



County Paved Curve

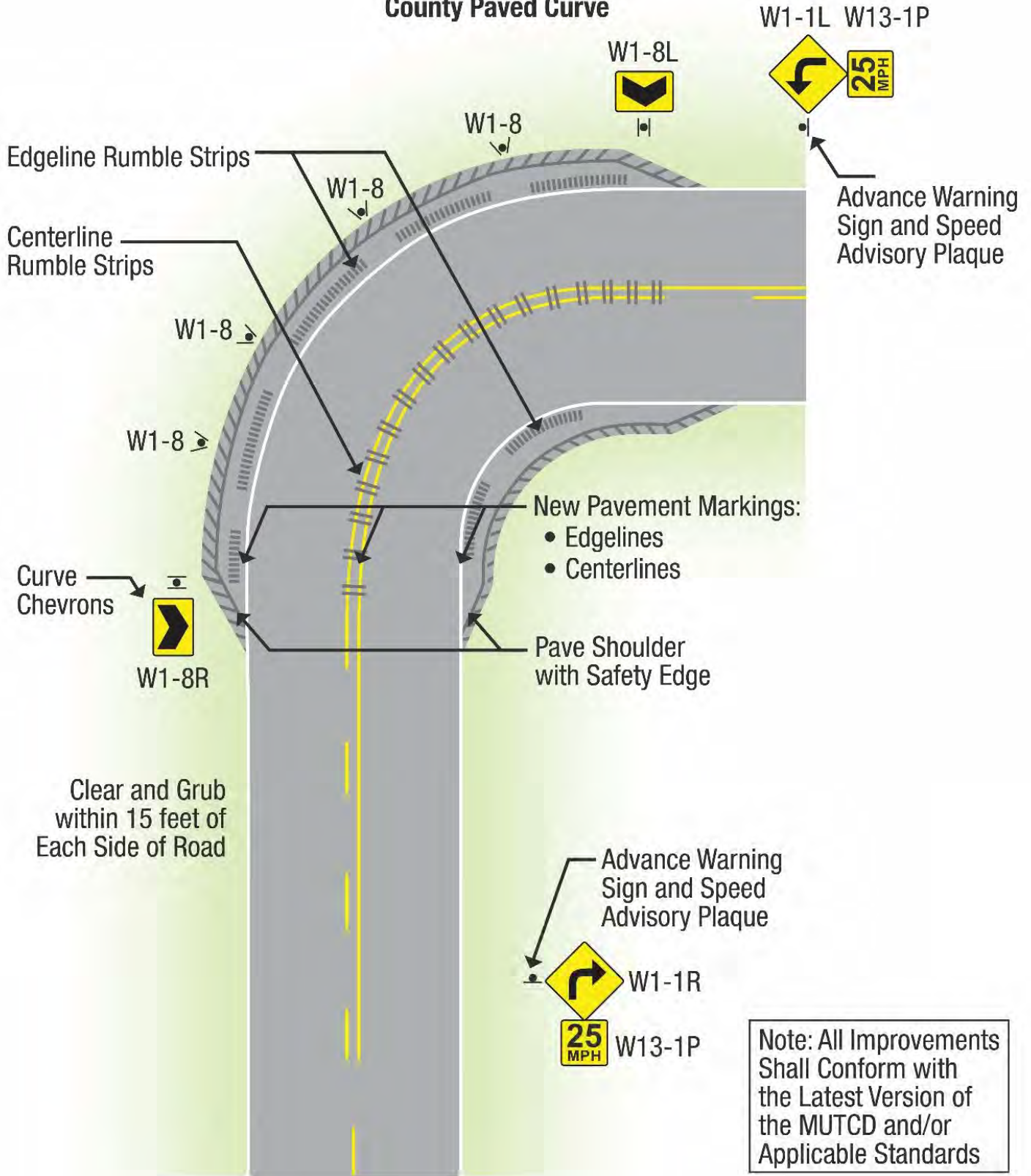


Figure 32 – County Paved Horizontal Curve Safety Improvements



6.4.4. Project Selection Decision Tree

After conducting the risk factor calculations and rankings for all paved curves within the county, and developing the curve safety countermeasures, a project selection decision tree was developed. The decision tree was utilized to develop and systemically define location-specific recommendations for the curves based on the characteristics of the curves (ADT, radius, paved shoulder, lane width, etc.). The decision tree for curve safety improvements is shown in **Figure 33**.

Each possible decision tree outcome represents a set of potential safety improvements for the curve. The decision tree was utilized to determine projects for the curves with the highest risk factor rankings and project sheets were developed for those curves. Not all improvements are recommended at all locations and the project sheets contain the recommended improvements for the specific location based on the decision tree process, existing conditions, and defined criteria.

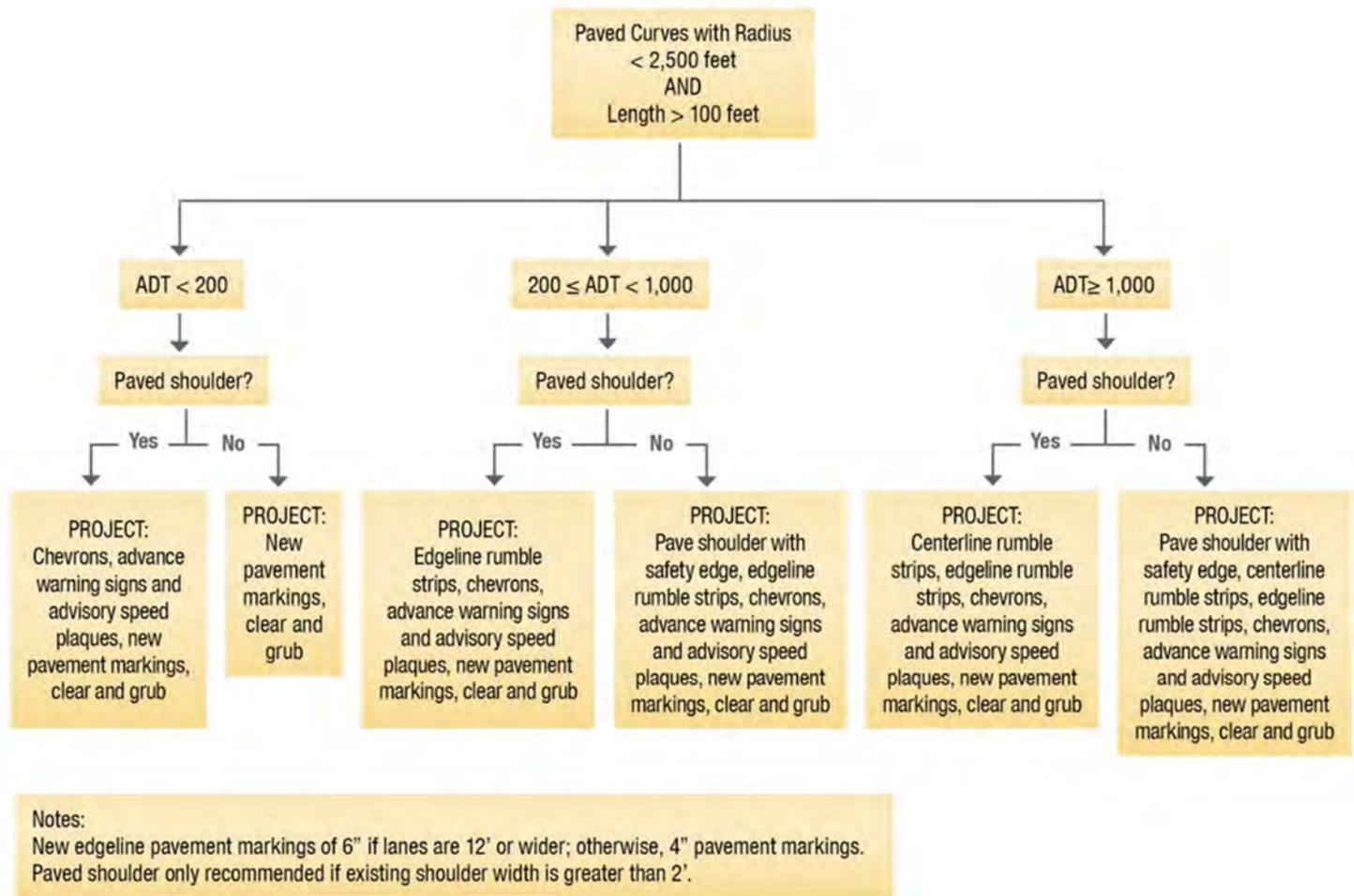


Figure 33 – County Paved Horizontal Curve Project Decision Tree



6.4.5. Prioritized Curve Recommendations

After the decision tree was utilized to identify safety improvements for the curves with the greatest amount of risk factor points, project sheets were developed for these locations. The curves with the greatest amount of risk factor points are shown in **Table 20** and project sheets are located in **Appendix D2**. For curves located on a high scoring roadway segment, the GPS ID of the segment is listed in the table.

Table 20 – County Paved Horizontal Curve Prioritized Project Cost Summary

GPS ID	Curve	Risk Factor Points	High Scoring Segment	Estimated Project Cost
20242	Curve on 210TH ST at the intersection with M AVE	13	3899	\$ 20,000
70394	Curve on F AVE 3,700 ft south of the intersection with 155TH ST	12	3909	\$ 40,000
99951	Curve on D25 at the intersections with 185TH ST and H AVE	12		\$ 11,000
99952	Curve on D25 at the intersections with 190TH ST and H AVE	11		\$ 11,000
88870	Curve on L AVE 1,500 ft south of the intersection with 205TH ST	9		\$ 13,000
Total (5 Curves)				\$ 95,000

Figure 34 shows the locations of the curves where project sheets and specific curve improvement recommendations were made.

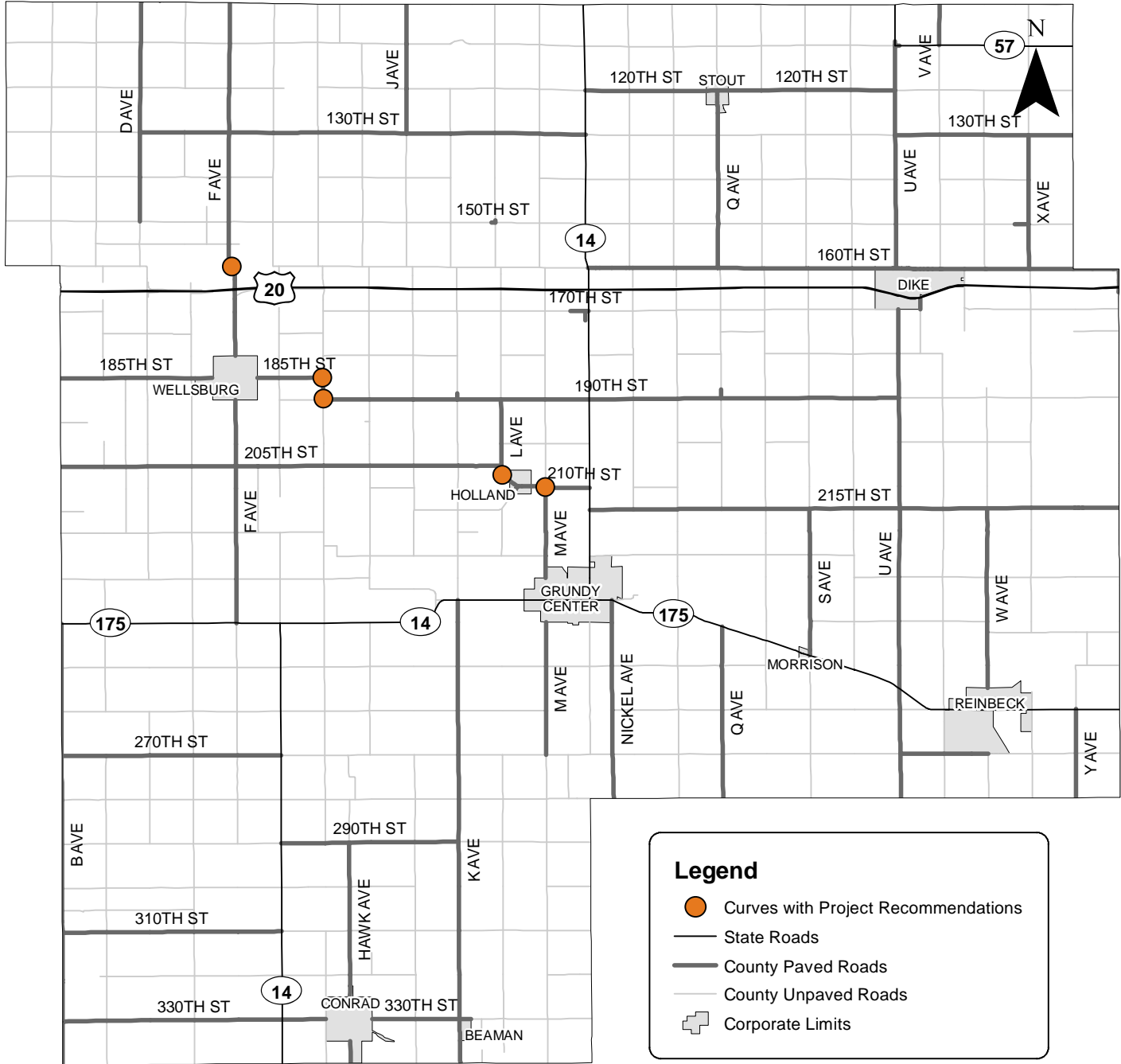


Figure 34 – County Paved Horizontal Curve Prioritized Project Locations

Project sheets for the curves with project recommendations are included in **Appendix D2**. The risk factor ranking results and relevant data for every analyzed curve is included in **Appendix D3**.



6.4.6. Other Curve Countermeasures

The purpose of the LRSP project is to identify systemic safety improvement projects using a GIS analysis and a project selection decision tree. However, just because a safety improvement is not included within the project sheet does not mean that it should not be considered at the location. There are a variety of safety improvements that could be considered that were not included in the project decision tree due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed at curves throughout the county. **Table 21** provides a summary of several other curve safety improvements that could be considered appropriate by the county and that were included on the back side of the project sheets as additional potential improvements. The CMFs, where they have been defined, and estimated costs of these countermeasures are included in the table. Detailed descriptions of each of the countermeasures is provided in **Appendix D1**. Estimated costs for these countermeasures were noted on the back side of the project sheet at the workshop, as directed by the County Engineer. However, the County Engineer could choose to add or remove such countermeasures from consideration at any time, based on engineering judgment or new information.

Table 21 – County Paved Curve Additional Potential Improvements Summary

Safety Countermeasure	Crash Modification Factor (CMF)	Estimated Cost
Additional Curve Signage	CMF not defined	\$1,000/curve
Retroreflective Strip on Chevron Sign Post	CMF not defined	\$100/each
Transverse Rumble Strips Prior to Curve	0.66 Install Transverse Rumble Strips as Traffic Calming Device	\$2,000/curve
Superelevation Correction	CMF not defined	\$100,000/each
High Friction Surface Treatment (HFST)	FHWA Proven Countermeasure 0.48 - 0.76	\$150,000/mile
Speed Activated Flashers on Chevron Sign	CMF 0.59 - 0.61 Install Flashers, Chevron Signs, and Curve Warning Signs	\$3,000/each
Guardrail	0.53-0.56 New Guardrail Along Embankment	\$50,000/mile
On-Pavement Marking for Speed Control	0.62	\$500/each
Post-Mounted Delineators	0.55 Install Edgelines, Centerlines, and Post-Mounted Delineators	\$1,000/mile



6.5. Unpaved Roadways

Grundy County maintains approximately 830 miles of county roads, of which approximately 639 miles are unpaved (77%). Unpaved road crashes accounted for 220 of the 805 crashes (27.3%) in Grundy County from 2008 to 2017. Unpaved roadways were not included in the analysis based on limited data availability, low traffic volumes, and limited types of safety improvements that can be systemically implemented on unpaved roads. Even though location-specific recommendations were not made as part of this project, safety along unpaved segments, at unpaved intersections, and along unpaved curves is also important. Potential projects and/or activities that could be implemented by the County Engineer on unpaved roadways include the following items:

- Maintenance of gravel
- Major rehabilitation
- Upgrade signs
- Realign intersection
- Improve/increase shoulder/lane width
- Delineate roadside hazards with retroreflective markers
- Curve chevrons
- Advance curve warning signs and speed advisory plaques
- Driveway entrance policy
- Clear and grub
- Winter maintenance

Descriptions of each of these unpaved roadway safety countermeasures are provided in **Appendix E**.



7. HIGH CRASH LOCATIONS

While the intent of the LRSP is to identify systemic safety improvements at segments, intersections, and curves throughout the county, the following tables provide a list of high crash locations for reference. The Iowa DOT Safety Improvement Candidate Location (SICL) methodology was followed to identify these high crash locations. For the purposes of this project, the SICL methodology included 10 years of crash data, and was modified and applied to segments and curves, normalizing the analysis by crashes per mile. Due to these modifications, the crash locations in the following tables will differ from the published Iowa DOT SICL list. High crash location tables with a list of roadway segments (**Table 22**), intersections (**Table 23**), and curves (**Table 24**) with high crash frequency were developed for the county as well as a summary map (**Figure 35**). The top ten locations were listed in the tables.

Table 22 – Segment Safety Improvement Candidate Locations

Rank	GPS ID	Segment	Length (mi)	High Scoring Location
1	3934	V AVE between 110TH ST and BUTLER COUNTY LINE	0.92	Yes
2	3570	270TH ST between V AVE and BLACKHAWK ST	0.62	Yes
3	3918	M AVE between 210TH ST and A AVE	2.05	Yes
4	3912	F AVE between 130TH ST and 2500 ft S of 155TH ST	2.98	Yes
5	3899	210TH ST between STATE ST and N AVE	1.34	Yes
6	3947	S AVE between 215TH ST and DIAGONAL RD	3.32	No
7	3936	NICKEL AVE between 250TH ST and DIAGONAL RD	0.98	No
8	3906	330TH ST between B AVE and H AVE	5.98	Yes
9	3900	215TH ST between N AVE and BLACK HAWK COUNTY LINE	12.00	No
10	3904	310TH ST between B AVE and G AVE	4.99	No



Table 23 – Intersection Safety Improvement Candidate Locations

Rank	GPS ID	Intersection	Control Type	High Scoring Location
1	208629	IA 14/G AVE & D67/330TH ST	Two-way stop	No
2	209016	CO RD D65/310TH ST & CO RD T19/E AVE	Two-way stop	No
3	208855	IA 175/DIAGONAL RD & CO RD T55/U AVE	Two-way stop	Yes
4	209044	CO RD D67/330TH ST/CO HWY D67 & CO RD S75/B AVE	Two-way stop	No
5	209018	CO RD S75/B AVE & 305TH ST & UNION ST	Two-way stop	No
6	209359	CO RD D35/210TH ST & CO RD T37/M AVE	Two-way stop	Yes
7	209176	CO RD D53/270TH ST & CO RD T29/K AVE	Two-way stop	No
8	209448	CO RD D17/130TH ST & CO RD T55/U AVE	Two-way stop	Yes
9	208976	CO RD D67/330TH ST & CO RD T29/K AVE	Two-way stop	Yes
10	208956	HAWK AVE & 320TH ST	Two-way stop	No

Table 24 – Curve Safety Improvement Candidate Locations

Rank	GPS ID	Roadway	Nearest Town	Length (ft)	Radius (ft)	High Scoring Location
1	70394	Curve on F AVE 3,700 ft south of the intersection with 155TH ST	WELLSBURG	1,746	1,222	Yes
2	20242	Curve on 210TH ST at the intersection with M AVE	HOLLAND	514	272	Yes
3	88870	Curve on L AVE 1,500 ft south of the intersection with 205TH ST	HOLLAND	346	430	Yes

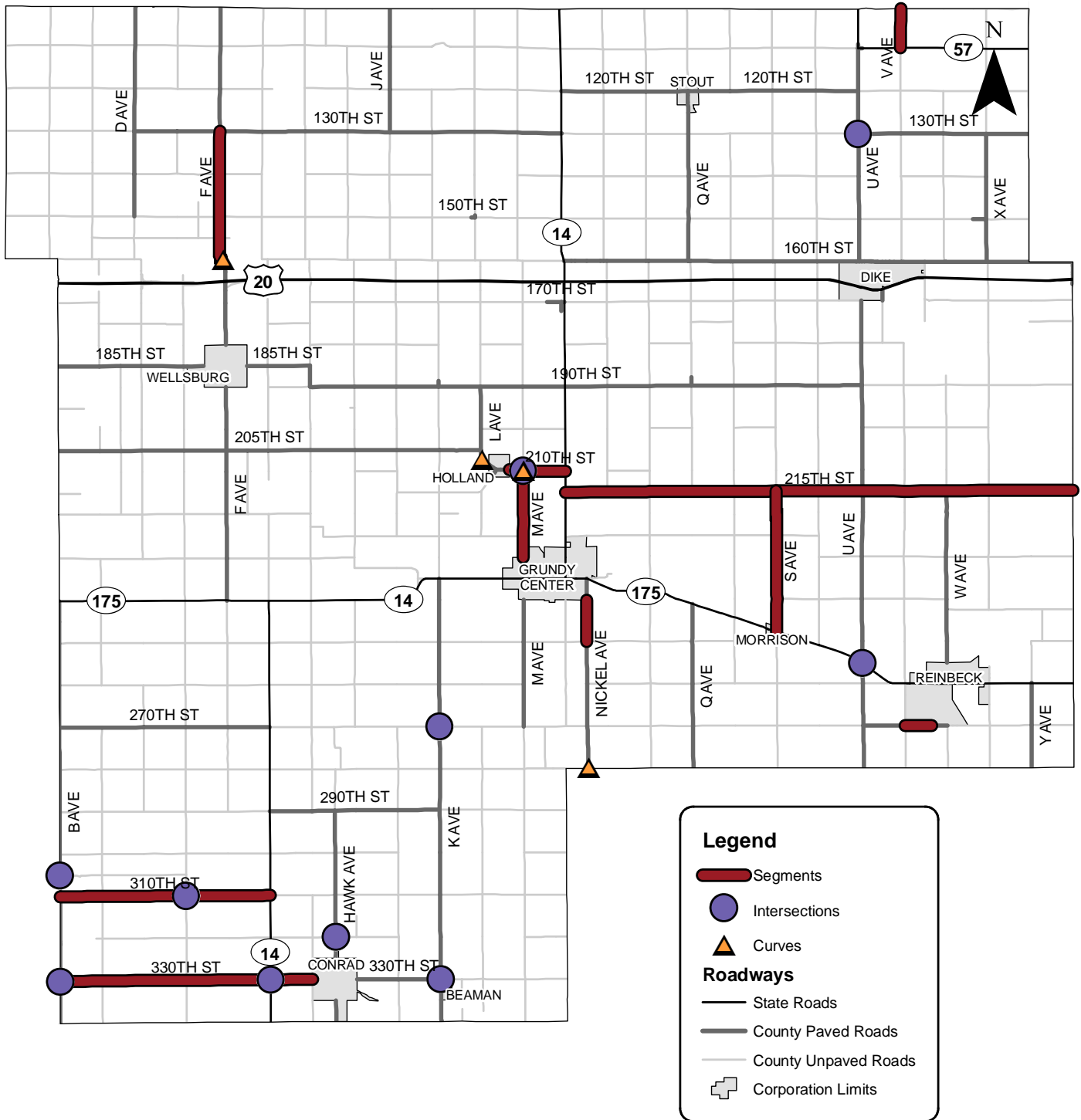


Figure 35 – LRSP Safety Improvement Candidate Locations

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8. SUMMARY

The Grundy County LRSP was developed to aid the County Engineer in identifying and prioritizing roadway segments, intersections, and curves for safety improvements. The LRSP followed a data-driven process to develop systemic safety improvements on Grundy County paved roads. The LRSP was developed through a seven-step process that included gathering background information, data collection, data analysis, countermeasure selection, project development, county input, and development of the LRSP.

- **Gather Background Information:** The Iowa SHSP was reviewed, and data requests were made of the counties to provide the location and presence of rumble strips, destination lighting, stop signs, and other pertinent safety improvements.
- **Data Collection:** A comprehensive GIS project database was developed utilizing the following databases as provided by Iowa DOT, the county, or collected as part of this project:
 - Crash database
 - Roadway database
 - Pavement management database
 - Roadside hazard database
 - Horizontal curve database
 - County stop sign locations
 - Intersection database
- **Data Analysis:** After development of the comprehensive GIS project database, the crash data was analyzed for the county. Crashes were compared to the SHSP Key Safety Emphasis Areas for the State of Iowa, and crash trees and maps were prepared for the county.
- **Countermeasure Selection:** Following data analysis, a workshop was held with the safety stakeholders of the county. Prior to the workshop, a list of safety topics was developed and distributed to the counties to foster discussion at the workshop on driver-related safety countermeasure implementation. At the workshop, driver-related countermeasures were reviewed, and stakeholders discussed existing and proposed driver-related countermeasures.
- **Develop Projects for Inclusion into the LRSP:** A risk factor ranking process was developed for segments, intersections, and curves, and risk factor scores were calculated for all the segments, intersections, and curves within Grundy County. After conducting the risk factor analysis, safety improvement recommendations were developed for the feature types based on the project selection decision trees and summarized in location-specific project sheets. These project sheets, detailing the recommended safety improvements at specific locations, were then provided to the County Engineer for review.
- **County Input:** The draft project sheets were reviewed at the county workshop. The County Engineer provided input for additional safety countermeasures based on engineering judgment and site-specific knowledge.
- **Develop LRSPs:** An LRSP was developed for Grundy County including a summary of the LRSP process along with recommended safety projects for implementation by the county.

8.1. Recommended Improvements

This LRSP identified driver-related countermeasures in addition to engineering-related countermeasures. The following sections summarize the recommended countermeasures and improvements for Grundy County.

8.1.1. Driver-Related Countermeasures

During the county workshop, attendees were provided information regarding fatal and serious injury crashes within the county and how that data aligned with the Iowa SHSP Key Safety Emphasis Areas. Potential countermeasures from the *NCHRP Report 500 Series* and the *Toward Zero Deaths* documents as well as information obtained from Phases 1, 2, and 3 were provided to stakeholders to facilitate discussion on what action items were currently underway in the county with respect to driver-related crashes. Countermeasures were grouped according to the 2013 Iowa SHSP 10 Key Safety Emphasis Areas, of which six are driver-related emphasis areas:

- Speed-related
- Unprotected persons
- Younger drivers
- Impaired driving
- Older drivers
- Inattentive/distracted driving



Figure 36 – Iowa SHSP Driver-Related Emphasis Areas

Based on discussions at the workshop, the following implementation statuses were defined for various driver-related countermeasures in the County: Underway/Ongoing, Area for Improvement, Opportunity, or Completed in the Past.

Table 25 provides a summary of the status of implementation of the driver-related countermeasures within the county. It is recommended that the county continue to implement countermeasures that are currently underway/ongoing and look for opportunities to implement additional countermeasures that are not currently being implemented. This will require input and coordination from all of the five E's of safety.



Table 25 – County Driver-Related Countermeasure Summary

Countermeasure	Status
Speed-Related	
Conduct targeted speed enforcement	Underway/Ongoing
Prosecute and impose sanctions on drivers not obeying school bus stop bars	Underway/Ongoing
Conduct education and awareness campaigns	Area for Improvement
Unprotected Persons	
Conduct targeted enforcement of restraint use	Underway/Ongoing
Instruction in proper child restraint use	Underway/Ongoing
Check for proper child restraint use in all motorist encounters	Underway/Ongoing
Positive Reinforcement	Opportunity
Conduct education and awareness campaigns	Underway/Ongoing
Younger Drivers	
Enforcement of graduated driver's license laws	Underway/Ongoing
Mock prom disaster events	Opportunity
Additional training in schools	Opportunity
Conduct education and awareness campaigns	Opportunity
Impaired Driving	
Conduct targeted OWI enforcement	Underway/Ongoing
Conduct safety checkpoints	Opportunity
Compliance checks for alcohol sales	Opportunity
Alternative transportation choices	Area for Improvement
Prosecute, impose sanctions on, and treat OWI offenders	Underway/Ongoing
Conduct education and awareness campaigns	Opportunity
Older Drivers	
Promote safe mobility choices	Opportunity
Encourage external reporting of at-risk drivers to licensing authorities	Underway/Ongoing
Conduct education and awareness campaigns	Opportunity
Inattentive/Distracted Driving	
Visibly enforce existing statutes to deter distracted driving	Area for Improvement
Agency policy for hands-free devices	Underway/Ongoing
Mobile simulator for distracted driving	Area for Improvement
Conduct education and awareness campaigns	Opportunity



8.1.2. Engineering Countermeasures

In addition to the driver-related countermeasures, engineering projects were developed for roadway segments, intersections, and horizontal curves on county paved roads that had high risk factor rankings based on the analysis methodology. **Table 26** provides a cost summary of the projects developed for the county.

Table 26 – Engineering Countermeasures Cost Summary

Facility Type	Number of Locations	Estimated Project Cost
Segments	12	\$ 2,238,000
Intersections	14	\$ 1,429,000
Curves	5	\$ 95,000
Total Improvement Costs	31	\$ 3,762,000

8.2. Implementation

One of the goals of the LRSP project is to provide a document that is usable and can be frequently consulted by the County Engineer to aid in requesting funding and in the completion of traffic safety improvement projects on county-maintained roads. This section describes some recommendations on how this plan can be implemented within the county.

The project sheets developed and provided in **Appendix B2**, **Appendix C2**, and **Appendix D2** are intended to be used as a straightforward way to apply for safety improvement funding through HSIP-S. The recommendations contained within the project sheets lend themselves well to HSIP-S funding because they were developed based on a proactive risk factor assessment, with a focus on reducing the potential for fatal and serious injury crashes.

Additionally, there is a list of high-crash locations contained within **Section 7** of this document. It is recommended that the County Engineer consider applying for TSIP funding at these locations because TSIP funding considers benefit-cost analysis. The County Engineer can review these locations to determine if safety improvements, similar to the ones outlined within **Section 6.2**, **Section 6.3**, and **Section 6.4** are applicable, and develop a TSIP application based on the recommended improvements.

The County Engineer should also review the projects within the Five-Year Program and consider including safety recommendations from the project sheets into those projects, where applicable. In future cycles of the Five-Year Program, it is recommended that the safety projects included on the project sheets be considered for inclusion in the program.

The County Engineer should also consider consulting the LRSP when developing a project for design or addressing a maintenance issue, in order to incorporate the types of safety improvement recommendations in the LRSP and in the project sheets. Doing so can help prioritize projects and emphasize safety in design and maintenance.

Finally, the LRSP can be consulted during routine maintenance activities such as striping and mowing (clearing and grubbing). The document can be used to provide instruction or education to maintenance crews about the safety implications of their work.



8.3. Next Steps

Project sheets containing the prioritized list of projects have been provided in **Appendix B2**, **Appendix C2**, and **Appendix D2** to aid the County Engineer in obtaining funding for safety improvements and/or for incorporating recommendations into planned roadway improvement projects. These sheets may require updating for funding applications in future years. The County Engineer may also make changes to the prepared project sheets based on local knowledge of the site, available funding, and/or specific needs.

It is recommended that the county continue to foster cooperation with other stakeholders and look for opportunities to improve and expand implementation of driver-related countermeasures. The county should continue its history of implementing a number of safety improvement projects annually. Based on current funding levels, it is anticipated that many of the engineering improvements listed in this plan could be implemented within five to ten years, or sooner. Additionally, this LRSP should be updated within five to ten years to reflect improvements that have been implemented, additional availability of roadway feature data, and changes in crash types and patterns.

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9. 2023 UPDATE

9.1. County Progress

Grundy County will measure progress of their LRSP through two different methods: tracking fatalities and serious injuries using the Iowa Crash Analysis Tool (ICAT) along with documenting completion of projects identified within the LRSP.

After April 15th of each year, the county will update the table of fatalities and serious injuries to track their progress towards zero fatalities and serious injuries. **Table 27** contains a summary of fatalities and serious injuries for the county from 2012 to 2021.

Table 27 – County Tracking of Fatalities and Serious Injuries

Year	Fatalities	Serious Injuries	Fatalities and Serious Injuries
2012	3	4	7
2013	4	13	17
2014	2	7	9
2015	0	4	4
2016	2	4	6
2017	1	10	11
2018	1	5	6
2019	3	5	8
2020	2	9	11
2021	3	13	16

Source: Iowa Crash Analysis Tool (ICAT), <https://icat.iowadot.gov/>, accessed September 21, 2022.

At the same time the county updates its fatalities and serious injuries, the county will also provide a list of prioritized projects that have been completed as identified within the LRSP. The projects noted in **Table 28** and **Table 29** include the prioritized projects as identified in the LRSP (for segments and intersections respectively) that have been at least partially implemented or are currently planned for implementation. The county has completed or is in the process of completing one of the segment projects and four of the intersection projects.



Table 28 – County Paved Roadway Segment Improvement Tracking

GPS ID	Segment	Segment Length (miles)	Risk Factor Points	Notes
3918	M AVE between 210TH ST and A AVE	2.05	12	Add right turn lane at Hwy 175/M Ave and paved shoulders at 210 th St/M Ave intersection (Planned for 2024).

Table 29 – County Paved Intersection Improvement Tracking

GPS ID	Intersection	Risk Factor Points	Notes
County-County / County-Other Intersections			
208930	CO RD D55/290TH ST & CO RD T29/K AVE	12	Installed solar stop sign, transverse rumble strips, and signs (Completed in 2020).
208976	CO RD D67/330TH ST & CO RD T29/K AVE	11	Installed solar stop sign and solar crossroad sign (Completed in 1998).
208571	CO RD D19/160TH ST & CO RD T55/U AVE	10	Installed solar stop sign, transverse rumble strips, and signs (Completed in 2020).
County-State Intersections			
208855	IA 175/DIAGONAL RD & CO RD T55/U AVE	14	Installed solar stop sign (Completed in 2017).



APPENDIX A
RECOMMENDATIONS KEY MAP

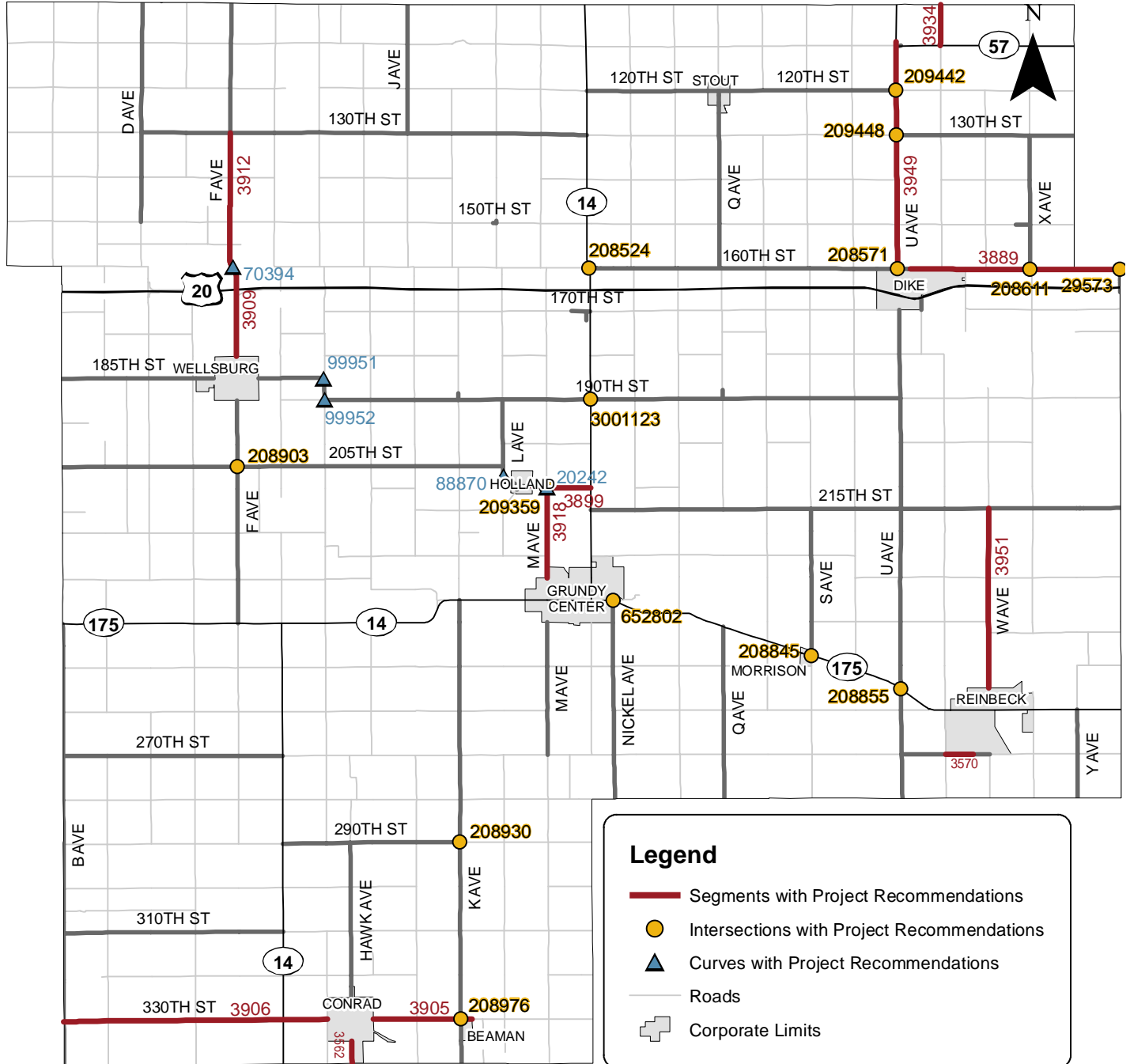


Figure A1 – Grundy County Recommendations Key Map



APPENDIX B1
SEGMENT SAFETY COUNTERMEASURES

This appendix summarizes the **segment** safety countermeasures for consideration and provides detailed descriptions for each countermeasure from both the project selection decision tree as well as the additional potential improvements listed on the back side of the project sheets.

SEGMENT COUNTERMEASURES FROM PROJECT SELECTION DECISION TREE

The countermeasures in this section were included in the project selection decision tree and recommended on the segment project sheets based on the criteria described in **Section 6.2.1**.

Conduct a Road Safety Assessment (RSA)

An RSA is a formal safety performance examination that reviews, in detail, the geometry of a roadway facility. As part of an RSA, an independent, multi-disciplinary team assesses the condition of a given roadway and provides short-, mid-, and long-term recommendations for safety improvements for all modes currently, or planned to be provided by the facility. RSAs have been conducted throughout the United States and are generally accepted as a proactive, low-cost approach to improve safety. This countermeasure cost estimate does not include the cost of implementing the recommendations of the RSA.

Conduct Access Control Analysis

An access control analysis can aid in determining access management decisions along a corridor. This countermeasure is intended to provide additional information on a specific facility as to the most appropriate access control treatments. Consolidating driveways reduces the number of conflict points on a given roadway and concentrates access where through-drivers can expect and anticipate left and/or right-turning vehicles, thus improving safety. The cost estimate associated with this countermeasure does not include implementing the findings of the access control analysis.

New Pavement Markings

This safety countermeasure includes new centerline and edgeline pavement markings along the curve. The updated markings can clarify and further delineate the curve, reducing the risk of a run-off-the-road crash. If the lanes were 12 feet or wider, new edgeline pavement markings of six inches were recommended; Research suggests that widening pavement markings from four to six inches in rural areas results in a CMF of 0.64 to 0.83. Otherwise, new four-inch pavement markings were recommended. Research suggests that installing new 4' pavement markings in rural areas results in a CMF of 0.61 to 0.74.

Edgeline Rumble Strips

Edgeline rumble strips provide tactile and audible warning to a driver if they are beginning to depart the lane. This safety improvement has recorded CMFs in the range of 0.61 to 0.67. Depending on the conditions of the roadway, the County Engineer may choose to install rumble strips placed in the shoulder offset from the edgeline, or they may place the rumble strips on the edgeline and provide pavement markings over them, resulting in edgeline rumble strips. For purposes of this document, both will be called rumble strips.

Centerline Rumble Strips

CMFs of 0.55 to 0.91 represent the safety benefit from the installation of centerline rumble strips. In Iowa, rumble strips placed in the centerline of the roadway generally have pavement markings



over them. To be consistent with the Iowa DOT Design Manual 3C-5, centerline rumble strips will be referred to as rumble strips even though in circumstances they may technically be “rumble stripes”. This safety improvement provides an audible and tactile warning to drivers when crossing the centerline and can aid in the avoidance of some high severity lane departure crashes.

Pave Shoulder with Safety Edge

Constructing or increasing the width of an existing paved shoulder can reduce the potential for a severe crash as the result of a lane departure. CMFs associated with paving the shoulder in rural areas range from 0.75 to 0.99. At locations where paved shoulders are recommended, it is suggested that the County Engineer consider a minimum of a two-foot shoulder; however, based on right-of-way and roadway characteristics, the County Engineer may choose to install a wider shoulder.

According to the FHWA, a Safety Edge is “a simple but effective solution that can help save lives by allowing drivers who drift off [roadways] to return to the road safely. Instead of a vertical drop-off, the Safety Edge shapes the edge of pavement to 30 degrees.” The installation of a Safety Edge has CMFs of 0.77 - 0.96 and is an FHWA Proven Countermeasure.

Clear and Grub

This countermeasure includes clearing and grubbing the areas within the clear zone of the roadway (defined here as 15 feet on each side of the road). This safety countermeasure decreases the hazard of a run off the road crash by reducing the number of obstructions a vehicle could impact after a lane departure. A 0.78 CMF has been documented as distance from roadside features was increased.

*For descriptions on curve countermeasures see **Appendix D1**.*

OTHER SEGMENT COUNTERMEASURES

Safety improvements not included on the first page of the roadway segment project sheet may still merit consideration at a specific location. There are a variety of other safety improvements that could be considered that were not included in the project selection decision tree due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed at road segments throughout the county. The following sections describe several other roadway segment safety improvements that could be considered appropriate by the county and that were included on the back side of the project sheets.

Flattening and Widening Foreslopes

This improvement includes flattening the foreslopes of the roadway edge from 2V:1H (typical) to 3V:1H to increase the ability of a driver after a lane departure to return to the roadway safely. CMFs for flattening side slopes are in the range of 0.9, while flattening to 4:1 or 6:1 are in the range of 0.58 to 0.71.

On-pavement Markings for Speed Control

This improvement includes installing in-lane pavement markings including the speed limit to reinforce the posted speed limit. On-pavement markings can serve as additional information and reminders to drivers of the posted speed limit and the importance of observing their speed. A CMF of 0.62 has been recorded for adding additional on-pavement markings.

Delineate Roadside Hazards with Retroreflective Markers

Retroreflective markers can be applied to roadside objects and trees, increasing the visibility of hazards, and helping delineate the roadway where minimal delineation may exist.

Guardrail

Installing guardrail can help redirect vehicles after a lane departure to remain on the roadway and avoid roadside hazards. CMFs in the range of 0.53 to 0.56 have been recorded for installing new guardrail along an embankment.

Post-Mounted Delineators

As stated in the MUTCD, “delineators are particularly beneficial at locations where the [roadway] alignment might be confusing or unexpected, such as at lane-reduction transitions and curves. Delineators are effective guidance devices at night and during adverse weather. An important advantage of delineators in certain locations is that they remain visible when the roadway is wet, or snow covered.” Providing post-mounted retroreflective delineators along the roadway can give additional information to drivers as to the location of the roadside edge and alignment. The CMF for installing post-mounted delineators in combination with edgelines and centerlines has been recorded at 0.55.

Remove/Relocate Objects in Hazardous Locations

This countermeasure includes removing or relocating objects from within the clear zone of the roadside. This allows drivers who run off the road to potentially return to the road or have a less severe consequence when departing the roadway. A CMF of 0.62 is associated with this countermeasure.

*For descriptions on additional curve countermeasures see **Appendix D1**.*



APPENDIX B2
SEGMENT PROJECT SHEETS

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 16



Project Name: 270TH ST between V AVE and BLACKHAWK ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

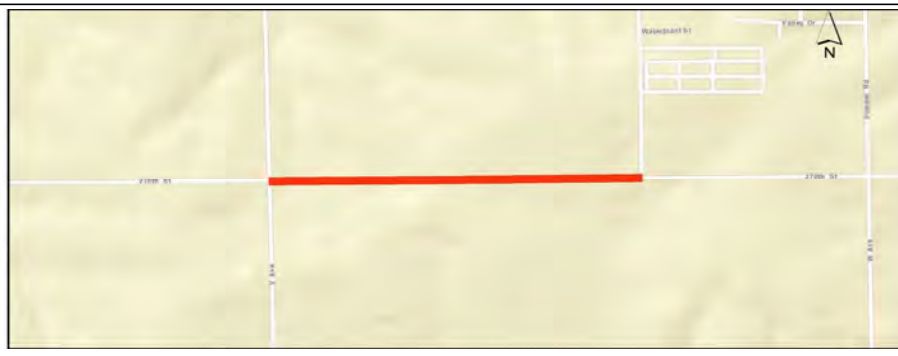
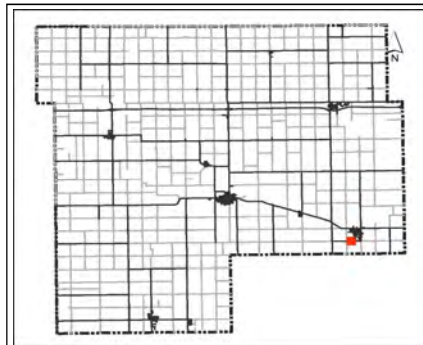
SEGMENT

Location Description

GPS ID: 3570

Road: 270TH ST
From: V AVE
To: BLACKHAWK ST
Length (miles): 0.62

Project Location Maps



Segment Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	530	4
Pavement Shoulder Width (ft)	22' 4'	2
Average Roadside Risk	3.12	4
Access Points per Mile	8.0	3
High Risk Curve Density/Mile	0.0	0
Avg. Pavement Condition (IRI)	120	1
Lane Departure Crashes	3	2
Total Risk Factor Points (23 max)		16

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	4
Speed Limit (mph)	45
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Curves (L>100', R≤1,000')	0
Curves with Chevrons	0

Crash Data, 2008-2017	
Total Crashes	4
K and A Crashes	1
Lane Departure Crashes	3
Lane Departure K and A Crashes	1
Total Crash Rate (per HMVMT)	331.9
K and A Crash Rate (per HMVMT)	83.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Conduct Road Safety Assessment (RSA)	1	EA	\$ 30,000	\$ 30,000
Conduct Access Control Analysis	0	EA	\$ 30,000	\$ -
Install 4" Retroreflective Edgeline (Both Sides of Road)	0.62	MILE	\$ 1,200	\$ 747
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	0.62	MILE	\$ 800	\$ 498
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	0.00	MILE	\$ 65,000	\$ -
Install Edgeline Rumble Strips (Both Sides of Road)	0.62	MILE	\$ 2,500	\$ 1,556
Install Centerline Rumble Strips	0.00	MILE	\$ 1,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 2,500	\$ -
Clear and Grub (15 ft Both Sides of Road)**	0.62	MILE	\$ 10,000	\$ 6,225
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 39,026

Continued on back of this page.

** Unit price varies based on average roadside risk score.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 16



Project Name: 270TH ST between V AVE and BLACKHAWK ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 3570

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Flatten and Widen Foreslopes (both sides of road)		MILE	\$ 75,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Delineate Roadside Hazard (tree or utility pole) with Retroreflective Tape		EA	\$ 15	\$ -
Guardrail		MILE	\$ 50,000	\$ -
Post-Mounted Delineators		MILE	\$ 4,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed		CURVE	\$ 5,000	\$ -
Retroreflective Strips on Chevron Sign Posts		CURVE	\$ 100	\$ -
Transverse Rumble Strips Prior to Curve		EA	\$ 2,000	\$ -
Remove/Relocate Object in Hazardous Location		EA	\$ 1,000	\$ -
Superelevation Correction on Curve		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ -
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 39,026
Subtotal:				\$ 39,026
Mobilization: (% +/-)* 10%				\$ 3,910
Traffic Control: (% +/-) 5%				\$ 2,013
Contingency: (% +/-) 20%				\$ 8,051
Estimated Project Cost				\$ 53,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 14



Project Name: W AVE between 215TH ST and 220 ft N of E KENWOOD ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

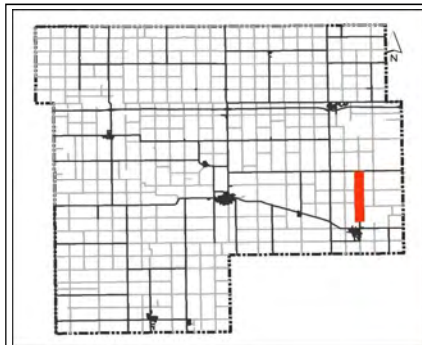
SEGMENT

Location Description

GPS ID: 3951

Road: W AVE
From: 215TH ST
To: 220 ft N of E KENWOOD ST
Length (miles): 4.05

Project Location Maps



Segment Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	730	6
Pavement Shoulder Width (ft)	22' 4'	0
Average Roadside Risk	5.33	4
Access Points per Mile	3.7	1
High Risk Curve Density/Mile	0.0	0
Avg. Pavement Condition (IRI)	231	2
Lane Departure Crashes	1	2
Total Risk Factor Points (23 max)		14

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	4
Speed Limit (mph)	55
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Curves (L>100', R≤1,000')	0
Curves with Chevrons	0

Crash Data, 2008-2017	
Total Crashes	15
K and A Crashes	0
Lane Departure Crashes	1
Lane Departure K and A Crashes	0
Total Crash Rate (per HMVMT)	88.9
K and A Crash Rate (per HMVMT)	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Conduct Road Safety Assessment (RSA)	0	EA	\$ 30,000	\$ -
Conduct Access Control Analysis	0	EA	\$ 30,000	\$ -
Install 4" Retroreflective Edgeline (Both Sides of Road)	4.05	MILE	\$ 1,200	\$ 4,860
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	4.05	MILE	\$ 800	\$ 3,240
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	0.00	MILE	\$ 65,000	\$ -
Install Edgeline Rumble Strips (Both Sides of Road)	4.05	MILE	\$ 2,500	\$ 10,125
Install Centerline Rumble Strips	0.00	MILE	\$ 1,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 2,500	\$ -
Clear and Grub (15 ft Both Sides of Road)**	4.05	MILE	\$ 10,000	\$ 40,502
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 58,727

Continued on back of this page.

** Unit price varies based on average roadside risk score.

Project Location Map Sources:

Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 14



Project Name: W AVE between 215TH ST and 220 ft N of E KENWOOD ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 3951

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Flatten and Widen Foreslopes (both sides of road)		MILE	\$ 75,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Delineate Roadside Hazard (tree or utility pole) with Retroreflective Tape		EA	\$ 15	\$ -
Guardrail		MILE	\$ 50,000	\$ -
Post-Mounted Delineators		MILE	\$ 4,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed		CURVE	\$ 5,000	\$ -
Retroreflective Strips on Chevron Sign Posts		CURVE	\$ 100	\$ -
Transverse Rumble Strips Prior to Curve		EA	\$ 2,000	\$ -
Remove/Relocate Object in Hazardous Location		EA	\$ 1,000	\$ -
Superelevation Correction on Curve		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ -
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 58,727
Subtotal:				\$ 58,727
Mobilization: (% +/-)* 10%				\$ 5,880
Traffic Control: (% +/-) 5%				\$ 3,079
Contingency: (% +/-) 20%				\$ 12,314
Estimated Project Cost				\$ 80,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 14



Project Name: HAWK AVE between DUESENBURG DR and MARSHALL COUNTY LINE
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

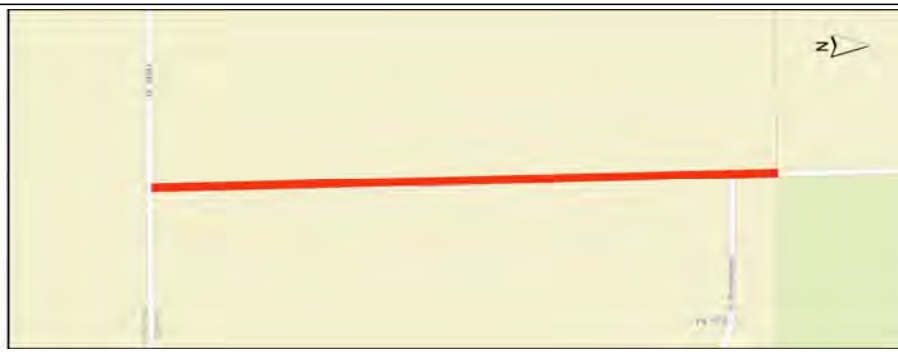
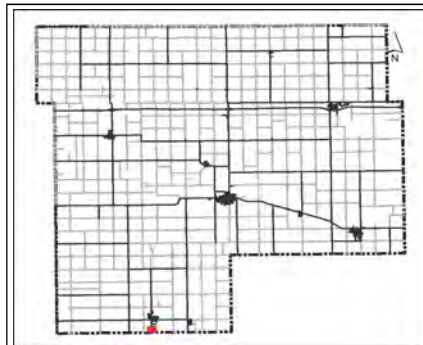
SEGMENT

Location Description

GPS ID: 3562

Road: HAWK AVE
From: DUESENBURG DR
To: MARSHALL COUNTY LINE
Length (miles): 0.50

Project Location Maps



Segment Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	470	3
Pavement Shoulder Width (ft)	22' 1'	2
Average Roadside Risk	5.28	4
Access Points per Mile	8.0	3
High Risk Curve Density/Mile	0.0	0
Avg. Pavement Condition (IRI)	303	2
Lane Departure Crashes	0	0
Total Risk Factor Points (23 max)		14

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	1
Speed Limit (mph)	55
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Curves (L>100', R≤1,000')	0
Curves with Chevrons	0

Crash Data, 2008-2017	
Total Crashes	1
K and A Crashes	0
Lane Departure Crashes	0
Lane Departure K and A Crashes	0
Total Crash Rate (per HMVMT)	116.2
K and A Crash Rate (per HMVMT)	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Conduct Road Safety Assessment (RSA)	0	EA	\$ 30,000	\$ -
Conduct Access Control Analysis	0	EA	\$ 30,000	\$ -
Install 4" Retroreflective Edgeline (Both Sides of Road)	0.50	MILE	\$ 1,200	\$ 601
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	0.50	MILE	\$ 800	\$ 401
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	0.00	MILE	\$ 65,000	\$ -
Install Edgeline Rumble Strips (Both Sides of Road)	0.50	MILE	\$ 2,500	\$ 1,253
Install Centerline Rumble Strips	0.00	MILE	\$ 1,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 2,500	\$ -
Clear and Grub (15 ft Both Sides of Road)**	0.50	MILE	\$ 10,000	\$ 5,012
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 7,267

Continued on back of this page.

** Unit price varies based on average roadside risk score.

Project Location Map Sources:

Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 14



Project Name: HAWK AVE between DUESENBURG DR and MARSHALL COUNTY LINE
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 3562

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Flatten and Widen Foreslopes (both sides of road)		MILE	\$ 75,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Delineate Roadside Hazard (tree or utility pole) with Retroreflective Tape		EA	\$ 15	\$ -
Guardrail		MILE	\$ 50,000	\$ -
Post-Mounted Delineators		MILE	\$ 4,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed		CURVE	\$ 5,000	\$ -
Retroreflective Strips on Chevron Sign Posts		CURVE	\$ 100	\$ -
Transverse Rumble Strips Prior to Curve		EA	\$ 2,000	\$ -
Remove/Relocate Object in Hazardous Location		EA	\$ 1,000	\$ -
Superelevation Correction on Curve		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ -
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 7,267
Subtotal:				\$ 7,267
Mobilization: (% +/-)* 10%				\$ 2,500
Traffic Control: (% +/-) 5%				\$ 447
Contingency: (% +/-) 20%				\$ 1,786
Estimated Project Cost				\$ 12,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 13



Project Name: 210TH ST between STATE ST and N AVE
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

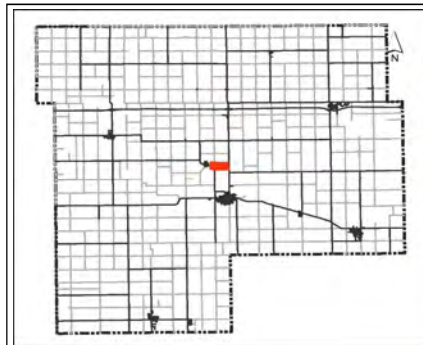
Location Description

GPS ID: 3899

Road: 210TH ST
From: STATE ST
To: N AVE
Length (miles): 1.34

This segment contains the following high scoring intersection: GPS ID 209359
 This segment contains the following high scoring curve: GPS ID 20242

Project Location Maps



Segment Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	1,210	6
Pavement Shoulder Width (ft)	22' 6'	0
Average Roadside Risk	0.83	0
Access Points per Mile	11.2	3
High Risk Curve Density/Mile	0.7	1
Avg. Pavement Condition (IRI)	120	1
Lane Departure Crashes	2	2
Total Risk Factor Points (23 max)		13

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	6
Speed Limit (mph)	55
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Curves (L>100', R≤1,000')	1
Curves with Chevrons	2

Crash Data, 2008-2017	
Total Crashes	17
K and A Crashes	0
Lane Departure Crashes	2
Lane Departure K and A Crashes	0
Total Crash Rate (per HMVMT)	287.9
K and A Crash Rate (per HMVMT)	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Conduct Road Safety Assessment (RSA)	0	EA	\$ 30,000	\$ -
Conduct Access Control Analysis	0	EA	\$ 30,000	\$ -
Install 4" Retroreflective Edgeline (Both Sides of Road)	1.34	MILE	\$ 1,200	\$ 1,603
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	1.34	MILE	\$ 800	\$ 1,069
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	1.34	MILE	\$ 65,000	\$ 86,834
Install Edgeline Rumble Strips (Both Sides of Road)	1.34	MILE	\$ 2,500	\$ 3,340
Install Centerline Rumble Strips	1.34	MILE	\$ 1,000	\$ 1,336
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	2	CURVE	\$ 2,500	\$ 5,000
Clear and Grub (15 ft Both Sides of Road)**	1.34	MILE	\$ 5,000	\$ 6,680
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 105,862

Continued on back of this page.

** Unit price varies based on average roadside risk score.

Project Location Map Sources:

Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 13



Project Name: 210TH ST between STATE ST and N AVE
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 3899

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Flatten and Widen Foreslopes (both sides of road)		MILE	\$ 75,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Delineate Roadside Hazard (tree or utility pole) with Retroreflective Tape		EA	\$ 15	\$ -
Guardrail		MILE	\$ 50,000	\$ -
Post-Mounted Delineators		MILE	\$ 4,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed		CURVE	\$ 5,000	\$ -
Retroreflective Strips on Chevron Sign Posts		CURVE	\$ 100	\$ -
Transverse Rumble Strips Prior to Curve		EA	\$ 2,000	\$ -
Remove/Relocate Object in Hazardous Location		EA	\$ 1,000	\$ -
Superelevation Correction on Curve		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ -
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 105,862
Subtotal:				\$ 105,862
Mobilization: (% +/-)* 10%				\$ 10,590
Traffic Control: (% +/-) 5%				\$ 5,310
Contingency: (% +/-) 20%				\$ 21,238
Estimated Project Cost				\$ 143,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 13



Project Name: 330TH ST between WILSON ST and BECKMAN ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

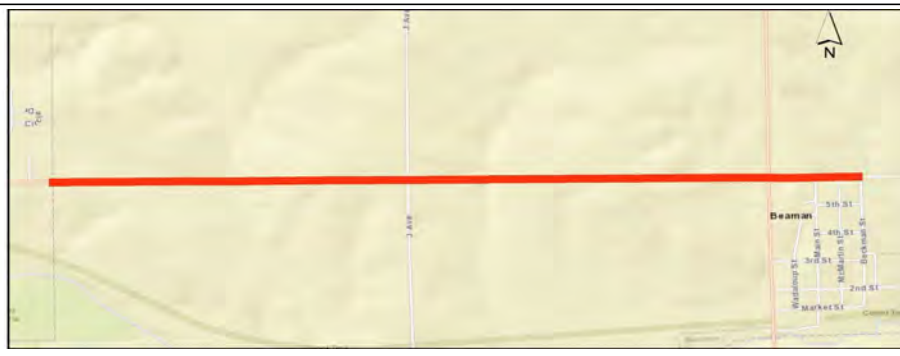
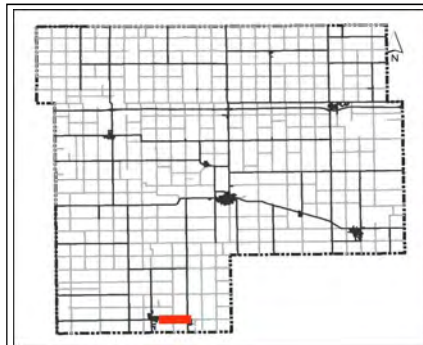
Location Description

GPS ID: 3905

Road: **330TH ST**
 From: **WILSON ST**
 To: **BECKMAN ST**
 Length (miles): **2.25**

This segment contains the following high scoring intersection: **GPS ID 208976**

Project Location Maps



Segment Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	1,230	6
Pavement Shoulder Width (ft)	22' 3'	0
Average Roadside Risk	2.37	2
Access Points per Mile	5.8	3
High Risk Curve Density/Mile	0.0	0
Avg. Pavement Condition (IRI)	87	0
Lane Departure Crashes	5	2
Total Risk Factor Points (23 max)		13

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	3
Speed Limit (mph)	55
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Curves (L>100', R≤1,000')	0
Curves with Chevrons	0

Crash Data, 2008-2017	
Total Crashes	18
K and A Crashes	0
Lane Departure Crashes	5
Lane Departure K and A Crashes	0
Total Crash Rate (per HMVMT)	178.1
K and A Crash Rate (per HMVMT)	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Conduct Road Safety Assessment (RSA)	0	EA	\$ 30,000	\$ -
Conduct Access Control Analysis	0	EA	\$ 30,000	\$ -
Install 4" Retroreflective Edgeline (Both Sides of Road)	2.25	MILE	\$ 1,200	\$ 2,694
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	2.25	MILE	\$ 800	\$ 1,796
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	2.25	MILE	\$ 65,000	\$ 145,926
Install Edgeline Rumble Strips (Both Sides of Road)	2.25	MILE	\$ 2,500	\$ 5,613
Install Centerline Rumble Strips	2.25	MILE	\$ 1,000	\$ 2,245
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 2,500	\$ -
Clear and Grub (15 ft Both Sides of Road)**	2.25	MILE	\$ 7,500	\$ 16,838
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 175,112

Continued on back of this page.

** Unit price varies based on average roadside risk score.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Front Page

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 13



Project Name: 330TH ST between WILSON ST and BECKMAN ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 3905

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Flatten and Widen Foreslopes (both sides of road)		MILE	\$ 75,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Delineate Roadside Hazard (tree or utility pole) with Retroreflective Tape		EA	\$ 15	\$ -
Guardrail		MILE	\$ 50,000	\$ -
Post-Mounted Delineators		MILE	\$ 4,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed		CURVE	\$ 5,000	\$ -
Retroreflective Strips on Chevron Sign Posts		CURVE	\$ 100	\$ -
Transverse Rumble Strips Prior to Curve		EA	\$ 2,000	\$ -
Remove/Relocate Object in Hazardous Location		EA	\$ 1,000	\$ -
Superelevation Correction on Curve		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ -
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 175,112
Subtotal:				\$ 175,112
Mobilization: (% +/-)* 10%				\$ 17,520
Traffic Control: (% +/-) 5%				\$ 8,874
Contingency: (% +/-) 20%				\$ 35,494
Estimated Project Cost				\$ 237,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 13



Project Name: F AVE between 130TH ST and 2500 ft S of 155TH ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

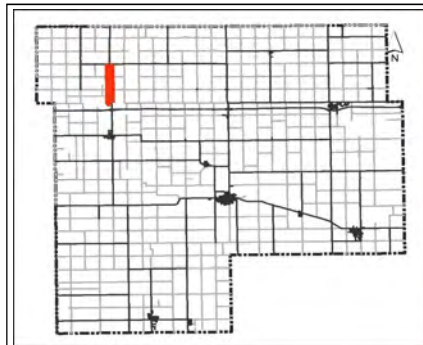
Location Description

GPS ID: 3912

Road: F AVE
From: 130TH ST
To: 2500 ft S of 155TH ST
Length (miles): 2.98

This segment contains the following high scoring curve: GPS ID 70394

Project Location Maps



Segment Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	750	5
Pavement Shoulder Width (ft)	22' 8'	2
Average Roadside Risk	1.59	2
Access Points per Mile	2.7	0
High Risk Curve Density/Mile	0.0	0
Avg. Pavement Condition (IRI)	214	2
Lane Departure Crashes	6	2
Total Risk Factor Points (23 max)		13

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	8
Speed Limit (mph)	55
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Curves (L>100', R≤1,000')	0
Curves with Chevrons	1

Crash Data, 2008-2017	
Total Crashes	18
K and A Crashes	2
Lane Departure Crashes	6
Lane Departure K and A Crashes	2
Total Crash Rate (per HMVMT)	220.3
K and A Crash Rate (per HMVMT)	24.5

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Conduct Road Safety Assessment (RSA)	1	EA	\$ 30,000	\$ 30,000
Conduct Access Control Analysis	0	EA	\$ 30,000	\$ -
Install 4" Retroreflective Edgeline (Both Sides of Road)	2.98	MILE	\$ 1,200	\$ 3,579
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	2.98	MILE	\$ 800	\$ 2,386
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	0.00	MILE	\$ 65,000	\$ -
Install Edgeline Rumble Strips (Both Sides of Road)	2.98	MILE	\$ 2,500	\$ 7,456
Install Centerline Rumble Strips	0.00	MILE	\$ 1,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	1	CURVE	\$ 2,500	\$ 2,500
Clear and Grub (15 ft Both Sides of Road)**	2.98	MILE	\$ 7,500	\$ 22,368
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 68,289

Continued on back of this page.

** Unit price varies based on average roadside risk score.

Project Location Map Sources:

Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 13



Project Name: F AVE between 130TH ST and 2500 ft S of 155TH ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 3912

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Flatten and Widen Foreslopes (both sides of road)		MILE	\$ 75,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Delineate Roadside Hazard (tree or utility pole) with Retroreflective Tape		EA	\$ 15	\$ -
Guardrail		MILE	\$ 50,000	\$ -
Post-Mounted Delineators		MILE	\$ 4,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed		CURVE	\$ 5,000	\$ -
Retroreflective Strips on Chevron Sign Posts		CURVE	\$ 100	\$ -
Transverse Rumble Strips Prior to Curve		EA	\$ 2,000	\$ -
Remove/Relocate Object in Hazardous Location		EA	\$ 1,000	\$ -
Superelevation Correction on Curve		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ -
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 68,289
Subtotal:				\$ 68,289
Mobilization: (% +/-)* 10%				\$ 6,830
Traffic Control: (% +/-) 5%				\$ 3,576
Contingency: (% +/-) 20%				\$ 14,305
Estimated Project Cost				\$ 93,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 13



Project Name: V AVE between 110TH ST and BUTLER COUNTY LINE
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

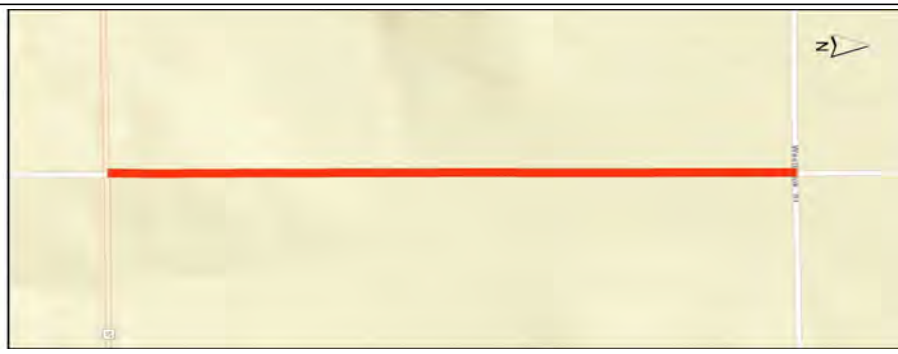
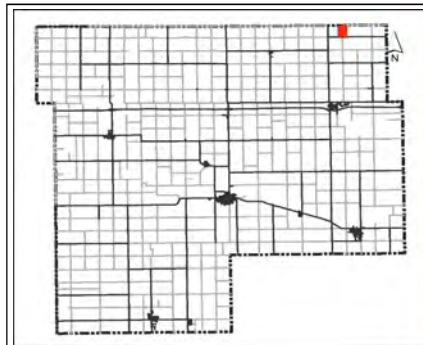
SEGMENT

Location Description

GPS ID: 3934

Road: V AVE
From: 110TH ST
To: BUTLER COUNTY LINE
Length (miles): 0.92

Project Location Maps



Segment Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	650	4
Pavement Shoulder Width (ft)	22' 4'	0
Average Roadside Risk	7.92	4
Access Points per Mile	4.4	2
High Risk Curve Density/Mile	0.0	0
Avg. Pavement Condition (IRI)	118	1
Lane Departure Crashes	1	2
Total Risk Factor Points (23 max)		13

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	4
Speed Limit (mph)	55
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Curves (L>100', R≤1,000')	0
Curves with Chevrons	0

Crash Data, 2008-2017	
Total Crashes	7
K and A Crashes	1
Lane Departure Crashes	1
Lane Departure K and A Crashes	0
Total Crash Rate (per HMVMT)	320.9
K and A Crash Rate (per HMVMT)	45.8

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Conduct Road Safety Assessment (RSA)	1	EA	\$ 30,000	\$ 30,000
Conduct Access Control Analysis	0	EA	\$ 30,000	\$ -
Install 4" Retroreflective Edgeline (Both Sides of Road)	0.92	MILE	\$ 1,200	\$ 1,103
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	0.92	MILE	\$ 800	\$ 735
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	0.00	MILE	\$ 65,000	\$ -
Install Edgeline Rumble Strips (Both Sides of Road)	0.92	MILE	\$ 2,500	\$ 2,297
Install Centerline Rumble Strips	0.00	MILE	\$ 1,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 2,500	\$ -
Clear and Grub (15 ft Both Sides of Road)**	0.92	MILE	\$ 10,000	\$ 9,188
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 43,323

Continued on back of this page.

** Unit price varies based on average roadside risk score.

Project Location Map Sources:

Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 13



Project Name: V AVE between 110TH ST and BUTLER COUNTY LINE
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 3934

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Flatten and Widen Foreslopes (both sides of road)		MILE	\$ 75,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Delineate Roadside Hazard (tree or utility pole) with Retroreflective Tape		EA	\$ 15	\$ -
Guardrail		MILE	\$ 50,000	\$ -
Post-Mounted Delineators		MILE	\$ 4,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed		CURVE	\$ 5,000	\$ -
Retroreflective Strips on Chevron Sign Posts		CURVE	\$ 100	\$ -
Transverse Rumble Strips Prior to Curve		EA	\$ 2,000	\$ -
Remove/Relocate Object in Hazardous Location		EA	\$ 1,000	\$ -
Superelevation Correction on Curve		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ -
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 43,323
Subtotal:				\$ 43,323
Mobilization: (% +/-)*				10% \$ 4,340
Traffic Control: (% +/-)				5% \$ 2,267
Contingency: (% +/-)				20% \$ 9,070
Estimated Project Cost				\$ 59,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 12



Project Name: 160TH ST between UNIVERSITY AVE and MAIN ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

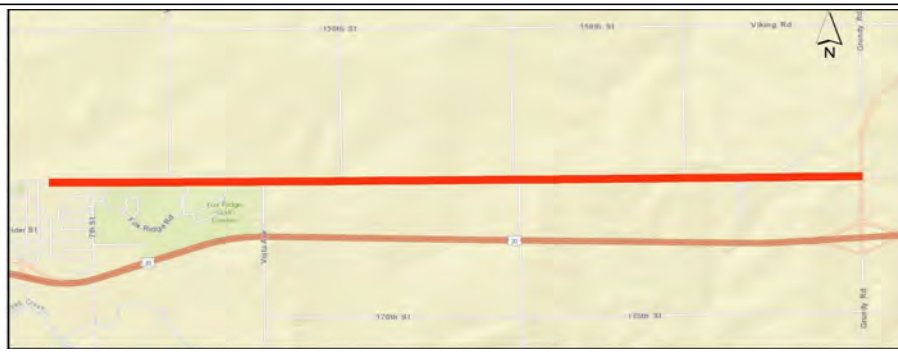
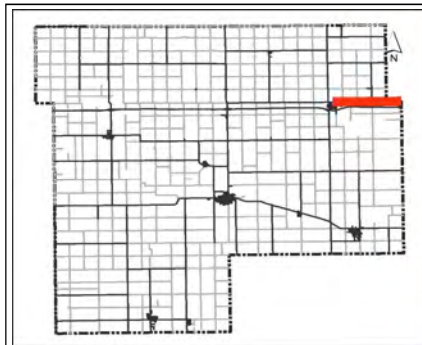
Location Description

GPS ID: 3889

Road: **160TH ST**
 From: UNIVERSITY AVE
 To: MAIN ST
 Length (miles): **4.75**

This segment contains the following high scoring intersections: GPS IDs 29573 and 208611

Project Location Maps



Segment Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	2,370	6
Pavement Shoulder Width (ft)	24' 8'	0
Average Roadside Risk	1.05	0
Access Points per Mile	7.8	3
High Risk Curve Density/Mile	0.0	0
Avg. Pavement Condition (IRI)	114	1
Lane Departure Crashes	4	2
Total Risk Factor Points (23 max)		12

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	8
Speed Limit (mph)	55
Lane Width (ft)	12
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Curves (L>100', R≤1,000')	0
Curves with Chevrons	0

Crash Data, 2008-2017	
Total Crashes	25
K and A Crashes	1
Lane Departure Crashes	4
Lane Departure K and A Crashes	0
Total Crash Rate (per HMVMT)	61.0
K and A Crash Rate (per HMVMT)	2.4

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Conduct Road Safety Assessment (RSA)	0	EA	\$ 30,000	\$ -
Conduct Access Control Analysis	0	EA	\$ 30,000	\$ -
Install 4" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,200	\$ -
Install 6" Retroreflective Edgeline (Both Sides of Road)	4.75	MILE	\$ 1,800	\$ 8,544
Install 4" Retroreflective Centerline	4.75	MILE	\$ 800	\$ 3,798
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	4.75	MILE	\$ 65,000	\$ 308,550
Install Edgeline Rumble Strips (Both Sides of Road)	4.75	MILE	\$ 2,500	\$ 11,867
Install Centerline Rumble Strips	4.75	MILE	\$ 1,000	\$ 4,747
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 2,500	\$ -
Clear and Grub (15 ft Both Sides of Road)**	4.75	MILE	\$ 5,000	\$ 23,735
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 361,241

Continued on back of this page.

** Unit price varies based on average roadside risk score.

Project Location Map Sources:

Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 12



Project Name: 160TH ST between UNIVERSITY AVE and MAIN ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 3889

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Flatten and Widen Foreslopes (both sides of road)		MILE	\$ 75,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Delineate Roadside Hazard (tree or utility pole) with Retroreflective Tape		EA	\$ 15	\$ -
Guardrail		MILE	\$ 50,000	\$ -
Post-Mounted Delineators		MILE	\$ 4,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed		CURVE	\$ 5,000	\$ -
Retroreflective Strips on Chevron Sign Posts		CURVE	\$ 100	\$ -
Transverse Rumble Strips Prior to Curve		EA	\$ 2,000	\$ -
Remove/Relocate Object in Hazardous Location		EA	\$ 1,000	\$ -
Superelevation Correction on Curve		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ -
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 361,241
Subtotal:				\$ 361,241
Mobilization: (% +/-)* 10%				\$ 36,130
Traffic Control: (% +/-) 5%				\$ 18,126
Contingency: (% +/-) 20%				\$ 72,503
Estimated Project Cost				\$ 488,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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Project Description Form Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 12



Project Name: F AVE between 600 ft N of KENT LN and 2500 ft S of 155TH ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

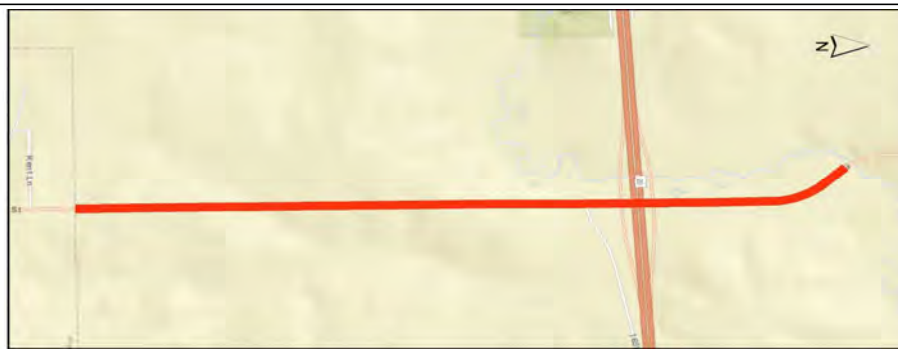
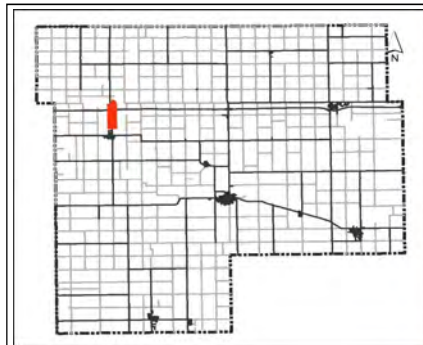
Location Description

GPS ID: 3909

Road: F AVE
From: 600 ft N of KENT LN
To: 2500 ft S of 155TH ST
Length (miles): 2.08

This segment contains the following high scoring curve: GPS ID 70394

Project Location Maps



Segment Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	1,560	6
Pavement Shoulder Width (ft)	22' 8'	0
Average Roadside Risk	2.91	2
Access Points per Mile	5.3	2
High Risk Curve Density/Mile	0.0	0
Avg. Pavement Condition (IRI)	76	0
Lane Departure Crashes	3	2
Total Risk Factor Points (23 max)		12

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	8
Speed Limit (mph)	55
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Curves (L>100', R≤1,000')	0
Curves with Chevrons	1

Crash Data, 2008-2017	
Total Crashes	18
K and A Crashes	0
Lane Departure Crashes	3
Lane Departure K and A Crashes	0
Total Crash Rate (per HMVMT)	151.3
K and A Crash Rate (per HMVMT)	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Conduct Road Safety Assessment (RSA)	0	EA	\$ 30,000	\$ -
Conduct Access Control Analysis	0	EA	\$ 30,000	\$ -
Install 4" Retroreflective Edgeline (Both Sides of Road)	2.08	MILE	\$ 1,200	\$ 2,501
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	2.08	MILE	\$ 800	\$ 1,667
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	2.08	MILE	\$ 65,000	\$ 135,449
Install Edgeline Rumble Strips (Both Sides of Road)	2.08	MILE	\$ 2,500	\$ 5,210
Install Centerline Rumble Strips	2.08	MILE	\$ 1,000	\$ 2,084
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	1	CURVE	\$ 2,500	\$ 2,500
Clear and Grub (15 ft Both Sides of Road)**	2.08	MILE	\$ 7,500	\$ 15,629
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 165,040

Continued on back of this page.

** Unit price varies based on average roadside risk score.

Project Location Map Sources:

Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 12



Project Name: F AVE between 600 ft N of KENT LN and 2500 ft S of 155TH ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 3909

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Flatten and Widen Foreslopes (both sides of road)		MILE	\$ 75,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Delineate Roadside Hazard (tree or utility pole) with Retroreflective Tape		EA	\$ 15	\$ -
Guardrail		MILE	\$ 50,000	\$ -
Post-Mounted Delineators		MILE	\$ 4,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed		CURVE	\$ 5,000	\$ -
Retroreflective Strips on Chevron Sign Posts		CURVE	\$ 100	\$ -
Transverse Rumble Strips Prior to Curve		EA	\$ 2,000	\$ -
Remove/Relocate Object in Hazardous Location		EA	\$ 1,000	\$ -
Superelevation Correction on Curve		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ -
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 165,040
Subtotal:				\$ 165,040
Mobilization: (% +/-)* 10%				\$ 16,510
Traffic Control: (% +/-) 5%				\$ 8,290
Contingency: (% +/-) 20%				\$ 33,160
Estimated Project Cost				\$ 223,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 12



Project Name: M AVE between 210TH ST and A AVE
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

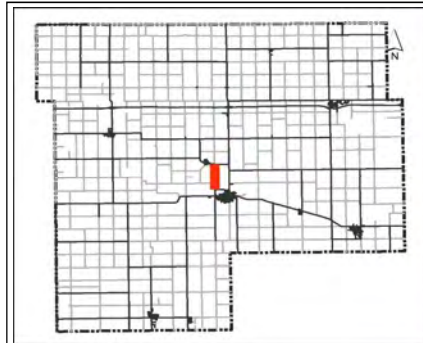
Location Description

GPS ID: 3918

Road: **M AVE**
 From: 210TH ST
 To: A AVE
 Length (miles): **2.05**

This segment contains the following high scoring intersection: **GPS ID 209359**
 This segment contains the following high scoring curve: **GPS ID 20242**

Project Location Maps



Segment Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	1,640	6
Pavement Shoulder Width (ft)	22' 8'	0
Average Roadside Risk	1.26	0
Access Points per Mile	6.4	3
High Risk Curve Density/Mile	0.0	0
Avg. Pavement Condition (IRI)	133	1
Lane Departure Crashes	1	2
Total Risk Factor Points (23 max)		12

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	8
Speed Limit (mph)	55
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Curves (L>100', R≤1,000')	0
Curves with Chevrons	0

Crash Data, 2008-2017	
Total Crashes	24
K and A Crashes	1
Lane Departure Crashes	1
Lane Departure K and A Crashes	0
Total Crash Rate (per HMVMT)	195.9
K and A Crash Rate (per HMVMT)	8.2

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Conduct Road Safety Assessment (RSA)	0	EA	\$ 30,000	\$ -
Conduct Access Control Analysis	0	EA	\$ 30,000	\$ -
Install 4" Retroreflective Edgeline (Both Sides of Road)	2.05	MILE	\$ 1,200	\$ 2,454
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	2.05	MILE	\$ 800	\$ 1,636
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	2.05	MILE	\$ 65,000	\$ 132,940
Install Edgeline Rumble Strips (Both Sides of Road)	2.05	MILE	\$ 2,500	\$ 5,113
Install Centerline Rumble Strips	2.05	MILE	\$ 1,000	\$ 2,045
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 2,500	\$ -
Clear and Grub (15 ft Both Sides of Road)**	2.05	MILE	\$ 5,000	\$ 10,226
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 154,414

Continued on back of this page.

** Unit price varies based on average roadside risk score.

Project Location Map Sources:

Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 12



Project Name: M AVE between 210TH ST and A AVE
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 3918

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Flatten and Widen Foreslopes (both sides of road)		MILE	\$ 75,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Delineate Roadside Hazard (tree or utility pole) with Retroreflective Tape		EA	\$ 15	\$ -
Guardrail		MILE	\$ 50,000	\$ -
Post-Mounted Delineators		MILE	\$ 4,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed		CURVE	\$ 5,000	\$ -
Retroreflective Strips on Chevron Sign Posts		CURVE	\$ 100	\$ -
Transverse Rumble Strips Prior to Curve		EA	\$ 2,000	\$ -
Remove/Relocate Object in Hazardous Location		EA	\$ 1,000	\$ -
Superelevation Correction on Curve		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ -
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 154,414
Subtotal:				\$ 154,414
Mobilization: (% +/-)* 10%				\$ 15,450
Traffic Control: (% +/-) 5%				\$ 7,827
Contingency: (% +/-) 20%				\$ 31,309
Estimated Project Cost				\$ 209,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 12



Project Name: U AVE between 110TH ST and 160TH ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

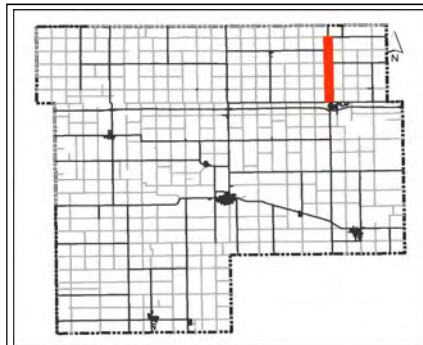
Location Description

GPS ID: 3949

Road: **U AVE**
 From: 110TH ST
 To: 160TH ST
 Length (miles): 5.11

This segment contains the following high scoring intersections: GPS IDs 208571, 209442, and 209448

Project Location Maps



Segment Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	1,410	6
Pavement Shoulder Width (ft)	22' 8'	0
Average Roadside Risk	1.72	2
Access Points per Mile	3.5	1
High Risk Curve Density/Mile	0.0	0
Avg. Pavement Condition (IRI)	131	1
Lane Departure Crashes	6	2
Total Risk Factor Points (23 max)		12

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	8
Speed Limit (mph)	55
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Curves (L>100', R≤1,000')	0
Curves with Chevrons	0

Crash Data, 2008-2017	
Total Crashes	22
K and A Crashes	1
Lane Departure Crashes	6
Lane Departure K and A Crashes	1
Total Crash Rate (per HMVMT)	83.5
K and A Crash Rate (per HMVMT)	3.8

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Conduct Road Safety Assessment (RSA)	0	EA	\$ 30,000	\$ -
Conduct Access Control Analysis	0	EA	\$ 30,000	\$ -
Install 4" Retroreflective Edgeline (Both Sides of Road)	5.11	MILE	\$ 1,200	\$ 6,136
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	5.11	MILE	\$ 800	\$ 4,091
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	5.11	MILE	\$ 65,000	\$ 332,361
Install Edgeline Rumble Strips (Both Sides of Road)	5.11	MILE	\$ 2,500	\$ 12,783
Install Centerline Rumble Strips	5.11	MILE	\$ 1,000	\$ 5,113
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 2,500	\$ -
Clear and Grub (15 ft Both Sides of Road)**	5.11	MILE	\$ 7,500	\$ 38,349
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 398,833

Continued on back of this page.

** Unit price varies based on average roadside risk score.

Project Location Map Sources:

Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 12



Project Name: U AVE between 110TH ST and 160TH ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 3949

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Flatten and Widen Foreslopes (both sides of road)		MILE	\$ 75,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Delineate Roadside Hazard (tree or utility pole) with Retroreflective Tape		EA	\$ 15	\$ -
Guardrail		MILE	\$ 50,000	\$ -
Post-Mounted Delineators		MILE	\$ 4,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed		CURVE	\$ 5,000	\$ -
Retroreflective Strips on Chevron Sign Posts		CURVE	\$ 100	\$ -
Transverse Rumble Strips Prior to Curve		EA	\$ 2,000	\$ -
Remove/Relocate Object in Hazardous Location		EA	\$ 1,000	\$ -
Superelevation Correction on Curve		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ -
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 398,833
Subtotal:				\$ 398,833
Mobilization: (% +/-)* 10%				\$ 39,890
Traffic Control: (% +/-) 5%				\$ 20,055
Contingency: (% +/-) 20%				\$ 80,222
Estimated Project Cost				\$ 539,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 12



Project Name: 330TH ST between B AVE and H AVE
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

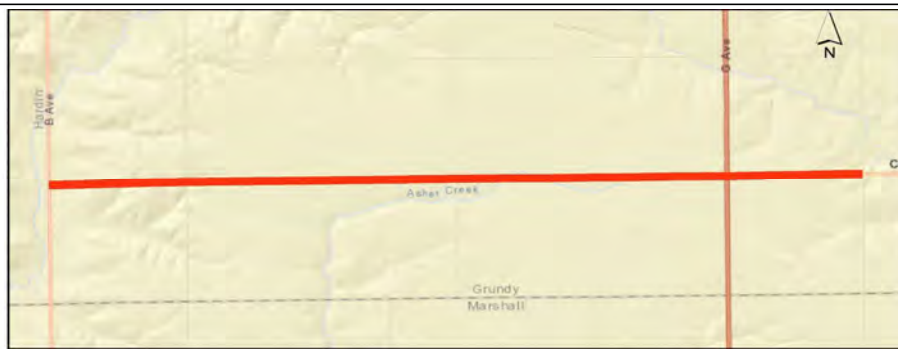
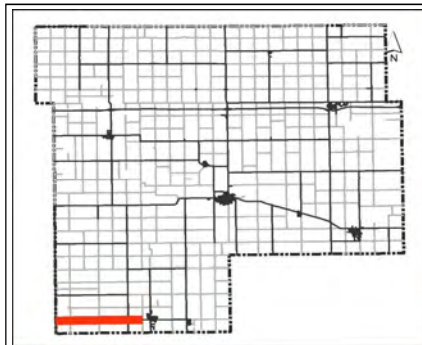
SEGMENT

Location Description

GPS ID: 3906

Road: 330TH ST
From: B AVE
To: H AVE
Length (miles): 5.98

Project Location Maps



Segment Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	950	5
Pavement Shoulder Width (ft)	24' 6'	0
Average Roadside Risk	1.54	2
Access Points per Mile	4.7	2
High Risk Curve Density/Mile	0.0	0
Avg. Pavement Condition (IRI)	162	1
Lane Departure Crashes	10	2
Total Risk Factor Points (23 max)		12

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	3 / 6
Speed Limit (mph)	55
Lane Width (ft)	11 / 12
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Curves (L>100', R≤1,000')	0
Curves with Chevrons	0

Crash Data, 2008-2017	
Total Crashes	44
K and A Crashes	0
Lane Departure Crashes	10
Lane Departure K and A Crashes	0
Total Crash Rate (per HMVMT)	212.0
K and A Crash Rate (per HMVMT)	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Conduct Road Safety Assessment (RSA)	0	EA	\$ 30,000	\$ -
Conduct Access Control Analysis	0	EA	\$ 30,000	\$ -
Install 4" Retroreflective Edgeline (Both Sides of Road)	0.98	MILE	\$ 1,200	\$ 1,182
Install 6" Retroreflective Edgeline (Both Sides of Road)	5.00	MILE	\$ 1,800	\$ 9,000
Install 4" Retroreflective Centerline	5.98	MILE	\$ 800	\$ 4,788
Pave 2" Shoulder with Safety Edge (Both Sides of Road)	0.00	MILE	\$ 65,000	\$ -
Install Edgeline Rumble Strips (Both Sides of Road)	5.98	MILE	\$ 2,500	\$ 14,962
Install Centerline Rumble Strips	0.00	MILE	\$ 1,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 2,500	\$ -
Clear and Grub (15 ft Both Sides of Road)**	5.98	MILE	\$ 7,500	\$ 44,886
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 74,818

Continued on back of this page.

** Unit price varies based on average roadside risk score.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Front Page

Local Road Safety Plan
Project Description for Roadway Segment Improvements

Risk Factor Points: 12



Project Name: 330TH ST between B AVE and H AVE
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/20/18

Prepared By: DJG/DVM
Checked By: MMO

SEGMENT

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 3906

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Flatten and Widen Foreslopes (both sides of road)		MILE	\$ 75,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Delineate Roadside Hazard (tree or utility pole) with Retroreflective Tape		EA	\$ 15	\$ -
Guardrail		MILE	\$ 50,000	\$ -
Post-Mounted Delineators		MILE	\$ 4,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed		CURVE	\$ 5,000	\$ -
Retroreflective Strips on Chevron Sign Posts		CURVE	\$ 100	\$ -
Transverse Rumble Strips Prior to Curve		EA	\$ 2,000	\$ -
Remove/Relocate Object in Hazardous Location		EA	\$ 1,000	\$ -
Superelevation Correction on Curve		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ -
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 74,818
Subtotal:				\$ 74,818
Mobilization: (% +/-)* 10%				\$ 7,490
Traffic Control: (% +/-) 5%				\$ 3,938
Contingency: (% +/-) 20%				\$ 15,754
Estimated Project Cost				\$ 102,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

Kimley-Horn has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Kimley-Horn at this time and represent only Kimley-Horn's judgment as a design professional familiar with the construction industry. Kimley-Horn cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Project Description Form Disclaimer:

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End of Project Description

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APPENDIX B3
SEGMENT RISK FACTOR RANKING RESULTS



APPENDIX C1
INTERSECTION SAFETY COUNTERMEASURES

This appendix summarizes the **intersection** safety countermeasures for consideration and provides detailed descriptions for each countermeasure from both the project selection decision tree as well as the additional potential improvements listed on the back side of the project sheets.

INTERSECTION COUNTERMEASURES FROM PROJECT SELECTION DECISION TREE

The countermeasures in this section were included in the project selection decision tree and recommended on the intersection project sheets based on the criteria described in **Section 6.3.1**.

Coordinate with Local Jurisdiction on Signal Modifications

Although there are not many traffic signals along the county road system which are operated and maintained by the county, the recommendations from this Local Road Safety Plan (LRSP) include a coordination item with the local jurisdiction at locations where signalized intersections scored high on the risk factor rankings. This coordination could include the installation of retroreflective backplates, installing larger signal heads, signal retiming, flashing yellow arrow implementation, and/or overhead signal installation.

Signal Warrant Analysis to Consider Removal of Signal

At locations where a signalized intersection may not be warranted, based on reported daily entering vehicles (DEVs), it is recommended that a signal warrant analysis, including the required traffic counts, be conducted to determine if the traffic signal is warranted. Removing an unwarranted traffic signal has a documented crash modification factor (CMF) as high as 0.76. The cost associated with this recommendation includes only the counts and analysis, not the physical removal of the traffic signal.

Intersection Configuration Evaluation (ICE)

Per the Minnesota Department of Transportation (MnDOT),

“ICE is a process that identifies the best intersection control through a comprehensive analysis and documentation of the technical (safety and operational), economic, and political issues of viable alternatives” (<http://www.dot.state.mn.us/trafficeng/safety/ice/>).

This evaluation broadens the framework for consideration of intersection control beyond the traditional traffic signal. Through this evaluation process, the optimal control is anticipated to be recommended, based on an objective analysis. Stop signs, yield signs, channelized movements, access control, grade separation, roundabouts or fully signalized intersections can be the result of the ICE.

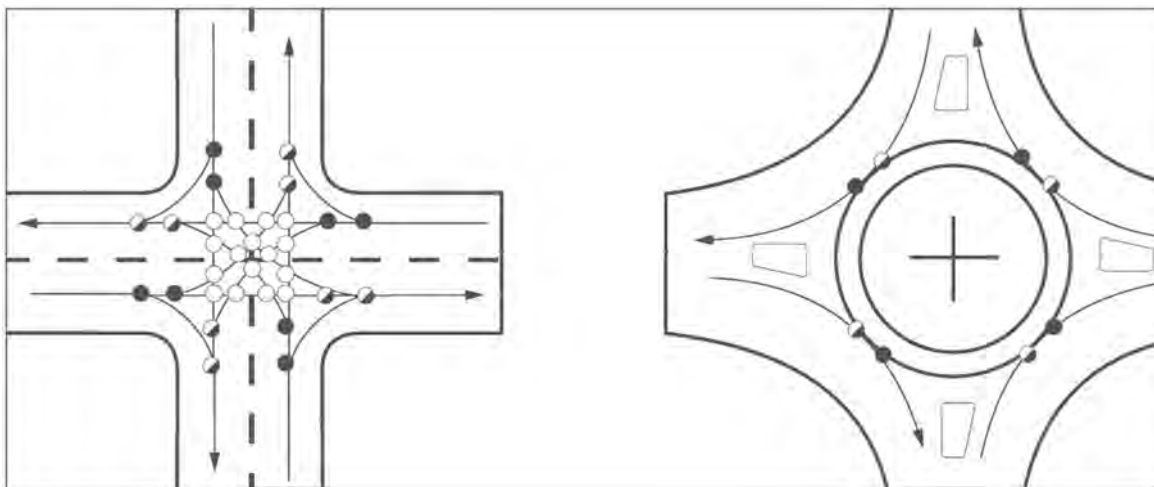
In 2007, the MnDOT’s Office of Traffic, Safety, and Operations published an “Intersection Control Evaluation” manual (http://www.dot.state.mn.us/trafficeng/safety/ice/2007_ICE_Manual.pdf). This comprehensive manual describes in detail the process that is recommended in Minnesota. Many states currently have ICE policies and require ICE to be completed prior to determining intersection control and configurations, including: California, Indiana, Florida, Minnesota, Washington, and Wisconsin. The Iowa DOT is in the process of developing their own guidelines for ICE. The recommended process includes identifying intersections, collecting data, performing warrant analyses, analyzing alternatives, and selecting a preferred alternative. Following the scoping, an alternative is selected by preparing conceptual designs, identifying right-of-way requirements, estimating life-cycle costs, considering political impacts, reevaluating alternatives, and receiving staff approval. Finally, an ICE report is compiled, documenting the process and results. Additional guidance on ICE can be found in the California DOT (Caltrans) 2013 policy directive on ICE (<http://www.dot.ca.gov/trafficops/ice.html>).

The recommendation of conducting an ICE was based on fatal or serious injury crash (K or A crash) history, DEVs, and current signalization; or number of approaches. The cost estimate includes only the cost of the evaluation. The following countermeasure takes into account the cost for implementing the results of the ICE.

Implement Results of ICE

Along with the recommendation of the ICE, this recommendation includes implementing the selected intersection configuration. Since the evaluation is necessary to determine which configuration to implement, the cost associated with this recommendation is the estimated average of potential intersection configurations. Intersection configurations that could be considered include: roundabouts, multi-way stop control, traffic signals, restricting left-turn movements, median U-turn intersections, and grade separation. While roundabouts are not appropriate in every scenario, more information is provided here as roundabouts should be considered as part of the ICE and are a less traditional intersection configuration in Iowa.

Roundabouts are a Federal Highway Administration (FHWA) proven safety countermeasure with marked safety improvements thoroughly documented. CMFs for converting a stop-controlled rural intersection to a roundabout have been recorded from 0.18 - 0.42 showing reductions in crashes as high as 82%. In addition to providing significant safety benefits, roundabouts are also able to accommodate abnormal intersections, such as intersections with more than four approaches or an angled minor or major approach. Many of the safety benefits of roundabouts stem from the fact that they have fewer conflict points (see **Figure C1**). In a conventional intersection, 32 conflict points exist at which a crash may occur. This is reduced to eight conflict points in a typical one-lane roundabout. Furthermore, the vehicle conflict points at a roundabout are unlikely to result in right-angle or head-on collisions which tend to be more severe crash types. Instead, the majority of crashes are rear-end or side-swipe collisions. In addition to less-severe crash types, crashes at roundabouts tend to occur at lower speeds which results in fewer injuries and fatalities.



**Four-Leg Intersection
32 Conflict Points**

**Roundabout
8 Conflict Points**

Source: Federal Highway Administration

Figure C1 – Conflict Points at Intersections

All-Way Stop Warrant Analysis (Install)

This safety countermeasure includes conducting an all-way stop warrant analysis on an existing two-way stop-controlled intersection. The analysis should include a review of traffic volumes, crash history and sight distance as detailed in the Manual of Uniform Traffic Control Devices (MUTCD) for an intersection that is not currently controlled by stop signs for all approaches. This safety countermeasure was recommended based on the CMFs in the range of 0.39 for converting a two-way stop-controlled intersection to all-way stop control. An engineering study is required to warrant the installation of all-way stop control. Only the analysis was recommended in the decision tree, based on traffic volumes that could potentially meet the minimum volume thresholds for an all-way stop to be warranted.

All-Way Stop Warrant Analysis (Remove)

This safety countermeasure includes conducting an all-way stop warrant analysis on an existing all-way stop-controlled intersection. The analysis should include a review of traffic volumes, crash history and sight distance as detailed in the MUTCD. An engineering study is required to warrant the removal of all-way stop control, converting to two-way stop control. Only the analysis was recommended in the decision tree, based on traffic volumes that would potentially not meet the minimum volume thresholds for an all-way stop to be warranted.

Destination Lighting

The Iowa DOT has a *Destination Lighting Specifics and Best Practices (2018)* document that should be consulted prior to installation of destination lighting. Various options are available including replacing existing HPS lights, new installations, and solar installations. The document provides detail on luminaire type, pole design, mounting height, pole placement, preferred luminaires, and sample specifications.

Destination lighting is different than typical intersection lighting, in that the purpose of destination lighting is to inform drivers, from a distance, that an intersection is located near the light. As can be seen in **Figure C2**, the High-Pressure Sodium (HPS) lighting option has traditionally provided a better spreading of light to the approaching driver when the Light-Emitting Diode (LED) system does not have a drop lens. LED lighting options without a drop lens dissipate less light outward and typically focus light down, towards the roadway. For the purpose of destination lighting, HPS or LED with drop lenses are preferred due to their dispersion of light. In rural situations, especially during nighttime conditions, intersections can be difficult to identify without the presence of destination lighting. For this purpose, destination lighting is recommended when certain volume thresholds defined in the decision tree are exceeded.



Figure C2 – Examples of Destination Lighting

Destination lighting, as a recommended safety countermeasure with a CMF of 0.62, can be installed on a new light pole or be attached to an existing utility pole near the subject intersection as shown in **Figure C3**. Some counties noted a preference to not install a new pole due to the increased maintenance and cost of a new pole while others have identified the coordination with the utility companies as a hindrance to installing destination lighting on an existing utility pole.



Figure C3 – Destination Lighting Installation Options

Upgrade Signs and Pavement Markings

Another low-cost intersection safety countermeasure includes the upgrading of signs and pavement markings. Providing “Stop Ahead” pavement markings has a recorded CMF range of 0.4 to 0.69 and increasing the retroreflectivity of stop signs (or replacing signs with new larger signs) has a CMF range of 0.75 to 0.91. The following improvements were recommended for applicable intersection approaches:

- Stop sign (R1-1 36”x36”) and post
 - Large stop sign for enhanced visibility from a greater distance
- All Way (plaque) (R1-3P 18”x6”) or Cross Traffic Does Not Stop (plaque) (W4-4P 24”x12”)
 - Informational plaque to provide valuable information to drivers
- Intersection Warning Sign and Post (W2-1 – W2-6 24”x24”)
 - Installed on uncontrolled intersection approaches to warn users of potential vehicle conflicts from the intersection roadway and/or vehicles slowing to make turns
- Stop ahead sign and post (W3-1 30”x30”)
 - This sign is installed upstream to inform drivers of upcoming stop-controlled conditions



- Stop ahead pavement markings
 - Installed as a supplement to the “Stop Ahead” sign, this on-pavement marking has a recorded CMF of 0.4 to 0.69 adding reinforcement of the upcoming stop-controlled condition
- Stop bar
 - Installed to delineate where the driver should stop to check for oncoming vehicles and reinforce the stop-controlled condition with on-pavement markings at the intersection. This pavement marking can also be visible from cross-traffic, further delineating the intersection. In the case of an unpaved minor approach a stop bar may not be feasible but is nevertheless recommended.
- Double yellow line 100’ back from the intersection
 - Provides additional delineation of the intersection

Implementing systemic signing and marking improvements at stop-controlled intersections is an FHWA Proven Countermeasure and has CMFs ranging from 0.89 to 0.92.

Install Second Stop Sign and Stop Ahead Signs

Installing a second stop sign and stop ahead sign on the left side of the roadway for reinforcement of the stop-controlled condition was another safety countermeasure that was suggested where certain volume thresholds were met. Installing the second stop sign and stop ahead signs on the left side of the roadway provides for additional visibility and reinforces the stop-controlled condition ahead.

Flashing Beacon on All Stop Signs

This countermeasure includes installing flashing beacons on top of all stop signs and/or yield signs at an intersection. It is anticipated that the flashing beacons would be solar-power LED beacons to expedite the installation and reduce the monthly cost associated with power for the lights. This countermeasure provides enhanced visibility and reinforcement of the stop/yield-controlled condition.

Transverse Rumble Strips on All or Minor Approaches

Installing transverse rumble strips can alert drivers of an upcoming stop sign. In the case of an all-way stop-controlled intersection, rumble strips are recommended on all approaches. For a one-way or two-way stop-controlled intersection, only the minor paved approaches (those that are stop-controlled) are recommended for rumble strip installation. Installing transverse rumble strips on stop-controlled approaches in rural areas has a CMF of 0.79 to 0.87.

Install Advanced Cross Street Name Signs (Major Approaches)

This safety countermeasure includes the installation of cross street name signs with the intersection warning signs in advance of an intersection on the major approaches to provide additional information to drivers, increasing their decision time and distance. This improvement also provides additional emphasis of an upcoming intersection.

Clear and Grub

This includes clearing and grubbing the areas within the sight triangles of the vehicles that approach stop signs at a given intersection. This safety countermeasure increases the sight distance for vehicles prior to entering an intersection. This is particularly beneficial under two-way stop-controlled or uncontrolled situations where conflicting vehicles may not stop or yield. A budgetary cost has been included in the project sheets; however, it is recommended that the County Engineer confirm the need to clear and grub as projects move forward.

OTHER INTERSECTION COUNTERMEASURES

There are a variety of other safety improvements that could be considered that were not included in the project selection decision tree due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed at intersections throughout the county. The following sections describe several other intersection safety improvements that could be considered appropriate by the county and that were included on the back side of the project sheets.

Construction of Turn Lanes

Providing right- and left-turn lanes to remove slowing or turning vehicles from the through lanes has CMFs ranging from 0.52 to 0.74. This safety countermeasure needs to be evaluated on a case-by-case basis based on turning movement volumes, which were not available as part of this project. This improvement can be particularly effective where there are high amounts of conflicting movements at intersections. When considering turn lanes for a specific location, right-of-way constraints will need to be considered.

Realignment of Intersection to Reduce or Eliminate Skew

Intersection skew was reviewed as part of the risk factor analysis, but realignment of specific intersections was not recommended, due to constraints such as right-of-way and geometrics that could not be determined from a systemic approach. Depending on existing site conditions, this countermeasure could be particularly beneficial and should be considered where feasible. The CMF for intersection geometry reconfiguration is included in the Highway Safety Manual (HSM) and varies based on the existing skew angle. With the optimal 90-degree intersection configuration sight triangles are maximized, crossing distance is minimized, and the intersection meets typical driver expectations.

Provide Bypass Lane on Shoulder at T-Intersection

A bypass lane at a T-intersection allows through traffic a separate lane of travel from those vehicles intending to turn left at the intersection. This improvement removes some conflict points and has the potential to reduce the frequency of rear-end crashes.

Convert Offset T-Intersection to Four-Legged Intersection

Where two offset T-intersections are within close proximity, this countermeasure suggests combining the two intersections into a single four-legged intersection. The consolidation of the two intersections into one reduces conflict points and aligns better with driver expectations.



Use Indirect Left-Turn Treatments

Restricting or eliminating turning maneuvers by providing channelization or closing median openings can have significant safety benefits. This safety countermeasure could be implemented as part of an access management policy, referenced below. A CMF of 0.8 has been determined for providing indirect left-turn treatments.

Convert Four-Legged Intersection to Offset T-Intersection

Where a four-legged intersection has high opposing turning movements, two offset T-intersections may provide the needed traffic flow while reducing conflicts.

Install LED Flashing Beacons on Intersection Warning Signs

Flashing beacons draw the attention of drivers to the associated signage. This improvement enhances the conspicuity of intersection warning signs for drivers approaching the intersection. This sign/beacon combination can help increase awareness of drivers to potential upcoming vehicle conflicts. Flashing beacons on stop signs and curve chevron signs have measured safety benefits and are expected to provide safety benefits when applied to intersection warning signs as well.

Stop Signs with LED Flashing Lights

Installing stop signs with LEDs embedded in the border of the sign can increase the conspicuity of the sign from a greater distance, particularly at nighttime. A CMF of 0.59 has been recorded for replacing a standard stop sign with a stop sign with LED flashing lights.

Install Retroreflective Strips on Stop Sign Posts

This countermeasure includes the installation of retroreflective strips on the posts of stop signs. The strips can increase the visibility of the stop signs and increase driver awareness of a stop-controlled intersection.

Low-Cost Intersection Conflict Warning System (ICWS)

This safety improvement warns vehicles on the major approach of a two-way stop-controlled intersection when there is a vehicle present/stopped at the upcoming intersection. According to the FHWA,

“These systems usually use a double set of detectors on the stop approach to identify approaching and stopped vehicles and warn traffic on the through approach of their presence using activated flashing beacons on passive intersection warning signs to indicate that a vehicle from the cross street may enter the intersection. They are often deployed at rural stop-controlled intersections that have either a history of crash experience or limited sight distance. Missouri, Minnesota, North Carolina, Pennsylvania, and Virginia have deployed these systems or variations of them.”

The FHWA also states that, this technology “has been successfully deployed... at a relatively low cost per intersection and has generally resulted in substantial intersection crash reductions.”

Access Management

According to the Transportation Research Board, “Access management is the systematic control of the location, spacing, design and operation of driveways, median openings, interchanges, and street connections to a roadway.” Various counties throughout Iowa have access management policies in place and substantial research has been conducted supporting the safety, operations, economic, and environmental effects of access management.

Figure C4 shows a generic definition of the functional area of an intersection. This area includes regions where vehicle speeds vary in order to change lanes and complete turns. Queues may also develop on the approach legs of the intersection. Driveways should be located outside of the functional area of the intersection so as not to negatively impact the operations of the intersection.

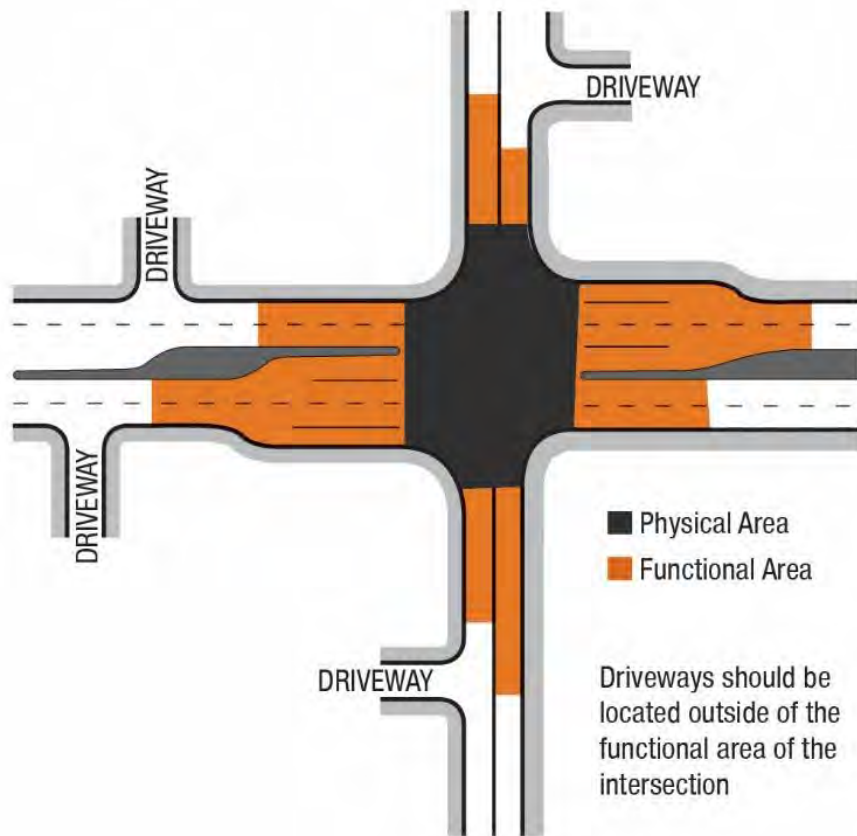


Figure C4 – Intersection Functional Area

In rural scenarios, access management is best applied by limiting left-turn movements onto high-speed roadways and providing sufficient spacing between roadway access points. Please refer to the *Statewide Urban Design and Specifications (SUDAS)* and AASHTO’s *A Policy on Geometric Design of Highways and Streets (Green Book)* for more information.



APPENDIX C2
INTERSECTION PROJECT SHEETS

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 19



Project Name: Co Rd D35/210th St & Co Rd T37/M Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Location Description

Road: **Co Rd D35/210th St**
 Road: **Co Rd T37/M Ave**

Closest City: **HOLLAND**

GPS ID: **209359**

This intersection is located on the following high scoring segments: GPS IDs 3899 and 3918

County to coordinate with local agency to implement improvements that are on right-of-way that is not under control of the County.

Project Location Maps



Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Distance from Previous Stop	2 mi	4
Approach Angle (Degrees)	58	4
Intersection within Curve	Yes	4
Daily Entering Vehicles	2,098	3
Minor Street Volume	1,170	2
Roads/Driveways within 250 Feet	2	1
K or A Crashes	0	0
Number of Approaches	5	1
Total Risk Factor Points (22 max)		19

Other Information	
Number of Approaches	5
Number of Paved Approaches	3
Major ADT	1,640
Minor ADT	1,170
Destination Lighting	Yes
Transverse Rumble Strips (Number of Approaches)	0
Control Type	Two-way stop

Crash Data, 2008-2017	
Total Crashes	7
K and A Crashes	0
Right Angle, Rear-end, or Turning Crashes	1
Total Nighttime Crashes	1
Nighttime/Daytime Crash Ratio**	0.5

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Coordinate with Local Jurisdiction on Signal Modifications	0	EA	\$ 2,500	\$ -
Signal Warrant Analysis to Consider Removal of Signal	0	EA	\$ 5,000	\$ -
Intersection Configuration Evaluation (ICE)	1	EA	\$ 25,000	\$ 25,000
Implement Results of ICE	1	EA	\$ 750,000	\$ 750,000
All-Way Stop Analysis and Converting Two-Way Stop to All-Way Stop	0	EA	\$ 5,000	\$ -
All-Way Stop Analysis and Removal of Stop Signs on Major Approaches	0	EA	\$ 5,000	\$ -
Install Destination Lighting	0	LEG	\$ 8,000	\$ -
Upgrade Signs and Pavement Markings	1	LEG	\$ 2,200	\$ 2,200
Upgrade Signs (Unpaved Approaches)	2	LEG	\$ 1,000	\$ 2,000
Install Second Stop Sign and Stop Ahead Sign	1	LEG	\$ 1,200	\$ 1,200
Install Solar-Powered Flashing Beacon on Stop Sign	2	EA	\$ 2,500	\$ 5,000
Install Transverse Rumble Strips	1	LEG	\$ 1,000	\$ 1,000
Install Intersection Warning Signs and Advance Street Name Plaques on Major Approaches	2	LEG	\$ 1,200	\$ 2,400
Clear and Grub within Sight Triangle	5	LEG	\$ 1,500	\$ 7,500
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 796,300

Continued on back of this page.

** Nighttime/Daytime Crash Ratio = 3 x nighttime crashes/daytime crashes per Iowa DOT I.M. 2.110 Attachment A.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 19



Project Name: Co Rd D35/210th St & Co Rd T37/M Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 209359

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	NB	SB	EB	WB	Quantity	Unit	Unit Price	Item Cost
Provide Left-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Provide Right-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Realign Intersection Approach to Reduce or Eliminate Intersection Skew						LEG	\$ 200,000	\$ -
Provide Bypass Lane on Shoulder at T-intersection						EA	\$ 50,000	\$ -
Convert Offset T-Intersection to Four-Legged Intersection						EA	\$ 300,000	\$ -
Use Indirect Left-Turn Treatment to Minimize Conflicts at Divided Highway Intersection						LEG	\$ 75,000	\$ -
Convert Four-Legged Intersection to Offset T-Intersection						EA	\$ 300,000	\$ -
Install Solar-Powered Flashing Beacon on Intersection Warning Sign						LEG	\$ 2,500	\$ -
Install Stop Signs with LED Flashing Lights						LEG	\$ 2,500	\$ -
Install Retroreflective Strip on Stop Sign Post	X	X			3	EA	\$ 10	\$ 30
Low-Cost Intersection Conflict Warning System (ICWS)						EA	\$ 15,000	\$ -
Flashing Beacon on Intersection Warning Sign						SIGN	\$ 2,500	\$ -
Other:								
Other:								
Additional Potential Improvements Subtotal:								\$ 30
Project Selection Decision Tree Systemic Improvements Subtotal:								\$ 796,300
Subtotal:								\$ 796,330
Mobilization: (% +/-)*								10% \$ 75,000
Traffic Control: (% +/-)								5% \$ 39,934
Contingency: (% +/-)								20% \$ 159,736
Estimated Project Cost								\$ 1,071,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

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Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 12



Project Name: Co Rd D55/290th St & Co Rd T29/K Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Location Description

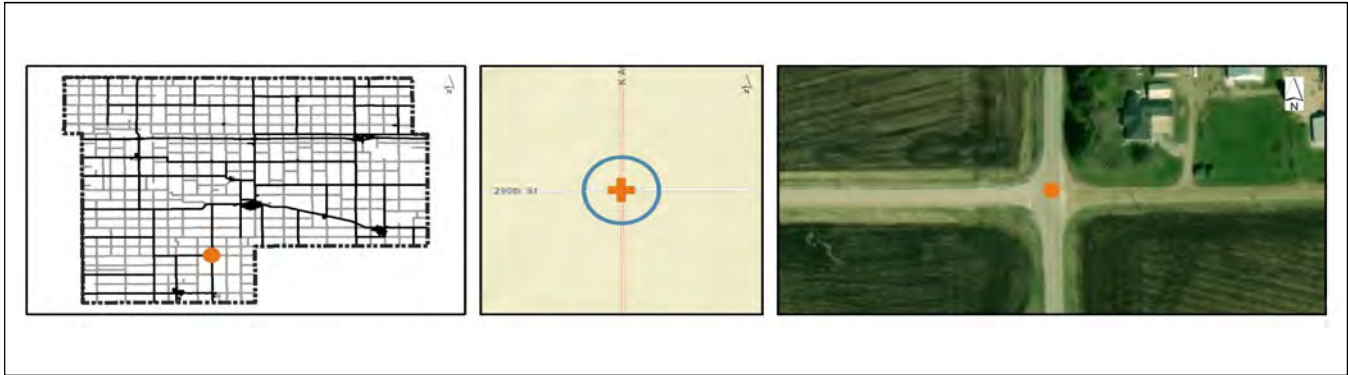
Road: **Co Rd D55/290th St**
 Road: **Co Rd T29/K Ave**

Closest City: **BEAMAN**

GPS ID: **208930**

County to coordinate with local agency to implement improvements that are on right-of-way that is not under control of the County.

Project Location Maps



Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Distance from Previous Stop	4 mi	4
Approach Angle (Degrees)	90	0
Intersection within Curve	No	0
Daily Entering Vehicles	885	2
Minor Street Volume	240	2
Roads/Driveways within 250 Feet	1	1
K or A Crashes	1	2
Number of Approaches	4	1
Total Risk Factor Points (22 max)		12

Other Information	
Number of Approaches	4
Number of Paved Approaches	3
Major ADT	930
Minor ADT	240
Destination Lighting	Yes
Transverse Rumble Strips (Number of Approaches)	0
Control Type	Two-way stop

Crash Data, 2008-2017	
Total Crashes	1
K and A Crashes	1
Right Angle, Rear-end, or Turning Crashes	1
Total Nighttime Crashes	0
Nighttime/Daytime Crash Ratio**	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Coordinate with Local Jurisdiction on Signal Modifications	0	EA	\$ 2,500	\$ -
Signal Warrant Analysis to Consider Removal of Signal	0	EA	\$ 5,000	\$ -
Intersection Configuration Evaluation (ICE)	0	EA	\$ 25,000	\$ -
Implement Results of ICE	0	EA	\$ 750,000	\$ -
All-Way Stop Analysis and Converting Two-Way Stop to All-Way Stop	0	EA	\$ 5,000	\$ -
All-Way Stop Analysis and Removal of Stop Signs on Major Approaches	0	EA	\$ 5,000	\$ -
Install Destination Lighting	0	LEG	\$ 8,000	\$ -
Upgrade Signs and Pavement Markings	1	LEG	\$ 2,200	\$ 2,200
Upgrade Signs (Unpaved Approaches)	1	LEG	\$ 1,000	\$ 1,000
Install Second Stop Sign and Stop Ahead Sign	1	LEG	\$ 1,200	\$ 1,200
Install Solar-Powered Flashing Beacon on Stop Sign	0	EA	\$ 2,500	\$ -
Install Transverse Rumble Strips	1	LEG	\$ 1,000	\$ 1,000
Install Intersection Warning Signs and Advance Street Name Plaques on Major Approaches	2	LEG	\$ 1,200	\$ 2,400
Clear and Grub within Sight Triangle	4	LEG	\$ 1,500	\$ 6,000
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 13,800

Continued on back of this page.

** Nighttime/Daytime Crash Ratio = 3 x nighttime crashes/daytime crashes per Iowa DOT I.M. 2.110 Attachment A.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 12



Project Name: Co Rd D55/290th St & Co Rd T29/K Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 208930

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	NB	SB	EB	WB	Quantity	Unit	Unit Price	Item Cost
Provide Left-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Provide Right-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Realign Intersection Approach to Reduce or Eliminate Intersection Skew						LEG	\$ 200,000	\$ -
Provide Bypass Lane on Shoulder at T-intersection						EA	\$ 50,000	\$ -
Convert Offset T-Intersection to Four-Legged Intersection						EA	\$ 300,000	\$ -
Use Indirect Left-Turn Treatment to Minimize Conflicts at Divided Highway Intersection						LEG	\$ 75,000	\$ -
Convert Four-Legged Intersection to Offset T-Intersection						EA	\$ 300,000	\$ -
Install Solar-Powered Flashing Beacon on Intersection Warning Sign						LEG	\$ 2,500	\$ -
Install Stop Signs with LED Flashing Lights						LEG	\$ 2,500	\$ -
Install Retroreflective Strip on Stop Sign Post			X	X	3	EA	\$ 10	\$ 30
Low-Cost Intersection Conflict Warning System (ICWS)						EA	\$ 15,000	\$ -
Flashing Beacon on Intersection Warning Sign						SIGN	\$ 2,500	\$ -
Other:								
Other:								
Additional Potential Improvements Subtotal:								\$ 30
Project Selection Decision Tree Systemic Improvements Subtotal:								\$ 13,800
Subtotal:								\$ 13,830
Mobilization: (% +/-)*								10% \$ 2,500
Traffic Control: (% +/-)								5% \$ 734
Contingency: (% +/-)								20% \$ 2,936
Estimated Project Cost								\$ 20,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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Project Description Form Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: **11**



Project Name: Co Rd D67/330th St & Co Rd T29/K Ave
 Agency Name: Grundy County
 Contact Name: Mauer, Gary
 E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
 Checked By: MMO

INTERSECTION

Location Description

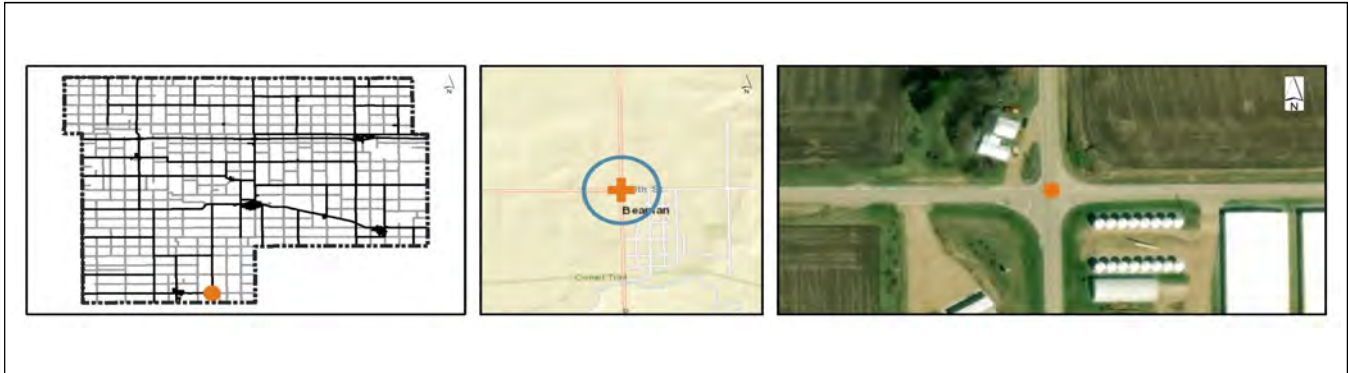
Road: Co Rd D67/330th St
 Road: Co Rd T29/K Ave

Closest City: **BEAMAN**

GPS ID: 208976

This intersection is located on the following high scoring segment: GPS ID 3905
 County to coordinate with local agency to implement improvements that are on right-of-way that is not under control of the County.

Project Location Maps



Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Distance from Previous Stop	2 mi	4
Approach Angle (Degrees)	90	0
Intersection within Curve	No	0
Daily Entering Vehicles	2,145	3
Minor Street Volume	930	2
Roads/Driveways within 250 Feet	1	1
K or A Crashes	0	0
Number of Approaches	4	1
Total Risk Factor Points (22 max)		11

Other Information	
Number of Approaches	4
Number of Paved Approaches	4
Major ADT	1,540
Minor ADT	930
Destination Lighting	Yes
Transverse Rumble Strips (Number of Approaches)	2
Control Type	Two-way stop

Crash Data, 2008-2017	
Total Crashes	4
K and A Crashes	0
Right Angle, Rear-end, or Turning Crashes	2
Total Nighttime Crashes	0
Nighttime/Daytime Crash Ratio**	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Coordinate with Local Jurisdiction on Signal Modifications	0	EA	\$ 2,500	\$ -
Signal Warrant Analysis to Consider Removal of Signal	0	EA	\$ 5,000	\$ -
Intersection Configuration Evaluation (ICE)	0	EA	\$ 25,000	\$ -
Implement Results of ICE	0	EA	\$ 750,000	\$ -
All-Way Stop Analysis and Converting Two-Way Stop to All-Way Stop	0	EA	\$ 5,000	\$ -
All-Way Stop Analysis and Removal of Stop Signs on Major Approaches	0	EA	\$ 5,000	\$ -
Install Destination Lighting	0	LEG	\$ 8,000	\$ -
Upgrade Signs and Pavement Markings	2	LEG	\$ 2,200	\$ 4,400
Upgrade Signs (Unpaved Approaches)	0	LEG	\$ 1,000	\$ -
Install Second Stop Sign and Stop Ahead Sign	2	LEG	\$ 1,200	\$ 2,400
Install Solar-Powered Flashing Beacon on Stop Sign	2	EA	\$ 2,500	\$ 5,000
Install Transverse Rumble Strips	0	LEG	\$ 1,000	\$ -
Install Intersection Warning Signs and Advance Street Name Plaques on Major Approaches	2	LEG	\$ 1,200	\$ 2,400
Clear and Grub within Sight Triangle	4	LEG	\$ 1,500	\$ 6,000
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 20,200

Continued on back of this page.

** Nighttime/Daytime Crash Ratio = 3 x nighttime crashes/daytime crashes per Iowa DOT I.M. 2.110 Attachment A.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 11



Project Name: Co Rd D67/330th St & Co Rd T29/K Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 208976

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	NB	SB	EB	WB	Quantity	Unit	Unit Price	Item Cost
Provide Left-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Provide Right-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Realign Intersection Approach to Reduce or Eliminate Intersection Skew						LEG	\$ 200,000	\$ -
Provide Bypass Lane on Shoulder at T-intersection						EA	\$ 50,000	\$ -
Convert Offset T-Intersection to Four-Legged Intersection						EA	\$ 300,000	\$ -
Use Indirect Left-Turn Treatment to Minimize Conflicts at Divided Highway Intersection						LEG	\$ 75,000	\$ -
Convert Four-Legged Intersection to Offset T-Intersection						EA	\$ 300,000	\$ -
Install Solar-Powered Flashing Beacon on Intersection Warning Sign						LEG	\$ 2,500	\$ -
Install Stop Signs with LED Flashing Lights						LEG	\$ 2,500	\$ -
Install Retroreflective Strip on Stop Sign Post			X	X	4	EA	\$ 10	\$ 40
Low-Cost Intersection Conflict Warning System (ICWS)						EA	\$ 15,000	\$ -
Flashing Beacon on Intersection Warning Sign						SIGN	\$ 2,500	\$ -
Other:								
Other:								
Additional Potential Improvements Subtotal:								\$ 40
Project Selection Decision Tree Systemic Improvements Subtotal:								\$ 20,200
Subtotal:								\$ 20,240
Mobilization: (% +/-)*								10% \$ 2,500
Traffic Control: (% +/-)								5% \$ 1,052
Contingency: (% +/-)								20% \$ 4,208
Estimated Project Cost								\$ 28,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: **11**



Project Name: Co Rd D35/205th St & Co Rd T19/F Ave
 Agency Name: Grundy County
 Contact Name: Mauer, Gary
 E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
 Checked By: MMO

INTERSECTION

Location Description

Road: Co Rd D35/205th St
 Road: Co Rd T19/F Ave

Closest City: **WELLSBURG**

GPS ID: 208903

County to coordinate with local agency to implement improvements that are on right-of-way that is not under control of the County.

Project Location Maps



Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Distance from Previous Stop	6 mi	4
Approach Angle (Degrees)	90	0
Intersection within Curve	No	0
Daily Entering Vehicles	1,900	3
Minor Street Volume	510	2
Roads/Driveways within 250 Feet	1	1
K or A Crashes	0	0
Number of Approaches	4	1
Total Risk Factor Points (22 max)		11

Other Information	
Number of Approaches	4
Number of Paved Approaches	4
Major ADT	1,550
Minor ADT	510
Destination Lighting	Yes
Transverse Rumble Strips (Number of Approaches)	2
Control Type	Two-way stop

Crash Data, 2008-2017	
Total Crashes	0
K and A Crashes	0
Right Angle, Rear-end, or Turning Crashes	0
Total Nighttime Crashes	0
Nighttime/Daytime Crash Ratio**	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Coordinate with Local Jurisdiction on Signal Modifications	0	EA	\$ 2,500	\$ -
Signal Warrant Analysis to Consider Removal of Signal	0	EA	\$ 5,000	\$ -
Intersection Configuration Evaluation (ICE)	0	EA	\$ 25,000	\$ -
Implement Results of ICE	0	EA	\$ 750,000	\$ -
All-Way Stop Analysis and Converting Two-Way Stop to All-Way Stop	0	EA	\$ 5,000	\$ -
All-Way Stop Analysis and Removal of Stop Signs on Major Approaches	0	EA	\$ 5,000	\$ -
Install Destination Lighting	0	LEG	\$ 8,000	\$ -
Upgrade Signs and Pavement Markings	2	LEG	\$ 2,200	\$ 4,400
Upgrade Signs (Unpaved Approaches)	0	LEG	\$ 1,000	\$ -
Install Second Stop Sign and Stop Ahead Sign	2	LEG	\$ 1,200	\$ 2,400
Install Solar-Powered Flashing Beacon on Stop Sign	4	EA	\$ 2,500	\$ 10,000
Install Transverse Rumble Strips	0	LEG	\$ 1,000	\$ -
Install Intersection Warning Signs and Advance Street Name Plaques on Major Approaches	2	LEG	\$ 1,200	\$ 2,400
Clear and Grub within Sight Triangle	4	LEG	\$ 1,500	\$ 6,000
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 25,200

Continued on back of this page.

** Nighttime/Daytime Crash Ratio = 3 x nighttime crashes/daytime crashes per Iowa DOT I.M. 2.110 Attachment A.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 11



Project Name: Co Rd D35/205th St & Co Rd T19/F Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 208903

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	NB	SB	EB	WB	Quantity	Unit	Unit Price	Item Cost
Provide Left-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Provide Right-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Realign Intersection Approach to Reduce or Eliminate Intersection Skew						LEG	\$ 200,000	\$ -
Provide Bypass Lane on Shoulder at T-intersection						EA	\$ 50,000	\$ -
Convert Offset T-Intersection to Four-Legged Intersection						EA	\$ 300,000	\$ -
Use Indirect Left-Turn Treatment to Minimize Conflicts at Divided Highway Intersection						LEG	\$ 75,000	\$ -
Convert Four-Legged Intersection to Offset T-Intersection						EA	\$ 300,000	\$ -
Install Solar-Powered Flashing Beacon on Intersection Warning Sign						LEG	\$ 2,500	\$ -
Install Stop Signs with LED Flashing Lights						LEG	\$ 2,500	\$ -
Install Retroreflective Strip on Stop Sign Post			X	X	4	EA	\$ 10	\$ 40
Low-Cost Intersection Conflict Warning System (ICWS)						EA	\$ 15,000	\$ -
Flashing Beacon on Intersection Warning Sign						SIGN	\$ 2,500	\$ -
Other:								
Other:								
Additional Potential Improvements Subtotal:								\$ 40
Project Selection Decision Tree Systemic Improvements Subtotal:								\$ 25,200
Subtotal:								\$ 25,240
Mobilization: (% +/-)*								10% \$ 2,530
Traffic Control: (% +/-)								5% \$ 1,446
Contingency: (% +/-)								20% \$ 5,784
Estimated Project Cost								\$ 35,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

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Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 10



Project Name: D18 & D19
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 10/4/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Location Description

Road: **D18** Closest City: **CEDAR FALLS** GPS ID: **29573**
 Road: **D19**

This intersection is located on the following high scoring segment: GPS ID 3889
 County to coordinate with local agency to implement improvements that are on right-of-way that is not under control of the County.

Project Location Maps



Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Distance from Previous Stop	5.5 mi	4
Approach Angle (Degrees)	90	0
Intersection within Curve	No	0
Daily Entering Vehicles	2,770	3
Minor Street Volume	1,560	2
Roads/Driveways within 250 Feet	0	0
K or A Crashes	0	0
Number of Approaches	4	1
Total Risk Factor Points (22 max)		10

Other Information	
Number of Approaches	4
Number of Paved Approaches	4
Major ADT	2,490
Minor ADT	1,560
Destination Lighting	Yes
Transverse Rumble Strips (Number of Approaches)	1
Control Type	All-way stop

Crash Data, 2008-2017	
Total Crashes	2
K and A Crashes	0
Right Angle, Rear-end, or Turning Crashes	2
Total Nighttime Crashes	1
Nighttime/Daytime Crash Ratio**	3.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Coordinate with Local Jurisdiction on Signal Modifications	0	EA	\$ 2,500	\$ -
Signal Warrant Analysis to Consider Removal of Signal	0	EA	\$ 5,000	\$ -
Intersection Configuration Evaluation (ICE)	0	EA	\$ 25,000	\$ -
Implement Results of ICE	0	EA	\$ 750,000	\$ -
All-Way Stop Analysis and Converting Two-Way Stop to All-Way Stop	0	EA	\$ 5,000	\$ -
All-Way Stop Analysis and Removal of Stop Signs on Major Approaches	1	EA	\$ 5,000	\$ 5,000
Install Destination Lighting	0	LEG	\$ 8,000	\$ -
Upgrade Signs and Pavement Markings	4	LEG	\$ 2,200	\$ 8,800
Upgrade Signs (Unpaved Approaches)	0	LEG	\$ 1,000	\$ -
Install Second Stop Sign and Stop Ahead Sign	4	LEG	\$ 1,200	\$ 4,800
Install Solar-Powered Flashing Beacon on Stop Sign	8	EA	\$ 2,500	\$ 20,000
Install Transverse Rumble Strips	3	LEG	\$ 1,000	\$ 3,000
Install Intersection Warning Signs and Advance Street Name Plaques on Major Approaches	4	LEG	\$ 1,200	\$ 4,800
Clear and Grub within Sight Triangle	4	LEG	\$ 1,500	\$ 6,000
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 52,400

Continued on back of this page.

** Nighttime/Daytime Crash Ratio = 3 x nighttime crashes/daytime crashes per Iowa DOT I.M. 2.110 Attachment A.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 10



Project Name: D18 & D19
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 10/4/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 29573

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	NB	SB	EB	WB	Quantity	Unit	Unit Price	Item Cost
Provide Left-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Provide Right-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Realign Intersection Approach to Reduce or Eliminate Intersection Skew						LEG	\$ 200,000	\$ -
Provide Bypass Lane on Shoulder at T-intersection						EA	\$ 50,000	\$ -
Convert Offset T-Intersection to Four-Legged Intersection						EA	\$ 300,000	\$ -
Use Indirect Left-Turn Treatment to Minimize Conflicts at Divided Highway Intersection						LEG	\$ 75,000	\$ -
Convert Four-Legged Intersection to Offset T-Intersection						EA	\$ 300,000	\$ -
Install Solar-Powered Flashing Beacon on Intersection Warning Sign						LEG	\$ 2,500	\$ -
Install Stop Signs with LED Flashing Lights						LEG	\$ 2,500	\$ -
Install Retroreflective Strip on Stop Sign Post	X	X	X	X	8	EA	\$ 10	\$ 80
Low-Cost Intersection Conflict Warning System (ICWS)						EA	\$ 15,000	\$ -
Flashing Beacon on Intersection Warning Sign						SIGN	\$ 2,500	\$ -
Other:								
Other:								
Additional Potential Improvements Subtotal:								\$ 80
Project Selection Decision Tree Systemic Improvements Subtotal:								\$ 52,400
Subtotal:								\$ 52,480
Mobilization: (% +/-)*								10% \$ 5,250
Traffic Control: (% +/-)								5% \$ 2,654
Contingency: (% +/-)								20% \$ 10,616
Estimated Project Cost								\$ 71,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 10



Project Name: Co Rd D19/160th St & Co Rd T65/X Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 10/4/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Location Description

Road: **Co Rd D19/160th St**
 Road: **Co Rd T65/X Ave**

Closest City: **DIKE**

GPS ID: **208611**

This intersection is located on the following high scoring segment: GPS ID 3889
 County to coordinate with local agency to implement improvements that are on right-of-way that is not under control of the County.

Project Location Maps



Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Distance from Previous Stop	3 mi	4
Approach Angle (Degrees)	90	0
Intersection within Curve	No	0
Daily Entering Vehicles	2,160	3
Minor Street Volume	310	2
Roads/Driveways within 250 Feet	1	1
K or A Crashes	0	0
Number of Approaches	3	0
Total Risk Factor Points (22 max)		10

Other Information	
Number of Approaches	3
Number of Paved Approaches	3
Major ADT	2,440
Minor ADT	310
Destination Lighting	Yes
Transverse Rumble Strips (Number of Approaches)	0
Control Type	One-way stop

Crash Data, 2008-2017	
Total Crashes	2
K and A Crashes	0
Right Angle, Rear-end, or Turning Crashes	2
Total Nighttime Crashes	0
Nighttime/Daytime Crash Ratio**	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Coordinate with Local Jurisdiction on Signal Modifications	0	EA	\$ 2,500	\$ -
Signal Warrant Analysis to Consider Removal of Signal	0	EA	\$ 5,000	\$ -
Intersection Configuration Evaluation (ICE)	0	EA	\$ 25,000	\$ -
Implement Results of ICE	0	EA	\$ 750,000	\$ -
All-Way Stop Analysis and Converting Two-Way Stop to All-Way Stop	0	EA	\$ 5,000	\$ -
All-Way Stop Analysis and Removal of Stop Signs on Major Approaches	0	EA	\$ 5,000	\$ -
Install Destination Lighting	0	LEG	\$ 8,000	\$ -
Upgrade Signs and Pavement Markings	1	LEG	\$ 2,200	\$ 2,200
Upgrade Signs (Unpaved Approaches)	0	LEG	\$ 1,000	\$ -
Install Second Stop Sign and Stop Ahead Sign	1	LEG	\$ 1,200	\$ 1,200
Install Solar-Powered Flashing Beacon on Stop Sign	0	EA	\$ 2,500	\$ -
Install Transverse Rumble Strips	1	LEG	\$ 1,000	\$ 1,000
Install Intersection Warning Signs and Advance Street Name Plaques on Major Approaches	2	LEG	\$ 1,200	\$ 2,400
Clear and Grub within Sight Triangle	2	LEG	\$ 1,500	\$ 3,000
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 9,800

Continued on back of this page.

** Nighttime/Daytime Crash Ratio = 3 x nighttime crashes/daytime crashes per Iowa DOT I.M. 2.110 Attachment A.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 10



Project Name: Co Rd D19/160th St & Co Rd T65/X Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 10/4/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 208611

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	NB	SB	EB	WB	Quantity	Unit	Unit Price	Item Cost
Provide Left-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Provide Right-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Realign Intersection Approach to Reduce or Eliminate Intersection Skew						LEG	\$ 200,000	\$ -
Provide Bypass Lane on Shoulder at T-intersection						EA	\$ 50,000	\$ -
Convert Offset T-Intersection to Four-Legged Intersection						EA	\$ 300,000	\$ -
Use Indirect Left-Turn Treatment to Minimize Conflicts at Divided Highway Intersection						LEG	\$ 75,000	\$ -
Convert Four-Legged Intersection to Offset T-Intersection						EA	\$ 300,000	\$ -
Install Solar-Powered Flashing Beacon on Intersection Warning Sign						LEG	\$ 2,500	\$ -
Install Stop Signs with LED Flashing Lights						LEG	\$ 2,500	\$ -
Install Retroreflective Strip on Stop Sign Post		X			2	EA	\$ 10	\$ 20
Low-Cost Intersection Conflict Warning System (ICWS)						EA	\$ 15,000	\$ -
Flashing Beacon on Intersection Warning Sign						SIGN	\$ 2,500	\$ -
Other:								
Other:								
Additional Potential Improvements Subtotal:								\$ 20
Project Selection Decision Tree Systemic Improvements Subtotal:								\$ 9,800
Subtotal:								\$ 9,820
Mobilization: (% +/-)*								10% \$ 2,500
Traffic Control: (% +/-)								5% \$ 536
Contingency: (% +/-)								20% \$ 2,144
Estimated Project Cost								\$ 15,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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Project Description Form Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 10



Project Name: Co Rd D19/160th St & Co Rd T55/U Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 10/4/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Location Description

Road: **Co Rd D19/160th St**
 Road: **Co Rd T55/U Ave**

Closest City: **DIKE**

GPS ID: **208571**

This intersection is located on the following high scoring segment: GPS ID 3949
 County to coordinate with local agency to implement improvements that are on right-of-way that is not under control of the County.

Project Location Maps



Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Distance from Previous Stop	6 mi	4
Approach Angle (Degrees)	90	0
Intersection within Curve	No	0
Daily Entering Vehicles	2,080	3
Minor Street Volume	1,230	2
Roads/Driveways within 250 Feet	1	1
K or A Crashes	0	0
Number of Approaches	3	0
Total Risk Factor Points (22 max)		10

Other Information	
Number of Approaches	3
Number of Paved Approaches	3
Major ADT	2,400
Minor ADT	1,230
Destination Lighting	Yes
Transverse Rumble Strips (Number of Approaches)	0
Control Type	One-way stop

Crash Data, 2008-2017	
Total Crashes	2
K and A Crashes	0
Right Angle, Rear-end, or Turning Crashes	1
Total Nighttime Crashes	0
Nighttime/Daytime Crash Ratio**	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Coordinate with Local Jurisdiction on Signal Modifications	0	EA	\$ 2,500	\$ -
Signal Warrant Analysis to Consider Removal of Signal	0	EA	\$ 5,000	\$ -
Intersection Configuration Evaluation (ICE)	0	EA	\$ 25,000	\$ -
Implement Results of ICE	0	EA	\$ 750,000	\$ -
All-Way Stop Analysis and Converting Two-Way Stop to All-Way Stop	0	EA	\$ 5,000	\$ -
All-Way Stop Analysis and Removal of Stop Signs on Major Approaches	0	EA	\$ 5,000	\$ -
Install Destination Lighting	0	LEG	\$ 8,000	\$ -
Upgrade Signs and Pavement Markings	1	LEG	\$ 2,200	\$ 2,200
Upgrade Signs (Unpaved Approaches)	0	LEG	\$ 1,000	\$ -
Install Second Stop Sign and Stop Ahead Sign	1	LEG	\$ 1,200	\$ 1,200
Install Solar-Powered Flashing Beacon on Stop Sign	2	EA	\$ 2,500	\$ 5,000
Install Transverse Rumble Strips	1	LEG	\$ 1,000	\$ 1,000
Install Intersection Warning Signs and Advance Street Name Plaques on Major Approaches	2	LEG	\$ 1,200	\$ 2,400
Clear and Grub within Sight Triangle	2	LEG	\$ 1,500	\$ 3,000
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 14,800

Continued on back of this page.

** Nighttime/Daytime Crash Ratio = 3 x nighttime crashes/daytime crashes per Iowa DOT I.M. 2.110 Attachment A.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 10



Project Name: Co Rd D19/160th St & Co Rd T55/U Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 10/4/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 208571

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	NB	SB	EB	WB	Quantity	Unit	Unit Price	Item Cost
Provide Left-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Provide Right-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Realign Intersection Approach to Reduce or Eliminate Intersection Skew						LEG	\$ 200,000	\$ -
Provide Bypass Lane on Shoulder at T-intersection						EA	\$ 50,000	\$ -
Convert Offset T-Intersection to Four-Legged Intersection						EA	\$ 300,000	\$ -
Use Indirect Left-Turn Treatment to Minimize Conflicts at Divided Highway Intersection						LEG	\$ 75,000	\$ -
Convert Four-Legged Intersection to Offset T-Intersection						EA	\$ 300,000	\$ -
Install Solar-Powered Flashing Beacon on Intersection Warning Sign						LEG	\$ 2,500	\$ -
Install Stop Signs with LED Flashing Lights						LEG	\$ 2,500	\$ -
Install Retroreflective Strip on Stop Sign Post		X			2	EA	\$ 10	\$ 20
Low-Cost Intersection Conflict Warning System (ICWS)						EA	\$ 15,000	\$ -
Flashing Beacon on Intersection Warning Sign						SIGN	\$ 2,500	\$ -
Other:								
Other:								
Additional Potential Improvements Subtotal:								\$ 20
Project Selection Decision Tree Systemic Improvements Subtotal:								\$ 14,800
Subtotal:								\$ 14,820
Mobilization: (% +/-)*								10% \$ 2,500
Traffic Control: (% +/-)								5% \$ 936
Contingency: (% +/-)								20% \$ 3,744
Estimated Project Cost								\$ 22,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

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Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 10



Project Name: Co Rd D17/120th St & Co Rd T55/U Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 10/4/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Location Description

Road: **Co Rd D17/120th St**
 Road: **Co Rd T55/U Ave**

Closest City: **NEW HARTFORD**

GPS ID: **209442**

This intersection is located on the following high scoring segment: GPS ID 3949
 County to coordinate with local agency to implement improvements that are on right-of-way that is not under control of the County.

Project Location Maps



Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Distance from Previous Stop	4 mi	4
Approach Angle (Degrees)	90	0
Intersection within Curve	No	0
Daily Entering Vehicles	1,895	3
Minor Street Volume	540	2
Roads/Driveways within 250 Feet	0	0
K or A Crashes	0	0
Number of Approaches	4	1
Total Risk Factor Points (22 max)		10

Other Information	
Number of Approaches	4
Number of Paved Approaches	3
Major ADT	1,750
Minor ADT	540
Destination Lighting	Yes
Transverse Rumble Strips (Number of Approaches)	1
Control Type	Two-way stop

Crash Data, 2008-2017	
Total Crashes	4
K and A Crashes	0
Right Angle, Rear-end, or Turning Crashes	0
Total Nighttime Crashes	0
Nighttime/Daytime Crash Ratio**	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Coordinate with Local Jurisdiction on Signal Modifications	0	EA	\$ 2,500	\$ -
Signal Warrant Analysis to Consider Removal of Signal	0	EA	\$ 5,000	\$ -
Intersection Configuration Evaluation (ICE)	0	EA	\$ 25,000	\$ -
Implement Results of ICE	0	EA	\$ 750,000	\$ -
All-Way Stop Analysis and Converting Two-Way Stop to All-Way Stop	0	EA	\$ 5,000	\$ -
All-Way Stop Analysis and Removal of Stop Signs on Major Approaches	0	EA	\$ 5,000	\$ -
Install Destination Lighting	0	LEG	\$ 8,000	\$ -
Upgrade Signs and Pavement Markings	1	LEG	\$ 2,200	\$ 2,200
Upgrade Signs (Unpaved Approaches)	1	LEG	\$ 1,000	\$ 1,000
Install Second Stop Sign and Stop Ahead Sign	1	LEG	\$ 1,200	\$ 1,200
Install Solar-Powered Flashing Beacon on Stop Sign	2	EA	\$ 2,500	\$ 5,000
Install Transverse Rumble Strips	0	LEG	\$ 1,000	\$ -
Install Intersection Warning Signs and Advance Street Name Plaques on Major Approaches	2	LEG	\$ 1,200	\$ 2,400
Clear and Grub within Sight Triangle	4	LEG	\$ 1,500	\$ 6,000
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 17,800

Continued on back of this page.

** Nighttime/Daytime Crash Ratio = 3 x nighttime crashes/daytime crashes per Iowa DOT I.M. 2.110 Attachment A.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 10



Project Name: Co Rd D17/120th St & Co Rd T55/U Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 10/4/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 209442

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	NB	SB	EB	WB	Quantity	Unit	Unit Price	Item Cost
Provide Left-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Provide Right-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Realign Intersection Approach to Reduce or Eliminate Intersection Skew						LEG	\$ 200,000	\$ -
Provide Bypass Lane on Shoulder at T-intersection						EA	\$ 50,000	\$ -
Convert Offset T-Intersection to Four-Legged Intersection						EA	\$ 300,000	\$ -
Use Indirect Left-Turn Treatment to Minimize Conflicts at Divided Highway Intersection						LEG	\$ 75,000	\$ -
Convert Four-Legged Intersection to Offset T-Intersection						EA	\$ 300,000	\$ -
Install Solar-Powered Flashing Beacon on Intersection Warning Sign						LEG	\$ 2,500	\$ -
Install Stop Signs with LED Flashing Lights						LEG	\$ 2,500	\$ -
Install Retroreflective Strip on Stop Sign Post			X	X	3	EA	\$ 10	\$ 30
Low-Cost Intersection Conflict Warning System (ICWS)						EA	\$ 15,000	\$ -
Flashing Beacon on Intersection Warning Sign						SIGN	\$ 2,500	\$ -
Other:								
Other:								

Additional Potential Improvements Subtotal:	\$	30
Project Selection Decision Tree Systemic Improvements Subtotal:	\$	17,800
Subtotal:	\$	17,830
Mobilization: (% +/-)*	10%	\$ 2,500
Traffic Control: (% +/-)	5%	\$ 934
Contingency: (% +/-)	20%	\$ 3,736
Estimated Project Cost	\$	25,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

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Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 10



Project Name: Co Rd D17/130th St & Co Rd T55/U Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 10/4/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Location Description

Road: **Co Rd D17/130th St**
 Road: **Co Rd T55/U Ave**

Closest City: **DIKE**

GPS ID: **209448**

This intersection is located on the following high scoring segment: GPS ID 3949
 County to coordinate with local agency to implement improvements that are on right-of-way that is not under control of the County.

Project Location Maps



Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Distance from Previous Stop	4 mi	4
Approach Angle (Degrees)	90	0
Intersection within Curve	No	0
Daily Entering Vehicles	1,883	3
Minor Street Volume	650	2
Roads/Driveways within 250 Feet	0	0
K or A Crashes	0	0
Number of Approaches	4	1
Total Risk Factor Points (22 max)		10

Other Information	
Number of Approaches	4
Number of Paved Approaches	3
Major ADT	1,620
Minor ADT	650
Destination Lighting	Yes
Transverse Rumble Strips (Number of Approaches)	0
Control Type	Two-way stop

Crash Data, 2008-2017	
Total Crashes	4
K and A Crashes	0
Right Angle, Rear-end, or Turning Crashes	3
Total Nighttime Crashes	1
Nighttime/Daytime Crash Ratio**	1.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Coordinate with Local Jurisdiction on Signal Modifications	0	EA	\$ 2,500	\$ -
Signal Warrant Analysis to Consider Removal of Signal	0	EA	\$ 5,000	\$ -
Intersection Configuration Evaluation (ICE)	0	EA	\$ 25,000	\$ -
Implement Results of ICE	0	EA	\$ 750,000	\$ -
All-Way Stop Analysis and Converting Two-Way Stop to All-Way Stop	0	EA	\$ 5,000	\$ -
All-Way Stop Analysis and Removal of Stop Signs on Major Approaches	0	EA	\$ 5,000	\$ -
Install Destination Lighting	0	LEG	\$ 8,000	\$ -
Upgrade Signs and Pavement Markings	1	LEG	\$ 2,200	\$ 2,200
Upgrade Signs (Unpaved Approaches)	1	LEG	\$ 1,000	\$ 1,000
Install Second Stop Sign and Stop Ahead Sign	1	LEG	\$ 1,200	\$ 1,200
Install Solar-Powered Flashing Beacon on Stop Sign	2	EA	\$ 2,500	\$ 5,000
Install Transverse Rumble Strips	1	LEG	\$ 1,000	\$ 1,000
Install Intersection Warning Signs and Advance Street Name Plaques on Major Approaches	2	LEG	\$ 1,200	\$ 2,400
Clear and Grub within Sight Triangle	4	LEG	\$ 1,500	\$ 6,000
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 18,800

Continued on back of this page.

** Nighttime/Daytime Crash Ratio = 3 x nighttime crashes/daytime crashes per Iowa DOT I.M. 2.110 Attachment A.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 10



Project Name: Co Rd D17/130th St & Co Rd T55/U Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 10/4/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 209448

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	NB	SB	EB	WB	Quantity	Unit	Unit Price	Item Cost
Provide Left-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Provide Right-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Realign Intersection Approach to Reduce or Eliminate Intersection Skew						LEG	\$ 200,000	\$ -
Provide Bypass Lane on Shoulder at T-intersection						EA	\$ 50,000	\$ -
Convert Offset T-Intersection to Four-Legged Intersection						EA	\$ 300,000	\$ -
Use Indirect Left-Turn Treatment to Minimize Conflicts at Divided Highway Intersection						LEG	\$ 75,000	\$ -
Convert Four-Legged Intersection to Offset T-Intersection						EA	\$ 300,000	\$ -
Install Solar-Powered Flashing Beacon on Intersection Warning Sign						LEG	\$ 2,500	\$ -
Install Stop Signs with LED Flashing Lights						LEG	\$ 2,500	\$ -
Install Retroreflective Strip on Stop Sign Post			X	X	3	EA	\$ 10	\$ 30
Low-Cost Intersection Conflict Warning System (ICWS)						EA	\$ 15,000	\$ -
Flashing Beacon on Intersection Warning Sign						SIGN	\$ 2,500	\$ -
Other:								
Other:								
Additional Potential Improvements Subtotal:								\$ 30
Project Selection Decision Tree Systemic Improvements Subtotal:								\$ 18,800
Subtotal:								\$ 18,830
Mobilization: (% +/-)*								10% \$ 2,500
Traffic Control: (% +/-)								5% \$ 1,134
Contingency: (% +/-)								20% \$ 4,536
Estimated Project Cost								\$ 27,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 15



Project Name: IA 175/G Ave/Diagonal Rd & Co Rd T45/Nickel Ave & 235th St
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Location Description

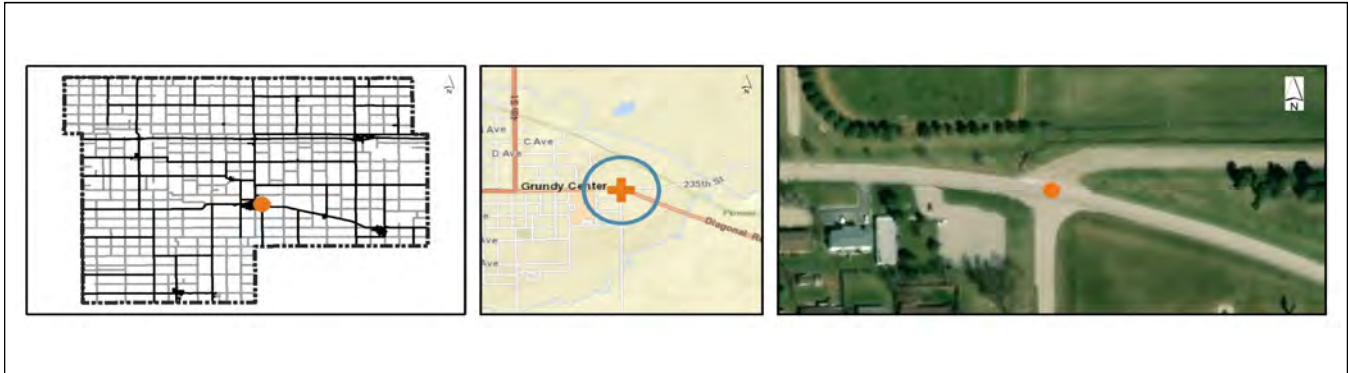
Road: IA 175/G Ave/Diagonal Rd
Road: Co Rd T45/Nickel Ave & 235th St

Closest City: GRUNDY CENTER

GPS ID: 652802

County to coordinate with local agency to implement improvements that are on right-of-way that is not under control of the County.

Project Location Maps



Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Distance from Previous Stop	4.5 mi	4
Approach Angle (Degrees)	30	4
Intersection within Curve	No	0
Daily Entering Vehicles	2,495	3
Minor Street Volume	300	2
Roads/Driveways within 250 Feet	1	1
K or A Crashes	0	0
Number of Approaches	4	1
Total Risk Factor Points (22 max)		15

Other Information	
Number of Approaches	4
Number of Paved Approaches	3
Major ADT	3,140
Minor ADT	300
Destination Lighting	Yes
Transverse Rumble Strips (Number of Approaches)	0
Control Type	Two-way stop

Crash Data, 2008-2017	
Total Crashes	0
K and A Crashes	0
Right Angle, Rear-end, or Turning Crashes	0
Total Nighttime Crashes	0
Nighttime/Daytime Crash Ratio**	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Coordinate with Local Jurisdiction on Signal Modifications	0	EA	\$ 2,500	\$ -
Signal Warrant Analysis to Consider Removal of Signal	0	EA	\$ 5,000	\$ -
Intersection Configuration Evaluation (ICE)	0	EA	\$ 25,000	\$ -
Implement Results of ICE	0	EA	\$ 750,000	\$ -
All-Way Stop Analysis and Converting Two-Way Stop to All-Way Stop	0	EA	\$ 5,000	\$ -
All-Way Stop Analysis and Removal of Stop Signs on Major Approaches	0	EA	\$ 5,000	\$ -
Install Destination Lighting	0	LEG	\$ 8,000	\$ -
Upgrade Signs and Pavement Markings	1	LEG	\$ 2,200	\$ 2,200
Upgrade Signs (Unpaved Approaches)	1	LEG	\$ 1,000	\$ 1,000
Install Second Stop Sign and Stop Ahead Sign	1	LEG	\$ 1,200	\$ 1,200
Install Solar-Powered Flashing Beacon on Stop Sign	0	EA	\$ 2,500	\$ -
Install Transverse Rumble Strips	1	LEG	\$ 1,000	\$ 1,000
Install Intersection Warning Signs and Advance Street Name Plaques on Major Approaches	2	LEG	\$ 1,200	\$ 2,400
Clear and Grub within Sight Triangle	4	LEG	\$ 1,500	\$ 6,000
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 13,800

Continued on back of this page.

** Nighttime/Daytime Crash Ratio = 3 x nighttime crashes/daytime crashes per Iowa DOT I.M. 2.110 Attachment A.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 15



Project Name: IA 175/G Ave/Diagonal Rd & Co Rd T45/Nickel Ave & 235th St
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 652802

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	NB	SB	EB	WB	Quantity	Unit	Unit Price	Item Cost
Provide Left-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Provide Right-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Realign Intersection Approach to Reduce or Eliminate Intersection Skew						LEG	\$ 200,000	\$ -
Provide Bypass Lane on Shoulder at T-intersection						EA	\$ 50,000	\$ -
Convert Offset T-Intersection to Four-Legged Intersection						EA	\$ 300,000	\$ -
Use Indirect Left-Turn Treatment to Minimize Conflicts at Divided Highway Intersection						LEG	\$ 75,000	\$ -
Convert Four-Legged Intersection to Offset T-Intersection						EA	\$ 300,000	\$ -
Install Solar-Powered Flashing Beacon on Intersection Warning Sign						LEG	\$ 2,500	\$ -
Install Stop Signs with LED Flashing Lights						LEG	\$ 2,500	\$ -
Install Retroreflective Strip on Stop Sign Post	X	X			3	EA	\$ 10	\$ 30
Low-Cost Intersection Conflict Warning System (ICWS)						EA	\$ 15,000	\$ -
Flashing Beacon on Intersection Warning Sign						SIGN	\$ 2,500	\$ -
Other:								
Other:								
Additional Potential Improvements Subtotal:								\$ 30
Project Selection Decision Tree Systemic Improvements Subtotal:								\$ 13,800
Subtotal:								\$ 13,830
Mobilization: (% +/-)*								10% \$ 2,500
Traffic Control: (% +/-)								5% \$ 734
Contingency: (% +/-)								20% \$ 2,936
Estimated Project Cost								\$ 20,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

Kimley-Horn has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Kimley-Horn at this time and represent only Kimley-Horn's judgment as a design professional familiar with the construction industry. Kimley-Horn cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Project Description Form Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 14



Project Name: IA 175/Diagonal Rd & Co Rd T55/U Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Location Description

Road: IA 175/Diagonal Rd
 Road: Co Rd T55/U Ave

Closest City: REINBECK

GPS ID: 208855

County to coordinate with local agency to implement improvements that are on right-of-way that is not under control of the County.

Project Location Maps



Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Distance from Previous Stop	4 mi	4
Approach Angle (Degrees)	51	4
Intersection within Curve	No	0
Daily Entering Vehicles	2,360	3
Minor Street Volume	800	2
Roads/Driveways within 250 Feet	0	0
K or A Crashes	0	0
Number of Approaches	4	1
Total Risk Factor Points (22 max)		14

Other Information	
Number of Approaches	4
Number of Paved Approaches	4
Major ADT	2,660
Minor ADT	800
Destination Lighting	Yes
Transverse Rumble Strips (Number of Approaches)	2
Control Type	Two-way stop

Crash Data, 2008-2017	
Total Crashes	10
K and A Crashes	0
Right Angle, Rear-end, or Turning Crashes	2
Total Nighttime Crashes	2
Nighttime/Daytime Crash Ratio**	0.9

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Coordinate with Local Jurisdiction on Signal Modifications	0	EA	\$ 2,500	\$ -
Signal Warrant Analysis to Consider Removal of Signal	0	EA	\$ 5,000	\$ -
Intersection Configuration Evaluation (ICE)	0	EA	\$ 25,000	\$ -
Implement Results of ICE	0	EA	\$ 750,000	\$ -
All-Way Stop Analysis and Converting Two-Way Stop to All-Way Stop	0	EA	\$ 5,000	\$ -
All-Way Stop Analysis and Removal of Stop Signs on Major Approaches	0	EA	\$ 5,000	\$ -
Install Destination Lighting	0	LEG	\$ 8,000	\$ -
Upgrade Signs and Pavement Markings	2	LEG	\$ 2,200	\$ 4,400
Upgrade Signs (Unpaved Approaches)	0	LEG	\$ 1,000	\$ -
Install Second Stop Sign and Stop Ahead Sign	2	LEG	\$ 1,200	\$ 2,400
Install Solar-Powered Flashing Beacon on Stop Sign	2	EA	\$ 2,500	\$ 5,000
Install Transverse Rumble Strips	0	LEG	\$ 1,000	\$ -
Install Intersection Warning Signs and Advance Street Name Plaques on Major Approaches	2	LEG	\$ 1,200	\$ 2,400
Clear and Grub within Sight Triangle	4	LEG	\$ 1,500	\$ 6,000
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 20,200

Continued on back of this page.

** Nighttime/Daytime Crash Ratio = 3 x nighttime crashes/daytime crashes per Iowa DOT I.M. 2.110 Attachment A.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 14



Project Name: IA 175/Diagonal Rd & Co Rd T55/U Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 208855

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	NB	SB	EB	WB	Quantity	Unit	Unit Price	Item Cost
Provide Left-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Provide Right-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Realign Intersection Approach to Reduce or Eliminate Intersection Skew						LEG	\$ 200,000	\$ -
Provide Bypass Lane on Shoulder at T-intersection						EA	\$ 50,000	\$ -
Convert Offset T-Intersection to Four-Legged Intersection						EA	\$ 300,000	\$ -
Use Indirect Left-Turn Treatment to Minimize Conflicts at Divided Highway Intersection						LEG	\$ 75,000	\$ -
Convert Four-Legged Intersection to Offset T-Intersection						EA	\$ 300,000	\$ -
Install Solar-Powered Flashing Beacon on Intersection Warning Sign						LEG	\$ 2,500	\$ -
Install Stop Signs with LED Flashing Lights						LEG	\$ 2,500	\$ -
Install Retroreflective Strip on Stop Sign Post	X	X			4	EA	\$ 10	\$ 40
Low-Cost Intersection Conflict Warning System (ICWS)						EA	\$ 15,000	\$ -
Flashing Beacon on Intersection Warning Sign						SIGN	\$ 2,500	\$ -
Other:								
Other:								
Additional Potential Improvements Subtotal:								\$ 40
Project Selection Decision Tree Systemic Improvements Subtotal:								\$ 20,200
Subtotal:								\$ 20,240
Mobilization: (% +/-)*								10% \$ 2,500
Traffic Control: (% +/-)								5% \$ 1,052
Contingency: (% +/-)								20% \$ 4,208
Estimated Project Cost								\$ 28,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

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Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 14



Project Name: IA 175/Diagonal Rd & Co Rd T53/S Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Location Description

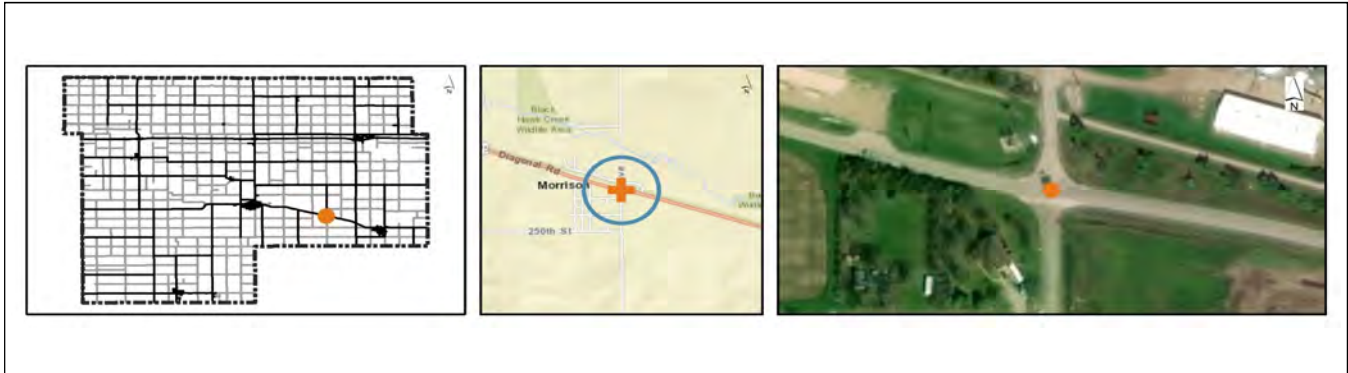
Road: IA 175/Diagonal Rd
 Road: Co Rd T53/S Ave

Closest City: MORRISON

GPS ID: 208845

County to coordinate with local agency to implement improvements that are on right-of-way that is not under control of the County.

Project Location Maps



Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Distance from Previous Stop	3.5 mi	4
Approach Angle (Degrees)	76	2
Intersection within Curve	No	0
Daily Entering Vehicles	1,845	3
Minor Street Volume	300	2
Roads/Driveways within 250 Feet	4	2
K or A Crashes	0	0
Number of Approaches	4	1
Total Risk Factor Points (22 max)		14

Other Information	
Number of Approaches	4
Number of Paved Approaches	3
Major ADT	1,690
Minor ADT	300
Destination Lighting	Yes
Transverse Rumble Strips (Number of Approaches)	0
Control Type	Two-way stop

Crash Data, 2008-2017	
Total Crashes	0
K and A Crashes	0
Right Angle, Rear-end, or Turning Crashes	0
Total Nighttime Crashes	0
Nighttime/Daytime Crash Ratio**	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Coordinate with Local Jurisdiction on Signal Modifications	0	EA	\$ 2,500	\$ -
Signal Warrant Analysis to Consider Removal of Signal	0	EA	\$ 5,000	\$ -
Intersection Configuration Evaluation (ICE)	0	EA	\$ 25,000	\$ -
Implement Results of ICE	0	EA	\$ 750,000	\$ -
All-Way Stop Analysis and Converting Two-Way Stop to All-Way Stop	0	EA	\$ 5,000	\$ -
All-Way Stop Analysis and Removal of Stop Signs on Major Approaches	0	EA	\$ 5,000	\$ -
Install Destination Lighting	0	LEG	\$ 8,000	\$ -
Upgrade Signs and Pavement Markings	1	LEG	\$ 2,200	\$ 2,200
Upgrade Signs (Unpaved Approaches)	1	LEG	\$ 1,000	\$ 1,000
Install Second Stop Sign and Stop Ahead Sign	1	LEG	\$ 1,200	\$ 1,200
Install Solar-Powered Flashing Beacon on Stop Sign	0	EA	\$ 2,500	\$ -
Install Transverse Rumble Strips	1	LEG	\$ 1,000	\$ 1,000
Install Intersection Warning Signs and Advance Street Name Plaques on Major Approaches	2	LEG	\$ 1,200	\$ 2,400
Clear and Grub within Sight Triangle	4	LEG	\$ 1,500	\$ 6,000
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 13,800

Continued on back of this page.

** Nighttime/Daytime Crash Ratio = 3 x nighttime crashes/daytime crashes per Iowa DOT I.M. 2.110 Attachment A.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 14



Project Name: IA 175/Diagonal Rd & Co Rd T53/S Ave
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 208845

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	NB	SB	EB	WB	Quantity	Unit	Unit Price	Item Cost
Provide Left-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Provide Right-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Realign Intersection Approach to Reduce or Eliminate Intersection Skew						LEG	\$ 200,000	\$ -
Provide Bypass Lane on Shoulder at T-intersection						EA	\$ 50,000	\$ -
Convert Offset T-Intersection to Four-Legged Intersection						EA	\$ 300,000	\$ -
Use Indirect Left-Turn Treatment to Minimize Conflicts at Divided Highway Intersection						LEG	\$ 75,000	\$ -
Convert Four-Legged Intersection to Offset T-Intersection						EA	\$ 300,000	\$ -
Install Solar-Powered Flashing Beacon on Intersection Warning Sign						LEG	\$ 2,500	\$ -
Install Stop Signs with LED Flashing Lights						LEG	\$ 2,500	\$ -
Install Retroreflective Strip on Stop Sign Post	X	X			3	EA	\$ 10	\$ 30
Low-Cost Intersection Conflict Warning System (ICWS)						EA	\$ 15,000	\$ -
Flashing Beacon on Intersection Warning Sign						SIGN	\$ 2,500	\$ -
Other:								
Other:								
Additional Potential Improvements Subtotal:								\$ 30
Project Selection Decision Tree Systemic Improvements Subtotal:								\$ 13,800
Subtotal:								\$ 13,830
Mobilization: (% +/-)*								10% \$ 2,500
Traffic Control: (% +/-)								5% \$ 734
Contingency: (% +/-)								20% \$ 2,936
Estimated Project Cost								\$ 20,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 12



Project Name: IA 14 & Co Rd D25/190th St
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Location Description

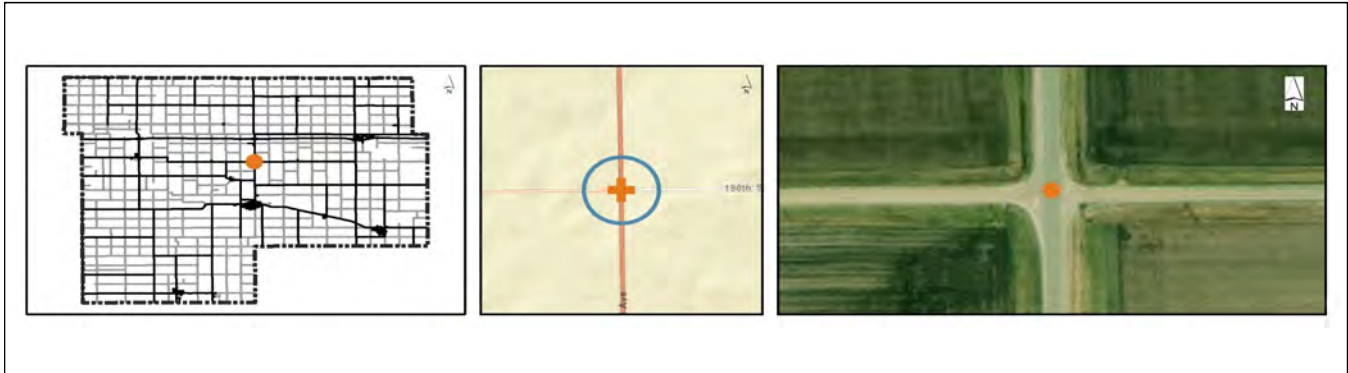
Road: IA 14
 Road: Co Rd D25/190th St

Closest City: **HOLLAND**

GPS ID: 3001123

County to coordinate with local agency to implement improvements that are on right-of-way that is not under control of the County.

Project Location Maps



Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Distance from Previous Stop	7 mi	4
Approach Angle (Degrees)	90	0
Intersection within Curve	No	0
Daily Entering Vehicles	4,225	3
Minor Street Volume	270	2
Roads/Driveways within 250 Feet	0	0
K or A Crashes	1	2
Number of Approaches	4	1
Total Risk Factor Points (22 max)		12

Other Information	
Number of Approaches	4
Number of Paved Approaches	4
Major ADT	4,220
Minor ADT	270
Destination Lighting	Yes
Transverse Rumble Strips (Number of Approaches)	2
Control Type	Two-way stop

Crash Data, 2008-2017	
Total Crashes	3
K and A Crashes	1
Right Angle, Rear-end, or Turning Crashes	2
Total Nighttime Crashes	0
Nighttime/Daytime Crash Ratio**	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Coordinate with Local Jurisdiction on Signal Modifications	0	EA	\$ 2,500	\$ -
Signal Warrant Analysis to Consider Removal of Signal	0	EA	\$ 5,000	\$ -
Intersection Configuration Evaluation (ICE)	0	EA	\$ 25,000	\$ -
Implement Results of ICE	0	EA	\$ 750,000	\$ -
All-Way Stop Analysis and Converting Two-Way Stop to All-Way Stop	0	EA	\$ 5,000	\$ -
All-Way Stop Analysis and Removal of Stop Signs on Major Approaches	0	EA	\$ 5,000	\$ -
Install Destination Lighting	0	LEG	\$ 8,000	\$ -
Upgrade Signs and Pavement Markings	2	LEG	\$ 2,200	\$ 4,400
Upgrade Signs (Unpaved Approaches)	0	LEG	\$ 1,000	\$ -
Install Second Stop Sign and Stop Ahead Sign	2	LEG	\$ 1,200	\$ 2,400
Install Solar-Powered Flashing Beacon on Stop Sign	0	EA	\$ 2,500	\$ -
Install Transverse Rumble Strips	0	LEG	\$ 1,000	\$ -
Install Intersection Warning Signs and Advance Street Name Plaques on Major Approaches	2	LEG	\$ 1,200	\$ 2,400
Clear and Grub within Sight Triangle	4	LEG	\$ 1,500	\$ 6,000
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 15,200

Continued on back of this page.

** Nighttime/Daytime Crash Ratio = 3 x nighttime crashes/daytime crashes per Iowa DOT I.M. 2.110 Attachment A.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 12



Project Name: IA 14 & Co Rd D25/190th St
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 3001123

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	NB	SB	EB	WB	Quantity	Unit	Unit Price	Item Cost
Provide Left-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Provide Right-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Realign Intersection Approach to Reduce or Eliminate Intersection Skew						LEG	\$ 200,000	\$ -
Provide Bypass Lane on Shoulder at T-intersection						EA	\$ 50,000	\$ -
Convert Offset T-Intersection to Four-Legged Intersection						EA	\$ 300,000	\$ -
Use Indirect Left-Turn Treatment to Minimize Conflicts at Divided Highway Intersection						LEG	\$ 75,000	\$ -
Convert Four-Legged Intersection to Offset T-Intersection						EA	\$ 300,000	\$ -
Install Solar-Powered Flashing Beacon on Intersection Warning Sign						LEG	\$ 2,500	\$ -
Install Stop Signs with LED Flashing Lights						LEG	\$ 2,500	\$ -
Install Retroreflective Strip on Stop Sign Post			X	X	4	EA	\$ 10	\$ 40
Low-Cost Intersection Conflict Warning System (ICWS)						EA	\$ 15,000	\$ -
Flashing Beacon on Intersection Warning Sign						SIGN	\$ 2,500	\$ -
Other:								
Other:								
Additional Potential Improvements Subtotal:								\$ 40
Project Selection Decision Tree Systemic Improvements Subtotal:								\$ 15,200
Subtotal:								\$ 15,240
Mobilization: (% +/-)*								10% \$ 2,500
Traffic Control: (% +/-)								5% \$ 852
Contingency: (% +/-)								20% \$ 3,408
Estimated Project Cost								\$ 22,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 12



Project Name: IA 14 & Co Rd D19/160th St
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Location Description

Road: IA 14
 Road: Co Rd D19/160th St

Closest City: **STOUT**

GPS ID: 208524

County to coordinate with local agency to implement improvements that are on right-of-way that is not under control of the County.

Project Location Maps



Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Distance from Previous Stop	7 mi	4
Approach Angle (Degrees)	72	2
Intersection within Curve	No	0
Daily Entering Vehicles	3,320	3
Minor Street Volume	530	2
Roads/Driveways within 250 Feet	0	0
K or A Crashes	0	0
Number of Approaches	4	1
Total Risk Factor Points (22 max)		12

Other Information	
Number of Approaches	4
Number of Paved Approaches	3
Major ADT	3,560
Minor ADT	530
Destination Lighting	Yes
Transverse Rumble Strips (Number of Approaches)	1
Control Type	Two-way stop

Crash Data, 2008-2017	
Total Crashes	3
K and A Crashes	0
Right Angle, Rear-end, or Turning Crashes	3
Total Nighttime Crashes	0
Nighttime/Daytime Crash Ratio**	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Coordinate with Local Jurisdiction on Signal Modifications	0	EA	\$ 2,500	\$ -
Signal Warrant Analysis to Consider Removal of Signal	0	EA	\$ 5,000	\$ -
Intersection Configuration Evaluation (ICE)	0	EA	\$ 25,000	\$ -
Implement Results of ICE	0	EA	\$ 750,000	\$ -
All-Way Stop Analysis and Converting Two-Way Stop to All-Way Stop	0	EA	\$ 5,000	\$ -
All-Way Stop Analysis and Removal of Stop Signs on Major Approaches	0	EA	\$ 5,000	\$ -
Install Destination Lighting	0	LEG	\$ 8,000	\$ -
Upgrade Signs and Pavement Markings	1	LEG	\$ 2,200	\$ 2,200
Upgrade Signs (Unpaved Approaches)	1	LEG	\$ 1,000	\$ 1,000
Install Second Stop Sign and Stop Ahead Sign	1	LEG	\$ 1,200	\$ 1,200
Install Solar-Powered Flashing Beacon on Stop Sign	2	EA	\$ 2,500	\$ 5,000
Install Transverse Rumble Strips	0	LEG	\$ 1,000	\$ -
Install Intersection Warning Signs and Advance Street Name Plaques on Major Approaches	2	LEG	\$ 1,200	\$ 2,400
Clear and Grub within Sight Triangle	4	LEG	\$ 1,500	\$ 6,000
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 17,800

Continued on back of this page.

** Nighttime/Daytime Crash Ratio = 3 x nighttime crashes/daytime crashes per Iowa DOT I.M. 2.110 Attachment A.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Local Road Safety Plan
Project Description for Intersection Improvements

Risk Factor Points: 12



Project Name: IA 14 & Co Rd D19/160th St
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
Checked By: MMO

INTERSECTION

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 208524

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	NB	SB	EB	WB	Quantity	Unit	Unit Price	Item Cost
Provide Left-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Provide Right-Turn Lane at Intersection						LEG	\$ 75,000	\$ -
Realign Intersection Approach to Reduce or Eliminate Intersection Skew						LEG	\$ 200,000	\$ -
Provide Bypass Lane on Shoulder at T-intersection						EA	\$ 50,000	\$ -
Convert Offset T-Intersection to Four-Legged Intersection						EA	\$ 300,000	\$ -
Use Indirect Left-Turn Treatment to Minimize Conflicts at Divided Highway Intersection						LEG	\$ 75,000	\$ -
Convert Four-Legged Intersection to Offset T-Intersection						EA	\$ 300,000	\$ -
Install Solar-Powered Flashing Beacon on Intersection Warning Sign						LEG	\$ 2,500	\$ -
Install Stop Signs with LED Flashing Lights						LEG	\$ 2,500	\$ -
Install Retroreflective Strip on Stop Sign Post			X	X	3	EA	\$ 10	\$ 30
Low-Cost Intersection Conflict Warning System (ICWS)						EA	\$ 15,000	\$ -
Flashing Beacon on Intersection Warning Sign						SIGN	\$ 2,500	\$ -
Other:								
Other:								
Additional Potential Improvements Subtotal:								\$ 30
Project Selection Decision Tree Systemic Improvements Subtotal:								\$ 17,800
Subtotal:								\$ 17,830
Mobilization: (% +/-)*								10% \$ 2,500
Traffic Control: (% +/-)								5% \$ 934
Contingency: (% +/-)								20% \$ 3,736
Estimated Project Cost								\$ 25,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

Kimley-Horn has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Kimley-Horn at this time and represent only Kimley-Horn's judgment as a design professional familiar with the construction industry. Kimley-Horn cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Project Description Form Disclaimer:

The recommended improvements contained in this project description form were developed through a Geographic Information System (GIS) database risk assessment and project decision tree selection process, as specifically stated in our scope of services. Kimley-Horn has no control over the accuracy of the GIS databases nor the suitability of the specific improvements for the location, and has provided recommended improvements for consideration by the County Engineer. The County Engineer may use this project description form to aid in the selection and development of projects, but this project description form should not be used as the sole basis for the County Engineer's decision making process. We endeavored to research issues and constraints to the extent practical given the scope, budget, and schedule agreed to with the Client. Our assessment is based in large part on information provided to us by others (DOT, county staff, etc.) and therefore is only as accurate and complete as the information provided to us. No formal assessment was made for the improvement recommendations contained on this page, if in question, it is recommended that a study/analysis of this location be made to warrant the above indicated improvements. This project description form is based on our knowledge as of September 2018.

End of Project Description

Back Page



APPENDIX C3
INTERSECTION RISK FACTOR RANKING RESULTS



GPS ID	Paved Road	Intersecting Road	Risk Factor Points	Distance from Previous STOP (Value)	Distance from Previous STOP (Points)	Approach Angle (Value)	Approach Angle (Points)	Intersection within Curve (Value)	Intersection within Curve (Points)	Daily Entering Vehicles (Value)	Daily Entering Vehicles (Points)	Minor Street Volume (Value)	Minor Street Volume (Points)	Access Points within 250' (Value)	Access Points within 250' (Points)	K or A Crash (Value)	K or A Crash (Points)	Number of Approaches (Value)	Number of Approaches (Points)	Total Crashes	K and A	Right angle, rear-end, or turning crashes	Major ADT	Minor ADT	Destination Lighting	Transverse Rumble Strips (Number of Approaches)	Control Type
209359	Co Rd D35/210th St	Co Rd T37/M Ave	19	2 mi	4	58	4	1	4	2,098	3	1,170	2	2	1	0	0	5	1	7	0	1	1,640	1,170	Yes	0	Two-way stop
652802	IA 175/G Ave/Diagonal Rd	Co Rd T45/Nickel Ave & 235th St	15	4.5 mi	4	30	4	0	0	2,495	3	300	2	1	1	0	0	4	1	0	0	0	3,140	300	Yes	0	Two-way stop
208845	IA 175/Diagonal Rd	Co Rd T53/S Ave	14	3.5 mi	4	76	2	0	0	1,845	3	300	2	4	2	0	0	4	1	0	0	0	1,690	300	Yes	0	Two-way stop
208855	IA 175/Diagonal Rd	Co Rd T55/U Ave	14	4 mi	4	51	4	0	0	2,360	3	800	2	0	0	0	0	4	1	10	0	2	2,660	800	Yes	2	Two-way stop
208524	IA 14	Co Rd D19/160th St	12	7 mi	4	72	2	0	0	3,320	3	530	2	0	0	0	0	4	1	3	0	3	3,560	530	Yes	1	Two-way stop
208930	Co Rd D55/290th St	Co Rd T29/K Ave	12	4 mi	4	90	0	0	0	885	2	240	2	1	1	1	2	4	1	1	1	1	930	240	Yes	0	Two-way stop
3001123	IA 14	Co Rd D25/190th St	12	7 mi	4	90	0	0	0	4,225	3	270	2	0	0	1	2	4	1	3	1	2	4,220	270	Yes	2	Two-way stop
208514	IA 14/N Ave	D17/130th St	11	8 mi	4	90	0	0	0	2,655	3	610	2	2	1	0	0	4	1	3	0	2	2,200	610	Yes	0	Two-way stop
208629	IA 14/G Ave	D67/330th St	11	5 mi	4	90	0	0	0	4,615	3	2,100	2	1	1	0	0	4	1	16	0	12	4,450	2,100	No	0	Two-way stop
208775	IA 57	T55/V Ave	11	2 mi	4	90	0	0	0	2,485	3	650	2	1	1	0	0	4	1	5	0	2	2,780	650	No	0	Two-way stop
208827	IA 175/Diagonal Rd	T47/Q Ave	11	4 mi	4	70	2	0	0	2,005	3	680	2	0	0	0	0	3	0	2	0	2	1,920	680	Yes	1	One-way stop
208903	Co Rd D35/205th St	Co Rd T19/F Ave	11	6 mi	4	90	0	0	0	1,900	3	510	2	1	1	0	0	4	1	0	0	0	1,550	510	Yes	2	Two-way stop
208976	Co Rd D67/330th St	Co Rd T29/K Ave	11	2 mi	4	90	0	0	0	2,145	3	930	2	1	1	0	0	4	1	4	0	2	1,540	930	Yes	2	Two-way stop
2000265	IA 14	170th St	11	7 mi	4	90	0	0	0	4,075	3	120	1	0	0	1	2	4	1	2	1	1	4,220	120	No	0	Two-way stop
29573	D18	D19	10	5.5 mi	4	90	0	0	0	2,770	3	1,560	2	0	0	0	0	4	1	2	0	2	2,490	1,560	Yes	1	All-way stop
208500	IA 14/N Ave	D17/120th St	10	3 mi	4	90	0	0	0	2,665	3	370	2	0	0	0	0	4	1	2	0	1	2,200	370	Yes	0	Two-way stop
208571	Co Rd D19/160th St	Co Rd T55/U Ave	10	6 mi	4	90	0	0	0	2,080	3	1,230	2	1	1	0	0	3	0	2	0	1	2,400	1,230	Yes	0	One-way stop
208611	Co Rd D19/160th St	Co Rd T65/X Ave	10	3 mi	4	90	0	0	0	2,160	3	310	2	1	1	0	0	3	0	2	0	2	2,440	310	Yes	0	One-way stop
208641	IA 14/G Ave	D55/290th St	10	4 mi	4	90	0	0	0	2,525	3	270	2	0	0	0	0	4	1	2	0	1	2,980	270	Yes	0	Two-way stop
208679	IA 14/240th St	T29/K Ave	10	10.5 mi	4	90	0	0	0	2,995	3	910	2	0	0	0	0	4	1	4	0	2	3,420	910	Yes	0	Two-way stop
208735	IA 14	Co Rd D35/210th St	10	1.5 mi	4	90	0	0	0	4,018	3	1,170	2	0	0	0	0	4	1	6	0	2	4,220	1,170	Yes	1	Two-way stop
208772	IA 57/U Ave	Co Rd T55	10	< 1.5 mi	0	23	4	0	0	2,665	3	1,360	2	1	1	0	0	3	0	1	0	0	2,870	1,360	Yes	0	One-way stop
208784	IA 175/240th St/IOWA 175	Co Rd S75/B Ave	10	10 mi	4	90	0	0	0	2,085	3	500	2	0	0	0	0	4	1	3	0	2	2,120	500	No	0	Two-way stop
208789	IA 175/240th St	T19/F Ave	10	5 mi	4	90	0	0	0	2,100	3	1,190	2	0	0	0	0	4	1	0	0	0	1,970	1,190	Yes	1	Two-way stop
208889	IA 175/260th St	Co Rd T69/BUTLER RD	10	2 mi	4	90	0	0	0	1,925	3	180	2	0	0	0	0	4	1	0	0	0	2,330	180	Yes	0	Two-way stop
208980	HAWK Ave	ALMA St & MAIN St	10	4 mi	4	90	0	0	0	915	2	289	2	3	2	0	0	3	0	0	0	0	690	289	Yes	0	One-way stop
209044	Co Rd D67/330th St/Co Hwy D67	Co Rd S75/B Ave	10	5 mi	4	90	0	0	0	1,290	3	710	2	0	0	0	0	4	1	5	0	2	810	710	Yes	0	Two-way stop
209082	Co Rd D53/270th St	Co Rd T55/U Ave	10	1.5 mi	4	90	0	0	0	825	2	520	2	1	1	0	0	4	1	1	0	1	770	520	Yes	0	All-way stop
209238	Co Rd D25/190th St	Co Rd T55/U Ave	10	7 mi	4	90	0	0	0	1,255	3	240	2	0	0	0	0	4	1	0	0	0	1,530	240	Yes	0	Two-way stop
209355	Co Rd D35/210th St	M Ave	10	< 1.5 mi	0	15	2	1	4	1,473	3	5	0	1	1	0	0	3	0	0	0	0	1,330	5	No	0	One-way stop
209440	Co Rd T55/U Ave	110th St	10	5 mi	4	90	0	0	0	1,495	3	400	2	0	0	0	0	4	1	0	0	0	1,750	400	No	0	Two-way stop
209442	Co Rd D17/120th St	Co Rd T55/U Ave	10	4 mi	4	90	0	0	0	1,895	3	540	2	0	0	0	0	4	1	4	0	0	1,750	540	Yes	1	Two-way stop
209448	Co Rd D17/130th St	Co Rd T55/U Ave	10	4 mi	4	90	0	0	0	1,883	3	650	2	0	0	0	0	4	1	4	0	3	1,620	650	Yes	0	Two-way stop
209520	Co Rd D17/130th St	Co Rd T25/J Ave	10	3 mi	4	90	0	0	0	625	1	290	2	3	2	0	0	4	1	0	0	0	610	290	Yes	0	Two-way stop
208491	IA 57/WestBROOK St	Co Rd T13/D Ave	9	3 mi	4	90	0	0	0	1,425	3	1,020	2	1	1	0	0	3	0	0	0	0	1,630	1,020	Yes	1	One-way stop
208605	Co Rd D19/160th St	VISTA Ave	9	1.5 mi	4	90	0	0	0	2,045	3	90	1	1	1	0	0	3	0	0	0	0	2,290	90	No	0	One-way stop
208945	IA 14/G Ave	D53/270th St	9	5 mi	4	90	0	0	0	2,440	3	90	1	1	0	0	0	4	1	1	0	0	2,980	90	Yes	0	Two-way stop
208733	IA 14/N Ave	D35/215th St	9	7 mi	4	90	0	0	0	3,385	3	400	2	0	0	0	0	3	0	2	0	1	3,760	400	Yes	0	One-way stop
209018	Co Rd S75/B Ave	305th St & UNION St	9	< 1.5 mi	0	83	2	0	0	700	2	340	2	0	0	1	2	4	1	2	1	0	640	340	Yes	0	Two-way stop
209259	Co Rd D35/215th St	Co Rd T55/U Ave	9	7 mi	4	90	0	0	0	1,205	2	460	2	0	0	0	0	4	1	2	0	2	1,230	460	Yes	0	All-way stop
209267	Co Rd D35/215th St	Co Rd T65/W Ave	9	4 mi	4	90	0	0	0	1,155	2	440	2	0	0	0	0	4	1	2	0	2	1,220	440	Yes	1	Two-way stop
209562	Co Rd D17/130th St	Co Rd T19/F Ave	9	8 mi	4	90	0	0	0	850	2	380	2	0	0	0	0	4	1	1	0	0	750	380	Yes	0	All-way stop
652838	Co Rd T29/K Ave	MARKET St	9	< 1.5 mi	0	85	2	0	0	1,565	3	310	2	4	2	0	0	3	0	0	0	0	1,540	310	Yes	0	One-way stop
29579	IA-20 S RAMP CURV	GRUNDY RD	8	< 1.5 mi	0	74	2	0	0	1,300	3	360	2	1	1	0	0	3	0	2	0	0	1,010	360	Yes	0	One-way stop
208773	IA 57/110th St	NA	8	< 1.5 mi	0	20	2	0	0	2,225	3	400	2	1	1	0	0	3	0	0	0	0	1,970	400	No	0	One-way stop
208931	Co Rd D55/290th St	HAWK Ave	8	4 mi	4	90	0	0	0	435	1	240	2	0	0	0	0	4	1	0	0	0	430	240	Yes	0	Two-way stop
209091	Co Rd D53/270th St	W Ave & PIONEER RD	8	1.5 mi	4	90	0	0	0	455	1	110	1	1	1	0	0	4	1	0	0	0	430	110	No	0	All-way stop
209321	Co Rd D35/215th St	Co Rd T53/S Ave	8	3.5 mi	4	90	0	0	0	533	1	180	2	0	0	0	0	4	1	1	0	1	460	180	Yes	1	Two-way stop
209345	Co Rd D25/190th St	L Ave	8	1.5 mi	4	90	0	0	0	475	1	270	2	0	0	0	0	4	1	0	0	0	390	270	Yes	0	Two-way stop
29582	IA-20 N RAMP CURV	GRUNDY RD	7	< 1.5 mi	0	70	2	0	0	905	2	410	2	1	1	0	0	3	0	0	0	0	1,560	410	Yes	1	One-way stop



GPS ID	Paved Road	Intersecting Road	Risk Factor Points	Distance from Previous STOP (Value)	Distance from Previous STOP (Points)	Approach Angle (Value)	Approach Angle (Points)	Intersection within Curve (Value)	Intersection within Curve (Points)	Daily Entering Vehicles (Value)	Daily Entering Vehicles (Points)	Minor Street Volume (Value)	Minor Street Volume (Points)	Access Points within 250' (Value)	Access Points within 250' (Points)	K or A Crash (Value)	K or A Crash (Points)	Number of Approaches (Value)	Number of Approaches (Points)	Total Crashes	K and A	Right angle, rear-end, or turning crashes	Major ADT	Minor ADT	Destination Lighting	Transverse Rumble Strips (Number of Approaches)	Control Type
209066	Co Rd T65/W Ave	240th St	4	< 1.5 mi	0	90	0	0	0	840	2	80	1	1	1	0	0	3	0	1	0	0	1,140	80	No	0	One-way stop
209068	Co Rd T65/W Ave	242nd St	4	< 1.5 mi	0	90	0	0	0	840	2	80	1	1	1	0	0	3	0	1	0	0	1,140	80	No	0	One-way stop
209146	Co Rd T37/M Ave	225th St	4	< 1.5 mi	0	90	0	0	0	1,720	3	120	1	0	0	0	0	3	0	0	0	0	1,640	120	No	0	One-way stop
209168	Co Rd T29/K Ave	250th St	4	< 1.5 mi	0	90	0	0	0	840	2	70	1	0	0	0	0	4	1	0	0	0	910	70	No	0	Two-way stop
209176	Co Rd D53/270th St	Co Rd T29/K Ave	4	< 1.5 mi	0	90	0	0	0	813	2	60	1	0	0	0	0	4	1	3	0	2	910	60	No	0	Two-way stop
209235	Co Rd T55/U Ave	170th St & 1st St	4	< 1.5 mi	0	90	0	0	0	1,420	3	110	1	0	0	0	0	3	0	1	0	0	1,530	110	No	0	One-way stop
209271	Co Rd D35/215th St	X Ave	4	< 1.5 mi	0	90	0	0	0	1,105	2	25	0	1	1	0	0	4	1	0	0	0	1,220	25	No	0	Two-way stop
209362	Co Rd D35/205th St	K Ave	4	< 1.5 mi	0	90	0	0	0	875	2	60	1	0	0	0	0	4	1	0	0	0	510	60	No	0	Two-way stop
209370	Co Rd D35/205th St	I Ave	4	< 1.5 mi	0	90	0	0	0	865	2	60	1	0	0	0	0	4	1	0	0	0	510	60	No	0	Two-way stop
209372	Co Rd D35/205th St	H Ave	4	< 1.5 mi	0	90	0	0	0	875	2	80	1	0	0	0	0	4	1	0	0	0	510	80	No	0	Two-way stop
209394	Co Rd D25/185th St	G Ave	4	< 1.5 mi	0	90	0	0	0	420	1	150	2	0	0	0	0	4	1	0	0	0	380	150	No	0	Two-way stop
209450	Co Rd D17/120th St	T Ave	4	< 1.5 mi	0	90	0	0	0	685	2	40	0	1	1	0	0	4	1	0	0	0	540	40	No	0	Two-way stop
209453	Co Rd D17/130th St	V Ave	4	< 1.5 mi	0	90	0	0	0	905	2	80	1	0	0	0	0	4	1	1	0	1	650	80	No	0	Two-way stop
209466	Co Rd D18/150th St	Co Rd T65/X Ave	4	< 1.5 mi	0	90	0	0	0	400	1	100	1	1	1	0	0	4	1	0	0	0	310	100	No	0	Two-way stop
209580	Co Rd T19/F Ave	140th St	4	< 1.5 mi	0	90	0	0	0	733	2	70	1	0	0	0	0	4	1	1	0	0	750	70	No	0	Two-way stop
209600	Co Rd D15/155th St	Co Rd T19/F Ave	4	< 1.5 mi	0	90	0	0	0	710	2	50	1	0	0	0	0	4	1	0	0	0	750	50	No	0	Two-way stop
652842	Co Rd S75/B Ave	Front St	4	< 1.5 mi	0	86	0	0	0	635	1	289	2	1	1	0	0	3	0	0	0	0	520	289	Yes	0	One-way stop
652846	Co Rd T45/Nickel Ave	H Ave E	4	< 1.5 mi	0	90	0	0	0	405	1	289	2	2	1	0	0	3	0	0	0	0	300	289	No	0	One-way stop
3000286	Co Rd T19/F Ave	165th St	4	< 1.5 mi	0	90	0	0	0	1,740	3	60	1	0	0	0	0	3	0	0	0	0	1,880	60	No	0	One-way stop
8000866	Co Rd D19/160th St	FOX RIDGE RD	4	< 1.5 mi	0	90	0	0	0	2,013	3	26	0	2	1	0	0	3	0	1	1	1	2,290	26	Yes	0	One-way stop
64982	Co Rd T23/WestBROOK St	Co Rd T25/JAY Ave/J Ave	3	< 1.5 mi	0	90	0	0	0	468	1	60	1	0	0	0	0	4	1	1	0	1	460	60	No	0	Two-way stop
208549	Co Rd D19/160th St	R Ave	3	< 1.5 mi	0	90	0	0	0	870	2	40	0	1	1	0	0	3	0	0	0	0	740	40	No	0	One-way stop
208929	Co Rd T29/K Ave	280th St	3	< 1.5 mi	0	90	0	0	0	793	2	30	0	0	0	0	0	4	1	0	0	0	910	30	No	0	Two-way stop
208950	Co Rd D65/310th St	HAWK Ave	3	< 1.5 mi	0	90	0	0	0	485	1	100	1	0	0	0	0	4	1	1	0	1	430	100	No	0	Two-way stop
208994	Co Rd T29/K Ave/WALLACE Ave	100th St	3	< 1.5 mi	0	90	0	0	0	1,215	2	40	0	0	0	0	0	4	1	1	0	0	1,290	40	No	0	Two-way stop
209016	Co Rd D65/310th St	Co Rd T19/E Ave	3	< 1.5 mi	0	90	0	0	0	230	0	30	0	0	0	1	2	4	1	1	1	1	150	30	No	0	Two-way stop
209023	Co Rd D65/310th St	C Ave	3	< 1.5 mi	0	90	0	0	0	243	0	60	1	1	1	0	0	4	1	0	0	0	150	60	No	0	Two-way stop
209040	Co Rd D67/330th St	E Ave	3	< 1.5 mi	0	90	0	0	0	705	2	30	0	0	0	0	0	4	1	0	0	0	720	30	No	0	Two-way stop
209062	Co Rd T55/U Ave	230th St	3	< 1.5 mi	0	90	0	0	0	730	2	30	0	0	0	0	0	4	1	1	0	0	800	30	No	0	Two-way stop
209064	Co Rd T55/U Ave	240th St	3	< 1.5 mi	0	90	0	0	0	725	2	35	0	0	0	0	0	4	1	1	0	0	800	35	No	0	Two-way stop
209076	Co Rd T55/U Ave	260th St	3	< 1.5 mi	0	90	0	0	0	490	1	50	1	0	0	0	0	4	1	0	0	0	520	50	No	0	Two-way stop
209085	Co Rd D53/270th St	V Ave	3	< 1.5 mi	0	90	0	0	0	540	1	80	1	0	0	0	0	4	1	1	0	0	530	80	No	0	Two-way stop
209110	Co Rd T47/Q Ave	250th St	3	< 1.5 mi	0	90	0	0	0	655	1	70	1	0	0	0	0	4	1	2	0	0	680	70	No	0	Two-way stop
209122	Co Rd D53/270th St	Co Rd T47/Q Ave	3	< 1.5 mi	0	90	0	0	0	650	1	50	1	0	0	0	0	4	1	0	0	0	680	50	No	0	Two-way stop
209166	Co Rd T37/M Ave	250th St	3	< 1.5 mi	0	90	0	0	0	285	0	70	1	2	1	0	0	4	1	2	0	1	260	70	No	0	Two-way stop
209210	Co Rd S75/B Ave	260th St	3	< 1.5 mi	0	90	0	0	0	485	1	50	1	0	0	0	0	4	1	0	0	0	500	50	No	0	Two-way stop
209244	Co Rd T55/U Ave	200th St	3	< 1.5 mi	0	90	0	0	0	910	2	60	0	0	0	0	0	3	0	0	0	0	1,230	60	No	0	One-way stop
209260	Co Rd D35/215th St	T Ave	3	< 1.5 mi	0	90	0	0	0	483	1	35	0	1	1	0	0	4	1	0	0	0	460	35	No	0	One-way stop
209263	Co Rd D35/215th St	V Ave	3	< 1.5 mi	0	90	0	0	0	433	1	60	1	0	0	0	0	4	1	0	0	0	440	60	No	0	Two-way stop
208913	Co Rd D35/215th St	Co Rd T47/P Ave	3	< 1.5 mi	0	90	0	0	0	405	1	50	1	0	0	0	0	4	1	1	0	0	400	50	No	0	Two-way stop
208341	Co Rd D25/190th St	K Ave	3	< 1.5 mi	0	90	0	0	0	385	0	60	1	1	1	0	0	4	1	0	0	0	380	60	No	0	Two-way stop
209366	Co Rd D35/205th St	J Ave	3	< 1.5 mi	0	90	0	0	0	840	2	35	0	0	0	0	0	4	1	0	0	0	510	35	No	0	Two-way stop
209398	Co Rd D25/185th St	E Ave	3	< 1.5 mi	0	90	0	0	0	408	1	50	1	0	0	0	0	4	1	2	0	1	350	50	No	0	Two-way stop
209400	Co Rd D25/185th St	D Ave	3	< 1.5 mi	0	90	0	0	0	350	0	90	1	1	1	0	0	4	1	0	0	0	300	90	No	0	Two-way stop
209414	Co Rd D35/205th St	G Ave	3	< 1.5 mi	0	90	0	0	0	835	2	40	0	0	0	0	0	4	1	0	0	0	510	40	No	0	Two-way stop
209428	Co Rd D35/205th St/Co Hwy D35	B Ave	3	< 1.5 mi	0	90	0	0	0	390	1	60	1	0	0	0	0	4	1	2	0	1	460	60	No	0	Two-way stop
209457	Co Rd D17/130th St	W Ave	3	< 1.5 mi	0	90	0	0	0	873	2	35	0	0	0	0	0	4	1	0	0	0	650	35	No	0	Two-way stop
209478	Co Rd D17/120th St	P Ave	3	< 1.5 mi	0	90	0	0	0	533	1	70	1	0	0	0	0	4	1	0	0	0	370	70	No	0	Two-way stop
209480	Co Rd D17/120th St	R Ave	3	< 1.5 mi	0	90	0	0	0	695	2	90	1	0	0	0	0	3	0	0	0	0	540	90	No	0	One-way stop
209494	Co Rd D17/130th St	M Ave	3	< 1.5 mi	0	90	0	0	0	545	1	90	1	0	0	0	0	4	1	0	0	0	610	90	No	0	Two-way stop
209506	Co Rd T25/J Ave	110th St	3	< 1.5 mi	0	90	0	0	0	473	1	45	0	1	1	0	0	4	1	2	0	1	460	45	No	0	Two-way stop
209518	Co Rd D17/130th St	Co Rd T33/L Ave	3	< 1.5 mi	0	90	0	0	0	515	1	60	1	0	0	0	0	4	1	0	0	0	610	60	No	0	Two-way stop
209556	Co Rd T13/D Ave	110th St	3	< 1.5 mi	0	90	0	0	0	415	1	60	1	0	0	0	0	4	1	0	0	0	360	60	No	0	Two-way stop
209582	Co Rd D15/150th St	Co Rd T19/F Ave	3	< 1.5 mi	0	90	0	0	0	718	2	45	0	0	0	0	0	4	1	0	0	0	750	45	No	0	Two-way stop
652841	Co Rd S75/B Ave	CENTER St	3	< 1.5 mi	0	90	0	0	0	545	1	110	1	1	1	0	0	3	0	0	0	0	520	110	Yes	0	One-way stop
652844	Co Rd T45/Nickel Ave	J Ave E	3	< 1.5 mi	0	90	0	0	0	503	1	300	2	0	0	0	0	3	0	0	0	0	486	300	No	0	One-way stop
652849	Co Rd T53/S Ave	3rd St	3	< 1.5 mi	0	90	0	0	0	285	0	130	1	3	2	0	0	3	0	0	0	0	289	130	Yes	0	One-way stop
3001121	Co Rd S75/B Ave/MARSH Ave	100th St	3	< 1.5 mi	0	90	0	0	0	815	2	40	0	0	0	0	0	4	1	0	0	0	810	40	No	0	One-way stop
64908	Co Rd T55/VALL Ave/V Ave	WestBROOK St	2	< 1.5 mi	0	90	0	0																			



GPS ID	Paved Road	Intersecting Road	Risk Factor Points	Distance from Previous STOP (Value)	Distance from Previous STOP (Points)	Approach Angle (Value)	Approach Angle (Points)	Intersection within Curve (Value)	Intersection within Curve (Points)	Daily Entering Vehicles (Value)	Daily Entering Vehicles (Points)	Minor Street Volume (Value)	Minor Street Volume (Points)	Access Points within 250' (Value)	Access Points within 250' (Points)	K or A Crash (Value)	K or A Crash (Points)	Number of Approaches (Value)	Number of Approaches (Points)	Total Crashes	K and A	Right angle, rear-end, or turning crashes	Major ADT	Minor ADT	Destination Lighting	Transverse Rumble Strips (Number of Approaches)	Control Type
209240	Co Rd D25/190th St	T Ave	1	< 1.5 mi	0	90	0	0	0	263	0	35	0	0	0	0	0	4	1	0	0	0	240	35	No	0	Two-way stop
209294	Co Rd D25/190th St	Co Rd T47/Q Ave	1	< 1.5 mi	0	90	0	0	0	263	0	45	0	0	0	0	0	4	1	0	0	0	240	45	No	0	Two-way stop
209297	Co Rd D25/190th St	P Ave	1	< 1.5 mi	0	90	0	0	0	270	0	40	0	0	0	0	0	4	1	0	0	0	240	40	No	0	Two-way stop
209305	Co Rd D25/190th St	Co Rd T53/S Ave	1	< 1.5 mi	0	90	0	0	0	253	0	25	0	0	0	0	0	4	1	1	0	0	240	25	No	0	Two-way stop
209319	Co Rd D35/215th St	R Ave	1	< 1.5 mi	0	90	0	0	0	380	0	25	0	0	0	0	0	4	1	0	0	0	400	25	No	0	Two-way stop
209334	Co Rd D25/190th St	J Ave	1	< 1.5 mi	0	90	0	0	0	368	0	45	0	0	0	0	0	4	1	0	0	0	380	45	No	0	Two-way stop
209337	Co Rd D25/190th St	I Ave	1	< 1.5 mi	0	90	0	0	0	365	0	40	0	0	0	0	0	4	1	0	0	0	380	40	No	0	Two-way stop
209347	Co Rd D25/190th St	M Ave	1	< 1.5 mi	0	90	0	0	0	275	0	35	0	0	0	0	0	4	1	0	0	0	270	35	No	0	Two-way stop
209402	Co Rd D25/185th St	C Ave	1	< 1.5 mi	0	90	0	0	0	205	0	80	1	0	0	0	0	3	0	0	0	0	180	80	No	0	One-way stop
209423	Co Rd D35/205th St	CONCORD Ave	1	< 1.5 mi	0	90	0	0	0	373	0	45	0	0	0	0	0	4	1	0	0	0	460	45	No	0	Two-way stop
209498	Co Rd T47/Q Ave	150th St	1	< 1.5 mi	0	90	0	0	0	330	0	40	0	0	0	0	0	4	1	0	0	0	220	40	No	0	Two-way stop
209521	Co Rd D17/130th St	H Ave	1	< 1.5 mi	0	90	0	0	0	278	0	35	0	0	0	0	0	4	1	0	0	0	290	35	No	0	Two-way stop
209523	Co Rd D17/130th St	I Ave	1	< 1.5 mi	0	90	0	0	0	275	0	35	0	0	0	0	0	4	1	0	0	0	290	35	No	0	Two-way stop
209102	Co Rd T53/S Ave	240th St	0	< 1.5 mi	0	90	0	0	0	245	0	30	0	0	0	0	0	3	0	0	0	0	180	30	No	0	One-way stop
209114	Co Rd T45/Nickel Ave	260th St	0	< 1.5 mi	0	90	0	0	0	203	0	45	0	0	0	0	0	3	0	0	0	0	170	45	No	0	One-way stop
209172	Co Rd T37/M Ave	260th St	0	< 1.5 mi	0	90	0	0	0	233	0	25	0	0	0	0	0	3	0	0	0	0	260	25	No	0	One-way stop
209219	Co Rd D53/270th St	C Ave	0	< 1.5 mi	0	90	0	0	0	120	0	40	0	0	0	0	0	3	0	0	0	0	90	40	No	0	One-way stop
209311	Co Rd D35/215th St	O Ave	0	< 1.5 mi	0	90	0	0	0	378	0	35	0	0	0	0	0	3	0	0	0	0	400	35	No	0	One-way stop
209315	Co Rd D35/215th St	Co Rd T47/Q Ave	0	< 1.5 mi	0	90	0	0	0	368	0	15	0	0	0	0	0	3	0	0	0	0	400	15	No	0	One-way stop
209350	L Ave	200th St	0	< 1.5 mi	0	90	0	0	0	318	0	15	0	0	0	0	0	3	0	0	0	0	390	15	No	0	One-way stop
209401	Co Rd D25/185th St	CONCORD Ave	0	< 1.5 mi	0	90	0	0	0	255	0	40	0	0	0	0	0	3	0	0	0	0	250	40	No	0	One-way stop
209424	Co Rd D35/205th St	C Ave	0	< 1.5 mi	0	90	0	0	0	333	0	5	0	0	0	0	0	3	0	1	0	0	460	5	No	0	One-way stop
209464	Co Rd T65/X Ave	140th St	0	< 1.5 mi	0	90	0	0	0	340	0	40	0	0	0	0	0	3	0	0	0	0	310	40	No	0	One-way stop



APPENDIX D1
CURVE SAFETY COUNTERMEASURES

This appendix summarizes the **curve** safety countermeasures for consideration and provides detailed descriptions for each countermeasure from both the project selection decision tree as well as the additional potential improvements listed on the back side of the project sheets.

CURVE COUNTERMEASURES FROM PROJECT SELECTION DECISION TREE

The countermeasures in this section were included in the project selection decision tree and recommended on the curve project sheets based on the criteria described in **Section 6.4.1**.

New Pavement Markings

This safety countermeasure includes new centerline and edgeline pavement markings along the curve. The updated markings can clarify and further delineate the curve, reducing the risk of a run-off-the-road crash. If the lanes were 12 feet or wider, new edgeline pavement markings of six inches were recommended; Research suggests that widening pavement markings from four to six inches in rural areas results in a crash modification factor (CMF) of 0.64 to 0.83. Otherwise, new four-inch pavement markings were recommended. Research suggests that installing new 4' pavement markings in rural areas results in a CMF of 0.61 to 0.74.

Pave Shoulder with Safety Edge

Constructing or increasing the width of an existing paved shoulder can reduce the potential for a severe crash as the result of a lane departure. CMFs associated with paving the shoulder in rural areas range from 0.82 to 0.9. At locations where paved shoulders are recommended, it is suggested that the County Engineer consider a minimum of a two-foot shoulder; however, based on right-of-way and roadway characteristics, the County Engineer may choose to install a wider shoulder.

According to the Federal Highway Administration (FHWA), a Safety Edge is “a simple but effective solution that can help save lives by allowing drivers who drift off [roadways] to return to the road safely. Instead of a vertical drop-off, the Safety Edge shapes the edge of pavement to 30 degrees.” The installation of a Safety Edge has CMFs ranging from 0.85 to 0.92. According to the FHWA, from a maintenance standpoint, “because the Safety Edge provides an additional level of consolidation on the edge, edge raveling is decreased. This contributes to longer pavement life.”

Edgeline Rumble Strips

Edgeline rumble strips provide tactile and audible warning to a driver if they are beginning to depart the lane. This safety improvement has recorded CMFs in the range of 0.61 to 0.67 for rural run-off-the-road injury crashes. Depending on the conditions of the roadway, the County Engineer may choose to install rumble strips placed in the shoulder offset from the edgeline, or they may place the rumble strips on the edgeline and provide pavement markings over them, resulting in edgeline rumble strips. For purposes of this document, both will be called rumble strips.

Centerline Rumble Strips

CMFs of 0.55 to 0.91 represent the safety benefit from the installation of centerline rumble strips. In Iowa, rumble strips placed in the centerline of the roadway generally have pavement markings over them. To be consistent with the Iowa DOT Design Manual 3C-5, centerline rumble strips will be referred to as rumble strips even though in circumstances they may technically be “rumble stripes”. This safety improvement provides an audible and tactile warning to drivers when



crossing the centerline and can aid in the avoidance of some high severity lane departure crashes on curves.

Review Curves and Install Chevron Signs and Curve Warning Signs

This safety countermeasure includes the review of the curve and the installation of curve chevron signs placed along the outer radius of the curve and advanced curve warning signs with advisory speed plaques. Installing curve chevron signs where advanced warning signs are currently in place has CMFs ranging from 0.75 to 0.96, and when installed together with new advance warning signage, has CMFs ranging from 0.59 to 0.61. The signs should meet current Manual of Uniform Traffic Control Devices (MUTCD) and Iowa DOT standards.

Review Curves and Upgrade Chevron Signs and Curve Warning Signs

Where curve chevron signs, advance curve warning signs, and speed advisory plaques are already installed, this countermeasure includes reviewing the curve and upgrading the signage to meet current MUTCD and Iowa DOT standards, if needed.

Clear and Grub

Clearing and grubbing the areas within the clear zone of the roadway increases the sight distance for vehicles prior to entering, during, and after exiting a curve. This safety countermeasure also reduces the hazard of a run-off-the-road crash by reducing the number of obstructions a vehicle could impact after a lane departure. A 0.78 CMF has been documented as distance from roadside features was increased.

OTHER CURVE COUNTERMEASURES

There are a variety of other safety improvements that could be considered that were not included in the project decision tree due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed at curves throughout the county. The following sections describe several other curve safety improvements that could be considered appropriate by the county and that were included on the back side of the project sheets.

Additional Curve Signage

Curve signage in addition to the signage included in the project sheets could be considered, including the one direction large arrow sign (W1-6 48"x24") and the combination horizontal alignment/advisory speed sign (W1-1a 36"x36"). This additional curve signage could be appropriate in some situations to provide further emphasis to the change in horizontal alignment of the roadway.

Retroreflective Strips on Chevron Sign Posts

The installation of retroreflective strips on sign posts is currently under study by Iowa State University (InTrans) and the preliminary results are positive. This countermeasure includes the installation of retroreflective strips on the posts of curve chevron signs. The strips can increase the visibility of curve chevron signs and increase driver awareness of changes in horizontal alignment. Public response to this countermeasure has been very positive.

Transverse Rumble Strips Prior to Curve

This treatment can provide additional tactile and audible warning to the driver of an upcoming curve. It is recommended that this treatment be used with caution as the driver may misinterpret

the warning since transverse rumble strips in Iowa are typically installed prior to stop-controlled intersections. Transverse rumble strips installed as a traffic calming device have seen CMFs of 0.66.

Superelevation Correction

The use of superelevation, where none exists, or the correction of existing superelevation, can provide a safety benefit, helping to keep vehicles within the travel lanes while negotiating a curve, particularly at high speeds. This countermeasure requires substantial reconstruction of a curve and could reduce the amount of friction needed for vehicles to remain on the roadway in wet or snowy conditions. This recommendation is site-specific and would need additional attention by the County Engineer in order to be implemented at a specific location.

High Friction Surface Treatment (HFST)

Increasing the pavement friction on curves by installation of HFST has CMFs ranging from 0.48 to 0.76. According to the FHWA,

“HFSTs use aggregates that are both polish- and wear-resistant and develop channels to prevent water buildup on wet surfaces. The bonding materials such as epoxy and other available blends are designed to set quickly. HFST can be applied by machine at a similar speed to other paving surface treatments, or applied with hand tools, but the road surface must be durable with few to no cracks and crumbling.”

This treatment can be particularly beneficial on high-speed curves and curves with small radii to decrease the risk of skidding-related crashes. This countermeasure is more cost-effective than other major curve improvements such as modifying the superelevation or realigning the roadway.

Speed Activated Flashers on Chevron Signs

This countermeasure includes the installation of speed activated flashers either as beacons or as LED lights around the border of curve chevron signs. This improvement can provide additional warning to drivers exceeding the suggested speed limit prior to a curved section of roadway. The flashers can increase the visibility of curve chevron signs and increase driver awareness of changes in horizontal alignment, specifically when they are exceeding a designated speed. Where speed activated flashers have been installed in combination with curve chevrons and curve warning signage, CMFs of 0.59 to 0.61 have been recorded.

Guardrail

Installing guardrail can help redirect vehicles after a lane departure to remain on the roadway and avoid roadside hazards. CMFs in the range of 0.53 have been recorded for installing new guardrail along an embankment.

On-pavement Markings for Speed Control

This improvement includes painting the speed limit on the pavement to reinforce the posted speed limit. On-pavement markings can serve as additional information and reminders to drivers of the posted speed limit and the importance of observing their speed. Research has shown a CMF of 0.62 for additional in-lane pavement markings.

Post-Mounted Delineators

As stated in the MUTCD, “delineators are particularly beneficial at locations where the [roadway] alignment might be confusing or unexpected, such as at lane-reduction transitions and curves. Delineators are effective guidance devices at night and during adverse weather. An important



advantage of delineators in certain locations is that they remain visible when the roadway is wet, or snow covered.” Providing post-mounted retroreflective delineators along the roadway can give additional information to drivers as to the location of the roadside edge and alignment. The CMF for installing post-mounted delineators in combination with edgelines and centerlines has been recorded at 0.55.



APPENDIX D2
CURVE PROJECT SHEETS

Local Road Safety Plan
Project Description for Curve Improvements

Risk Factor Points: 13



CURVE

Project Name: Curve 20242 on 210TH ST
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18
Prepared By: DJG/DVM
Checked By: MMO

Location Description

Road: **210TH ST** Length (Miles): **0.14** Closest City: **HOLLAND**
 Length (feet): 714

GPS ID: 20242

This curve is located within the following high scoring segment: GPS ID 3899

Project Location Maps



Curve Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	1,330	6
Curve Radius (ft)	272	4
Shoulder Width (ft)	6	0
Avg. Pavement Condition (IRI)	87	0
Intersections Driveways	3 1	3
K or A Crash	0	0
Total Risk Factor Points (21 max)		13

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	6
Speed Limit (mph)	55
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Existing Curve Chevrons	Yes

Crash Data, 2008-2017	
Total Crashes	8
K and A Crashes	0
Lane Departure Crashes	0
Lane Departure K and A Crashes	0
Total Crash Rate (per HMVMT)	1,219.3
K and A Crash Rate (per HMVMT)	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Install 4" Retroreflective Edgeline (Both Sides of Road)	0.14	MILE	\$ 1,200	\$ 162
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	0.14	MILE	\$ 800	\$ 108
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	0.14	MILE	\$ 65,000	\$ 8,785
Install Edgeline Rumble Strips (Both Sides of Road)	0.14	MILE	\$ 2,500	\$ 338
Install Centerline Rumble Strips	0.14	MILE	\$ 1,000	\$ 135
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	1	CURVE	\$ 2,500	\$ 2,500
Clear and Grub (15 ft Both Sides of Road)	0.14	MILE	\$ 10,000	\$ 1,352
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 13,380

Continued on back of this page.

Project Location Map Sources:

Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

Front Page



Project Name: Curve 20242 on 210TH ST
 Agency Name: Grundy County
 Contact Name: Mauer, Gary
 E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
 Checked By: MMO

CURVE

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 20242

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Additional Curve Signage		CURVE	\$ 1,000	\$ -
Retroreflective Strip on Chevron Sign Post	1	CURVE	\$ 100	\$ 100
Transverse Rumble Strips Prior to Curve		CURVE	\$ 2,000	\$ -
Superelevation Correction		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Guardrail		MILE	\$ 50,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Post-Mounted Delineators		MILE	\$ 1,000	\$ -
Advance Curve Warning Sign on Both Sides of Road		EA	\$ 1,000	\$ -
Guardrail Delineators/Reflectors		MILE	\$ 500	\$ -
Other:				
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ 100
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 13,380
Subtotal:				\$ 13,480
Mobilization: (% +/-)*				10% \$ 2,500
Traffic Control: (% +/-)				5% \$ 804
Contingency: (% +/-)				20% \$ 3,216
Estimated Project Cost				\$ 20,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Curve Improvements

Risk Factor Points: **12**



CURVE

Project Name: Curve 70394 on F AVE
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

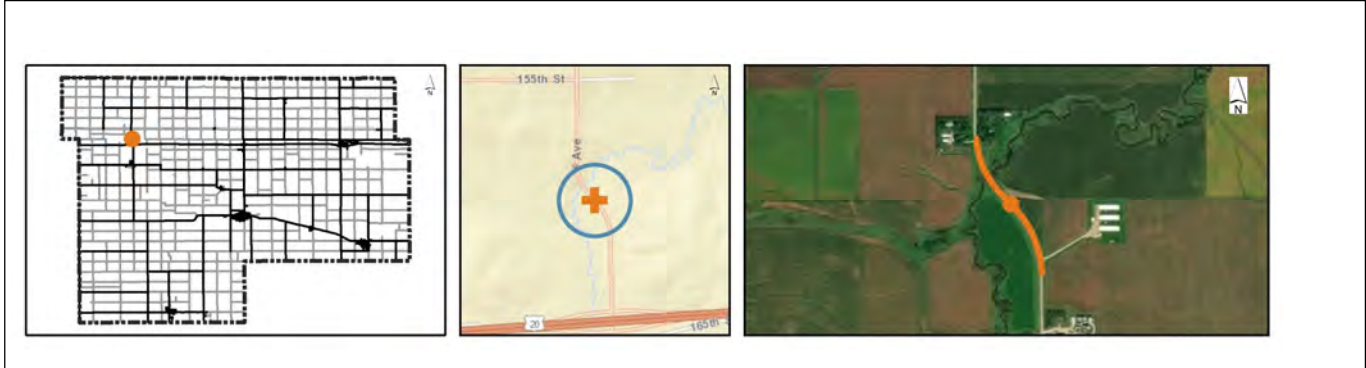
Date: 9/24/18
Prepared By: DJG/DVM
Checked By: MMO

Location Description

Road: **F AVE** Length (feet): **1,746** Length (Miles): **0.33** Closest City: **WELLSBURG** GPS ID: **70394**

This curve is located within the following high scoring segment: GPS ID 3909

Project Location Maps



Curve Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	750	2
Curve Radius (ft)	1,222	1
Shoulder Width (ft)	1	4
Avg. Pavement Condition (IRI)	200	2
Intersections Driveways	0 3	1
K or A Crash	1	2
Total Risk Factor Points (21 max)		12

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	8
Speed Limit (mph)	55
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Existing Curve Chevrons	Yes

Crash Data, 2008-2017	
Total Crashes	5
K and A Crashes	1
Lane Departure Crashes	3
Lane Departure K and A Crashes	1
Total Crash Rate (per HMVMT)	552.4
K and A Crash Rate (per HMVMT)	110.5

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Install 4" Retroreflective Edgeline (Both Sides of Road)	0.33	MILE	\$ 1,200	\$ 397
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	0.33	MILE	\$ 800	\$ 265
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	0.33	MILE	\$ 65,000	\$ 21,493
Install Edgeline Rumble Strips (Both Sides of Road)	0.33	MILE	\$ 2,500	\$ 827
Install Centerline Rumble Strips	0.00	MILE	\$ 1,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	1	CURVE	\$ 2,500	\$ 2,500
Clear and Grub (15 ft Both Sides of Road)	0.33	MILE	\$ 10,000	\$ 3,307
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 28,789

Continued on back of this page.

Project Location Map Sources:

Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

Front Page



Project Name: Curve 70394 on F AVE
 Agency Name: Grundy County
 Contact Name: Mauer, Gary
 E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
 Checked By: MMO

CURVE

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 70394

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Additional Curve Signage		CURVE	\$ 1,000	\$ -
Retroreflective Strip on Chevron Sign Post	1	CURVE	\$ 100	\$ 100
Transverse Rumble Strips Prior to Curve		CURVE	\$ 2,000	\$ -
Superelevation Correction		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Guardrail		MILE	\$ 50,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Post-Mounted Delineators		MILE	\$ 1,000	\$ -
Advance Curve Warning Sign on Both Sides of Road		EA	\$ 1,000	\$ -
Guardrail Delineators/Reflectors		MILE	\$ 500	\$ -
Other:				
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ 100
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 28,789
Subtotal:				\$ 28,889
Mobilization: (% +/-)*				10% \$ 2,890
Traffic Control: (% +/-)				5% \$ 1,644
Contingency: (% +/-)				20% \$ 6,577
Estimated Project Cost				\$ 40,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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Local Road Safety Plan
Project Description for Curve Improvements

Risk Factor Points: **12**



CURVE

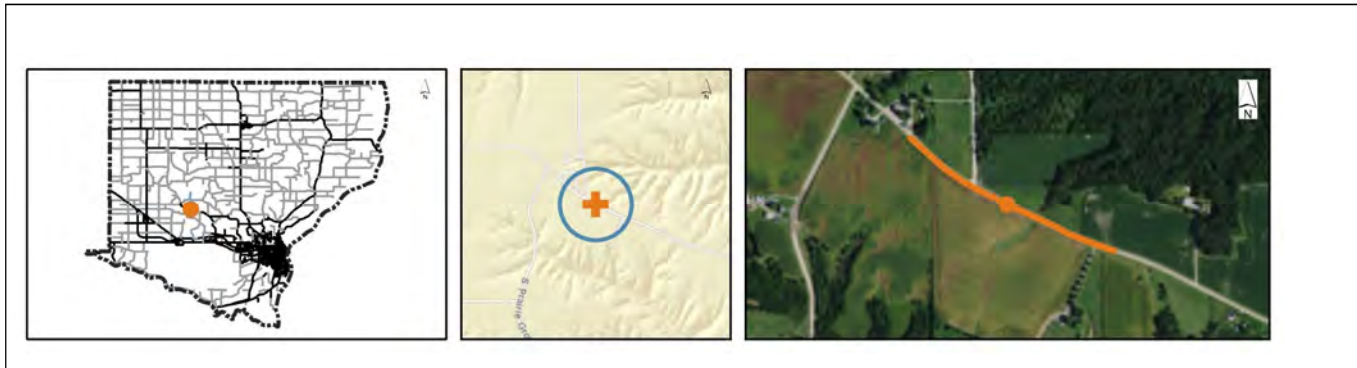
Project Name: Curve 99951 on D25
 Agency Name: Grundy County
 Contact Name: Mauer, Gary
 E-mail: garym@gccourthouse.org

Date: 11/7/18
 Prepared By: DJG/DVM
 Checked By: MMO

Location Description

Road: **D25** Length (feet): **458** Length (Miles): **0.09** Closest City: **WELLSBURG** GPS ID: **99951**

Project Location Maps



Curve Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	380	0
Curve Radius (ft)	200	4
Shoulder Width (ft)	1	4
Avg. Pavement Condition (IRI)	170	1
Intersections Driveways	1 0	3
K or A Crash	0	0
Total Risk Factor Points (21 max)		12

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	1
Speed Limit (mph)	55
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Existing Curve Chevrons	No

Crash Data, 2008-2017	
Total Crashes	0
K and A Crashes	0
Lane Departure Crashes	0
Lane Departure K and A Crashes	0
Total Crash Rate (per HMVMT)	0.0
K and A Crash Rate (per HMVMT)	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Install 4" Retroreflective Edgeline (Both Sides of Road)	0.09	MILE	\$ 1,200	\$ 104
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	0.09	MILE	\$ 800	\$ 69
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	0.00	MILE	\$ 65,000	\$ -
Install Edgeline Rumble Strips (Both Sides of Road)	0.09	MILE	\$ 2,500	\$ 217
Install Centerline Rumble Strips	0.00	MILE	\$ 1,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	1	CURVE	\$ 5,000	\$ 5,000
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 2,500	\$ -
Clear and Grub (15 ft Both Sides of Road)	0.09	MILE	\$ 10,000	\$ 867
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 6,257

Continued on back of this page.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Front Page



CURVE

Project Name: Curve 99951 on D25
 Agency Name: Grundy County
 Contact Name: Mauer, Gary
 E-mail: garym@gccourthouse.org

Date: 11/7/18
 Prepared By: DJG/DVM
 Checked By: MMO

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 99951

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Additional Curve Signage		CURVE	\$ 1,000	\$ -
Retroreflective Strip on Chevron Sign Post	1	CURVE	\$ 100	\$ 100
Transverse Rumble Strips Prior to Curve		CURVE	\$ 2,000	\$ -
Superelevation Correction		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Guardrail		MILE	\$ 50,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Post-Mounted Delineators		MILE	\$ 1,000	\$ -
Advance Curve Warning Sign on Both Sides of Road		EA	\$ 1,000	\$ -
Guardrail Delineators/Reflectors		MILE	\$ 500	\$ -
Other:				
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ 100
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 6,257
Subtotal:				\$ 6,357
Mobilization: (% +/-)* 10%				\$ 2,500
Traffic Control: (% +/-) 5%				\$ 429
Contingency: (% +/-) 20%				\$ 1,714
Estimated Project Cost				\$ 11,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page

Local Road Safety Plan
Project Description for Curve Improvements

Risk Factor Points: 11



CURVE

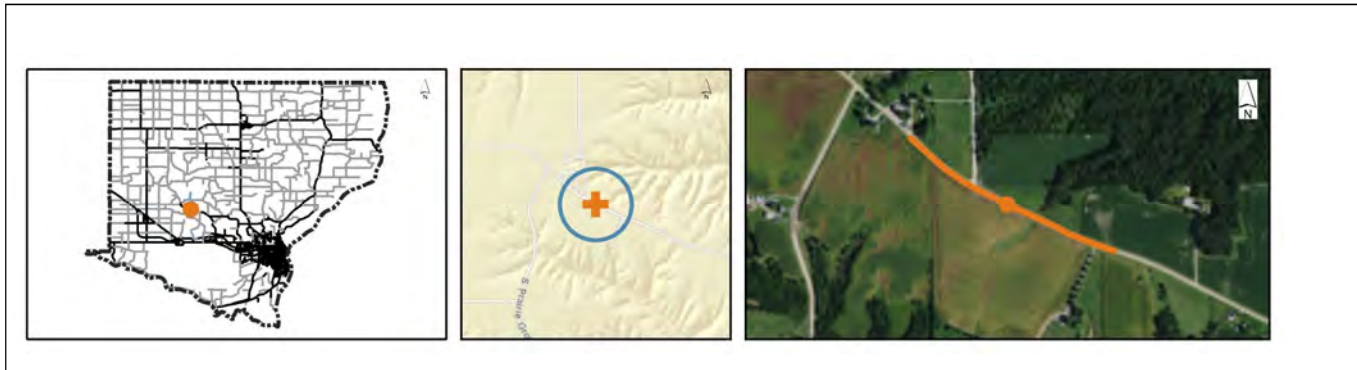
Project Name: Curve 99952 on D25
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 11/7/18
Prepared By: DJG/DVM
Checked By: MMO

Location Description

Road: **D25** Length (feet): **533** Length (Miles): **0.10** Closest City: **WELLSBURG** GPS ID: **99952**

Project Location Maps



Curve Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	380	0
Curve Radius (ft)	200	4
Shoulder Width (ft)	1	4
Avg. Pavement Condition (IRI)	90	0
Intersections Driveways	1 0	3
K or A Crash	0	0
Total Risk Factor Points (21 max)		11

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	1
Speed Limit (mph)	55
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Existing Curve Chevrons	No

Crash Data, 2008-2017	
Total Crashes	0
K and A Crashes	0
Lane Departure Crashes	0
Lane Departure K and A Crashes	0
Total Crash Rate (per HMVMT)	0.0
K and A Crash Rate (per HMVMT)	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Install 4" Retroreflective Edgeline (Both Sides of Road)	0.10	MILE	\$ 1,200	\$ 121
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	0.10	MILE	\$ 800	\$ 81
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	0.00	MILE	\$ 65,000	\$ -
Install Edgeline Rumble Strips (Both Sides of Road)	0.10	MILE	\$ 2,500	\$ 252
Install Centerline Rumble Strips	0.00	MILE	\$ 1,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	1	CURVE	\$ 5,000	\$ 5,000
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 2,500	\$ -
Clear and Grub (15 ft Both Sides of Road)	0.10	MILE	\$ 10,000	\$ 1,009
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 6,463

Continued on back of this page.

Project Location Map Sources:

Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Front Page



CURVE

Project Name: Curve 99952 on D25
 Agency Name: Grundy County
 Contact Name: Mauer, Gary
 E-mail: garym@gccourthouse.org

Date: 11/7/18
 Prepared By: DJG/DVM
 Checked By: MMO

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 99952

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Item Description	Quantity	Unit	Unit Price	Item Cost
Additional Curve Signage		CURVE	\$ 1,000	\$ -
Retroreflective Strip on Chevron Sign Post	1	CURVE	\$ 100	\$ 100
Transverse Rumble Strips Prior to Curve		CURVE	\$ 2,000	\$ -
Superelevation Correction		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Guardrail		MILE	\$ 50,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Post-Mounted Delineators		MILE	\$ 1,000	\$ -
Advance Curve Warning Sign on Both Sides of Road		EA	\$ 1,000	\$ -
Guardrail Delineators/Reflectors		MILE	\$ 500	\$ -
Other:				
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ 100
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 6,463
Subtotal:				\$ 6,563
Mobilization: (% +/-)* 10%				\$ 2,500
Traffic Control: (% +/-) 5%				\$ 387
Contingency: (% +/-) 20%				\$ 1,550
Estimated Project Cost				\$ 11,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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Local Road Safety Plan
Project Description for Curve Improvements

Risk Factor Points: **9**



CURVE

Project Name: Curve 88870 on L AVE
Agency Name: Grundy County
Contact Name: Mauer, Gary
E-mail: garym@gccourthouse.org

Date: 9/24/18
Prepared By: DJG/DVM
Checked By: MMO

Location Description

Road: **L AVE**
 Length (feet): **346** Length (Miles): **0.07** Closest City: **HOLLAND**

GPS ID: **88870**

Project Location Maps



Curve Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	800	4
Curve Radius (ft)	430	4
Shoulder Width (ft)	6	0
Avg. Pavement Condition (IRI)	71	0
Intersections Driveways	0 1	1
K or A Crash	0	0
Total Risk Factor Points (21 max)		9

Other Information	
Paved Shoulder	No
Shoulder Width (ft)	6
Speed Limit (mph)	55
Lane Width (ft)	11
Number of Lanes	2
Edgeline Rumble Strips	No
Centerline Rumble Strips	No
Existing Curve Chevrons	Yes

Crash Data, 2008-2017	
Total Crashes	0
K and A Crashes	0
Lane Departure Crashes	0
Lane Departure K and A Crashes	0
Total Crash Rate (per HMVMT)	0.0
K and A Crash Rate (per HMVMT)	0.0

Opinion of Probable Cost (Project Selection Decision Tree Results)

Item Description	Quantity	Unit	Unit Price	Item Cost
Install 4" Retroreflective Edgeline (Both Sides of Road)	0.07	MILE	\$ 1,200	\$ 79
Install 6" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
Install 4" Retroreflective Centerline	0.07	MILE	\$ 800	\$ 52
Pave 2' Shoulder with Safety Edge (Both Sides of Road)	0.07	MILE	\$ 65,000	\$ 4,262
Install Edgeline Rumble Strips (Both Sides of Road)	0.07	MILE	\$ 2,500	\$ 164
Install Centerline Rumble Strips	0.00	MILE	\$ 1,000	\$ -
Review Curve and Provide Signage to Meet MUTCD and Iowa DOT Standards, if Needed	0	CURVE	\$ 5,000	\$ -
Review and Upgrade Curve Signage to Meet MUTCD and Iowa DOT Standards, if Needed	1	CURVE	\$ 2,500	\$ 2,500
Clear and Grub (15 ft Both Sides of Road)	0.07	MILE	\$ 10,000	\$ 656
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 7,713

Continued on back of this page.

Project Location Map Sources:

Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

Front Page



Project Name: Curve 88870 on L AVE
 Agency Name: Grundy County
 Contact Name: Mauer, Gary
 E-mail: garym@gccourthouse.org

Date: 9/24/18

Prepared By: DJG/DVM
 Checked By: MMO

CURVE

Opinion of Probable Cost (Additional Potential Improvements)

GPS ID: 88870

There are a variety of other safety improvements that could be considered that were not included on the front page of the project sheet due to availability of data, the need for site-specific information, and/or the appetite for the countermeasure to be deployed throughout the county. The following countermeasures could be considered appropriate by the county and included below as additional potential improvements.

Item Description	Quantity	Unit	Unit Price	Item Cost
Additional Curve Signage		CURVE	\$ 1,000	\$ -
Retroreflective Strip on Chevron Sign Post	1	CURVE	\$ 100	\$ 100
Transverse Rumble Strips Prior to Curve		CURVE	\$ 2,000	\$ -
Superelevation Correction		EA	\$ 100,000	\$ -
Install High Friction Surface Treatment (HFST) on Curve		MILE	\$ 150,000	\$ -
Speed Activated Flasher on Chevron Sign		EA	\$ 3,000	\$ -
Guardrail		MILE	\$ 50,000	\$ -
On-Pavement Marking for Speed Control		EA	\$ 500	\$ -
Post-Mounted Delineators		MILE	\$ 1,000	\$ -
Advance Curve Warning Sign on Both Sides of Road		EA	\$ 1,000	\$ -
Guardrail Delineators/Reflectors		MILE	\$ 500	\$ -
Other:				
Other:				
Other:				
Other:				
Additional Potential Improvements Subtotal:				\$ 100
Project Selection Decision Tree Systemic Improvements Subtotal:				\$ 7,713
Subtotal:				\$ 7,813
Mobilization: (% +/-)* 10%				\$ 2,500
Traffic Control: (% +/-) 5%				\$ 537
Contingency: (% +/-) 20%				\$ 2,150
Estimated Project Cost				\$ 13,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

Opinion of Probable Construction Cost Disclaimer:

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End of Project Description

Back Page



APPENDIX D3
CURVE RISK FACTOR RANKING RESULTS



GPS ID	Paved Road	Length (ft)	Risk Factor Points	Average Daily Traffic (Value)	Average Daily Traffic (Points)	Curve Radius (ft) (Value)	Curve Radius (Points)	Shoulder Width (Value)	Shoulder Width (Points)	Pavement Condition (Value)	Pavement Condition (Points)	Intersections Driveways (Value)	Intersections Driveways (Points)	K or A Crash (Value)	K or A Crash (Points)	Total Crashes	K and A	Paved Shoulder	Speed Limit	Rumble Strips	Existing Curve Chevrons	Lane Width (ft)
20242	210TH ST	514	13	1,330	6	272	4	6	0	87	0	3 1	3	0	0	8	0	No	55	No	Yes	11
70394	F AVE	1,746	12	750	2	1,222	1	1	4	200	2	0 3	1	1	2	5	1	No	55	No	Yes	11
99951	D25	0	12	380	0	200	4	1	4	170	1	1 0	3	0	0	0	0	No	55	0	No	11.5
99952	D25	0	11	380	0	200	4	1	4	90	0	1 0	3	0	0	0	0	No	55	0	No	11.5
88870	L AVE	346	9	800	4	430	4	6	0	71	0	0 1	1	0	0	0	0	No	55	No	Yes	11
96589	NICKEL AVE	215	9	170	0	1,792	1	1	4	146	1	1 0	3	0	0	1	0	No	55	No	No	12



APPENDIX E
UNPAVED ROADWAY SAFETY COUNTERMEASURES

This appendix summarizes various **unpaved** road safety countermeasures for consideration and provides descriptions for each countermeasure.

GRAVEL ROADS CONSTRUCTION & MAINTENANCE GUIDE – FEDERAL HIGHWAY ADMINISTRATION (FHWA) 2015

A thorough resource on unpaved roads is provided by the FHWA entitled: **Gravel Roads Construction & Maintenance Guide**, which can be found at the following website: <https://www.fhwa.dot.gov/construction/pubs/ots15002.pdf>. This guide is quoted throughout this appendix. The guide includes detailed sections on the following topics:

- Routine Maintenance and Rehabilitation
- Drainage
- Surface Gravel
- Dust Control/Stabilization
- Innovations

The summary of the guide states: “The first and most basic thing to understand in road maintenance and construction is proper shape of the cross section. The road surface must have enough crown to drain water to the shoulder, but not excessive crown which impacts roadway safety.” “When proper shape is established and good surface gravel is placed, many gravel road maintenance problems simply go away, and road users are provided the best possible service from gravel roads” (*Gravel Roads Construction & Maintenance Guide, FHWA, 2015*).

UNPAVED ROADWAY SAFETY COUNTERMEASURES

The following sections provide general information on additional safety countermeasures for unpaved roadways

Maintenance of Gravel

It is important to preserve and maintain a proper road crown (four to six percent) for proper drainage to avoid ponding in potholes and/or ruts. Regular grading can help keep the roadway surface maintained, reducing water infiltration, and enhancing erosion control. According to the FHWA, “improper maintenance can lead to very quick deterioration of a gravel road, especially in wet weather”. It is also important to perform preventive maintenance to ensure that high shoulders, secondary ditches, berms, or curbs do not form. Per the FHWA, “when a gravel road develops high shoulders, it restricts the surface water from draining into the designed ditch. This creates a serious safety hazard. The time spent in eliminating a high shoulder (secondary ditch) will result in a road that is easier to maintain afterwards.”

Similar to the information provided on the paved Safety Edge, the maintenance of edge slopes on unpaved roads can allow vehicles that depart the travel lane to safely return to the roadway.

Major Rehabilitation

“At certain intervals, virtually every gravel road requires some major rehabilitation” (FHWA, 2015). This countermeasure involves not only reshaping the road surface, but the shoulder, foreslope and ditches. It is important that the redeveloped cross section be uniform, and that good drainage is provided, prior to replacing the surface gravel – failure to provide proper drainage or crown in



the road surface can lead to corrugation or washboarding, which can lead to loss of vehicle control.

The use of electronic slope controls has proven useful in gravel road maintenance, rehabilitation, and basic reconstruction. It is recommended that the county consider installing electronic slope controls on existing equipment to create a proper profile for new surfaces more efficiently.

Upgrade Signs

The following countermeasures relate to potential sign upgrades on the unpaved roadway system.

Stop Signs

A low-cost safety countermeasure that could be considered along unpaved roadways includes upgrading existing stop signs. Increasing the retroreflectivity of stop signs (or replacing signs with new signs) has crash modification factors (CMFs) from 0.75 to 0.91. This improvement increases the visibility of the signs, giving drivers more time to react to the stop-controlled condition.

Curve Chevrons

This safety countermeasure includes the installation of curve chevrons placed along the outer radius of the curved roadway segment. In some instances, County Engineers have relocated older curve chevrons, when replaced on their paved system, along curves located on their unpaved system. Installing curve chevron signs has CMFs ranging from 0.75 to 0.96, and when installed in combination with other advance warning signage, has CMFs ranging from 0.59 to 0.61.

Advance Curve Warning Signs and Speed Advisory Plaques

Providing advance warning of unexpected changes in horizontal alignment in conjunction with curve chevron signs has reported CMFs ranging from 0.59 to 0.61.

Delineate Roadside Hazards with Retroreflective Markers

Retroreflective markers can be applied to roadside objects and trees, increasing the visibility of hazards and helping delineate the roadway where minimal delineation may exist.

Realign Intersection

Based on right-of-way and site conditions, this countermeasure could be particularly beneficial and should be considered where feasible at locations where there is intersection skew. The CMF for intersection geometry reconfiguration is included in the Highway Safety Manual (HSM) and varies based on the existing skew angle. With the optimal 90-degree intersection configuration, sight triangles are maximized, crossing distance is minimized, and the intersection meets typical driver expectations.

Improve/Increase Shoulder/Lane Width

The County Engineer could consider the recommendation to improve/increase the shoulder width or lane width to accommodate traffic volumes and/or speed. This countermeasure could add safety benefits when applied properly, but could also encourage driving in excess of the speed limit, so it should be applied with caution.

Driveway Entrance Policy

It is recommended by the FHWA that, “to reduce maintenance problems [at driveways along unpaved roadways], [counties should] implement a permitting process. It should address the proper control of grade to match road edge, adequate width, and drainage.”

Clear and Grub

Vegetation should be kept clear of the roadway, although a natural vegetation buffer between the roadway and any ditches or waterways can help reduce runoff velocity and provide some erosion control. This safety countermeasure reduces the hazard of a run off the road crash by reducing the number of obstructions a vehicle could impact after a lane departure.

In addition, clearing and grubbing the areas within the sight triangles of the vehicles at intersections should also be considered. This safety countermeasure increases the sight distance for vehicles prior to entering an intersection. This is particularly beneficial under two-way stop-controlled or uncontrolled situations where conflicting vehicles may not stop or yield. Per the FHWA, “there is yet another great benefit of mowing [clearing and grubbing]; by removing the standing vegetation, drifting snow will not be trapped on the roadway, resulting in drastically reduced snow removal costs.”

Winter Maintenance

As salt cannot be used on gravel roads and frozen ground cannot be graded, sand is recommended for increased traction on curves and corners during winter events.



APPENDIX F
ADDITIONAL SAFETY RESOURCES

GOVERNOR'S TRAFFIC SAFETY BUREAU

215 East 7th Street, 3rd Floor, Des Moines, IA 50319-0248

PHONE: 515-725-6123 * FAX: 515-725-6133 * E-Mail: oertwig@dps.state.ia.us

MATERIALS REQUEST FORM

Name & Date of Event:

Audience:

Today's Date:

AVAILABLE ITEMS

Quantities are Limited

Brochures/Booklets:

- | | | |
|--|----------|--|
| 1. Is Your Child In The Right Car Seat? | 50 pack | |
| 2. Booze + Cruise = Lose | 100 pack | |
| 3. Sure, It's the Law - <i>English/Spanish</i> | 50 pack | |

Other:

- | | | |
|--|----------|--|
| 4. Sitting Up High <i>Activity Book with Safety Messages</i> | 50 pack | |
| 5. Public Guide <i>Child Restraint Law</i> English | 100 pack | |
| 6. Public Guide <i>Child Restraint Law</i> Spanish | 100 pack | |
| 7. Public Guide <i>OWI Law</i> | 100 pack | |

Please Complete to Ensure Request is Ready when Needed

Orders can be picked up or shipped.

Business Residential

Agency & Name & E-mail

Address:

Phone:

Pick Up/Ship Date:

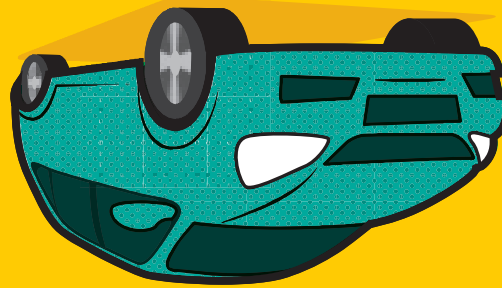
LOSE

CRUISE

BOOZE



=



+



Iowa Governor's Traffic Safety Bureau

WHAT CAN YOU DO?

- Don't drink and drive!
- Don't ride with someone who's been drinking!
- Stop your friends from driving after they've been drinking!
- Call a cab — get a ride home with someone who's sober.
- If you're under 21, just don't drink. In Iowa, it's against the law.
- And wear your seat belt — it's your best chance for survival if you're hit by a drunk driver.



IOWA'S DRUNK DRIVING LAW IS TOUGH!

ARE YOU UNDER 21? IS ONE BEER WORTH IT?

If you're under 21 and caught driving drunk, here's what happens:

- At .08 you are legally drunk and subject to the penalties of the drunk driving law.
- You lose your driver's license for 180 days for a first offense.
- In most cases, you won't get a work driving permit for at least 60 days.
- If you refuse a sobriety test, you lose your license for one year with no work driving permit for 90 days.
- For second and subsequent offenses, you lose your license for at least a year and won't get a work permit, period!
- Upon arrest for a second or subsequent offense, or for driving while revoked, your car can be impounded.

If you're under 21 and caught driving with a blood alcohol content of as little as .02, here's what happens:

- You lose your driver's license for 60 days for first-time offenders — two months without driving!
- You lose your driver's license for 90 days for subsequent offenses — three months without driving!
- No temporary permits for any reason!
- Alcohol is alcohol, whether it's beer, wine or liquor.
- For most people, .02 is as little as one beer, one glass of wine or one mixed drink — for some even less!

DRIVING WHILE REVOKED

A person who drives while his or her license is revoked under the OWI chapter (whether the revocation is administrative or court-ordered, and whether for an OWI or for a .02 violation) commits a serious misdemeanor and must pay a fine of \$1,000. Law enforcement officers may impound vehicles if the driver's license is revoked for an OWI. If such a driver is convicted of a second or subsequent offense while driving with a revoked license, the vehicle must be seized and forfeited to the state.

The owner of a vehicle who lends the vehicle to a person whose license is revoked for an OWI commits a simple misdemeanor and is jointly liable for any damages the driver causes if the owner knew, should have known, or gave consent to the operation of the vehicle by a driver with a revoked license.

VEHICLE IMPOUNDMENT/IMMOBILIZATION

A person arrested for a second or subsequent OWI, or for driving while a license is revoked for an OWI, may have the motor vehicle seized and impounded immediately upon arrest. The impoundment (or immobilization) continues for at least 180 days or until the driver's license revocation is completed — whichever period is longer. If the vehicle is not impounded at the time of arrest, it may be impounded or immobilized upon conviction for the second or subsequent OWI offense. If a vehicle is operated in violation of an order of impoundment or immobilization, it shall be seized and forfeited to the state. Operation of the vehicle is a serious misdemeanor.

REINSTATING A DRIVER'S LICENSE

If a motor vehicle license or nonresident operating privilege has been revoked for any OWI offense under chapter 321J (whether as a result of a court order or administrative action), the license or privilege may not be reinstated until the person:

- Pays a \$200 civil penalty.
- Presents proof of completion of a course for driving under the influence.
- Presents proof of completion of a substance abuse evaluation and treatment or rehabilitation services.
- Complies with financial responsibility laws, if applicable.
- Complies with ignition interlock requirements, if applicable.



DRUNK DRIVING. OVER THE LIMIT. UNDER ARREST.

www.iowagtsb.org • drivesmartiowa.com
Phone: (515) 725-6123 • Fax: (515) 725-6133

.08

Iowa's OWI Law

Operating a motor vehicle
while intoxicated
or drugged

UPDATED JULY 1, 2018

The graphic features a large, 3D-rendered black sphere with a white circle in the center containing the number ".08". Below the sphere is a red diamond-shaped sign with a white border. The sign contains the text "Iowa's OWI Law" in large white letters, followed by "Operating a motor vehicle while intoxicated or drugged" in smaller white letters. The entire graphic is set against a white background with a black horizontal bar at the bottom.

It is unlawful to operate a motor vehicle in Iowa in any of the following conditions:

1. While under the influence of an alcoholic beverage, other drugs or combination of such substances.
2. While having an alcohol concentration of .08 or more.
3. While any amount of a controlled substance is present in the person, as measured in the person's blood or urine.

CRIMINAL PENALTIES FOR OWI

First Offense A serious misdemeanor, punishable by up to one year in jail and a fine of \$1,250, or both. The minimum jail time is 48 hours, which may be served in an OWI program with law enforcement security. The judge may waive up to \$625 of the fine if the crime did not result in a personal injury or property damage. As an alternative to a portion or all of the fine, the court may order the person to perform unpaid community service. These offenders must also be ordered to complete a substance abuse evaluation and treatment course for drinking drivers and, in some cases, a reality education substance abuse prevention program.

Second Offense An aggravated misdemeanor, punishable by up to two years in prison. A minimum of seven days in jail must be served. A fine of \$1,875 to \$6,250 must be paid. These offenders must also be ordered to complete a substance abuse evaluation and treatment course for drinking drivers and, in some cases, a reality education substance abuse prevention program.

Third or Subsequent Offense A Class "D" felony, punishable by imprisonment up to five years and a fine of \$3,125 to \$9,375. A minimum of 30 days in jail must be served. These offenders must also be ordered to complete a substance abuse evaluation and treatment course for drinking drivers and, in some cases, a reality education substance abuse prevention program.

NOTE: OWI convictions and deferred judgments that occurred anywhere in the United States within the preceding 12 years will count in determining whether the offense charged is a second or third offense. Also, deferred judgments, deferred sentences or probation without service of the mandatory minimum period of incarceration may be granted in an OWI case only if the defendant:

- Has never been previously convicted or received a deferred judgment for OWI anywhere in the United States.
- At the time of arrest, agreed to take a chemical test and had a test result of no higher than .15.
- Did not cause injury to another person by driving while intoxicated.

All persons convicted must undergo a substance abuse evaluation (at the offender's expense) prior to sentencing, and the court must order the defendant to follow the recommendations of the evaluation.

Victims may receive restitution for all damages caused by a defendant. Public agencies may receive up to \$500 for costs incurred as a result of a defendant's crime requiring an emergency response.

CRIMINAL PENALTIES FOR OWI CAUSING DEATH OR SERIOUS INJURY

OWI which causes the death of another person is a Class "B" felony, punishable by up to 25 years in prison. This sentence cannot be suspended, and a defendant cannot be released on bail before sentencing, or while on appeal. There is no fine, but victim restitution of \$150,000 will be ordered. OWI which causes a serious injury to another person is a class "D" felony, punishable by up to five years in prison. This sentence cannot be suspended. A fine of \$750 to \$7,500 may be imposed, and victim restitution may be ordered.

DRIVER'S LICENSE REVOCATIONS

Administrative — Test Failure:

First Offense When a chemical test indicates an alcohol level of .08 or more or the presence of a controlled substance and the person has had no OWI-related revocations in the previous 12 years.....180 days

The Department shall require the defendant to install an ignition interlock device of a type approved by the commissioner of public safety on all vehicles owned or operated by the defendant if the defendant seeks a temporary restricted license.

Second or More One or more revocations in the previous 12 years.....1 year

The Department shall require the defendant to install an ignition interlock device of a type approved by the commissioner of public safety on all vehicles owned or operated by the defendant if the defendant seeks a temporary restricted license.

Administrative — Test Refusal (includes refusal of a urine or blood test if the officer requests such a test after a person has submitted a breath test; however, alternative to blood test must be offered unless a warrant is obtained):

First Offense When a chemical test is refused and the person has had no OWI-related revocations in the previous 12 years 1 year

The Department shall require the defendant to install an ignition interlock device of a type approved by the commissioner of public safety on all vehicles owned or operated by the defendant if the defendant seeks a temporary restricted license.

Second or More One or more revocations in the previous 12 years 2 years

The Department shall require the defendant to install an ignition interlock device of a type approved by the commissioner of public safety on all vehicles owned or operated by the defendant if the defendant seeks a temporary restricted license.

Administrative — Driver Under 18:

If a driver is under the age of 18 and his or her license or operating privileges are revoked administratively or by a court order, the revocation continues until the revocation expires or until the person reaches 18, whichever is later.

Upon Conviction for OWI — If Not Otherwise Revoked Administratively:

First Offense Upon conviction, if no convictions or revocations in the preceding 12 years 1 year; 180 days if evidence of a test.

The Department shall require the defendant to install an ignition interlock device of a type approved by the commissioner of public safety on all vehicles owned or operated by the defendant if the defendant seeks a temporary restricted license.

Second Offense One or more revocations in the preceding 12 years 2 years; 1 year if evidence of a test.

The Department shall require the defendant to install an ignition interlock device of a type approved by the commissioner of public safety on all vehicles owned or operated by the defendant if the defendant seeks a temporary restricted license.

Deferred If license is not otherwise revoked and court defers judgment..... 30 – 90 days

The Department shall require the defendant to install an ignition interlock device of a type approved by the commissioner of public safety on all vehicles owned or operated by the defendant if the defendant seeks a temporary restricted license.

Administrative — in Addition to Other Revocations:

Third Offense — Upon Conviction: 6 years

The Department shall require the defendant to install an ignition interlock device of a type approved by the commissioner of public safety on all vehicles owned or operated by the defendant if the defendant seeks a temporary restricted license.

Court Ordered — In Addition to Other Administrative or Court-Ordered Revocations:

Any level of offense involving serious injury caused by OWI..... 1 year in addition to any other revocation.

May apply for a temporary restricted license; ignition interlock device must be installed on all vehicles.

Any level of offense involving a death caused by OWI 6 years

May apply for a temporary restricted license after two years if ignition interlock device is installed on all vehicles.

.02/"ZERO TOLERANCE" ADMINISTRATIVE LICENSE REVOCATIONS FOR DRIVERS UNDER 21

The license of a person under 21 who submits to a chemical test which indicates an alcohol level of .02 or more, but less than .08, will be revoked for 60 days on a first violation and 90 days on subsequent violations. If such a person is suspected of operating with an alcohol level of .02 or more and refuses chemical testing, the license revocation will be one year on a first violation and two years on a second or subsequent violation. These revocations, .02/"zero tolerance" revocations, are administrative and are not dependent upon criminal charges being filed. If a license is revoked for a .02/"zero tolerance" violation, the driver is not eligible for a temporary restricted license at any time during the revocation.

A GUIDE TO THE IOWA CHILD RESTRAINT LAW

Iowa Code 321.446, Data Code 198a - as of July 2010

Key Points:

- A child under 1 year old and weighing less than 20 lbs. must be secured in a rear-facing child restraint system
- A child age 1 up to 6 years old must be secured in a child restraint system (a safety seat or booster seat--NOT a seat belt)
- A child from age 6 up to age 11 must be secured in a child restraint system or by a safety belt
- Rear seat occupants up to age 18 must be secured by a safety belt

A "child restraint system" is a specially designed seating system, including an internal harness or a belt positioning booster seat that meets federal motor vehicle safety standards.

- The misdemeanor fine is \$100.00, plus costs (non-moving violation) totaling at least \$195.00
- The law applies to both residents and non-residents of Iowa
- The child restraint system must be used in accordance with the manufacturer's instructions
- The child must be secured in the child restraint and the child restraint must be properly secured to the vehicle
- Non-use of a child restraint is probable cause to stop a vehicle
- An officer may investigate a suspected violation
- For unrestrained passengers age 0-13, the driver receives the citation, and for unrestrained passengers 14-17, the passenger receives the citation
- **1st offense citation will not result in conviction if driver "produces in court" proof of acquisition of child restraint**

Exceptions:

- Children certified by a physician as having a medical, physical or mental disability making restraint use inadvisable
- Children on bus, including a school bus
- Children riding on motorcycles
- Children riding in vehicles manufactured before 1966
- Children transported in authorized emergency vehicles
- Children transported by peace officers on official duty
- Children riding in motor homes except if riding in the front passenger seat (where they must be restrained)
- Children for whom a seat belt is not available due to all other belts being used (example: 4th child in back seat with only 3 belts)

This is only a guide, provided through the courtesy of

**Iowa Governor's Traffic Safety Bureau
Department of Public Safety**

Produced with Federal Highway Safety Funds 02/14 20M

A GUIDE TO SAFELY TRANSPORTING CHILDREN IN A MOVING VEHICLE

COMMON CHILD SAFETY SEAT MISUSE:

- Latch System used incorrectly
- Not securing top tether strap for forward facing seats
- Not buckling child into restraint
- Not securely anchoring the child restraint to the vehicle
- Improper seat for child's age and size
- Use of after-market products
- Harness retainer clip not at armpit level
- Loose harness straps

To graduate to an adult belt -- a child must pass the Belt Fit Test. To be able to sit with their back/buttocks against the seat, their knees bent at the edge of the seat and their feet touch the floor. The belt system must be snug across the center of the child's chest and across their lap at the hips.

COMMON SAFETY BELT MISUSED FOR CHILDREN:

- Lap belt up on abdomen
- Shoulder belt crossing on a child's face or neck
- Shoulder belt behind back
- Shoulder belt under their arm

**For your Child's sake, go above and beyond Iowa's
Child Passenger Safety Law!**

IOWA LAW

Children must ride in an appropriate rear facing seat until one year of age and at least 20 pounds.

Children must ride in a child safety seat or booster through the age of 5. (Seats must be used in accordance with manufacturer's directions)

Children must be in a booster seat or seat belt between 6 and 11 years old, regardless of their seating position within a vehicle.

Rear seat occupants up to age 18 must be secured by a safety belt.

BEST PRACTICE

Children should ride in an appropriate rear facing seat until the maximum weight limit of the seat is reached.

A child should be restrained in a 5-point harness until the maximum weight limit for the seat is reached. This is usually 50-65 pounds, although some are now 80-90 pounds.

At maximum harness weight a child should graduate into a booster seat. A child should ride in a booster until they pass the **Belt Fit Test** mentioned above.

For further information on child restraints, contact the

**Iowa Child Passenger Safety Helpline
1-800-258-6419**

For Certified Child Passenger Technicians & Child Restraint Checks

Visit this Website: www.blankchildrens.org/cps

Use of Electronic Communication Devices While Driving & Penalties	
Code Section & Applicable Motorist	Fine
321.178(2)(a) 16-18 yrs. – Work/Family Permits Class C Restriction “6” Primary Enforcement	\$30
-Shall not use electronic communication device or entertainment device while driving a motor vehicle.	
-May use when at complete stop off the traveled road.	
-May use electronic devices permanently installed in a motor vehicle or portable device operated through permanently installed equipment.	
321.180B(6)(a) Instruction Permit or Intermediate DL Class C or Y Restriction “2” Primary Enforcement	\$50
-Shall not use electronic communication device or entertainment device while driving a motor vehicle.	
-May use when at complete stop off the traveled road.	
-May use electronic devices permanently installed in a motor vehicle or portable device operated through permanently installed equipment.	
321.194(1)(c) 14-18 yrs. Special Minor’s License Class C Restriction “7” Primary Enforcement	\$50
-Shall not use electronic communication device or entertainment device while driving a motor vehicle.	
-May use when at complete stop off the traveled road.	
-May use electronic devices permanently installed in a motor vehicle or portable device operated through permanently installed equipment.	
321.276 Use of Electronic Messaging While Driving All Classes/Drivers Primary Enforcement	\$30
-Shall not use any portable electronic device to manually write, send, or view a text, instant message, email, internet site, social media or game while driving.	
-Write, send, and view include manual entry, transmission, or retrieval of electronic messages and include playing, browsing, or accessing a message.	
-May write, send or view an electronic message when at a complete stop off the traveled portion of the roadway.	
-May use voice-operated or hands-free device without the use of either hand except to activate or deactivate a feature or function.	
-May use wireless communication device as part of a digital dispatch system.	
-May use a GPS or navigation system.	
-May engage in a call, including selecting or entering a telephone number or name in a hand-held mobile telephone.	
<i>Persons Exempt from Restriction on writing, sending, or viewing an electronic message:</i> member of a public safety agency performing official duties; health care professional in the course of an emergency situation; individuals receiving safety-related info including emergency, traffic, or weather alerts.	

Use of Electronic Communication Devices While Driving & Penalties
Frequently Asked Questions:
Q) What is a “hand-held electronic communication device”? A) Iowa code defines a “hand-held electronic communication device” as a mobile telephone or other portable electronic communication device capable of being used to write, send, or view and electronic message, and includes devices temporarily mounted in the vehicle unless the device is voice-operated or hands-free. It does not include a voice-operated or hands-free device which allows the user to write, send or view an electronic message without the use of either hand except to activate or deactivate a feature or function, or a wireless digital dispatch system.
Q) What is an “electronic message”? A) Iowa code defines “electronic message” as an image visible on the screen of a hand-held electronic communication device and includes a text message, an instant message, email, an internet site, a social media application, or a game.
Q) Can I pull over an adult, fully licensed driver for using their phone as a GPS or navigation system? A) No. However, If the use of the device as a navigation system results in erratic driving and lane deviations, that can support a stop of the vehicle for other violations.
Q) Can I pull over an adult, fully licensed driver for talking on a cell phone while driving? A) No. Iowa code does not prohibit an adult, fully licensed driver from engaging in a telephone call, or activating or deactivating a feature or function of the device.
Q) Can I pull over an adult, fully licensed driver for texting, playing, browsing, accessing or viewing an electronic message? A) Yes. Using an electronic device while driving is a primary offense for all drivers. It is imperative that you observe and document the driver’s use of the phone, multiple key strokes, eyes away from the roadway, and/or any erratic driving to overcome a claim of dialing a phone number or activating or deactivating a function of the device. This will likely require some sustained observation. Reasonable suspicion or probable cause to make a traffic stop would also permit requesting consent to view the phone. Taking and inspecting the phone without consent requires a search warrant.
Q) Can I pull over a 16-year-old who is talking on the phone? A) Yes. Laws applicable to drivers within the GDL system or those with a minor’s work or school permit are prohibited from using electronic devices entirely, unless the vehicle is stopped and off the traveled portion of the roadway or the device is permanently installed in the vehicle or operated through permanently installed equipment.

Child Passenger Safety





A PARENT'S PRIMER

When you're an expectant mother, it's important to always wear your seat belt to protect you and your unborn child. Wear the lap belt across your hips and below your belly with the shoulder belt across your chest (between your breasts). Once your baby is born, follow these important safety steps.

GROWING UP SAFE: It's a four-step process.

As children grow, how they sit in your car, truck or SUV should change.

Save your child from injury or death by observing all four steps:

- 1 REAR-FACING SEATS**  For the best possible protection keep infants in the back seat, in rear-facing child safety seats, as long as possible up to the height or weight limit of the particular seat. At a minimum, keep infants rear-facing until a minimum of age 1 **and** at least 20 pounds.
- 2 FORWARD-FACING SEATS**  When children outgrow their rear-facing seats (at a minimum age 1 **and** at least 20 pounds) they should ride in forward-facing child safety seats, in the back seat, until they reach the upper weight or height limit of the particular seat (usually around age 4 and 40 pounds).
- 3 BOOSTER SEATS**  Once children outgrow their forward-facing seats (usually around age 4 and 40 pounds), they should ride in booster seats, in the back seat, until the vehicle seat belts fit properly. Seat belts fit properly when the lap belt lays across the upper thighs and the shoulder belt fits across the chest (usually at age 8 or when they are 4'9" tall).
- 4 SEAT BELTS**  When children outgrow their booster seats, (usually at age 8 or when they are 4'9" tall) they can use the adult seat belt in the back seat, if it fits properly (lap belt lays across the upper thighs and the shoulder belt fits across the chest).

Get Help!

ON THE WEB

Go to www.nhtsa.gov and choose Child Safety Seat Information from the menu or click on the child passenger safety icon. The site includes child safety seat installation tips, product ratings, recalls, and other useful information.

BY PHONE

For more information about child safety seats, booster seats, inspection/fitting stations in your area, seat belts, air bags, and

other highway safety issues, call the DOT Vehicle Safety Hotline at: 1-888-327-4236.

NEAR YOU

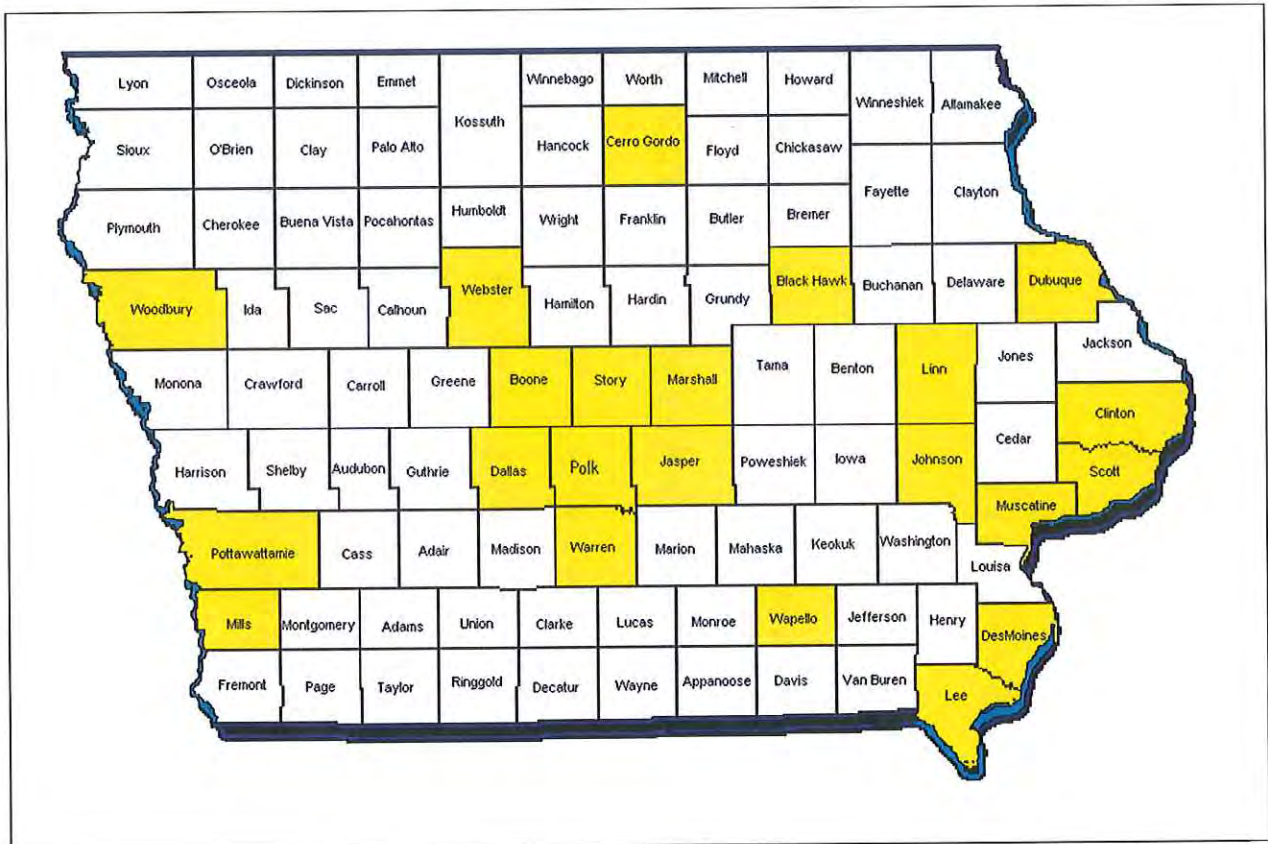
A certified child passenger safety technician can check your installation and answer questions. To find a technician or an inspection station near you, go to www.nhtsa.gov, click on the child passenger safety icon, and then click on the Fitting/Inspection Station link or go to www.seatcheck.org.

REMEMBER: All children under 13 should ride in the back seat.

Always read the child restraint instructions and the vehicle owner's manual.



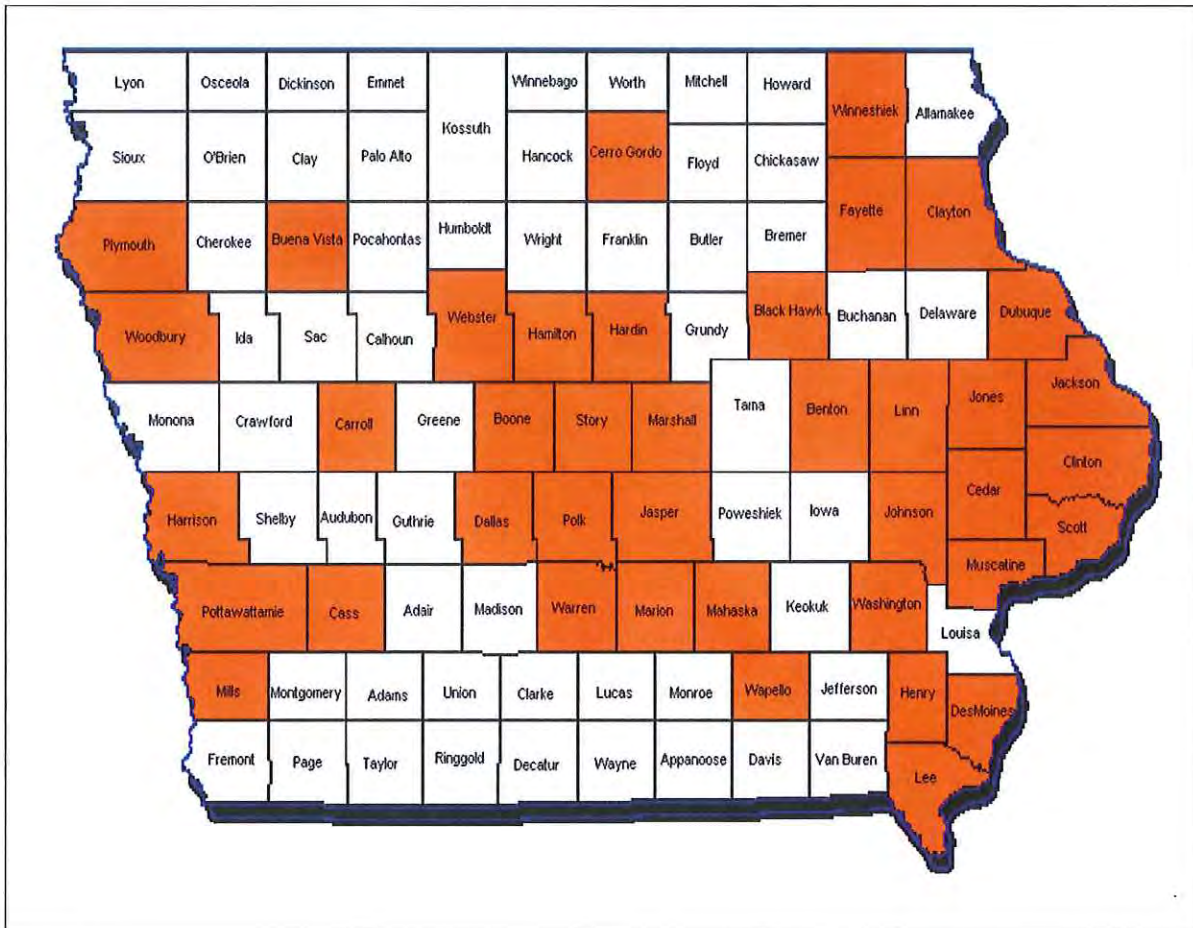
IOWA'S "TOP 22" PROBLEM IDENTIFICATION COUNTIES – FFY 2019



Black Hawk	Dubuque	Mills	Wapello
Boone	Jasper	Muscatine	Warren
Cerro Gordo	Johnson	Polk	Webster
Clinton	Lee	Pottawattamie	Woodbury
Dallas	Linn	Scott	
Des Moines	Marshall	Story	

**Eligible for Section 402
Grant Funding**

IOWA'S "TOP 40" PROBLEM IDENTIFICATION COUNTIES – FFY 2019



Benton	Clayton	Harrison	Mahaska	Scott
Black Hawk	Clinton	Henry	Marion	Story
Boone	Dallas	Jackson	Marshall	Wapello
Buena Vista	Des Moines	Jasper	Mills	Warren
Carroll	Dubuque	Johnson	Muscatine	Washington
Cass	Fayette	Jones	Plymouth	Webster
Cedar	Hamilton	Lee	Polk	Winneshiek
Cerro Gordo	Hardin	Linn	Pottawattamie	Woodbury

**Eligible for Section 405d
Grant Funding**

GUIDELINES FOR SECTION 405d FUNDING PROPOSALS Governor's Traffic Safety

Bureau - Iowa Department of Public Safety January 2018

The Iowa Governor's Traffic Safety Bureau (GTSB) administers the federally funded Section 405d Impaired Driving Countermeasures Program authorized on July 6, 2012 when President Obama signed into law P.L. 112-141, the Fixing America's Surface Transportation (FAST) Act. The FAST Act authorizes the federal surface transportation programs for highways, highway safety and transit. The National Highway Traffic Safety Administration, an agency of the U.S. Department of Transportation, administers federal highway safety programs on the national level. The Federal 405c Program is designed to help states, counties and communities initiate programs to combat the problem of impaired driving. Impaired driving and non-use of restraints are the leading causes of death and injury in traffic crashes in both Iowa and the Nation.

While 405d monies focus on impaired driving, other traffic safety activities, such as enforcement of seat belt, speed and stop violations are included. Applicants are encouraged to "leverage" funds from the GTSB with staff, financial or other resources they can contribute to a proposed project. Section 405d is a one-year program with a new application required annually. Proposals must be submitted by February 28 for consideration for a program that will begin the following October 1st.

To qualify for Section 405d funding, agencies must be in one of Iowa's designated Top 40 Problem Counties determined annually by an in-depth traffic data analysis of alcohol-related crashes, fatalities and injuries and OWI revocations. Agencies in counties ranked 1-22 are eligible regardless of population. Agencies in counties ranked 23-40 must be in cities with a population of 5,000 or more unless their jurisdiction is countywide.

Section 405d programs may include elements such as directed overtime enforcement, educational presentations, equipment, training and/or public information campaigns. Enforcement agencies requesting overtime are required to direct that overtime enforcement to high-risk times (typically evening) and at high-risk locations for impaired driving crashes and to participate in two multi-agency enforcement efforts during the program. With a focus on impaired driving prevention, agencies are also required to conduct public awareness through media releases, news articles and/or educational presentations.

AGENCY'S CURRENT RESOURCES

If your agency is asking for overtime for traffic enforcement, you must provide the number of sworn officers in your department and the average overtime rate of pay. If your agency is asking for any equipment, you must complete the Equipment Information Section of the application.

REQUESTED PROGRAM ELEMENTS/BUDGET

This section tells us exactly what your agency is requesting to carry out your proposed program. These elements, if approved, will make up your contract budget. While an estimate, be as specific as possible. Estimated project costs are categorized as follows:

1. Personal Services - Overtime and training-related travel expenses.
2. Commodities - Educational materials acquired and consumed specifically for the program. They must include impaired driving prevention information pre-approved by the Bureau.
3. Equipment - Cost of equipment provided for the grantee. Preliminary breath testers (PBTs) and in-car video cameras are examples of equipment.