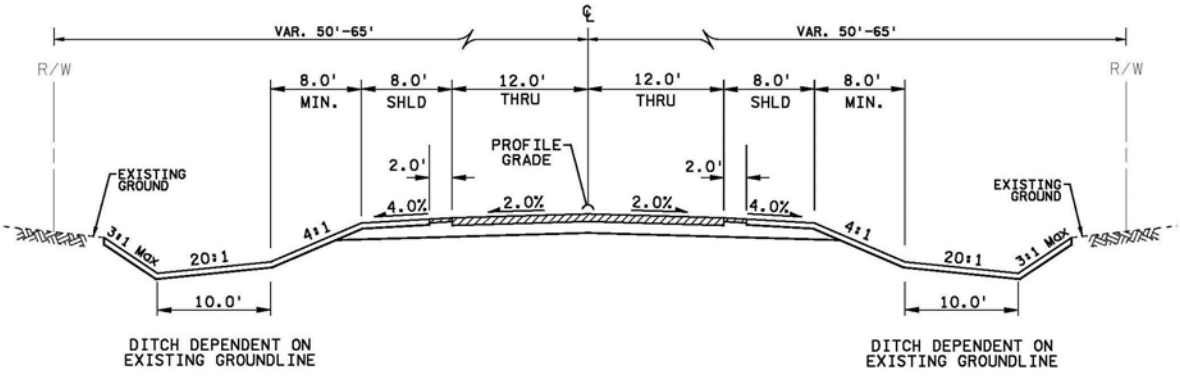


Table 10: Recommended Pavement Thicknesses

	Local Roads	Collector Roads	Arterial Roads
PCC Over Aggregate Cushion	6"	8"	8"-10"
Asphaltic Concrete with Aggregate Base	4" AC 6" Aggregate	6" AC 12" Aggregate	6" AC 12" Aggregate

Note 3: Recommendations are based off of Engineer's best professional judgment for like facilities. Actual pavement thicknesses may differ based upon further examination of specific site characteristics.

Unpaved Collector

Unpaved collector roadway facilities provide important connections to paved county routes and routes for the movement of farm goods and equipment. These routes should be designed to the applicable truck usage and surrounding land use activities. This plan recommends that these routes use suggested minimum gravel layer thicknesses as listed in Table 10.

Table 11: Gravel Design Recommendations

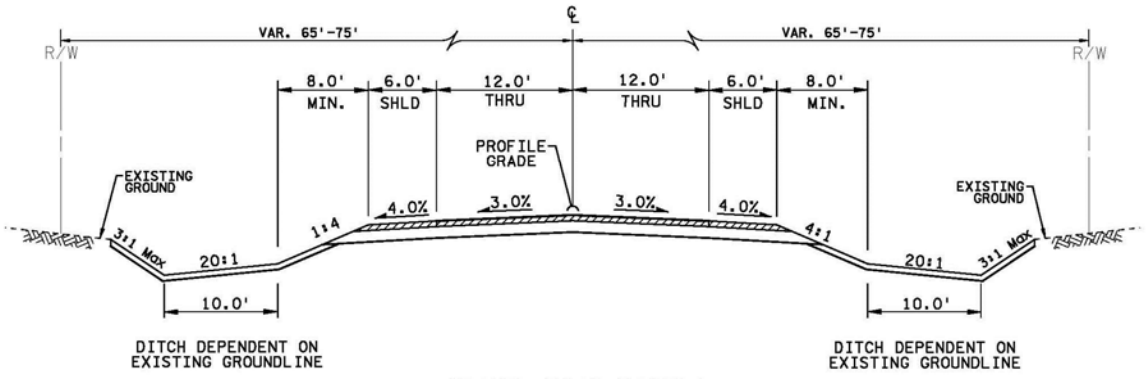
Estimated Daily No. of Heavy Trucks	Subgrade Support Condition*	Suggested Minimum Gravel Layer Thickness [in]
0 - 5	Low	6.5
	Medium	5.5
	High	4.5
5 - 10	Low	8.5
	Medium	7.0
	High	5.5
10 - 25	Low	11.5
	Medium	9.0
	High	7.0
25 - 50	Low	14.5
	Medium	11.5
	High	8.5

Source: South Dakota LTAP Gravel Roads Maintenance and Design Manual, Appendix, Page A11

* Where Low Subgrade Support: CBR≤ 3%
Where Medium Subgrade Support: 3% ≥ CBR ≤ 10%
Where High Subgrade Support: CBR > 10%

These roadways should also be designed and maintained to the same minimum standard so that the county routes can be distinguished from lower functioning roadways. The typical cross-section employed for county unpaved collector facilities should meet or exceed the minimum cross-section shown in Figure 27.

Figure 27: Unpaved Collector Roadway Typical Cross-Section



Access Management

As per the SDDOT Local Roads Manual, spacing on rural roadways should be used as a guideline in allowing access points along County roadways. The Manual states that access should be limited to 5 per mile or a maximum of one approximately every 1,000 feet. This is consistent with most of the current access points on the County's gravel system.

Due to the high speeds allowed on the County's paved system, access points should be consolidated to one every half-mile. This is especially poignant in the development of the County's arterial system. Future arterial roadways will serve heavy truck trips and higher traffic volumes, elevating the importance of reducing the number of conflict points and maximizing efficiency.

Through County zoning and subdivision authority, rural non-farm residential uses have been minimized by requiring lots to be a minimum of 40 acres in size. This has drastically reduced the amount of new driveways requested on county roadways. In the future, this practice should continue in order to minimize the impact to county roads and direct development into urban areas that are better equipped to handle such development.

However, there are existing rural non-farm developments within rural areas of Codington County. Requests have been made for the County to add these roadways to its system because of deteriorating roadway conditions caused by increased local traffic volumes due to residential development. Codington County may consider giving assistance to the applicable townships by providing roadway maintenance expertise or by instituting special assessment areas for road construction and maintenance. The County should resist public pressure to take responsibility of these facilities as they do not fit the intent of a county highway system and these roadways directly service local

residences rather than providing continuous routes for county-wide traffic movements. The County may wish to consider exceptions to this practice in areas where man-made or natural barriers create limited crossing opportunities and therefore present the need for an exception.

As growth areas around Watertown start to develop, it is important for Codington County to preserve the functionality of existing classified roadways by consolidating access points. This is done by guiding developers to create internal roadway networks for their developments rather than laying out subdivisions with lots that are dependent on County roads, arterials, or collectors for direct access. Most of these developments will occur in the extra-territorial jurisdiction of the City of Watertown and therefore will fall under the subdivision review process defined by the City. However, as the region grows Codington County is likely to face its own development pressures outside municipal jurisdiction. The county must work with individual municipalities and developers whenever development is being located along highly classified roadways under county jurisdiction.

Future Transportation Projects

Leading up to the transportation planning process, several transportation system issues had been identified. During the process, other issues were brought to light. The projects identified are the product of public input and analysis of the transportation system. The projects listed address safety, load capacity, environmental, and aging infrastructure concerns. These projects are expected to occur within a 20 year time horizon; however, the availability of funding or a shift in priorities due to unforeseen circumstances may alter the delivery of individual projects. These projects are shown graphically in Figure 28 and described in the subsection below.

Future Transportation Projects Plan

The projects listed below are referenced in Figure 28 which details the identified future roadway improvement in Codington County. The list is not comprehensive of all of the projects that have been identified as part of this Plan. A majority of the projects below represent issues that were identified early in the planning process. These key issues were studied more intently to give Codington County a purpose, need, and planning level cost estimate basis to guide their decision in implementing individual projects.

Site 1: 176th Street (CH 20) between 453rd Avenue and US 81

Paving of this two-mile segment of CH 20 would provide a continuous east/west paved route across the southern tier of the county. Paving the roadway as an arterial, that can accommodate full legal loads is estimated to cost approximately $4 million, assuming a planning level cost estimate of $1 million per lane mile.

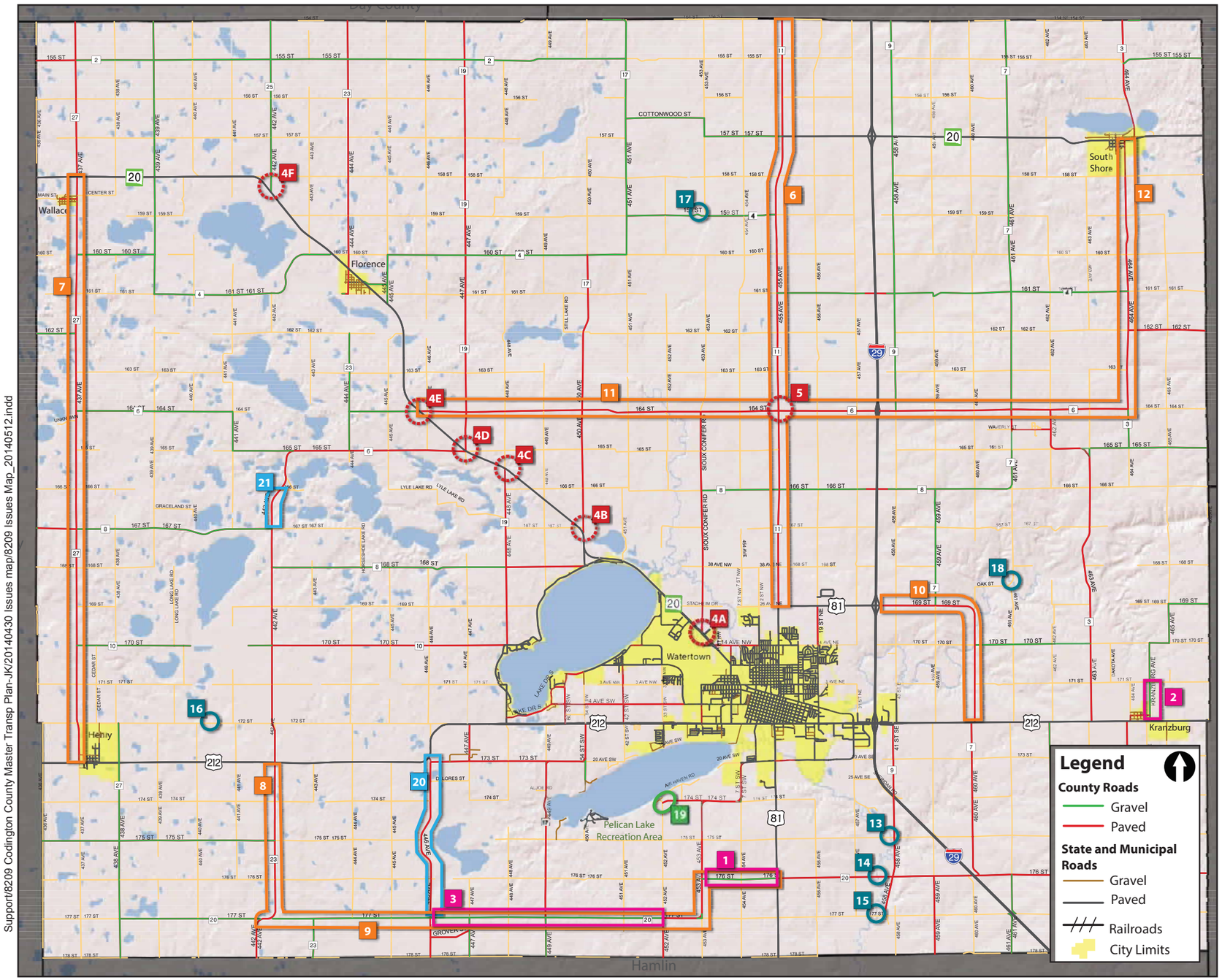
Site 2: CH 1 North of Kranzburg

This site consists of 4.5 miles of gravel road (CH 1) US Highway 212 to the Codington/Deuel County line approximately three miles north of US Highway 212. The roadway jogs back and forth from a north/south to an east/west roadway in two locations. The issues on this roadway are largely the result of a large dairy that is located just east of this roadway and one mile north of US Highway 212. The dairy generates a significant amount of truck traffic for purposes of delivering livestock feed and hay, and for the hauling of milk produced on the site. Agricultural equipment also uses this route.

One issue pertaining to the route seems to stem from the corners along the route at:

- Kranzburg Avenue and 170th Street,

CODINGTON COUNTY: Future Roadway Projects



Revised May 12, 2014

Figure 28

New Pavement

1. 176th St (CH 20) between 453rd Ave and US Highway 81
2. Kranzburg Ave, for one mile north of US Highway 212 – pavement or blotter, consider increase in load capacity
3. 177th St (CH 20) – pavement or blotter

Intersection Improvements

4. Realign to provide a 90-degree intersection with SD 20. Short term – work with SDDOT to shorten passing zones for intersections.
   - A. Sioux Conifer Rd and SD 20
   - B. 450th Ave and SD 20
   - C. 448th Ave and SD 20
   - D. 165th St and SD 20
   - E. 164th ST and SD 20
   - F. 442nd Ave and SD 20
5. 455th Ave (CH 11) at 164th St (CH 6) – Install safety improvements

Roadway Load Capacity Improvements

6. 455th Ave (CH 11) between County Line and US Highway 81
7. 437th St (CH 27) between SD Highway 20
8. CH 23 (442nd Ave) between US 212 and CH 20 (177th St)
9. CH 20 (177th St) between CH 23 and and US 81
10. 169th St between I-29 and CH 7 (460th Ave) and CH 7 between US 81 and US 212
11. CH 6 (164th St) between SD 20 and CH 3 (464th Ave)
12. CH 3 (464th Ave) between SD 20 and CH 6 (164th St)

Bridge/Structures

13. 175th St (Twp. Rd) Stream Crossing: Short term – install delineators, Long term – remove bridge
14. 176th St (CH 20) Stream Crossing: Bond bridge panels and repair longitudinal cracking
15. 177th St (Twp. Rd) Stream Crossing: Abandon and remove bridge
16. 172nd St (Twp. Rd) Stream Crossing: Abandon and remove bridge or convert to culvert
17. 159th St (CH 4-4) Stream Crossing: Replace or rehabilitate bridge
18. Old Truss Bridge on Township Rd west of 463rd Ave: Abandon and remove bridge

Roadway Alignment/Ditch Slopes

19. 174th St (CR 11-5) east of 452nd Ave: Short term – signage, delineation, clearing of trees in ROW. Long term – reconstruct to flatten ditch slopes.

Inundation

20. 446th Ave (CH 21-2) from US Highway 212 to CH 20: Do not repair due to high water levels and lack of natural outlet until water levels increase significantly. Improve 177th Street (CH 20) as alternate route.
21. 442nd Ave (CH 23) north of 167th St: Widen and pave at existing elevation.

- 170th Street and 465th Avenue, and
- 465th Avenue and 169th Street.

The Codington County Highway Department has enlarged the radii at these corners, to allow turns to be made more easily, but the turning movements still create the need for vehicles to slow down significantly and the turning movements create more wear and tear on the gravel roadway surface.

Improving the corners to increase the horizontal radii at the three 90 degree corners would result in approximately one mile of new roadway construction with gravel surfacing and new right-of-way acquisition. The estimated cost is $650,000.

Another issue with this corridor is the higher level of traffic in the first mile between US Highway 212 and the section line road that leads to the diary. This roadway experiences a higher level of traffic related to the village of Kranzburg and more of the traffic to and from the dairy. As a result, maintenance is a frequent issue.

Based on information from the South Dakota Local Transportation Assistance Program (LTAP), gravel is suitable up to an ADT volume of approximately 170. Beyond an ADT of 170, the required maintenance can make it more cost effective in the long run to pave the roadway. Even if the traffic is under an ADT of 170, a high volume of trucks or farm equipment may push the roadway into a situation where some form of pavement is the more cost effective solution. Blotter (asphalt surface treatment) is suitable up to an ADT of approximately 650, and a hot-mixed asphalt pavement is most cost effective over an ADT of 650. However, the data cautioned that blotter/otta seal construction only works well on a deep base and stable subgrade.

Recommendations for this corridor are as follows:

Table 12: Site 2 Recommendations

Action	Planning Level Cost Estimate
Mid Term • Consider paving Kranzburg Avenue from US Highway 212 to 171st Street (one mile). Due to the need to haul milk and livestock feed, the roadway improvement should be capable of handling full legal loads.	$2 million
Long Term • Gravel reconstruction of the three 90 degree turns on CH 1	$650,000

Site 3: 177th (CH 20) between 446th Avenue and 453rd Avenue

Paving of this seven-mile section of CH 20 is currently projected to occur during the 2014 and 2015 construction season. The County undertook this project due to the inundation of 446th Avenue north of 177th Avenue. This route provides a continuous paved route to access industrial areas south of Watertown along 20th Street.

Design and ROW acquisition for the next three miles to the east are close to being completed. The County's intent is not to use federal funding on this project so the project completion should occur in a shorter timeframe.

Site 4(4A though 4F): 448th Avenue (CH 19) at SD Highway 20 – Realign Intersection

During stakeholder involvement meetings, it was learned that a safety concern has been reported to the Codington County Sheriff's Department at site 4C on several occasions, and officers have observed the need for follow-up. The concern is exacerbated by the fairly recent opening of Joy Ranch along 448th Avenue (CH 19) south of SD Highway 20, which is resulting in more drivers on this roadway who are unfamiliar with local conditions.

CH 19 has a skewed intersection with SD Highway 20. Northbound drivers approaching the highway are concentrating on eastbound traffic, and pay very little attention to westbound traffic on SD Highway 20. However, this westbound segment of SD Highway 20 is on a downhill slope, and has an excellent view of oncoming traffic, and is therefore a westbound passing zone. The issue that has come to the attention of emergency service providers pertains to northbound right turn movements onto the highway. Drivers making this movement have encountered oncoming (passing) traffic in the eastbound lane upon making their turn.

Two suggestions have arisen. One involves working with SDDOT in the short term to shorten the westbound passing zone. Another involves realignment of CH 19 near the intersection with SD Highway 20 to create a 90 degree intersection, as depicted in the following aerial photograph (Figure 29). This would be a more costly improvement from the standpoint of both construction and right of way acquisition.

Figure 229: 448th Ave Intersection Possible Realignment Alternative

SAT and stakeholder input also called for the remaining skewed intersections of County or Township roads along SD 20 to be addressed at some point in the future.

Table 13: Site 4(C) Recommendations

Action	Planning Level Cost Estimate
Short Term • Work with SDDOT to shorten the westbound passing zone east of CH 19	
Mid Term • Reconstruct the CH 19 approaches to SD Highway 20 to create a 90 degree intersection. • Reconstruct other skewed approaches of County roads along SD 20 to provide 90 degree intersections	$325,000 $250,000 to $400,000 per intersection

Site 5: 455th Avenue (CH 11) and 164th Street (CH 6) Intersection

Traffic control at this intersection consists of stop control on CH 6. The intersection has been the location of multiple severe crashes within the past five years. The crashes generally involved older drivers westbound on 164th

Street (CR 6). The drivers have stopped, or nearly stopped, before traveling into the intersection in front of an on-coming vehicle on CH 11. SDDOT completed at Road Safety Audit Review in 2012. Most of the recommended improvements have been implemented.

Recent intersection traffic count video captured numerous complacent drivers CH 6 not stopping at the stop signs. One near miss was captured on video. This video files demonstrating some of these episodes have been transmitted to the Codington County Highway Department and the Codington County Sheriff's Department for their information and use.

Based on observations made during the field review, intersection approach sight distance is generally not restricted. However, there is a tree line/shelterbelt, bridge object/hazard markers and a stream gauging station structure located approximately 600 feet north of the intersection on CR 11 that could be placing momentary limitations on intersection approach sight distance. These objects, combined with a slight vertical drop in CH 11 at or near the bridge, create a momentary point in the approach of southbound vehicles where they are somewhat difficult to see, especially during the daytime when headlights are not typically helpful in seeing oncoming traffic. Nevertheless, the bridge, associated object/hazard markers and stream gauging station are nearly eight seconds of travel time, based on sight distance, from the intersection.

A stop bar was in place on the eastbound CH 6 approach, but was not evident on the westbound approach. Rumble strips and advance stop sign warnings are in place on both approaches of CH 6. At the intersection, flashing beacons are mounted above the stop signs.

Intersection turning movement counts indicate that a Multi-way Stop condition is not warranted at this time.

Several low cost/near term intersection safety improvements are recommended, in order of phasing/cost priority.

Table 14: Site 5 Recommendations

Action	Planning Level Cost Estimate
Very Short Term • Install stop bar on the westbound CH 6 approach	recently completed
• Add "Stop Ahead" pavement messages on the eastbound and westbound approaches	recently completed
• Add cylindrical (can) delineators to the intersection corners to help mainline and stop approach drivers identify the intersection in advance. • Install overhead intersection/street lights • Install mainline dynamic warning signs	$5,000 to $150,000, depending upon combination of improvements
Mid Term (up to 10 years) • Reconstruct intersection as roundabout without increasing load limits	$2,000,000
Mid Term (up to 10 years) • Reconstruct intersection as part of a project to increase load limits	See Site 6

A more significant improvement would involve construction of a roundabout at this intersection. Ideal roundabout design involves building a slight curve into the approaching roadways, starting several hundred feet back from the intersection, to begin slowing traffic and aligning drivers with the ingress into the roundabout. Roundabouts, such as the one depicted below, can be designed to accommodate agricultural equipment and freight (See Figure 30). Reconstruction of CH 11 to allow for full weight legal loads would present an opportunity to build a roundabout at this intersection, allowing the county to incorporate a safety feature into the project. However, such a project could also be done on its own, without reconstruction of CH 11. The adjacent stream is a habitat for a threatened or endangered species of minnow. This would need to be taken into consideration with any roundabout design to determine feasibility of construction without negative impacts to the species.

Figure 30: Example Roundabout

Site 6 – 455th Avenue (CH 11) from US Highway 81 to SD Highway 20 or to the North County Line

Public and stakeholder input identified significant needs to use CH 11 for freight hauling up to full legal loads as opposed to the spring weight restrictions that are currently placed upon this roadway. The restrictions limit the use of the corridor by the gravel mine located along the south side of 162nd Street one mile east of CH 11. Other freight, including agricultural equipment and commodities, are also subject to these limitations.

From an economic standpoint, Codington County is interested in addressing these concerns and pursuing funding for upgrading the roadway to meet the industrial and agricultural needs for a year-round route that will accommodate full legal loads. The improvement could be 13 miles in length, extending from US Highway 81 to SD Highway 20, or 15 miles in length, extending to the north county line. However, the County's current levels of federal aid and local funding are not adequate to cover the costs of such an extensive improvement without neglecting other repaving and maintenance projects, which are carefully scheduled over a 20-year cycle to ensure that all roadways receive the necessary maintenance and up-keep.

Codington County is currently in the early stages of working with the SDDOT to secure safety funding for the installation of center line and edge line rumble striping.

CH 11 is currently being studied by LTAP at SDSU. Borings are being made to determine asphalt thickness and the composition of the roadway base. This data will be useful in refining future cost estimates for upgrading the roadway to accommodate year round legal loads.

Table 15: Site 6 Recommendations

Action	Planning Level Cost Estimate
Short Term • Reconstruct 12 miles of CH 11 from US Highway 81 to SD Highway 20 with adequate base and pavement for full legal loads on a year-round basis. Cost is dependent upon need to replace subgrade of this former US highway (formerly US Hwy 81).	$12,000,000 to $24,000,000
Mid Term • Reconstruct remaining three miles of CH 11 from SD Highway 20 to the north county line with adequate base and pavement for full legal loads on a year-round basis. Cost is dependent upon need to replace subgrade of this former US highway (formerly US Hwy 81).	$3,000,000 to $6,000,000

As described under the summary of Site 5, a major improvement such as this could be designed to include reconstruction of the CH 11 and CH 6 intersection.

Site 7: 437th Avenue (CH 27) from US Highway 212 to SD Highway 20

This site initially involved only a 0.5 mile segment of CH 27 between SD Highway 20 and the entrance to the Wallace grain elevator at Wallace Avenue, which reflects the most short term need. CH 27 is a paved roadway and is part of Codington County's primary roadway system. Wallace Avenue is a gravel street under the City of Wallace's jurisdiction. It has been designed to provide truck ingress and egress to the elevator.

The lack of roadways that are not subject to spring weight restrictions was an issue raised by agricultural stakeholders during the early public involvement process. The Wallace Elevator was expanded in recent years, and its close proximity to SD Highway 20 makes it an excellent candidate for an elevator that could be provided with year-round access without spring weight restrictions.

Improving the roadway to a point where it would allow for full legal loads on a year-round basis would involve the placement of additional asphalt surfacing. Recommendations for this site include:

Table 16: Site 7 Recommendations

Action	Planning Level Cost Estimate
Short Term • Improve 0.5 mile of CH 27 between SD Highway 20 and Wallace Avenue with a 3" mat to allow for year-round full legal loads.	$250,000
Mid Term • Reconstruct (undercut 3 feet under existing surface, pave, and widen to add NB turn lane at SD 20)	$1,000,000
Long Term • Full reconstruction from Wallace Avenue to US 212 to allow for full legal truck loads.	$1,000,000 per lane-mile

Funding for this improvement could include a combination of public and private dollars if the grain elevator is willing to participate with Codington County in the funding for the project.

A map showing the location of the site, photographs, and planning level cost estimates prepared by Brosz Engineering are provided in the Appendix of this Plan.

The County has designated CH 27 as a future county truck route in this Plan. As such, CH 27 (437th Avenue) has been shown in Figure 28 as being having load capacity improvement from SD 20 to US 212. The segment described here could be an interim project or prioritized as the first segment completed as part of a larger corridor long improvement.

Sites 8, 9, 10, 11, & 12: Roadway Load Capacity Improvements (County Arterials)

Paving of the following roadways:

- CH 23 (442nd Avenue) between US 212 and CH 20,
- CH 20 (177th Street) between CH 23 and US 81,
- CH 7 (169th Street/460th Avenue) between US 81 and US 212,
- CH 6 (164th Street) between SD 20 and CH 3, and
- CH 3 (464th Avenue) between SD 20 and CH 6

would provide a continuous and connected county arterial network throughout Codington County. Paving the roadways as arterials, that can accommodate full legal loads, is estimated to cost approximately $1 million per lane mile.

Table 17: Sites 8, 9, 10, 11, & 12 Recommendations

Action	Planning Level Cost Estimate
CH 23 (442nd Avenue) • Between US 212 and CH 20	$8,000,000
CH 20 (177th Street) • Between CH 23 and US 81	$13,000,000 (may be less due to an interim paving project)
CH 7 (169th Street/460th Avenue) • Between US 81 and US 212	$11,000,000
CH 6 (164th Street) • Between SD 20 and CH 3	$18,000,000
CH 3 (464th Avenue) • Between SD 20 and CH 6	$7,000,000

Sites 13, 14, & 15: East/West Bridges over Big Sioux River at 175th Street, 176th Street and 177th Street

Sites 13, 14 and 15 include a grouping of three bridges that cross the Big Sioux River within two miles of each other on section line roads. From north to south, the bridge locations and their average daily traffic volumes (ADTs) are shown in Table 18:

Table 18: Site 13, 14, & 15 Bridges Locations and ADTs

Site Bridges	Location	Sufficiency Rating	2009 ADT
Site 13	175th Street (a Sheridan Township road)	61.2	41
Site 14	176th Street (County Highway 20)	94.9	386
Site 15	177th Street (a Sheridan Township road)	54.8	73

The ADTs on the township bridges are quite low, while CH 20 volumes are considerably higher, and the highway is part of Codington County's Primary Route system. Aside from a one-mile jog to the south at 453rd Avenue and two miles of township road at the westerly end of the county, CH 20 is a continuous route across the southern tier of the county, making it an important alternative route to US Highway 212.

The bridge at **Site 15** is a candidate for replacement given its low sufficiency rating. Reconstruction of the bridge is estimated at nearly $600,000. Given the low volume on Site 15, the estimated average annual cost of to the traveling public of rerouting to the CH 20 bridge (Site 14) is approximately $5,300 per year, while the cost of rehabilitating, owning and operating the bridge is estimated at approximately $11,000 per year over the 75 year lifespan of the bridge. The economics of this situation result in a recommendation to close the bridge when conditions warrant replacement. An estimated cost for removal of the bridge is $60,000. CH 20 can easily accommodate the volumes the traffic currently using the township road. Since many of the trips using the bridge at Site 10 are likely oriented to and from Watertown, the inconvenience of using a different bridge is minimal.

Similarly, **Site 13** has an ADT of less than 50, and the sufficiency rating is quite low. CH 20 can easily handle the additional traffic volumes if this bridge were to be removed, but since the roadway is located one mile closer to Watertown; other alternative routes may be sought that do not involve traveling a mile farther away from town. The township road does not cross I-29, resulting in very limited use. As the sufficiency rating continues to decline, removal of this bridge should also be evaluated. Currently, issues noted with respect to this bridge include:

- Bridge guardrail spear ends (object/hazard markers are in place)
- Stream gauging station structure is within clear zone (no object/hazard markers are present, and delineators are recommended at a minimum)

Site 14, on CH 20, is in very good condition, with a sufficiency rating of 94.9. Maintenance plans for this bridge include bonding of bridge panels to repair longitudinal cracking.

Table 19 summarizes recommendations for the Site 13, 14, & 15 bridges:

Table 19: Site 13, 14, & 15 Bridge Recommendations - 175th Street, 176th Street (CH 20) and 177th Street

Action	Planning Level Cost Estimate
Site 13 – 175th Street	
• Short Term - Install delineators at stream gauging station	Minor Cost
• Long Term – Consider removal	$60,000
Site 14 – 176th Street (CH 20)	
• Minor Rehab - Bond bridge panels to repair longitudinal cracking (County recently completed a short-term seal coat)	$50,000

Site 15 – 177th Street • Monitor bridge condition and remove when sufficiency rating warrants bridge closure or replacement.	$60,000

A map showing the location of the site, photographs, and a cost comparison of replacing the bridge at Site 15 versus the cost of diverting traffic to CH 20 as provided by Brosz Engineering, is provided in the Appendix of this Plan.

Site 16: 172nd Street (Township Road) Bridge between 440th Avenue and 441st Avenue

The subject structure is 24 feet in length, and is a steel stringer bridge. The bridge was originally built in 1940 and was reconstructed in 1960. It has a sufficiency rating of 39.9 and is posted for approximately 40 percent of legal loads. The roadway approaches to the bridge are informally closed with temporary signing and barricades. At times, the roadway and bridge are overtopped as a result of seasonal drainage. Replacing the bridge at its current elevation is not recommended due to frequent inundation.

Long Lake, located north of 172nd Street, has risen by approximately 20 feet over the past several decades, and has the potential to extend south to 172nd Street and beyond. If this occurs, it will inundate the roadway and bridge, resulting in the need for a roadway grade raise, riprap erosion control, and a higher bridge structure (possibly a box culvert) in order to keep the roadway open. Reconstruction of approximately 0.4 miles of the roadway and replacement of the bridge is estimated to cost approximately $980,000.

The ADT on 172nd Street is less than 100, and US Highway 212 is located one mile to the south. Also, the corridor is inundated in two to three locations within 1.5 miles west of the bridge, limiting its use as a through-route within the southwest portion of the county. Therefore, abandonment or removal of the bridge is recommended.

Table 20: Site 16 Recommendation

Action	Planning Level Cost Estimate
• Abandon/remove bridge	$7,500 to $10,000
• Installation of culverts/structure to keep road passable without a grade raise	$150,000 to $180,000

172nd Street is the border between Graceland and Henry Townships. If Codington County abandons the bridge, discussions with these townships

will be needed. Another solution may be to replace the structure with a culvert, allowing the townships to use the roadway when not inundated.

A map showing the location of the bridge site, photographs, and a planning level cost estimate to raise the roadway and replace the bridge was prepared by Brosz Engineering and is provided in the Appendix of this Plan.

Site 17: 159th Street (CH 4) Bridge at the Big Sioux River west of 453rd Avenue

The bridge at this location is a 91-foot two-span double tee bridge with vertical timber abutments. It crosses the Big Sioux River approximately 0.3 mile west of 453rd Avenue. Built in 1973, it has a sufficiency rating of 68.4, and is currently posted at approximately 55 percent of legal loads. The main concern with this bridge is the damage that has been incurred in the past due to ice jams, and the potential for future damage by ice jams, since they frequently occur upstream (north) of the bridge during spring thaws. Codington County passed a resolution in July 2010 to move this bridge forward in the process for rehabilitation and replacement of the abutments with steel or concrete.

The nearest alternative river crossings are 2.5 miles to the north and three miles to the south. Thus, having a bridge at this location is important for the movement of agricultural equipment, emergency services, bus routes, mail delivery and keeping trip lengths down for general travel in the area.

The bridge is a candidate for replacement or rehabilitation. Rehabilitation is an alternative if the bridge can be rehabilitated for a cost of no more than 60 percent of replacement cost ($198,000 for rehabilitation with new abutments). The bridge has yet to appear in the SDDOT State Transportation Improvement Program (STIP) which lists projects expected to be funded within the next five years.

Table 21: Site 17 Recommendations

Action	Planning Level Cost Estimate
• Replace Bridge, or	$700,000
• Study alternatives and costs of rehabilitating the bridge. Rehabilitation is an option if it can be completed for no more than 60 percent of the cost of replacement.	Up to $420,000

A map showing the location of the site, photographs, and planning level cost estimates prepared by Brosz Engineering are provided in the Appendix of this Plan.

Site 18: 167th Street (Kranzburg Township Road) - Truss Bridge over Willow Creek

This site consists of a 41-foot single span truss bridge with vertical concrete abutments. The bridge crosses the Willow Creek on 167th Street, which is a gravel rural township road approximately 0.9 miles west of 463rd Avenue. The bridge was built in 1910, and has a sufficiency rating of only 26.4. It is currently posted at approximately 25 percent of legal loads. The bridge is eligible for registration as a historic structure.

The nearest alternative east/west routes are located one mile to the north and three miles to the south. However, the bridge is located on a narrow, minimally maintained and minimally traveled township road. At times, the bridge is fenced off by the property owner as part of the management of the surrounding pasture land.

Replacement of the bridge with a similar span and configuration is estimated to cost approximately $300,000 to $350,000. A low water culvert crossing could be an alternative, and would somewhere in the range of $150,000. Closure of the structure to all traffic is another option, while allowing the bridge to remain in place for pedestrian use only. Abandonment and removal is also an option. This would create a three mile area from north to south without an east/west crossing. However, given the topography of the area and the limited amount of traffic using the facility, the recommendation is to either abandon and remove the bridge, or leave it in place with signing that prohibits traffic from using the bridge and allows use by pedestrians only. Given the wear on the wood bridge deck, even pedestrian use would require some level of monitoring.

If federal funds are ever used to replace a bridge at this location, the bridge may not be destroyed without first offering it for sale or donation due to its age and historic status.

Site 19: 174th Street (CH 11-5) East of 452nd Avenue

This site consists of a portion of CH 11 on the south side of Pelican Lake between 452nd and 453rd Avenues. The roadway has a horizontal curve of approximately 460 feet, and within that curve, the roadway also slopes down to a low point where it crosses a stream. The structure over the stream consists of a double box culvert. No guardrail exists on the edges of the box culvert, but object/hazard markers are in place. The roadway has narrow

shoulders. In-slopes are steep on the entire mile-long section, particularly on the south side of the roadway.

Recommended improvements in the very short term include establishment of a 25 mph speed limit and narrow bridge signage, as well as delineations for objects and steep in-slopes. Additional short to mid-term improvements include reconstruction of approximately 426 feet of the roadway to allow for a 30 mph design speed and replacement of the culvert, which will provide for a standard clear zone. A 45 mph design speed would require a lengthier reconstruction of nearly 650 feet.

Table 22: Site 19 Roadway Improvement Recommendations - 174th Street (CH 11)

Action	Planning Level Cost Estimate
Short Term • Install signage for 25 mph speed limit and narrow bridge. Install delineators for objects and steep in-slopes.	$2,000
Mid Term • Reconstruct a minimum of 426 feet of roadway to allow for a 30 mph design speed with a five percent super elevation, replace culvert, provide for standard clear zone.	$190,000

A map showing the location of the site, photographs, and a planning level cost estimate as provided by Brosz Engineering for reconstructing the roadway to allow for a 30 mph design speed, is provided in the Appendix of this Plan.

Site 20: 446th Avenue (CH 21-2) from 177th Street (CH 20) to US Highway 212

This roadway is impassible at four locations between CH 20 and US Highway 212 due to inundation as a result of seasonal and persistent high water levels that have enlarged Goose Lake. The roadway is informally closed with temporary signing and barriers. Portions of the roadway are above water and useable, but drivers depend on connectivity with other township, county, or state routes to access these isolated segments.

Codington County is currently in the process of improving four miles of CH 20 east of CH 21. This route is already serving as an alternative route for traffic between Hamlin County and destinations within Coding County such as Watertown. Other alternatives were also considered:

- Raising CH 21 – This alternative was determined to be costly due to the fact that the natural outlet for Goose Lake is at approximately 1724.6 feet, while the water elevation in the spring of 2011 was 1714.8. Raising the roadway above the spill through elevation would require grade raises ranging from 0 to 15 feet, with average fill depths of 6 to 7 feet for nearly 2.5 miles. The costs for such a grade raise, paving and riprap side slope erosion protection range from $8 to $10 million. This action is not recommended.
- A lower grade raise to an elevation of 1720 feet would resolve the current situation, but if water levels continue to rise in Goose Lake, as they have consistently done since 1970, a roadway elevation of 1720 could become inundated again in approximately 15 years (based on historic trends). Such a grade raise cost an estimated $6.5 million. This action is not recommended.
- Alternate north/south route on 445th Avenue – Creating an alternate paved county road along 445th Avenue, a township road between CH 20 and US Highway 212, is estimated to cost approximately $4 million. This route has significant limitations, as it traverses a large wetland at and south of its intersection with 176th Street, and crosses a drainage channel that leads to Goose Lake just north of 175th Street. It is anticipated that future rising water levels could also affect this route at these low areas.

Codington County's current plan to improve CH 20 in 2014 and 2015 is an alternative that has several merits over the alternatives described above. CH 20 provides access to industrial sites on the south side of Watertown via CH 20 to US Highway 81, which is particularly important for the hauling of farm commodities to the elevator and ethanol plant. Access to US Highway 212 west of Watertown is provided via CH 20 to CH 17, which is a north/south roadway on the west side of Pelican Lake.

A map showing the location of the inundated roadway sites, photographs, historical Goose Lake water level data, and a planning level cost estimate to raise the roadway was prepared by Brosz Engineering and is provided in the Appendix of this Plan.

Site 21: 442nd Avenue (CH 23) North of 167th Avenue (CH 8) – Grade Raise

This site consists of approximately 0.5 miles of CH 25 just north of CH 8 that was partially or nearly inundated, but has been raised by the Codington County Highway Department. The corridor is paved to the north and south of the grade raise. It is one of the few north/south corridors with a high

level of continuity between Watertown and CH 27 at the west edge of the county, and it connects with CH 8, which is a route to/from SD Highway 20. Therefore, this roadway is an important route within the southwestern portion of the county.

As a result of the grade raise, the roadway is now passable. In the summer of 2014, the County placed three inches of asphalt on the gravel surface. The roadtop is 26 feet in width. The County will continue working to improve the roadway shoulders at the grade raise. At some point, another two inches of asphalt will need to be added to the roadway surface.

According to USGS topographic maps, adjacent water bodies in the vicinity of the grade raise have risen over 20 feet over the last several decades, from approximately 1713 to 1735. The raised portion of CH 25 is at approximately 1737-1738. Therefore, wave action and increased water levels could continue to make it difficult to keep this road passable. Recommended actions are as follows:

Table 23: Site 21 Recommendations

Action	Planning Level Cost Estimate
Short term • Continue to widen roadway and keep road passable to the traveling public. When desired width has been achieved, pave roadway surface.	$135,000
Long term • If rising water trend continues, raise the roadway surface approximately two feet and pave.	$650,000

A map showing the location of the site, photographs, and planning level cost estimates prepared by Brosz Engineering are provided in the Appendix of this Plan.

Funding

County roadway system mileage in Codington County must be balanced with the ability to fund the maintenance of those facilities. This includes both paved and gravel routes. If the system mileage exceeds the ability to fund construction and maintenance efforts, roadways fall into disrepair thus affecting the movement of people and goods throughout the county.

The rural nature of Codington County limits the amount of funding that is available from state and federal sources. The funding source heading below describes funding the county currently receives, other funding sources for

which the County map be eligible, and option the County could explore to provide more revenue for roadway improvements.

Federal Funding Sources

Surface Transportation Program (STP) – Rural

This federal source provides funding to functionally classified roadways (major collector and above) from the Highway Account of the Highway Trust Fund and is authorized through the latest iteration of the transportation bill, Moving Ahead for Progress – 21st Century (MAP-21), authorized by Congress.

The SDDOT suballocates funding directly to counties and urbanized areas. MAP-21 has adjusted the allocation of these funds in the following ways:

Funding Features[4]

- Set-asides
  - From the State's STP apportionment, the following sums are to be set aside:
  - A proportionate share of funds for the State's Transportation Alternatives (TA) program.
  - 2% for State Planning and Research (SPR).
  - For off-system bridges, an amount not less than 15% of the State's FY 2009 Highway Bridge Program apportionment (may not be taken from amounts suballocated based on population).
  - The set-aside for Transportation Enhancements is eliminated.
- Suballocation
  - 50% of a State's STP apportionment (after TA and SPR set-asides) is to be obligated in the following areas in proportion to their relative shares of the State's population--
  - *Urbanized areas with population greater than 200,000* – This portion is to be divided among those areas based on their relative share of population, unless the Secretary approves a joint request from the State and relevant MPO(s) to use other factors.
  - *Areas with population greater than 5,000 but no more than 200,000* – Projects in these areas are to be identified for funding by the

[4] Source: STP funding information was obtained from the Federal Highway Administration (FHWA) Factsheet on STP funding.

State in consultation with regional planning organizations, if any.

- *Areas with population of 5,000 or less*

- The remaining 50% may be used in any area of the State.

Federal share: Determined in accordance with 23 USC 120, including a special rate for certain safety projects and a new provision for increased Federal share for projects incorporating Innovative Project Delivery. Exceptions to 23 USC 120 are provided for certain freight projects, workforce development, training, and education activities, and Appalachian development highway system projects.

Transportation Alternatives Program (TAP)

The Transportation Alternatives Program (TAP) replaced the Transportation Enhancement Program (TEP) in MAP-21. Transportation Enhancements required that a state set aside ten percent of STP funding for non-motorized forms of transportation. Typically those funds would have been used to construct shared use paths or other bicycle and pedestrian amenities.

TAP funding replaced funding from other previous programs such as TEP, Safe Routes to Schools (SRTS), Recreational Trails, and other discretionary programs, wrapping them into a single funding source.

Funding Features[5]

The TAP is funded by contract authority from the Highway Account of the Highway Trust Fund. Funds are subject to the overall Federal-aid obligation limitation.

An amount equal to 2% of the total amount authorized from the Highway Account of the Highway Trust Fund for Federal-aid highways each fiscal year (FY) is to be reserved for the TAP.

The national total is divided among States based on each State's proportionate share of FY 2009 Transportation Enhancements funding.

Within each State, the amount for the TAP is set aside proportionately from the State's National Highway Performance Program (NHPP), Surface Transportation Program (STP), Highway Safety Improvement Program

[5] Source: TAP funding information was obtained from the FHWA Factsheet on TAP funding.

(HSIP), Congestion Mitigation and Air Quality Improvement Program (CMAQ), and Metropolitan Planning apportionments.

- Set-asides
    - Unless the Governor opts out in advance, an amount equal to the State's FY 2009 Recreational Trails Program (RTP) apportionment is to be set aside from the State's TAP funds for the RTP. See further detail below under "Program features."
- Suballocation
    - Fifty percent of a State's TAP apportionment (after deducting the set-aside for the RTP, if applicable) is suballocated to areas based on their relative share of the total State population, with the remaining 50 percent available for use in any area of the State. The suballocation is made in the same manner as for STP funds.
- Transfer of funds
    - A State may transfer up to 50% of its TAP funds to NHPP, STP, HSIP, CMAQ, and/or Metropolitan Planning. The amount transferred must come from the portion of TAP funds available for use anywhere in the State (no transfers of suballocated TAP funds, or funds set aside for the RTP).
- Eligible activities
    - Funds may be used for projects or activities that are related to surface transportation and described in the definition of "Transportation Alternatives."
    - Construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other nonmotorized forms of transportation.
    - Construction, planning, and design of infrastructure-related projects and systems that will provide safe routes for non-drivers, including children, older adults, and individuals with disabilities to access daily needs.
    - Conversion and use of abandoned railroad corridors for trails for pedestrians, bicyclists, or other nonmotorized transportation users.
    - Construction of turnouts, overlooks, and viewing areas.
    - Community improvement activities, including: inventory, control, or removal of outdoor advertising;
    - historic preservation and rehabilitation of historic transportation facilities;
    - vegetation management practices in transportation rights-of-way to improve roadway safety, prevent against invasive

species, and provide erosion control; and archaeological activities relating to impacts from implementation of a transportation project eligible under 23 USC.

- Any environmental mitigation activity, including pollution prevention and pollution abatement activities and mitigation to address stormwater management, control, and water pollution prevention or abatement related to highway construction or due to highway runoff; or reduce vehicle-caused wildlife mortality or to restore and maintain connectivity among terrestrial or aquatic habitats.
- In addition to defined Transportation Alternatives (as described above), The recreational trails program under 23 USC 206.The safe routes to school program under §1404 of SAFETEA–LU.
- Planning, designing, or constructing boulevards and other roadways largely in the right-of-way of former Interstate System routes or other divided highways.
- Workforce development, training, and education activities are also eligible uses of TAP funds.

Codington County has not used TAP or TEP funding to fund nonmotorized transportation projects. The recent changes to the funding source in MAP-21 has provided the flexibility for funding to be used on a wide variety of projects and as such the County should examine the feasibility of applying for TAP funding at the outset of projects that may qualify.

Highway Safety Improvement Program (HSIP)

HSIP funds are available for projects designed to achieve a significant reduction in traffic fatalities and serious injury crashes on public roads. In order to receive funding, the projects must be identified through data-driven analysis and a strategic approach commonly achieved through a corridor or sub-area study of individual transportation components.

Codington County, through this Plan and previous studies, has identified locations where HSIP funding could be utilized to reduce fatal and serious injury crashes. The SDDOT has also indicated that it has a surplus of HSIP funding and is currently looking for projects to allocate funding towards.

Funding Features[6]

Funded by contract authority from the Highway Account of the Highway Trust Fund, funds are subject to the overall Federal-aid obligation limitation.

MAP-21 has a new approach to core formula program funding, authorizing a lump sum total instead of individual authorizations for each program. Once each State's share of the total is calculated, it is divided up by program within the State.

- Set-asides
    - From the State's HSIP apportionment, the following sums are to be set aside:
    - Railway-highway crossings -- $220 million.
    - A proportionate share of funds for the State's Transportation Alternatives (TA) program.
    - 2% for State Planning and Research (SPR).

Federal share: Except as provided in 23 U.S.C. 120(c) and 130, the Federal share is 90%.

Eligible use of funding

A highway safety improvement project is any strategy, activity or project on a public road that is consistent with the data-driven State Strategic Highway Safety Plan (SHSP) and corrects or improves a hazardous road location or feature or addresses a highway safety problem. MAP-21 provides an example list of eligible activities, but HSIP projects are not limited to those on the list.

Workforce development, training, and education activities are also an eligible use of HSIP funds.

Program features

The primary features of the current HSIP are retained, including the requirement for a comprehensive, data-driven, SHSP that defines State safety goals and describes a program of strategies to improve safety. To obligate HSIP funds, a State must develop, implement and update a SHSP, produce a program of projects or strategies to reduce identified safety problems, and evaluate the SHSP on a regular basis.

The SHSP remains a statewide coordinated plan developed in cooperation with a broad range of multidisciplinary stakeholders.

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[6] Source: HSIP information was obtained from the FHWA Factsheet on HSIP funding.

States are required to have a safety data system to perform problem identification and countermeasure analysis on all public roads, adopt strategic and performance-based goals, advance data collection, analysis, and integration capabilities, determine priorities for the correction of identified safety problems, and establish evaluation procedures.

The Secretary is required to establish a subset of the model inventory of roadway elements (listing of roadway and traffic data elements critical to safety management, analysis, and decision-making), to be adopted and used by States to support these requirements.

State Planning and Research (SPR)

Like the name indicates, SPR funds statewide planning and research activities and are used in the 3-C approach to guide transportation investment decisions and to research transportation issues throughout the State. This Plan has been funded with an SPR grant through the SDDOT and matched with funds from Codington County.

Funding features

Funding is provided for SP&R by a 2% set-aside from each State's apportionments of four programs: the National Highway Performance Program (NHPP); the Surface Transportation Program (STP); the Highway Safety Improvement Program (HSIP); and the Congestion Mitigation Air Quality Improvement Program (CMAQ) Program.

Of the funds that are set aside, a minimum of 25% must be used for research purposes, unless the State certifies that more than 75% of the funds are needed for statewide and metropolitan planning and the Secretary accepts such certification.

In addition, transportation planning, research and development, and technology transfer activities are eligible for funding under the Surface Transportation Program.

Eligible activities

- Eligible activities include
    - Engineering and economic surveys and investigations
    - Planning of future highway programs and local public transportation systems and planning of the financing of such programs and systems, including metropolitan and statewide planning

- Development and implementation of management systems, plans and processes under the NHPP, HSIP, CMAQ, and the National Freight Policy
- Studies of the economy, safety, and convenience of surface transportation systems and the desirable regulation and equitable taxation of such systems
- Research, development, and technology transfer activities necessary in connection with the planning, design, construction, management, and maintenance of highway, public transportation, and intermodal transportation systems
- Study, research, and training on the engineering standards and construction materials for transportation systems described in the previous bullet, including the evaluation and accreditation of inspection and testing and the regulation and taxation of their use
- Conduct of activities relating to the planning of real-time monitoring elements
- Implementation by the Secretary of the findings and results of the Future Strategic Highway Research Program[1]

Federal share

The Federal share of the cost of a project carried out with SP&R funds shall be 80% unless the Secretary determines that the interests of the Federal-aid highway program would be best served by decreasing or eliminating the non-Federal share.

SP&R funds may be used by States as the non-Federal share for the Local Technical Assistance Program and the University Transportation Centers program.

Emergency Relief (ER)

ER funding is a federal funding source that, like all federal transportation funds in South Dakota, is allocated through the SDDOT. The program provides funding from the Highway Trust Fund to repair or reconstruct Federal-aid highways or roadways on federal lands that have suffered serious damage due to natural disasters or catastrophic events from external causes. This funding is often lumped with other State and local funding for areas damaged in eligible events.

In order to be eligible, a state or federal declaration of emergency must have been declared in the damaged area. The funding can then only be used to

restore affected facilities to their pre-disaster condition and is limited to the cost of the repair or reconstruction of a comparable facility.

Codington County has received a small amount of ER funding over the course of the last five years. This is due to flooding and the continuous rise in water levels throughout the County.

Codington County has also relied upon to funding from the Federal Emergency Management Administration (FEMA) to repair roadways after natural disasters have been declared. FEMA funding is limited to roadway that cannot receive ER funding, however.

Local Funding Sources

Motor Fuel Tax (MFT)

MFT funding is obtained by the sale of fuels used in motor vehicles. It represents a small portion of the total price of a gallon of gasoline you pay at the pump. There is both a state and federal levy on motor fuels. At present, all MFT remains with the State DOT and is not directly available for any local entities. The increasing efficiency of motor vehicles and the small proportion of tax to the price of a gallon of fuel, MFT does not supply enough funding to be relied upon as adequate way to pay for improvements.

Wheel Tax

The state has given authority to local jurisdictions to enact a tax, paid at the time of licensure, on the number of wheels on an automobile. The amount of tax that can be levied is four dollars per wheel up to a maximum amount of 16 dollars per vehicle. Codington County currently levies only two dollars per tire, providing annual revenue of $225,000.

Through referendum, the County could increase the tax to the maximum allowed. Twice the ballot measure to increase the tax has been voted down. Other jurisdictions have tied transportation tax increases to specific projects in order to gain support of the measure. This might be one avenue Codington County could explore to successfully raise the levy.

Road and Bridge County Budgetary Funding

The predominant funding for the Codington County Highway Department is its annual budgetary allotment. The County Commission allocated funding to the department for personnel, road and bridge repair, snow removal, grading, paving of new facilities, equipment, and any other transportation expenses.

Vehicle registration and licensing fees comprise a large portion of the budgetary transportation funding of Codington County currently. Table 24 shows the transportation funding that Codington County has received in the last five years. As you can see the budgetary funding has remained relatively constant until 2014 where it was increased by approximately one-million dollars.

Table 24: Codington County Highway Department Revenues

Codington County Roadway Funding Revenues						
Programs		**Year**				
		2010	2011	2012	2013	2014
Federal	STP-Rural	$ 167,780		$ 204,712		$ 195,896
	Transportation Alternatives					
	HSIP					
	Major Bridge/BRRP					
	FEMA		$ 476,406	$ 53,090	$ 21,340	
	SPR					
	Emergency Relief	$ 175,178		$ 71,680	$ 20,111	$650,000
State	STP Swap		$ 204,712		$ 195,896	
Local	MFT					
	Wheel-Tax	$ 225,000	$ 225,000	$ 225,000	$ 225,000	$ 225,000
	Road & Bridge Total Budget	$ 2,808,045	$ 2,738,321	$ 3,025,690	$ 3,021,300	$ 3,737,082
	Secondary Road					
	General Fund					
	Snow Removal & Grading	$ 85,000	$ 85,000	$ 85,000	$ 85,000	$ 85,000
	Other (licensing, Permits,etc)					
Totals		**$ 3,461,003**	**$ 3,729,439**	**$ 3,665,172**	**$ 3,568,647**	**$ 4,892,978**

Innovative Funding Solutions

In the last decade, federal transportation funding through the Highway Trust Fund has been inadequate to pay for the necessary improvements to the existing transportation network. Revenue streams feeding the Highway Trust Fund have been so insufficient that Congress has had to bolster the fund with general revenues dating back to at least the original passage of SAFETEA-LU in 2001.

Due to the insufficient funding levels, state and local entities have put forth new innovative ways of funding transportation and infrastructure. The following are ways in which other jurisdictions throughout the nation have filled the funding gap and innovative solutions proposed through guidance from federal agencies.

Public Private Partnerships (P3)

Public Private Partnerships are a new way of looking at funding infrastructure that has caught on to such an extent that the FHWA has now began prioritizing project funding applications in competitive grants that can demonstrate private funding as part of the funding mix.

P3 is a way of financing projects in which private entities are allowed to participate in project delivery and finance. This usually comes to bear when a private entity has stake in or will directly benefit from a project being completed.

Under traditional procurement, private contractors construct projects based on a public design with public financing and turn them over to the public sector upon completion for operations and maintenance. Under P3 models, the private sector may also participate in design, finance, operations, maintenance, and toll-revenue collection. "Availability payments" are a type of long-term lease in which the private sector designs, builds, finances, and operates a facility over a specified term in exchange for an annual payment. Under a toll concession, the private concessionaire receives the right to collect toll revenues from the facility instead of collecting a specified payment[7].

In Codington County, some public agencies have made agreements with private entities for the maintenance of public roads. Those private entities pay for impacts they may have on the roadway, usually heavy trucks; though, they benefit so much from having a well-maintained roadway, that they are willing to partially fund maintenance activities.

[7] Source: P3 information was obtained from the FHWA P3 Fact Sheet

In this way, Codington County could implement improvements listed in this Plan, by approaching private entities that would have a direct benefit and asking them to participate in project delivery.

Transportation Investments Generating Economic Recovery (TIGER)

This competitive grant has been newly reauthorized in MAP-21 and was originally instituted in the midst of the recent recession. This funding source must be applied for and generally, those who receive funding can demonstrate that the project will have a direct correlation in creating jobs. It is highly over-subscribed, and those that can bring other funding sources to bear are usually more successful in being awarded funding.

A local funding match of 20% of the project cost is required, but those projects with higher match percentages are preferred. Project readiness (engineering and NEPA documentation having already been completed) are important factors for project selection as well. The original intent of the creation of this grant was to get "shovel ready" projects going in order to create jobs. The 2014 TIGER application process allowed applications for planning studies for the first time.

The grant cycle is usually once every year or two depending upon funding. Preparing the grant application is typically a very intensive process because of its competitive nature, required documentation of project benefits, and limited funding.

Transportation Infrastructure Finance and Innovation Act (TIFIA)[8]

The Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides Federal credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to finance surface transportation projects of national and regional significance. TIFIA credit assistance provides improved access to capital markets, flexible repayment terms, and potentially more favorable interest rates than can be found in private capital markets for similar instruments. TIFIA can help advance qualified, large-scale projects that otherwise might be delayed or deferred because of size, complexity, or uncertainty over the timing of revenues. Many surface transportation projects - highway, transit, railroad, intermodal freight, and port access - are eligible for assistance. Each dollar of Federal funds can provide up to $10 in TIFIA credit assistance - and leverage $30 in transportation infrastructure investment.

[8] Source: TIFIA information was obtained from the FHWA Innovative Project Delivery website

Expenditures

Project expenditures are simply defined as the money spent on transportation related functions. Typically, expenditures (money being spent) must match revenues (money being received). Tracking revenues and expenses can also be used to analyze the fiscal impacts of future system modifications. In order to anticipate and financially plan for system enhancement and maintenance, an understanding of where revenues are generated, the reliability of those sources, and the cost of system modifications and maintenance must be understood.

Table 25: Expenditures by Project Type (2008-2012)

Expenditures by Project Type			
	Amount	Mileage	Cost/Mile
Seal Coat	$1,559,008	116	$13,417
Pave	$3,370,864	33	$102,147
2" Mat	$1,468,933	17	$86,407
Chip Seal	$126,490	12.5	$10,119.2
Gravel	$139,430	40	$3,485

As Table 24 above detailed the transportation funding the County received, Table 25 details the types of activities that funding is being spent on. It is important to note that the amounts in Table 25 are not adjusted for inflation. Since the start of what some have termed the "Great Recession" in 2008, the consumer price index as well as inflation has remained fairly constant because of the decision by the Federal Reserve Bank to artificially keep interest rates at an all-time low. Also, the individual characteristics of a particular project typically have the greatest bearing on project cost than do than does the monetary inflation rate.

Future Roadway Expenditures

Table 26: Potential Road Mile Change

As Codington County develops the future roadway network defined in this Plan, it will need to acquire funding to not only construct future facilities, but also to maintain those facilities as well.

The future roadway system mileage of Codington County could potentially gain approximately eight-miles of roadway but could potentially lose approximately 30 miles through the potential for jurisdictional transfers listed in this Plan. Table 23 details the potential mileage that various jurisdictions would gain if the all the changes listed were realized.

It is important to note that although Elmira Township would gain approximately three-miles of roadway it would also lose three miles in transfers to Codington County. Rauville Township, not listed on this figure, would lose approximately two-miles of roadway to a transfer to Codington County. Transfers from the SDDOT comprise the rest of the system mileage gained by Codington County.

With the potential transfer of almost 30 miles of roadway, this could make financial room for the construction and maintenance of other roadway facilities. However, most of the roadways being transferred are currently gravel and cost approximately $581 per mile per year to maintain. Codington County could potentially save $17,731 per year that could be repurposed for the maintenance of future roadway facilities.

Receiving Jurisdiction	Mileage
Townships	
Dexter	1.03
Elmira	2.99
Fuller	6.00
Graceland	3.51
Henry	1.01
Kampeska	1.67
Kranzburg N	0.64
Kranzburg S	4.09
Pelican	0.46
Sheridan	1.02
Total	**22.46**
Municipalities	
Florence	0.80
South Shore	0.32
Wallace	0.44
Watertown	13.05
Total	**14.62**
Other Jurisdictions	
Grant County	0.45
SD GFP Dept	0.73
Total	**1.19**
Grand Total	**38.28**
Codington County	
Gained	7.76
Lost	38.28
Total	**-30.52**