



McKenzie County Safety Projects



2022 Safe Streets and FY 2022 Safe Streets and Roads for All (SS4A) Funding Opportunity

Project Type: Implementation Grant

FY 2022 Project Funds Requested: \$2.85 Million (Total \$3.57M)

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Supporting Information can be found at:

<https://www.srfconsulting.com/mckenzie-county-safety-projects/>

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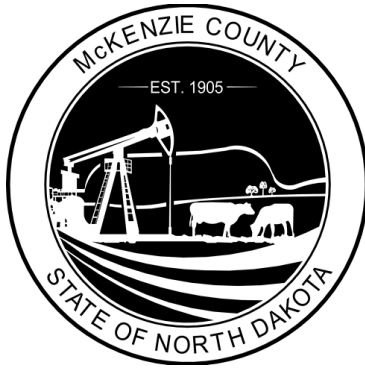
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Key Information Table

Application Name	McKenzie County Safety Projects
Lead Applicant	McKenzie County
If Multijurisdictional, additional eligible entities jointly applying	N/A
Roadway safety responsibility	Ownership and/or maintenance responsibilities over a roadway network
Population in Underserved Communities	61.5 percent
States(s) in which activities are located	North Dakota
Costs by State	North Dakota - \$3.57 Million
Funds to Underserved Communities	100%
Cost total for eligible activity (A) supplemental action plan activities in support of an existing Action Plan	\$0
Cost total for eligible activity (B) conducting planning, design, and development activities for projects and strategies identified in an Action Plan	\$329,446
Cost total for eligible activity (C) carrying out projects and strategies identified in an Action Plan	\$3,243,798
Action Plan or Established Plan Link	https://projects.srfconsulting.com/ss4a/McKenzie-County/McKenzieCountyRoadwaySafetyActionPlan.pdf

I. Overview



McKenzie County (herein known as the County) is requesting \$3.57 million in federal discretionary funding through the FY 2022 Safe Streets and Roads for All (SS4A) program. The requested funds will be used toward infrastructural initiatives to prevent death and serious injury involving all roadway users in the County.

According to the North Dakota Department of Transportation's (NDDOT) crash database, the County has the highest number of fatalities per county, 11 of the 100 fatalities in the state occurred in the County in 2019. Forty-three fatal crashes occurred in the County between 2015 and 2019 (this data range was used for this application rather than 2016-2020 since it represents the crash analysis conducted in the McKenzie County Roadway Safety Action Plan – herein known as the Plan), and there were 139 serious injury crashes. The County recognizes that these deaths and injuries are preventable and wanted to make a change. In 2020, The County Board tasked county staff with developing a Safety Action Plan, with the goal of reducing and ultimately eliminating fatal and serious injury crashes. The county worked with a consultant to complete a thorough assessment of safety issues on the roadway network and used a data driven systemic approach to identify areas of risk and to recommend safety projects to implement. On May 4, 2021, the Plan was officially adopted by the County. In August 2022, the County Board signed a resolution with an aim to eliminate all fatalities and severe injuries on county roads by 2032. The Plan is a dynamic, living document that outlines strategies and actions that should be taken within the next ten years, to implement safety strategies with a focus on safety, equity, and sustainability.

This application is seeking FY 2022 SS4A funds to implement infrastructure improvements at 82 unique locations (See [Full Project List and Cost Estimate](#)). All the listed projects and strategies are under the jurisdiction of the County. The infrastructure improvement projects and strategies (herein known as the Projects) can be broadly classified into:

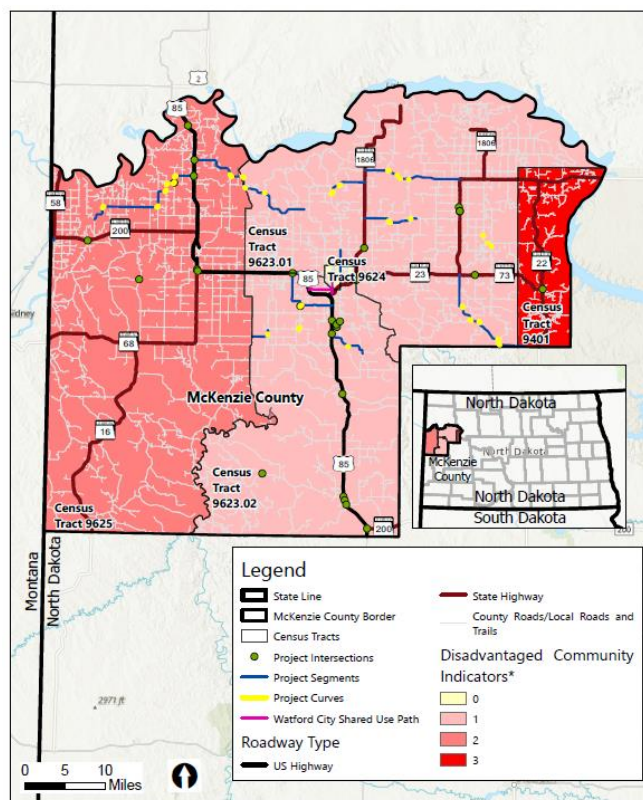
- Lane departure crash reduction (21 project locations) – Chevron signs, curve warning signs, speed advisory signs, rumble strips and pavement markings
- Head-on crash reduction (30 project locations)– Centerline rumble strips
- Intersection related crash reduction (30 project locations) – Intersection lighting, signs, markings and clearing sight triangles
- Pedestrian/bicycle crash reduction (1 project location) - Shared use path sidewalk addition/connections

The county is eager to get to work on implementation of the safety strategies identified in their plan. As a result of the Plan development process, the County has implemented new policies to include a safety edge, shoulders and rumble strips on all new paving projects. This is an important improvement since the County is a rapidly growing community that is frequently paving existing gravel roads.

II. Location

The Projects are in McKenzie County (See Figure 1 – [Project Location Map](#)), which is in western North Dakota. It lies within the Bakken Formation, which contains rich deposits of oil and natural gas. The County's northern border is formed by the Missouri River and Lake Sakakawea. It shares its western border with the State of Montana. The County's terrain varies from prairies to rolling hills. This topography shapes the transportation network, influencing roadway alignments and accessibility. In many areas, vertical and horizontal roadway curves pose a safety hazard. Remote areas have limited vehicle access.

The County is rural by definition (located outside of an Urbanized Area) and includes a few cities. Watford City is the largest municipality, containing roughly half of the County's population. The County also overlaps a portion of the Fort Berthold Reservation, which is home to the Mandan Hidatsa and Arikara Nation (MHA Nation or Three Affiliated Tribes). The swift rise in population stemming from Bakken oil development in recent years has put Watford City and the County on the map as a rapid growing community full of diverse opportunities for longtime citizens and new residents settling in and calling the community home. Over the past decade, the rapid development



[Figure 1 – Project Location Map and Relationship to Disadvantaged Communities](#)

of oil and gas reserves in western North Dakota fueled historic growth throughout the region. By the end of the decade, the County was the top oil-producing county in North Dakota and the fastest-growing county in the United States in terms of the percentage of population growth – its population increased from 6,360 in 2010 to 14,704 people in 2020 (131.2% growth). The County is projected to gain over 5,000-10,000 residents between 2020 and 2030, which is a significant increase that needs to account for infrastructure where limited public space, resources, and support are allocated to those who need it most. Prospects for continued growth are a key driver for the safety improvements for the county.

There are five census tracts (9401, 9623.01, 9623.02, 9624 and 9625) within the County (shown in [Figure 1](#)). Four are categorized as Disadvantaged Census Tracts according to USDOT's Areas of Persistent Poverty (APP) and Historically Disadvantaged Community

(HDC) Status Tool. As shown in Table 1, 61.5% of the County's 14,704 residents live within a transportation disadvantaged census tract, as based on the [indicators provided by USDOT](#).

McKenzie County Disadvantaged Community Indicators ¹										
	Population ²	Areas of Persistent Poverty	Historically Disadvantaged Community	Transportation Disadvantaged Community	Health Disadvantage Indicator	Economy Disadvantage Indicator	Equity Disadvantage Indicator	Resilience Disadvantage Indicator	Environmental Disadvantage Indicator	Total Indicators
Total	14,704	1,878	-	1,937	1,878	1,878	3,815	5,235	-	7
% of Total	100.0%	12.8%	0.0%	13.2%	12.8%	12.8%	25.9%	35.6%	0.0%	61.5%

¹Areas of Persistent Poverty Project and Historically Disadvantaged Community Status Tool

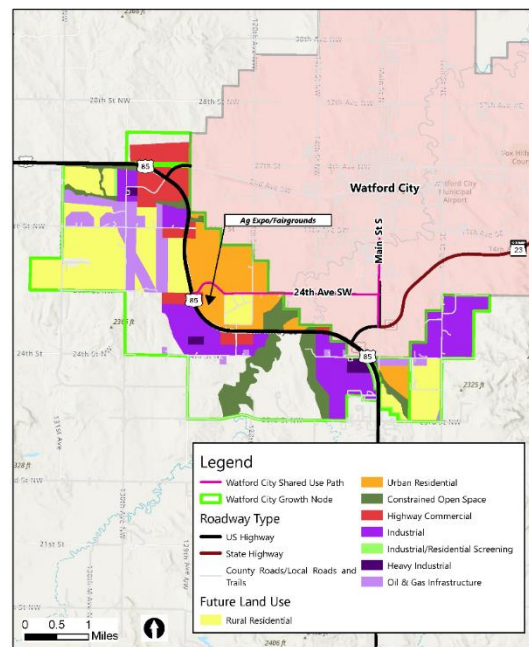
²2019 ACS Data

Table 1 – McKenzie County Disadvantages Community Indicators

Census Tract 9401 (population 1,878) is identified by the Justice 40 Initiative's [Climate and Economic Justice Screening Tool](#) as a disadvantaged community in three categories including: (1) climate change, (2) clean energy and energy efficiency, and (3) health burdens.

The 82 Projects identified to implement safety improvements using SS4A funds are all located in the census tracts mentioned above and identified by USDOT as meeting the criteria for at least one but no more than three of the six disadvantaged community indicators. The Projects are mapped over the sum of disadvantaged community indicators by census tract as shown in [Figure 1](#).

Census tract 9401 is also designated as an Area of Persistent Poverty (APP) and Qualified Opportunity Zone. The Projects are not located in a Historically Disadvantaged Community (HDC), as defined in the NOFO, Empowerment Zones, Promise Zones, or Choice Neighborhoods.



[Figure 2 – Growth Focus Area Map](#)

All 82 Projects included in this application are located in disadvantaged communities, and one of the Projects is in an APP and Qualified Opportunity Zone. The County is rural and all Projects are considered rural safety projects.

One of the 82 projects includes the construction of a shared use path which is an important connection between the existing path located to the north, that will connect Main Street to the new softball and fairgrounds complex on the southwest side of town. The path will be built along Main Street and 24th Ave SW and will eventually connect to the future shared use paths along Highway 85. It is a much-needed connection for bicycles/pedestrians to safely navigate both to the new fairgrounds, sports complex and eventually along Highway 85 to the Maah Daah Hey Trail system. Currently pedestrians and bicyclists are walking in the grass or on the shoulder along the side

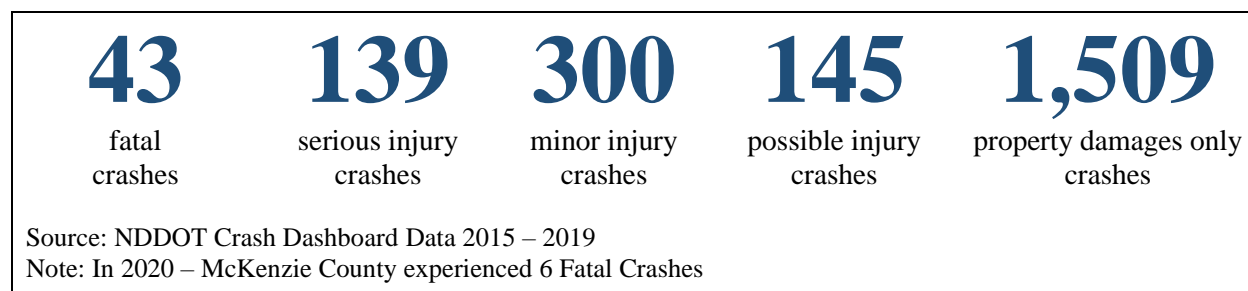
of these roads. The new fairgrounds plan to host events at least four days week, anticipating around 1,000 attendees per week. The shared use path travels through the orange area shown in [Figure 2](#), which is designated as future urban residential. This trail will set the stage for multi-modal mobility as the future residential area is built out.

III. Response to Selection Criteria

1. Safety Impact

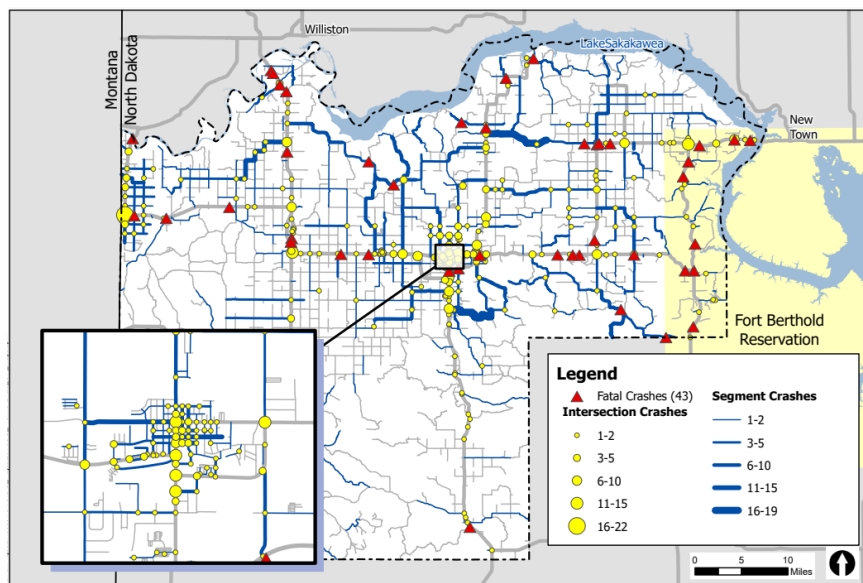
1.1 Description of the Safety Problem

Over the five-year period from 2015-2019, the County experienced (see [Figure 3](#)):



Crash analysis results (years 2015-2019 - this data range was used for this application rather than 2016-2020 since it represents the crash analysis conducted in the McKenzie County Roadway Safety Action Plan) indicates that the critical emphasis areas are intersection and lane departure crashes, primarily on curves:

- 42% of the severe rural intersection crashes involved a right-angle crash
- 77% of the severe rural non-intersection crashes were lane departure crashes with the majority (69%) being single vehicle crashes
- 53% of the rural severe non-intersection crashes occurred on a curve, while curves account for less than 11% of the rural roadways



As a leader in oil and gas production in North Dakota, the County attracts significant development and associated traffic from the energy industry. Driven by the energy industry, high truck volumes on the county road system in proportion to other vehicles makes the county unique from most other rural counties in the state. Together with Williams and Mountrail County (adjacent oil and gas-producing counties), the

[Figure 3 – Fatal and Serious Injury Crashes \(2015-2019\)](#)

three counties together accounted for 42 percent of truck involved fatal and injury crashes from the period of 2015 to 2019 (See [Truck Crash Map](#)).

Another unique factor is that from 2015 to 2019, out of state drivers (short term staff that have relocated to drive oil trucks) were involved in approximately 50% of crashes in the County. This implies that familiarity and education about driving on county or rural roads is lacking for many drivers. Also, the rural nature of the roadway system is a factor—most of the system is gravel or minimum maintenance, surfaces that pose different hazards to drivers than paved surfaces.

1.2 Safety Impact Assessment

To shift the County’s approach to highway planning, making safety a clear priority in highway investment decisions, in 2020, the County pursued a data-driven systemic safety approach, which looks at safety concerns proactively. The approach seeks out locations that are considered at risk not only based on historical crash data, but by roadway characteristics that have been proven to make roads more dangerous and addressing the concerns before a crash occurs. A systemic approach is used to efficiently identify risk and assign safety strategies to all roadways and intersections across the County. Figure 4 illustrates the Plan approach that was implemented.

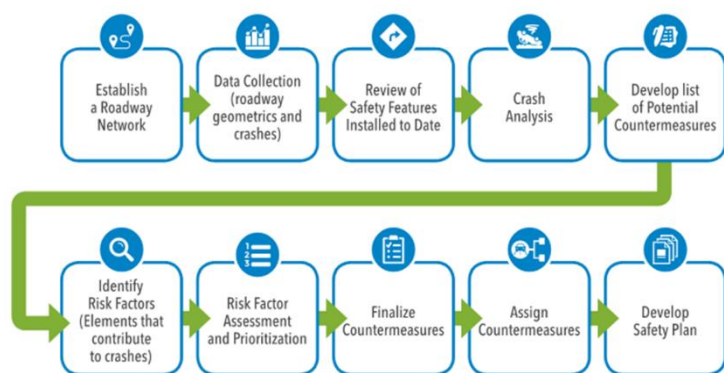


Figure 4 – Overview of CRSP Approach

The County evaluated 1,733 total segments, 4,282 total curves, and 1,566 intersections. Using the risk factors identified in the Plan, all roadway segments, intersections, and curves in the County were reviewed to determine which locations have the identified risk factors present. Each location was assessed using a “check” ranking system, assigning a check for each risk factor that is present. The more checks given to a location, the more at-risk the location is to

experience a severe crash. High priority locations include the top three check rankings of each category. The total number of locations analyzed, and the high priority segments, intersections and curves are shown in Table 2.

	Number Analyzed <i>Rural - Paved</i>	Number Analyzed <i>Rural - Gravel</i>	Number Analyzed Total	Number of High-Priority Locations**
Segments	54	1679	1733	166
Curves	264	4018	4282	154
Intersections*	N/A	N/A	1566	150

*The first two columns reference roadway segments. Intersections do not apply

**High-Priority locations are those assigned projects

Table 2 - Number of Locations Evaluated

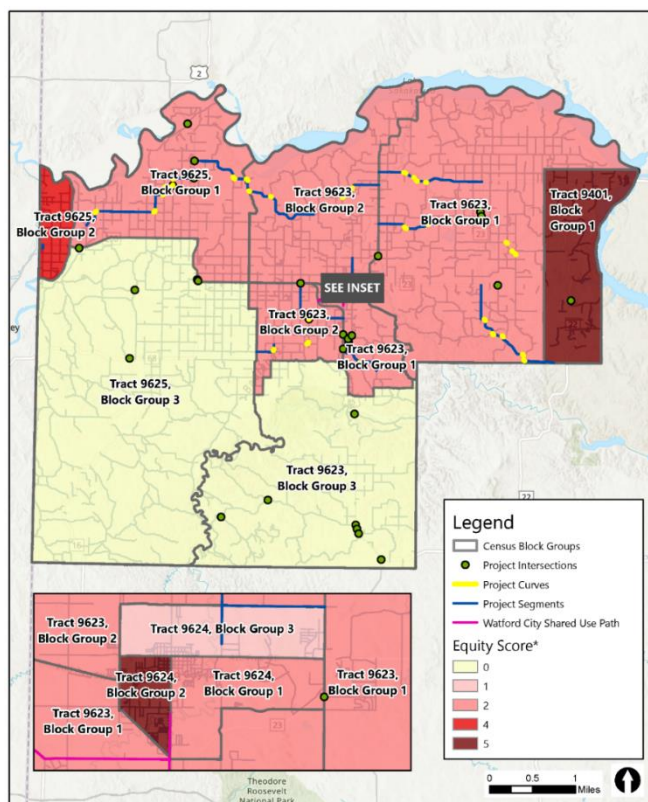
Low-cost high-impact projects were assigned to all identified high-priority locations. For this application, the County is applying for funding for the highest ranked locations on paved roads from each list – 21 segment locations, 30 curve locations and 30 intersections locations. A detailed

list of all the Project locations, risk rankings, costs and crash data are included in a table provided in the [Full Project List and Cost Estimate](#). Details about the effectiveness of the recommended safety improvements are provided in [Section 3.1 Create a Safer Community](#).

The shared use path project will enhance the safety of the community as the extension of a current multi-use path, by providing access to the new Softball and Fairgrounds Complex. The extended path would be a great asset to Watford City as it would provide the missing connection for residents to safely travel to and from the city. This path would decrease the chance of a motor vehicle/pedestrian crash by eliminating the need to walk or bike on the shoulder of Main Street and 24th Avenue. Many recreational walkers and bicyclists, consisting of families and health conscientious individuals, would take full advantage of this safe path. The County has the design of the shared use path almost complete. It will go out for bid in Spring of 2023. [Estimated construction costs](#) and [75% construction design plans](#) for the shared use path are available on the [application attachments website](#).

2. Equity, Engagement, and Collaboration

The County understands that consideration of equitable planning and design is a critical component to an inclusive process that represents the views and opinions of all populations including underserved and underrepresented populations. The findings and recommendations outlined within the Plan, and the selection of these Projects as a top priority, represent the culmination of planning and engagement efforts performed as part of several planning initiatives in recent years.



[Figure 5 – Equity Analysis](#)

In the Plan, a comprehensive equity assessment was conducted to provide direction to project assignment. The Plan emphasizes equity in the implementation process by: (1) ensuring an inclusive and representative public engagement process, (2) identifying underserved and disadvantaged communities within the County, and (3) incorporating equity considerations into prioritization and project recommendations.

Five priority equity indicators were analyzed in the Plan based on their connection to the Justice40 Initiative's interim definition of underserved communities. The indicators included: (1) minority population, (2) household poverty, (3) disabled population, (4) zero-vehicle households, and (5) dependent aged population. The County Block Groups were given a score of one to five, depending on if the indicator exceeded

the State of North Dakota's average for the given category. 93% of the County's population by Block Group exceeded the State average in at least two equity priority categories. Two of the 12 Block Groups (21.2% of the County's population) analyzed exceeded the State average in every category.

The underserved population in the County, from highest to least prevalence, as compared to State averages includes: disabled people, dependent aged people, minority people, people in poverty, and people with zero vehicle access. These populations are especially vulnerable to the rural character of the County and the necessity of safe mobility to go about their everyday lives. Census Tract 9401 makes up part of the Fort Berthold Reservation of the Mandan, Hidatsa and Arikara (MHA) Nation, and was identified as a critical community and stakeholder when assigning project recommendations. Census Tract 9401 has 95.4% minority population, one of the highest in the State of North Dakota. The local economy and rural nature of the County requires residents and those employed in the County to travel, often at great lengths, to get to work, school, medical appointments, and other destinations in order to achieve a high quality of life. Safety is of utmost importance on the County roadways and is often challenged by the County's rural roadway network.

The economy of the County is driven by energy production, construction, retail trade, and agriculture. Due to the low population and the workforce necessary to sustain the County's (and State's) economy and its inherent cyclical nature, there is a high prevalence of transitory workforce, including workers from out of State. Truck drivers, for example, may not be accustomed to the unique topography and rural roadway geographies of the County. This inexperience and lack of awareness of the area has historically led to numerous crashes and disastrous loss of life on the County's roadways.

All residents and those employed across the County deserve the safest rural roadway system that the County can provide. An SS4A Implementation Grant will provide essential funding for critical rural roadway improvements that will have a real impact on the health, safety, and welfare of the County and preserve the rural quality of life that all residents and the workers need.

Engagement

In order to further understand the safety concerns on the County roadways, the County reached out to the public to hear their feedback. To gather feedback, the County developed a wiki-map, which is an interactive online mapping tool that the public can use to place a pin on a map and add a comment about a roadway safety concern. This engagement process resulted in 326 responses. Locations that received a comment indicating a safety concern were included as a risk factor in the ranking described in [Section 1.2 Safety Impact Assessment](#).

A Safety Plan Stakeholder Group was developed to vet the planning process and plan results. Inter-governmental coordination was a key function of the Stakeholder Group. Coordination with key partners, especially the NDDOT, the US Forest Service, MHA Nation, and Watford City was critical in understanding key safety issues. Moving forward, the committee will continue to engage with underserved communities and help evaluate the impacts of the Projects in the future.

The above-mentioned equity, engagement, and collaboration helped shape the list of high priority locations and strategies included in the Plan.

3. Effective Practices and Strategies.

3.1 Create a Safer Community

As explained in [Section 1.2 Safety Impact Assessment](#), we used the data-driven systemic safety approach to identify high risk locations. From there we identified proven low-cost high-impact strategies to recommend for each location.

The 82 identified Project locations include several of FHWA’s Proven Safety Countermeasures, that are low-cost, high impact strategies with proven effectiveness to reduce fatal and serious injury crashes as shown in Table 3. We used Crash Modification Factors (CMFs) and other published research to identify the expected crash reduction percentage.

Proven Safety Strategy	Expected Crash Reduction Percentage	Number of each Strategy Included in this Application*
Paved Segments		
Enhance Edgeline/ Pavement Markings	10% to 45% all rural severe crashes	21
Shoulder Rumble Strip	20% run-off-road crashes	21
Centerline Rumble	40% head-on/sideswipe crashes	7
Paved Curves		
Upgrade/Install Chevrons	20% to 30%	30
Shoulder Rumble Strip	20% run-off-road crashes	30
Advanced Curve Warning/ Speed Advisory Sign	20% to 30%	30
Intersections		
Upgrade Signs and Markings	40% upgrade of all signs and pavement markings	22
Street Lights	25% to 40% of nighttime crashes	7
Review Sight Triangles	Not Available	29
Pedestrians		
Walkways	65-89% reduction in crashes involving pedestrians walking along roadways	1

*Note that the number of strategies listed is higher than the number of project location, since each location has two or more safety strategies recommended.

Table 3 – Crash Reduction Factors

4. Climate Change and Sustainability, and Economic Competitiveness.

4.1 Active Transportation

The Plan works together with the County’s [Capital Improvement Plan](#) supporting documentation to identify the need to improve roadway surfaces across the county to accommodate forecasted economic growth and to prepare for the impacts of growth. Just in the past ten years, the County has shifted from roughly 30 percent of its County Major Collectors (CMCs) to close to 70% of all CMCs paved. This improves the mobility and safety of all modes of transportation that use county roads, not just vehicles. Bicycles in particular benefit from past and planned road pavement and safety improvements. These improvements encourage bicycling in the County, especially adjacent to Watford City and on the Fort Berthold Reservation where basic amenities are more easily accessible, such as schools, grocery stores, and medical facilities.

4.2 Energy Efficiency

All lighting improvements associated with safety improvements will utilize LEDs. This saves energy and reduces maintenance needs—meaning less trips to many isolated rural areas to service intersections and other lighting.

4.3 Resilience from the Impacts of Climate Change

The County is projected to have increased occurrences of severe weather events, especially heavy storms (reference: [What Climate Change Means for North Dakota](#)). Safety improvements will help to keep drivers on the roadway during heavy storm events through visual improvements (e.g. lighting and signage) and other measures such as rumble strips.

4.4 Economic Sustainability and Competitiveness

The County’s [Capital Improvement Plan](#) supporting documentation highlights the energy industry as the most significant driver of traffic and safety impacts on the County’s roads. At least through 2030, the energy industry is projected to have sustained growth—this means truck traffic associated with the energy industry will need to continue to coexist with other vehicular traffic and modes of transportation. Countywide safety projects will create a safer environment for trucks to coexist with other traffic, reducing crashes, and positively impacting the county’s energy industry.

The energy industry is prominent in the County, but the County’s roots and the majority of land area is utilized for agriculture (farming and ranching). Other important aspects of the County’s economy include recreation (location of the North Unit of Theodore Roosevelt National Park, extensive National Grasslands, and other public recreational areas) and health care. According to the County’s [Comprehensive Plan](#), the County intends to work toward local economic sustainability—a dynamic economy built on more than energy with a thriving permanent population and high quality of life. To sustain this dynamic economy and higher quality of life, widespread safety improvements across the County are critical. Safety improvements will also help to ensure drivers and vehicles connected to various parts of the economy (energy and recreation, for example) can coexist safely on the same roadways.

Beyond energy, countywide roadway and safety improvements will increase mobility and connectivity for all road users to jobs and business opportunities. This is especially true for the County’s agricultural industry. Safety projects improve farm to market access, access to recreational areas, and connectivity to important services, such as health. This all helps support and strengthen the local economy beyond the horizon of the energy industry.

IV. Project Readiness

The County guarantees that all necessary activities will be completed within five years of grant execution. The Projects will conform to all current USDOT, AASHTO, and NDDOT standards for design and ADA compliant pedestrian infrastructure. The Projects suggested are low-cost high-impact strategies that are easy to add to existing roadways without major re-construction. The location and type of project to implement at each of the 82 locations has been identified. Simple design plans will need to be developed for each project (with the exception of the shared use path project which is already complete), to provide guidance to the hired contractor for placement of the various improvements (rumble strips, striping, signing, etc). The County has a retainer with a consultant in place, to provide these design services. The county board has committed funding to cover the cost of the local funds match. For locations where intersection lighting is suggested at intersections with State owned roadways, the County has confirmed with the DOT that they will enter into an agreement with the County, allowing them to construct the lighting, with the expectation that the County will pay for the electricity, which the County has agreed to.

For the shared use path project, all property and right-of-way (ROW) acquisition is in progress and the majority has been acquired. The rest will be completed before construction and in accordance with 49 CFR Part 24 and other Federal regulations by the County. The design work for the shared use path will be 100% complete and out for bid by the Spring of 2023.

The County anticipates construction of the safety improvements will be completed in phases, with shared use path completed the first year, the segment projects completed the second year, the curve projects completed in the third year and the intersection projects completed in the fourth year. Figure 6 shows all Projects and strategy milestones identified in the project schedule.

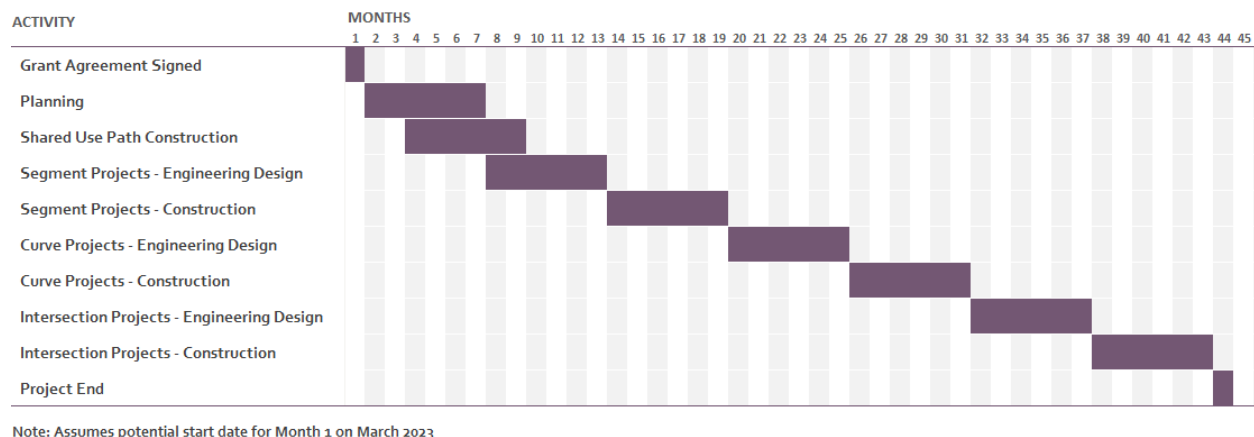


Figure 6 – Project Schedule