

US HIGHWAY 18 Clay, Palo Alto, Kossuth, and Hancock Counties PLANNING AND ENVIRONMENTAL LINKAGES (PEL) STUDY

Goals and Guiding Principles

Location and Environment Bureau | July 2021



EXECUTIVE SUMMARY

INTRODUCTION

The Iowa Department of Transportation (DOT) is preparing a transportation planning study for a portion of the US Highway 18 (US 18) corridor in Clay, Palo Alto, Kossuth, and Hancock Counties in northern Iowa following the Federal Highway Administration Planning and Environmental Linkages (PEL) process. The objectives of the US 18 PEL Study is to encourage public involvement and stakeholder input, gain an understanding of US 18 existing conditions within the Study Area, and identify the roadway improvements necessary to meet current and future traffic operations and mobility needs. This study will specifically assess the placement of Super Two Highway elements, in particular passing lanes and turn lane improvement to enhance mobility on a two-lane highway. The US 18 PEL Study will conclude with development of the US 18 Vision Document, a report that will summarize the Study's main findings and recommendations.

The US 18 PEL Study Area is 81 miles long and begins just west of S Grand Ave. in Spencer (Clay County) and extends to Country Club Dr. in Garner (Hancock County). This section of US 18 is on the Iowa DOT's primary highway system and Commercial and Industrial Network (CIN). Within the Study Area, US 18 passes through or near several communities; including Spencer, Dickens, Ruthven, Emmetsburg, Cylinder, Algona, Sexton, Wesley, Britt, Duncan, and Garner.

The majority of the existing roadway is a two-lane rural highway. The Study corridor currently serves between 2,300 and 7,800 vehicles per day (2019 Annual Average Daily Traffic Maps available from Iowa DOT). During the period of 2016-2020, there were 579 crashes (155 of which involved at least one injury or possible injury) that occurred along US 18 in the Study Area. There were eight fatal crashes.

The following notable features within the corridor will be considered as part of the US 18 PEL Study:

- Existing structures such as bridges and reinforced culvert boxes (RCBs)
- Existing accesses such as commercial, residential and farm accesses
- Railroad Corridors: There are three different railroads within the US 18 Study Area. Union Pacific (UP) Railroad has tracks in the cities of Emmetsburg and Algona. Canadian Pacific (CP) Railroad tracks run along or near US 18 throughout much of the Study Area. Part of the North Central Iowa Rail Corridor is found in the city of Garner.
- Algona Municipal Airport
- River and Waterway Crossings: There are 16 bridges on US 18 Highway in the Study Area. Major waterways include; the Little Sioux River, Lost Island Outlet, Deer Creek, Cylinder Creek, Lotts Creek, Four Mile Creek, the East Fork Des Moines River, Prairie Creek, Boone River, and the West Branch of the Iowa River.
- Natural and Recreational Areas: There are several natural and recreational areas that include wetlands, floodplains, threatened and endangered species habitats, parks, and other recreational use facilities.
- Other sensitive features within the Study Area include schools, cemeteries, churches, parks, utilities, and other recreational areas.

The Study Area is primarily rural in nature with surrounding land use of existing industry largely

centered around agriculture and manufacturing. Those who commute through the Study Area are likely destined to employment centers in the more developed urban employment areas. Based on existing land use in the corridor and surrounding region and input from local stakeholders, it is clear the US 18 corridor is a critical multi-modal transportation link for the transportation of agricultural commodities from farm to market via truck and rail, as well as the conveyance of commuter traffic between rural areas and the urban employment centers. Heavy recreational traffic is also common seasonally.

STUDY GOALS

This US 18 PEL Study will accomplish the following goal.

- **Identify, analyze, and recommend future roadway improvements.** The study will use stakeholder input, crash history data, existing infrastructure conditions, current and future traffic data, to provide recommendations to increase safety, operations, and mobility along the corridor specifically for Super Two Highway roadway improvements. It is expected that most of the recommendations will be focused on the evaluation of existing intersections for turn lane improvements and recommendations for proposed passing lane locations. Spot improvements will also be recommended to help improve the corridor.

STUDY GUIDING PRINCIPLES

The methodology and process used to complete this Study and to attain the goals noted above will follow these three guiding principles:

- **Guiding Principle #1: Good Stewardship.** Iowa DOT is responsible for maintaining a safe and efficient transportation system while also being good stewards of taxpayer dollars, the environment, and private property. Iowa DOT is committed to evaluating the needs of the US 18 corridor and developing potential improvement projects that balance transportation needs across the state, construction costs, and impacts to surrounding land, private property, and sensitive environmental areas.
- **Guiding Principle #2: Transparency.** Iowa DOT is committed to remaining transparent during the execution of this planning Study. Throughout the study, there will be opportunities for stakeholders and the public to comment and provide input and feedback on the Study. All information shared at the public involvement meetings will be posted on the Iowa DOT Public Involvement website (<http://www.news.iowadot.gov/pim/>) and will be available for viewing and submitting comments/feedback 24 hours a day, 7 days a week. Iowa DOT is committed to seriously considering all comments and feedback submitted throughout the duration of the Study.
- **Guiding Principle #3: Design Criteria.** A baseline of core design parameters that considers future traffic forecasts, design speeds, and super two highway guidance necessary for this Study will be utilized. Throughout this Study, more information will be learned about the existing corridor and future transportation needs. A flexible approach to applying the criteria will be undertaken to create solutions that best fit the context and needs of the corridor, as well as at individual locations along the corridor. Existing conditions will be compared to the current Iowa DOT design manual acceptable and preferred design standards as well as a baseline stand of the acceptable 3R design criteria. If 3R design criteria are not clearly defined, then the latest AASHTO Green Book “A Policy on Geometric Design of Highways and Streets (2011 edition)” will be used.

Practical Design Principles in some cases will be utilized to allow for nonconforming conditions.

The approaches and methodologies used to complete this Study will vary and evolve as the Study progresses. However, the principles and goals stated above will remain true throughout the Study and into future project development activities.

ACRONYMS AND ABBREVIATIONS

AADT	Annual Average Daily Traffic
CIN	Commercial and Industrial Network
DOT	Department of Transportation
FHWA	Federal Highway Administration
ICE	Infrastructure Condition Evaluation
iTRAM	Iowa DOT Statewide Travel Analysis Model
LRTP	Long-Range Transportation Plan
NEPA	National Environmental Policy Act
PEL	Planning and Environmental Linkages
RPA	Regional Planning Affiliation
US 18	United States Highway 18
UP	Union Pacific Railroad
CP	Canadian Pacific Railroad
NCIRC	North Central Iowa Rail Corridor

TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	i
ACRONYMS AND ABBREVIATIONS.....	iv
1 INTRODUCTION.....	1
2 PROJECT SETTING.....	1
3 STUDY GOAL.....	6
4 GUIDING PRINCIPLES.....	10
4.1 GOOD STEWARDSHIP.....	10
4.2 TRANSPARENCY.....	11
4.3 DESIGN PRINCIPLES.....	11
5 SUMMARY.....	12
6 REFERENCES.....	12

LIST OF TABLES

TABLE 1. CURRENT IOWA DOT PROGRAMMED IMPROVEMENT PROJECTS IN THE US 18 PEL CORRIDOR.....	4
TABLE 2. DECENNIAL US CENSUS BUREAU POPULATION STATISTICS FOR CLAY, PALO ALTO, KOSSUTH, AND HANCOCK COUNTIES.....	5

LIST OF FIGURES

FIGURE 1. US 18 PEL STUDY AREA.....	2
FIGURE 2. US 18 PEL STUDY CORRIDOR HISTORIC DAILY TRAFFIC VOLUMES.....	3
FIGURE 3. TYPICAL CROSS SECTION SUPER-2 HIGHWAY.....	7
FIGURE 4. SCHEMATIC OF A SECTION OF SUPER-2 HIGHWAY.....	8
FIGURE 5A. IOWA DOT DESIGN MANUAL ACCEPTABLE AND PREFERRED CRITERIA.....	9
FIGURE 5B. ACCEPTABLE VALUES FOR 3R ROADWAY FEATURES.....	10

APPENDIX A

FIGURE 1. US 18 STUDY AREA	
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1 INTRODUCTION

The Iowa Department of Transportation (DOT) is preparing a transportation planning study for a portion of the US Highway 18 (US 18) corridor in Clay, Palo Alto, Kossuth, and Hancock Counties in Northern Iowa. This planning study, hereafter referred to as the Study, is following the Federal Highway Administration (FHWA) Planning and Environmental Linkages (PEL) model. This model represents an approach to transportation planning decision making that considers environmental, community, and economic goals early in the planning stage, which:

- Minimizes duplication of effort.
- Promotes efficient and cost-effective solutions and environmental stewardship.
- Reduces delays in future project implementation.

The objective of the Study is to gain an understanding of the corridor's safety, mobility, and infrastructure, as well as identify the Super Two roadway improvements necessary to meet current and future traffic operations and mobility needs. It's also to encourage public involvement and stakeholder input throughout the process. The two-lane highway roadway improvements examined will primarily focus on turning and passing lane additions. Other spot highway roadway improvements will also be recommended in certain areas to help improve the transportation corridor within the Study Area. The Study will conclude with the development of the US 18 Vision Document, a report that will summarize the Study's findings and recommendations.

The Vision Document will provide two-lane highway roadway improvement project recommendations for this section of US 18 in Clay, Palo Alto, Kossuth, and Hancock Counties. The identified and recommended improvements in the Vision Document will be developed to a level that will allow the Study findings to serve as the foundation for future project development, including National Environmental Policy Act (NEPA) studies as decisions are made to fund and program individual improvement projects over time.

This memorandum summarizes the project setting and area, describes the goal of the Study, and presents the guiding principles and committed approach to project development that will be followed.

2 PROJECT SETTING

US 18 is a primary highway that spans the State of Iowa, crossing the Big Sioux River from South Dakota into western Iowa and eventually crossing the Mississippi River at Marquette in eastern Iowa into Wisconsin. Across the state, US 18 connects with other major north-south interstate and primary highway corridors, including Interstate 29 (I-29), US 75, IA 60, US 59, US 169, US 71, IA 4, US 69, I-35, US 65, US 63, US 218, and US 52. Some urban areas along US 18 include (from west to east) the cities of; Spencer, Algona, Clear Lake, Mason City, Charles City, and McGregor. US 18 is considered a primary highway in Iowa and is part of the Commercial and Industrial Network (CIN).

Figure 1 shows the US 18 PEL Study Area. A more detailed Study Area map is shown in

Appendix A. The corridor begins just west of S Grand Ave. in Spencer (Clay County) and extends to Country Club Dr. in Garner (Hancock County) The US 18 PEL Study Area is primarily rural in nature and passes through or near the corporate limits of several communities including Spencer, Dickens, Ruthven, Emmetsburg, Cylinder, Algona, Sexton, Wesley, Britt, Duncan, and Garner. At this time, the only location where a shift off existing alignment is being considered is at the town of Cylinder.

Existing US 18 traffic volumes within the Study Area currently range between 2,300 and 7,800 vehicles per day according to the Iowa DOT 2019 Annual Average Daily Traffic (AADT) maps. Historical Iowa DOT average daily traffic maps suggest that these daily volumes have been nearly constant since 2000 (see Figure 2).

Figure 1. US 18 PEL Study Area

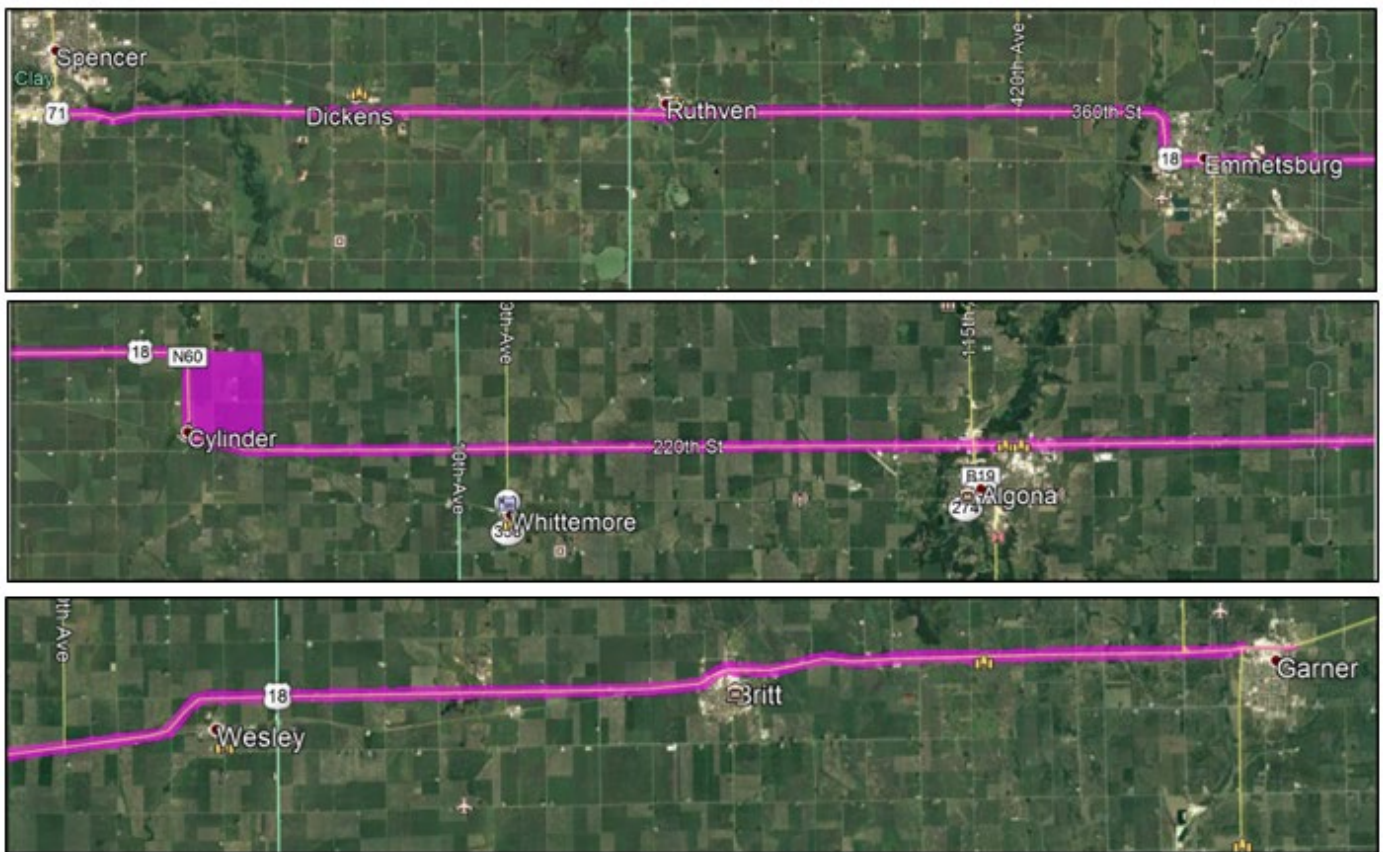
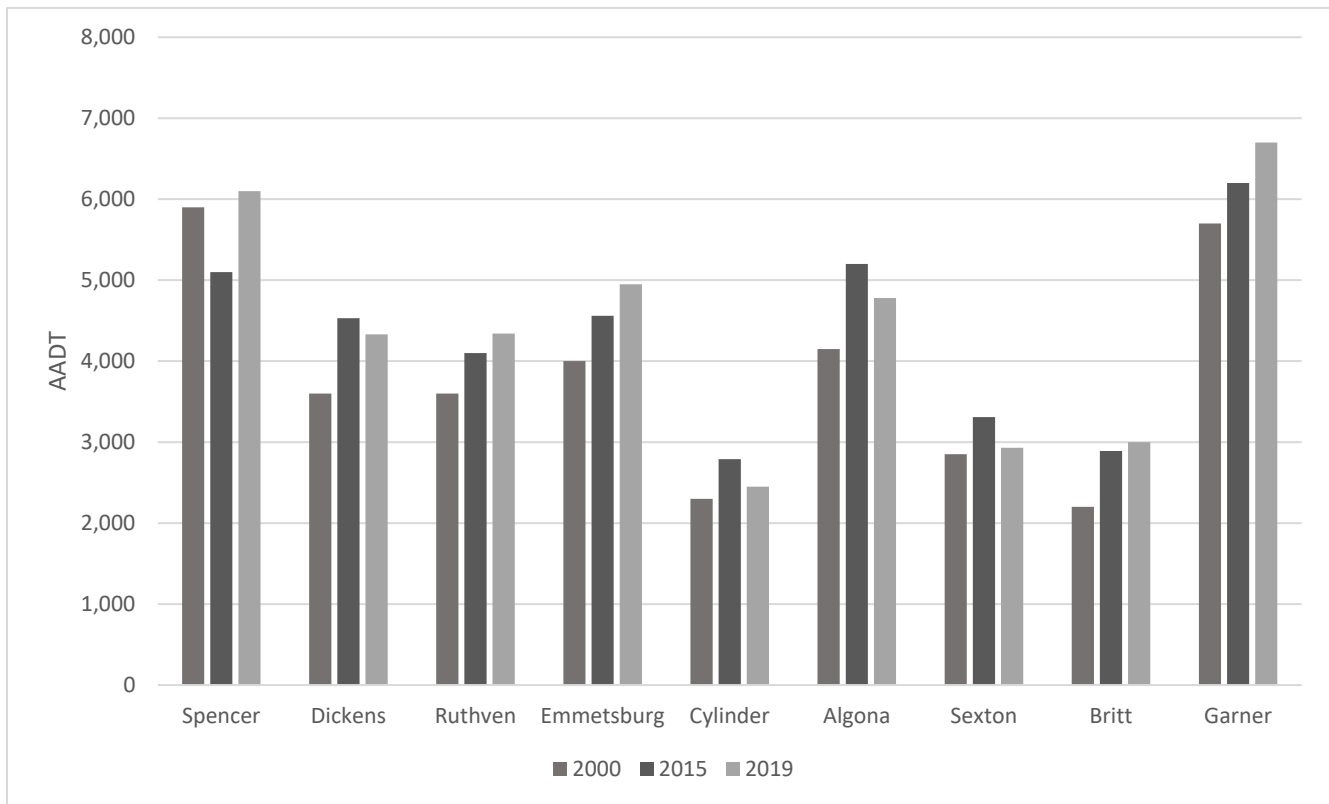


Figure 2. US 18 PEL Study Corridor Historic Daily Traffic Volumes



During the period of 2016-2020, there were 579 crashes (155 of which involved at least one injury or possible injury), that have occurred along US 18 in the Study corridor. There have also been eight fatal crashes. The most common collision type reported in the crash data was collision with property damage only, accounting for 72 percent of the total crashes. A detailed summary of the existing crash history in the Study Area can be found in the US 18 PEL Study Existing Crash History Report (Iowa DOT, July 2021).

The existing highway within the Study Area is primarily a rural two-lane highway. There are short stretches of multi-lane sections in Spencer (0.10 miles of 3-lane undivided), Emmetsburg (1.25 miles of 4-lane and 1 mile of 3-lane undivided), Algona (2.6 miles of 4-lane undivided), and Britt (0.25 mile of 4-lane divided).

The Study Area passes through generally flat terrain. There are several wildlife management areas, wildlife refuges, and parks throughout the 81-mile-long Study Area. Other potential environmental constraints within the Study Area include wetlands, floodplain, threatened and endangered species habitats, cultural resources, public and private recreational facilities, churches, and cemeteries. These resources will be considered throughout this PEL Study with a preliminary high-level examination. A more comprehensive study of possible resource impacts will be included in future planning and engineering studies. There are three different

railroads within the US 18 Study Area. Union Pacific (UP) Railroad has tracks in the cities of Emmetsburg and Algona. Canadian Pacific (CP) Railroad tracks run along or near US 18 throughout much of the Study Area. Part of the North Central Iowa Rail Corridor is found in the City of Garner. Proximity to these railroads and transportation impacts will be evaluated as part of this Study to help provide recommendations.

There are several water crossings in the Study Area. These include the Little Sioux River, Lost Island Outlet, Deer Creek, Lotts Creek, Four Mile Creek, East Fork Des Moines River, Prairie Creek, Boone River, and West Branch Iowa River. These water features as well as their associated floodplains will be considered during the PEL Study.

The State Freight Plan identifies this corridor as part of Iowa’s multimodal freight network. Also, the Iowa in Motion 2045 State Transportation Plan (Iowa DOT 2017) lists the US 18 corridor as a targeted corridor for mobility and safety improvements.

The corridor is also in the bottom 25 percent of primary highway corridors (the 25 percent of the primary system with the poorest existing infrastructure condition) based on Iowa Infrastructure Condition Evaluation (ICE) composite ratings. ICE is a tool developed to evaluate the state’s Primary Highway System using a composite rating calculated with different criteria that include pavement condition and roughness, structural ratings, congestion, and the mix of passenger cars and large trucks that use the corridor daily.

The State Transportation Plan identifies several upcoming improvements to this section of US 18, several of them are maintenance and rehabilitation projects in the current Iowa DOT 5-year improvements program 2022 -2026 (see Table 1).

Table 1. Current Iowa DOT Programmed Improvement Projects in the US 18 PEL Study Corridor (Moving in the Study Area from West to East)

County	Location	Project Type	Program Year
Clay	Lost Island Outlet 1.0 mi E of Co Rd M54	Bridge Deck Overlay	2022
Clay	Lost Island Outlet 1.6 mi E of Co Rd M54	Bridge Deck Overlay	2022
Palo Alto	W Fork Des Moines River 2.5 mi E of W Jct IA 4	Bridge Deck Overlay	2022
Palo Alto	Cylinder Creek at W Jct Co Rd N60	Bridge Replacement-CCS	2022
Palo Alto	Prairie Creek 2.8 mi W of W Jct IA 15	Bridge	2024
Kossuth/ Hancock	1.65 mi E of Co. Rd P64 to W Jct. Co. RD R26	Pavement Widening	2022

County	Location	Project Type	Program Year
Hancock	W Branch Iowa River 0.8 mi E of Co Rd R35	Bridge Rehabilitation	2024
Hancock	Drainage Ditch 2.8 mi E of Co Rd R35	Bridge Rehabilitation	2024
Hancock	E. Branch Iowa River to Country Club Dr. in Garner	Grade and Pave	2025

Iowa has designated 18 Regional Planning Affiliations (RPAs) that provide for regional transportation planning outside of urbanized areas in the state. The US 18 PEL Study corridor is covered by two RPAs: The North Iowa Area Council of Governments (RPA 2), which includes Kossuth and Hancock Counties, and the Northwest Iowa Planning and Development Commission (RPA 3), which includes Clay and Palo Alto Counties.

Historical census data provides existing and forecast population, employment, and other social attributes at the county level. Table 2 summarizes the population trends since 1980 in Clay, Palo Alto, Kossuth, and Hancock Counties. According to the 2020 Census, the population in Clay County was 16,384 people, dropping roughly 16 percent since 1980. Similarly, the 2020 Census data suggests that the population in Palo Alto County was approximately 8,996 people, a decline of around 29 percent since 1980. A similar trend was seen in Kossuth County whose population in 2020 was 14,828 (a decline of about 32 percent since 1980). Likewise, the population of Hancock county in 2020 was 10,795 people, which was a decline of about 22 percent since 1980. If we were to follow the population trends from the Census Bureau, we should expect a continued decline for each county moving forward into the future.

Table 2. Decennial US Census Bureau Population Statistics for Clay, Palo Alto, Kossuth, and Hancock Counties

Year	Population			
	Clay	Palo Alto	Kossuth	Hancock
1980	19,576	12,721	21,891	13,833
1990	17,585	10,669	18,591	12,683
2000	17,372	10,147	17,163	12,100
2010	16,667	9,421	15,543	11,341
2020	16,384	8,996	14,828	10,795
40-Year Change	-3,192	-3,725	-7,063	-3,038

The US 18 PEL Study Area is mainly rural and agricultural in nature with some residential, commercial, and industrial uses in the small communities along US 18. In the rural areas, existing industry is generally agriculture related with ethanol plants, co-ops, and grain-storage and handling facilities along the corridor. These agricultural industries generate heavy truck

traffic on the local road network and US 18. In the small communities, a variety of businesses are present, including trucking companies, restaurants, gas stations, and other retail and service-related businesses.

Residents in these counties often commute to the larger urban employment centers daily. While specific magnitudes and commuter routes are not known at this time, the commuter traffic is significant enough to deserve consideration when evaluating the transportation systems infrastructure condition and ability to meet future needs.

After review of existing land use in the Study Area and surrounding region as well as gathering of input from local stakeholders, it is clear that the US 18 transportation corridor is important in Clay, Palo Alto, Kossuth, and Hancock Counties, particularly as it relates to the agricultural business and transport of commodities between the field and market. The corridor supports the agricultural trucking needs, commodity shipment, and transfer along the CP railroad corridor, and conveyance of commuter traffic out of the rural outlying areas to the larger urban employment areas.

3 STUDY GOAL

The PEL model allows for the study of the corridor as a whole and the ability to make corridor-wide decisions that will shape the future investment and improvement projects within the corridor. The US 18 PEL Study will consist of a series of technical reports, including this memorandum, documenting various aspects of the Study. These technical reports will include the following:

- Goals and Guiding Principles
- Existing Crash History
- Existing Conditions
- Vision Document

The Study will culminate with a US 18 Vision Document that provides a roadmap for proposed improvements within the Study corridor. The goals and outcomes of the US 18 PEL Study are expected to closely align with the improvement strategies and focus areas defined in the Iowa in Motion 2045 State Transportation Plan, including the following:

- Right-size the highway system and apply cost-effective solutions to locations with existing and anticipated issues.
- Target investments to address mobility and safety needs on critical two-lane routes.
- Reduce the number of overall major crashes and the number of secondary crashes.
- Maximize the use of existing roadway capacity.

At the conclusion of this US 18 PEL Study, the US 18 Vision Document will address the following goal:

- Provide Super Two Highway recommendations for roadway improvements within the

Study Area. These roadway improvements will increase the operational performance, safety, and mobility within this corridor. This Study will determine recommended roadway improvements throughout the corridor to be incorporated in future projects.

The US 18 PEL Study will identify, analyze, and recommend future two-lane highway roadway improvements. Roadway improvements will consist of evaluating partially paved or fully paved intersection conditions for turn lane improvements and identifying proposed locations for passing lanes. Spot two lane highway roadway improvements will also be recommended to help improve the corridor.

The US 18 PEL Study will include a review of the Study Area infrastructure conditions, and crash history; these reviews will be documented in a series of technical reports. Existing conditions analysis will use available as-built/design roadway and bridge inventory tools, Iowa DOT crash data, traffic counts and daily traffic maps, field studies, and online tools as appropriate. The Iowa DOT statewide Travel Analysis Model (iTRAM) employs consistent data inputs grounded in sound methodologies and aligned with current industry best practices and historical traffic count trends specific to the Study corridor. iTRAM will be used to estimate future traffic volumes on US 18. Forecast traffic information will assume a future horizon (design) year of 2042.

The existing conditions information and forecasts of future traffic will be used to identify locations within the Study Area, if any, that may not meet the travel needs now or in the future and that support the development of improvements.

Improvement recommendations will include evaluation of adequate existing turn lanes, determination of potential turn lanes based off traffic volumes, and placement of the proposed passing lanes. Spot roadway improvements due to safety or operational concerns, and a shift off existing alignment will be evaluated at the town of Cylinder.

A potential cross section being assessed for this corridor is the Super-2 cross-section. A Super-2 Highway is a two-lane rural highway cross-section with occasional passing lanes (Figure 3) that promotes substantial improvements in traffic flow and safety performance by include passing lanes and turn lanes at intersections. The largest benefit of the Super-2 concept is the addition of passing lanes at regular intervals, which increase the opportunities for faster-moving traffic to safely pass slower-moving vehicles without the need to cross the roadway centerline and enter the opposing lane of traffic. Figure 4 provides a graphical plan view representation of the Super-2 Highway concept.

Figure 3. Typical Cross-Section Super-2 Highway

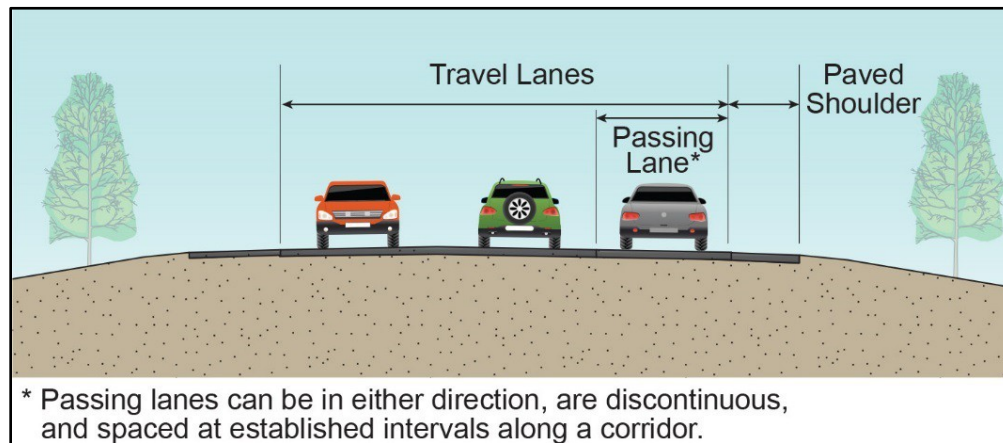
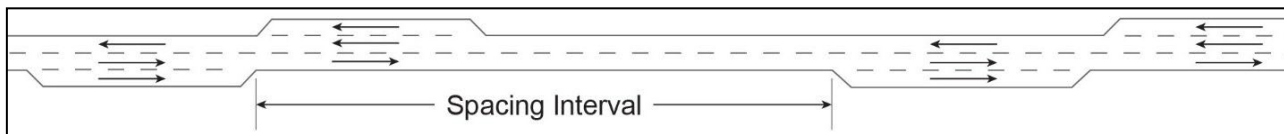


Figure 4. Schematic of a Section of Super-2 Highway



Recommendations for passing lane improvements will be developed around a set of flexible design criteria that can be adjusted to meet the context of the corridor or any individual portion of the corridor. Placement of proposed passing lanes will use the Iowa DOT’s Office of Design Manual (6C-2) Super Two Highways guidance.

Existing features will be compared to the preferred and acceptable DOT design criteria as well as the acceptable values for 3R roadway features. Figures 5a and 5b show the Iowa DOT Design Manual Acceptable and Preferred Criteria as well as the Acceptable Values for 3R Roadway Features respectively. The Acceptable Values for the 3R Roadway Features also reference the AASHTO Geometric Design of Highways and Streets and AASHTO Roadside Design Guide these evaluations may result in spot improvement recommendations.

Practical Design Principles in some cases will be utilized to allow for nonconforming conditions per the mentioned criteria. Practical Design Principles use current safety conditions, roadway geometry, projected project cost, as well as current and future traffic forecast to help guide the criteria used in specific locations.

Figure 5a. Iowa DOT Design Manual Acceptable and Preferred Criteria

Design Manual Section 1C-1 Last Updated: 04-29-19		Rural Two-Lane Highways (Rural Arterials)	
Design Element	Preferred	Acceptable	
Design speed (mph)	60	50	
Maximum superelevation rate (Refer to Section 2A-2)	6%	8%	
Design lane width (ft)	12	12	
Full depth paved width (ft)	12	12	
Right turn lane (ft)	12	10	
Climbing Lane (ft)	12	12	
Left turn lane (ft)	12	10	
Pavement cross-slope (on tangent sections)	Through lanes	2%	1.5% minimum, 2% maximum
	Auxiliary and turn lanes	3%	3% maximum
	Crown break at centerline	4%	4% maximum
Shoulder cross-slope (on tangent sections)	4%	Shoulder cross-slope cannot be less than the adjacent lane, 6% max for paved or granular shoulders, 8% max for earth shoulders	
Curb type (Refer to Section 3C-2)	Design speed = 50 or 55 mph	6-inch sloped	6-inch standard
Fore slope (For fill areas greater than 40 ft, contact the Soils Design Section for assistance)	Design speed ≥ 60 mph	4-inch sloped	6-inch sloped
	Adjacent to shoulder	10:1 for 4' then 6:1	3:1
	Beyond standard ditch depth and design clear zone	3.5:1	3:1
	Curbed roadways	2%	not steeper than 3:1
Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches.)		3:1	2.5:1
Transverse Slopes	w/ drainage structures	8:1	6:1
	w/o drainage structures	10:1	6:1
Ditches (Refer to Section 3G-1)	Outside ditch (depth x width) (ft)	5 x 10	--
Bridge width—new*	Bridge length ≤ 200 ft	design lane widths + effective shoulder widths	design lane widths + effective shoulder widths
	Bridge length > 200 ft	design lane widths + no less than 2 ft left and right	design lane widths + 2 ft offset left and right
Vertical clearance (ft) (above lanes, shoulders and 25 feet left and right of the center of railroad tracks)	Over primary	16.5	16
	Over non-primary	10:1 at interchange locations, 12:1 at all other locations	14
	Over railroad	23.3	23.3
Structural Capacity	Sign trusses and pedestrian bridges	17.5	17
		Contact Office of Bridges and Structures	Contact Office of Bridges and Structures
Level of Service	B	B	B

*FHWA notification via email is required if acceptable criteria is not met on the NHS system (No formal design exception is required)

Figure 5b. Acceptable Values for 3R Roadway

Acceptable Values for 3R Roadway Features (requires approval according to Section 1C-8)					
Design Element	Freeway	Non-Freeway			
Regulatory Speed (m.p.h.)	65/55	55	45	35	25
Minimum Vertical Curve (m.p.h.) (a)	65/55	35	25	15	5
Maximum Horizontal Curve (degrees) (b)	3	6	8	14	28
Maximum Gradient	3%	6%	7%	10%	13%
Lane Width (feet)	12	11 (c)	11	11	11
Parking Lane Width (feet)	--	--	8	8	8
Shoulder Width (feet)	10/6	6	4	4	2
Foreslopes	3 : 1	3 : 1	3 : 1	--	--
Transverse Slopes	6 : 1 (d)	6 : 1 (d)	6 : 1 (d)	--	--
Horizontal Clearance (feet)	(e)	(e)	(e)	3 (f)	3 (f)
Bridge Width (g)	Approach Lanes + Shoulder Width			Approach Lanes + Offset	
Vertical Clearance - Over NHS (feet) (h)	16.5	16.5	16.5	16.5	16.5
Vertical Clearance - Over Local (feet) (h)	14.5	14.5	14.5	14.5	14.5

- | | | | | | | | | | | | |
|--|---|---------------------|--------------------|---------|---|-------------|----|---------------|----|------------|----|
| <p>(a) Any length of stopping sight distance within the range of values established in the Current AASHTO "Greenbook" is acceptable for a specified speed.</p> <p>(b) Based on $e_{\text{maximum}} = 0.04$ (urban) and $e_{\text{maximum}} = 0.08$ (rural). Nonsuperelevated curves should be according to Table 111-12 in AASHTO "Greenbook" for high speed and Figure 111-17 for low speed.</p> <p>(c) Use 12' lanes if:</p> <ol style="list-style-type: none"> (1) Route is on National Truck Network, or (2) Design year ADT is greater than 2,000 and truck volume is greater than 10%, or (3) Design year ADT is greater than 750 and truck volume is greater than 10% and regulatory speed is greater than 50 m.p.h. <p>(d) If transverse slopes are modified with project, use 8:1 with drainage structures and 10:1 without drainage structures.</p> | <p>(e) Current AASHTO Roadside Design Guide.</p> <p>(f) Fixed objects (utility poles, fire hydrants, traffic signals, etc.) which are installed or relocated due to the project should be placed at the right-of-way line or at 10' from the traveled lane.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 60%;">(g) Design Year ADT</td> <td style="width: 40%;">Offset (each side)</td> </tr> <tr> <td style="text-align: center;">0 - 750</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">751 - 2,000</td> <td style="text-align: center;">2'</td> </tr> <tr> <td style="text-align: center;">2,001 - 4,000</td> <td style="text-align: center;">4'</td> </tr> <tr> <td style="text-align: center;">over 4,000</td> <td style="text-align: center;">6'</td> </tr> </table> <p>Design loading - legal load
Bridge rail and approach guardrail to be upgraded.</p> <p>(h) Railroad clearances are higher, generally 23.5' over a railroad track. Need to verify each Railroad's requirement.</p> | (g) Design Year ADT | Offset (each side) | 0 - 750 | 0 | 751 - 2,000 | 2' | 2,001 - 4,000 | 4' | over 4,000 | 6' |
| (g) Design Year ADT | Offset (each side) | | | | | | | | | | |
| 0 - 750 | 0 | | | | | | | | | | |
| 751 - 2,000 | 2' | | | | | | | | | | |
| 2,001 - 4,000 | 4' | | | | | | | | | | |
| over 4,000 | 6' | | | | | | | | | | |

4 GUIDING PRINCIPLES

To achieve the goals stated above, throughout the US 18 PEL Study, the Iowa DOT Project Team will be led by the guiding principles described in the following subsections.

4.1 GOOD STEWARDSHIP

Iowa DOT is responsible for maintaining a safe and efficient transportation system. With this responsibility comes the expectation that tax-payer dollars are managed and expended in an accountable and wise manner. With the limited funding available to the Iowa DOT, a balance must be met between maintaining the existing system in a safe and operable condition and funding projects that improve the mobility in the US 18 corridor.

Iowa DOT is also responsible for being a good steward of the environment and private property across the state. Roadway improvements will have some level of impact to surrounding lands, residences, and business. During project development and planning, a balance must be struck between impacts and the desired geometry and location of a roadway corridor. Iowa DOT is committed to evaluating the needs of the US 18 corridor, comparing the needs against other

transportation system needs across the state, and developing potential improvements projects with notable traffic flow and safety benefits that are worthy of investment.

4.2 TRANSPARENCY

Throughout the Study, there will be opportunities for stakeholders and the public to comment and provide input and feedback. As part of the public outreach, there will be public information meetings scheduled during the study. The meetings for project will be held online. During these meetings, Iowa DOT will present study findings. Materials such as technical memorandum will be available online. Iowa DOT is committed to listening and fully considering all ideas and feedback that the public provides. All the public involvement meeting materials will be posted on the Iowa DOT Public Involvement website and available for viewing, as well as submitting comments/feedback 24 hours a day, 7 days a week.

At the Study conclusion, Iowa DOT will make recommendations for improvements of the corridor within the Study Area. These recommendations will be grounded in the findings of the Study, the feedback provided by public and stakeholders, and will be in line with the stewardship responsibilities discussed above. Regardless of the decision(s) made, the Iowa DOT will remain committed to communicating the recommendations(s) and any future studies and next steps with the public and all stakeholders.

4.3 DESIGN PRINCIPLES

To guide the evaluation of crash data and existing conditions and for consideration of potential improvements, a baseline of core design parameters that includes existing and future traffic forecasts, Iowa DOT Design Manual, 3R Standards, and AASHTO Greenbook at a minimum is necessary for this study. Other design principles and guidance will be used as necessary to help identify proposed roadway improvements.

Traffic forecast volumes are an evaluation tool used to evaluate the need for turn lanes. The program year is used to evaluate the need for a minor or major right turn lane. The horizon (design) year is used to measure the need for a left turn lane. These core design parameters will be used to help right-size the US 18 corridor. Program Year of 2022 and Design Year of 2042 will be used to evaluate turn lanes and findings in the Vision Document.

Iowa DOT's Office of Design Manual (6C-2) Super Two Highways guidance will be used to evaluate the placement of passing lanes throughout the Study Area. In conjunction with 6C-2, the Iowa DOT design manual acceptable and preferred design standards, as well as the 3R design criteria will help aid in identifying spot improvement recommendations. If 3R design criteria are not clearly defined, then the latest AASHTO Green Book "A Policy on Geometric Design of Highways and Streets" will be used. Practical Design Principles in some cases will be utilized in certain conditions.

5 SUMMARY

The previous sections summarized the project goal and principles that will guide the Iowa DOT Project Team throughout the US 18 PEL Study process. The outlined approaches and methodologies are subject to change as the project development process evolves; however, the principles and goal stated herein will remain true throughout the Study.

Public involvement and feedback are critical factors for the successful completion of this Study. The feedback provided to Iowa DOT can help to guide the Study process and will prove to be helpful to the Iowa DOT when considering all factors and making decisions for the future of the corridor. The Iowa DOT will communicate project findings, recommendations, and next steps throughout and at the completion of this Study. Final project decisions will be grounded in the responsibility and commitment of Iowa DOT to maintain a transportation system that meets the needs of the traveling public today and in the future, while also judiciously expending available funds in a manner that meets the collective needs of stakeholders across the state.

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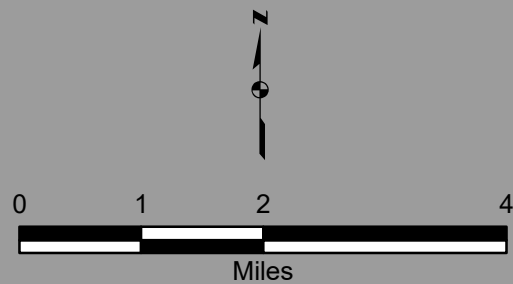
2020. <https://census.gov/prod/www/decennial.html>

Appendix A

Figure 1 – US 18 STUDY AREA MAPS



Created July 2021



Legend

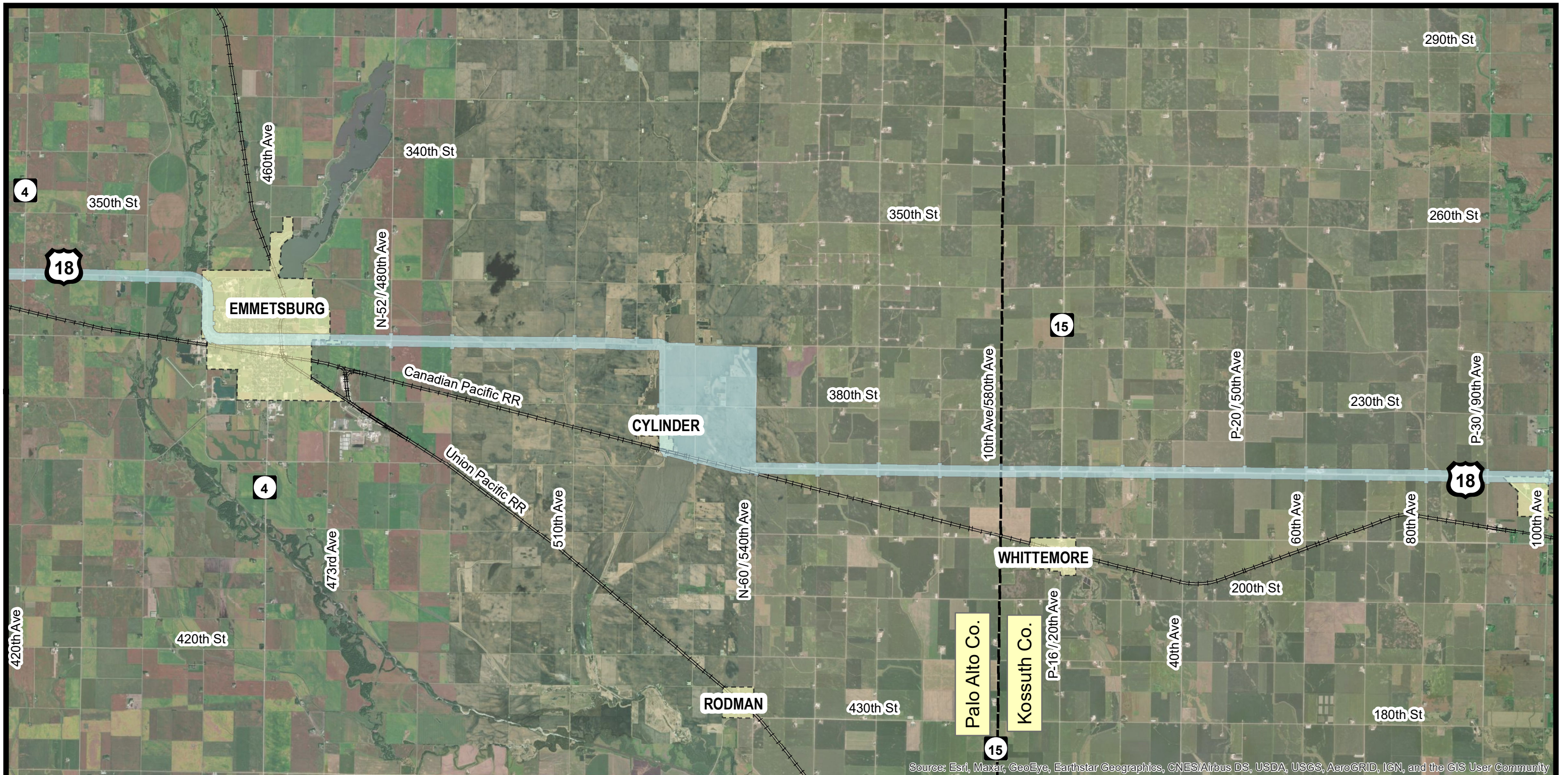
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- City Limit Boundaries
- County Border
- Active Railroad

FIGURE 1 - US 18 STUDY AREA

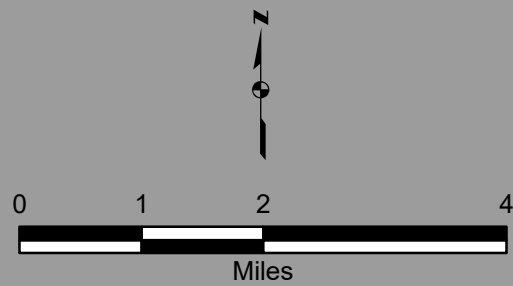
NHSX-018-2(126)--3H-21

Project Description:

**US 18 PEL Study - Spencer to Garner
Clay\Palo Alto\Kossuth\Hancock Counties,
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Legend

- Study Area
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FIGURE 1 - US 18 STUDY AREA

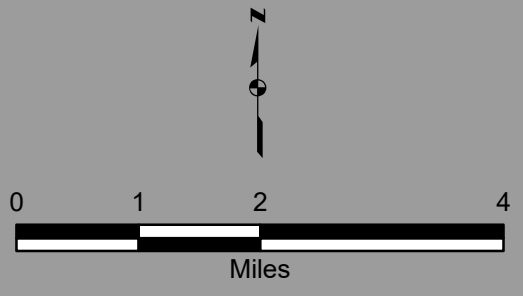
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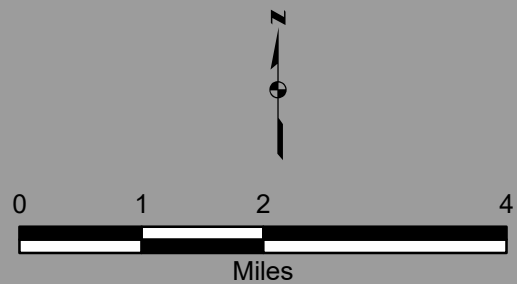
NHSX-018-2(126)--3H-21
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 Iowa



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Created July 2021



Legend

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