

South Dakota Department of Transportation

Interchange Modification Justification Report

Interstate 29 Exit 98
(SD115 / Dell Rapids - Colton)



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EXECUTIVE SUMMARY

The South Dakota Department of Transportation (SDDOT) has initiated an assessment of the existing interchange on Interstate 29 (I-29) at Exit 98 (Dell Rapids / SD115) near Dell Rapids, South Dakota. The interchange's crossroad is known locally by several different names, including SD Highway 115 from the interchange going east, Minnehaha County Highway 104 west of the interchange, and 246th Street. For the purposes of this document, it will be referred to as 246th Street.

This interchange modification justification report (IMJR) is the culmination of several steps that have been completed to document the benefits and impacts associated with a range of modification alternatives for the existing interchange. This document was completed following the outline provided in the Federal Highway Administration's (FHWA) August 2010 *Interstate System Access Informational Guide* and meets the requirements of the *Access to the Interstate System* policy printed in the Federal Register on August 27, 2009.

FHWA REQUIREMENTS

FHWA policy has developed requirements that need to be addressed when evaluating changes to access points on interstate facilities (Federal Register, Volume 74, Number 165, August 27, 2009). The requirements are part of a policy that was put in place to maintain high levels of safety and mobility on the Interstate System. The policy consists of eight requirements that new access locations should meet. As this modification request is to maintain the existing Exit 98 interchange's diamond interchange configuration, the following is the summarized response to each requirement. The full response to each requirement can be found in Chapter 9: Recommendations.

1. *The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).*

This modification request is to reconfigure an existing interchange. No additional access to the Interstate System is being requested. The reconfiguration of the existing interchange will have a negligible effect on the Interstate's traffic operations when compared with the existing interchange's configuration.

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2. The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).

This modification request is to reconfigure the geometrics of an existing interchange. No additional access to the Interstate System is being requested. Existing characteristics and development in the vicinity of the existing interchange limited the cost feasible options for interchange reconfiguration.

There are no areas within the State of South Dakota that will consistently experience congestion levels extreme enough to make ramp metering or HOV facilities economically feasible in the foreseeable future.

3. An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)).

Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

A limited analysis of the impact of the proposed interchange modification at Exit 98 on the Interstate's operations was completed as agreed upon by FHWA on June 24, 2013. This analysis indicates no operational issues at the interchange. As the adjacent interchanges are located four miles south and six miles north, operational analyses of those interchanges were not conducted as part of this IMJR. Results of any operational analyses conducted for the adjacent interchanges as part of the Decennial Interstate Corridor Study are located in Appendix D.

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4. *The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).*

The access improvement will maintain a connection to a public road (246th Street) and will replace the current full access interchange with a reconfigured full access interchange. The reconfigured interchange will continue to provide for all traffic movements. The improvement will meet or exceed current standards for Federal-aid projects on the Interstate system.

5. *The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.*

The proposed interchange improvement is consistent with local land use plans and is in the 2015-2018 STIP for 2017.

6. *In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).*

Previous studies conducted in the past 20 years (the *South Dakota Interstate Corridor Study* completed in February 2001 and the *2010 South Dakota Decennial Interstate Corridor Study* completed in November 2010) indicated no need for any future interchange additions along the segments of Interstate 29 between Exit 98 and the adjacent exits.

7. *When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development*

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with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).

The proposed interchange modification is the result of project scoping for the SD115 corridor between I-29 and Dell Rapids.

The reconfiguration of the interchange is being proposed to address structural issues with the existing crossroad bridge over I-29 and will correct geometric deficiencies associated with the existing interchange.

8. The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).

Considering that minimal additional right-of-way is anticipated to be acquired, it is anticipated that the environmental impacts specific to this interchange modification compared to the Do-Nothing Scenario will be negligible. The proposed revised access is included in the 2015-2018 STIP and programmed for 2017. The status of the environmental process is tracking consistent as other projects classified for categorical exclusion programmed for the same year.

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Chapter 1: INTRODUCTION

In 2004, the South Dakota Department of Transportation (SDDOT) pavement management system started targeting segments of South Dakota Highway 115 (246th Street) pavement between I-29 and Dell Rapids for either pavement replacement or total reconstruction. As the need for those pavement segments to be reconstructed became more eminent, the SDDOT started to look closely at the remaining life of the highway bridge over I-29 and determined that replacement of the structure during the pavement project would be the most prudent improvement in relation to construction cost and impacts to the traveling public. The replacement of the structure will require a change in the gradeline for the SD115 crossroad, resulting in changes to the gradeline for the Exit 98 ramps.

This interchange modification justification report (IMJR) is the culmination of several steps that have been completed to document the benefits and impacts associated with a range of modification alternatives for the existing interchange. This document was completed following the outline provided in the Federal Highway Administration's (FHWA) August 2010 *Interstate System Access Informational Guide* and meets the requirements of the *Access to the Interstate System* policy printed in the Federal Register on August 27, 2009.

Background

The existing Exit 98 interchange was first identified as having some minor needs by the 2001 *South Dakota Interstate Corridor Study*. These issues were determined to be minor enough not to require immediate attention given the existing and the projected traffic levels at the time.

Although some geometric upgrades to current design standards are needed, there is little need to deviate from the existing diamond interchange configuration.

The Exit 98 crossroad is referred to locally by several names. These include:

- South Dakota Highway 115 (from the interchange going east)
- Minnehaha County Highway 104 (from the interchange going west)
- 246th Street (Rural 911 Addressing),
- 4th Street (local street name with Dell Rapids),

For purposes of this document, the crossroad will be referred to as 246th Street.

Purpose

The pavement and structures in the vicinity of the interchange are approaching the end of their service lives and are in need of replacement. As such, it is appropriate to evaluate the existing interchange configuration, geometrics, and traffic operations

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for the anticipated future traffic levels as mainline and service road improvements are accomplished.

Project Location

Exit 98 is an existing connection between I-29 and 246th Street west of Dell Rapids, South Dakota in rural Minnehaha County South Dakota. Exit 98 is located approximately 14 miles north of the I-29 / I-90 System Interchange. Figure 1 shows the location of Exit 98.

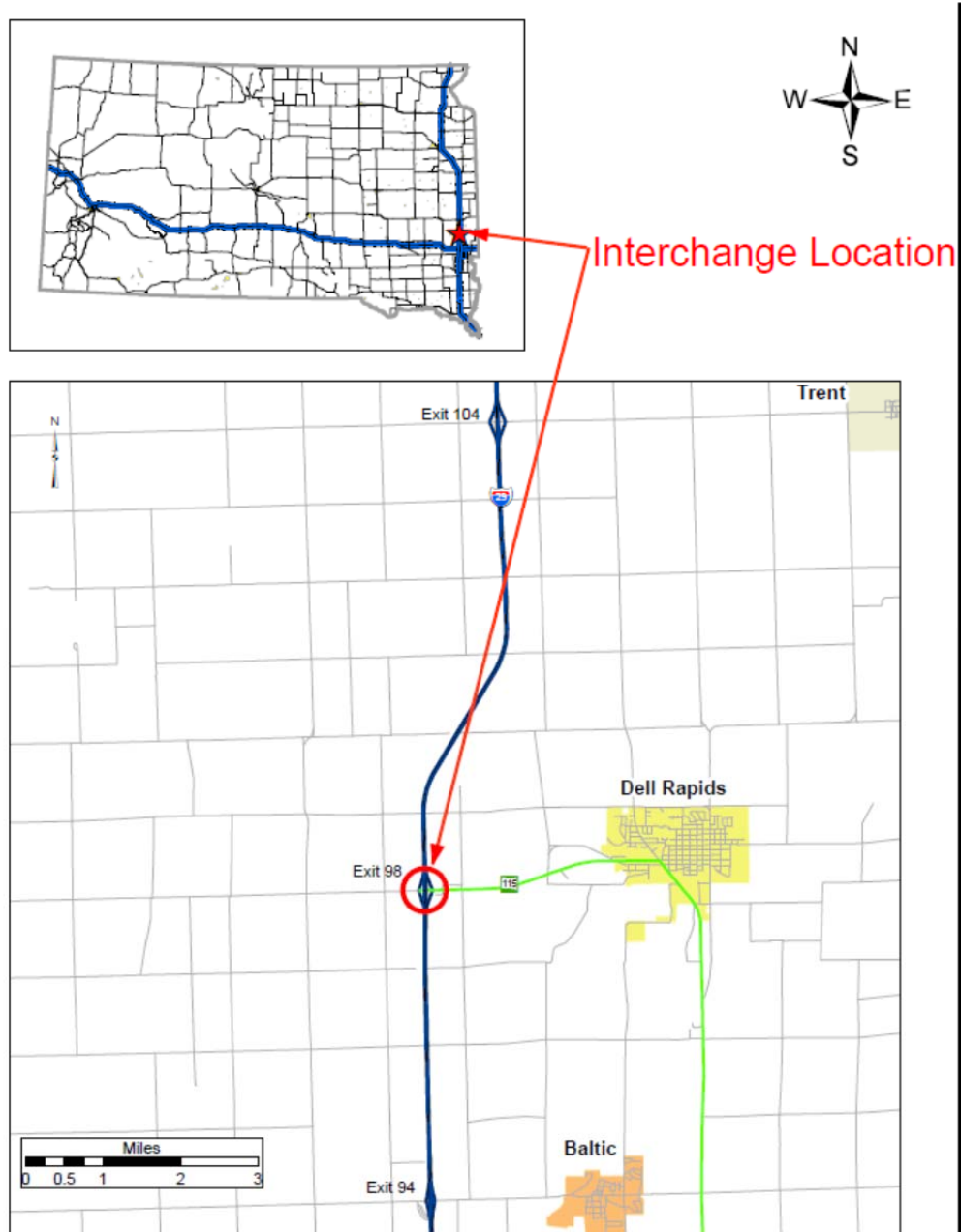


Figure 1: Project Location

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The current configuration for Exit 98 is a diamond interchange as shown in Figure 2. The proposed interchange modification would replace the diamond interchange at Exit 98 with a similar diamond.

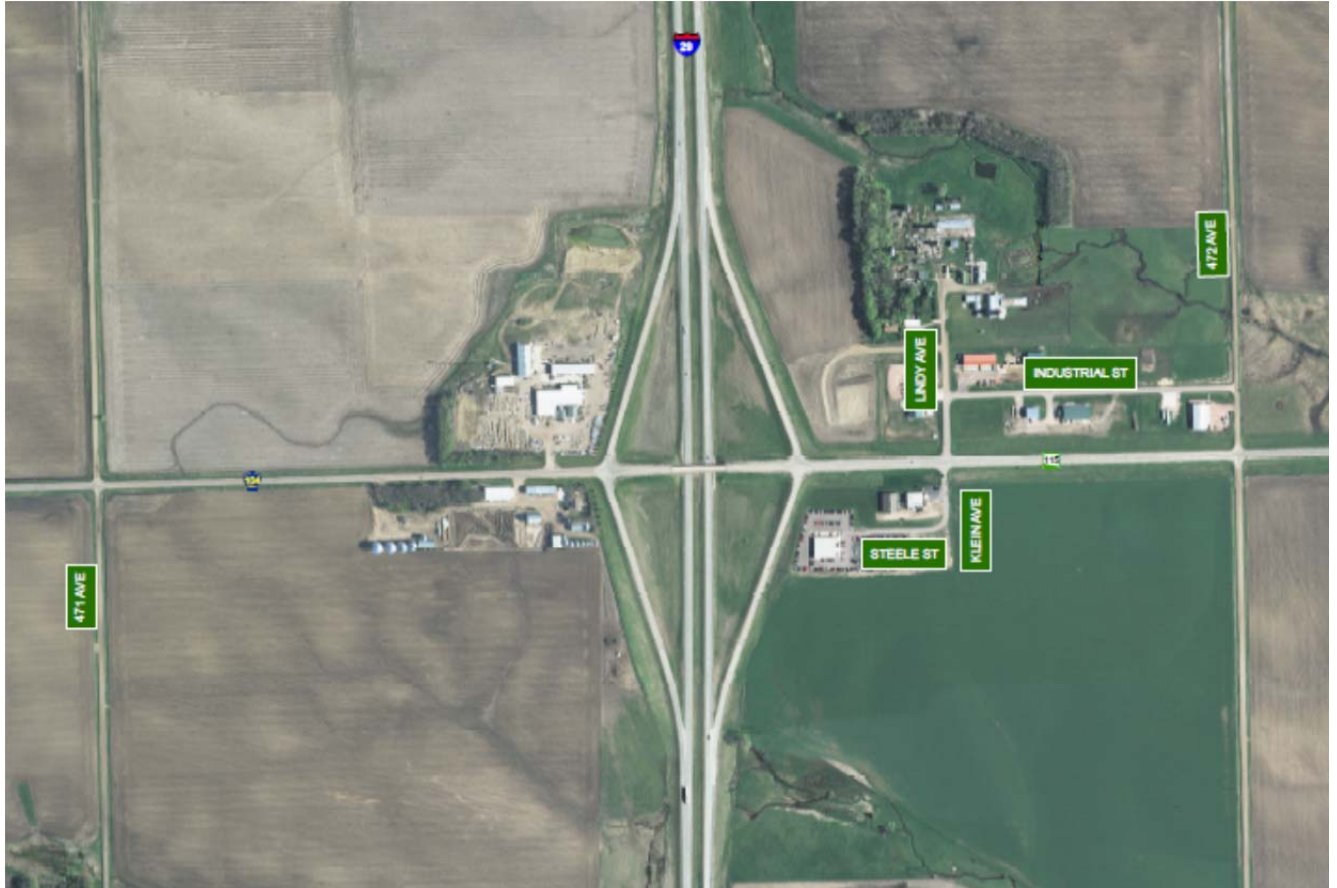


Figure 2: Existing Configuration

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Chapter 2: METHODOLOGY

This interchange modification justification report (IMJR) demonstrates that the action associated with implementing the proposed project does not have any fatal flaws. Demonstrating that no fatal flaws exist does not endorse the action, but rather allows for the conclusion that the identified access alternatives are not flawed from the perspective of traffic operations and safety, as required by the Federal Highway Administration (FHWA). Fatal flaws would include a proposed interchange modification that:

- Does not provide full access to public roads.
- Would negatively impact interstate facility traffic operations and cannot be reasonably mitigated.
- Would negatively impact interstate facility/cross street safety and cannot be reasonably mitigated.
- Conflicts with or is inconsistent with local and regional plans.
- Would create the potential for environmental consequences which could not be mitigated.

During the annual discussion with FHWA held on June 24, 2013, it was determined that only a limited traffic analysis would be needed since the adjacent interchange to the south is 4 mile away and the adjacent interchange to the north is 6 miles away. The 2010 Decennial Corridor Study showed no existing or future operational issues at any of the interchanges. As such, traffic data and analysis was completed only for the existing interchange. Adjacent interchanges, mainline Interstate, and crossroad corridor analyses are lacking.

This IMJR document is organized in accordance with section 3.5.3 of FHWA's *Interstate System Access Information Guide*, August 2010.

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Chapter 3: EXISTING CONDITIONS

Demographics

The existing Exit 98 interchange primarily provides connectivity to the Interstate System for the City of Dell Rapids and rural areas of northern Minnehaha County. The City of Dell Rapids, South Dakota is located approximately 2 ½ miles east of the interchange and has a 2010 Census population of 3,633.

Existing Land Use

Land use surrounding the Exit 98 interchange is classified by Minnehaha County primarily as agricultural with a mixture of light industrial/commercial in three of the four quadrants adjacent to the interchange, as shown in Figure 3.

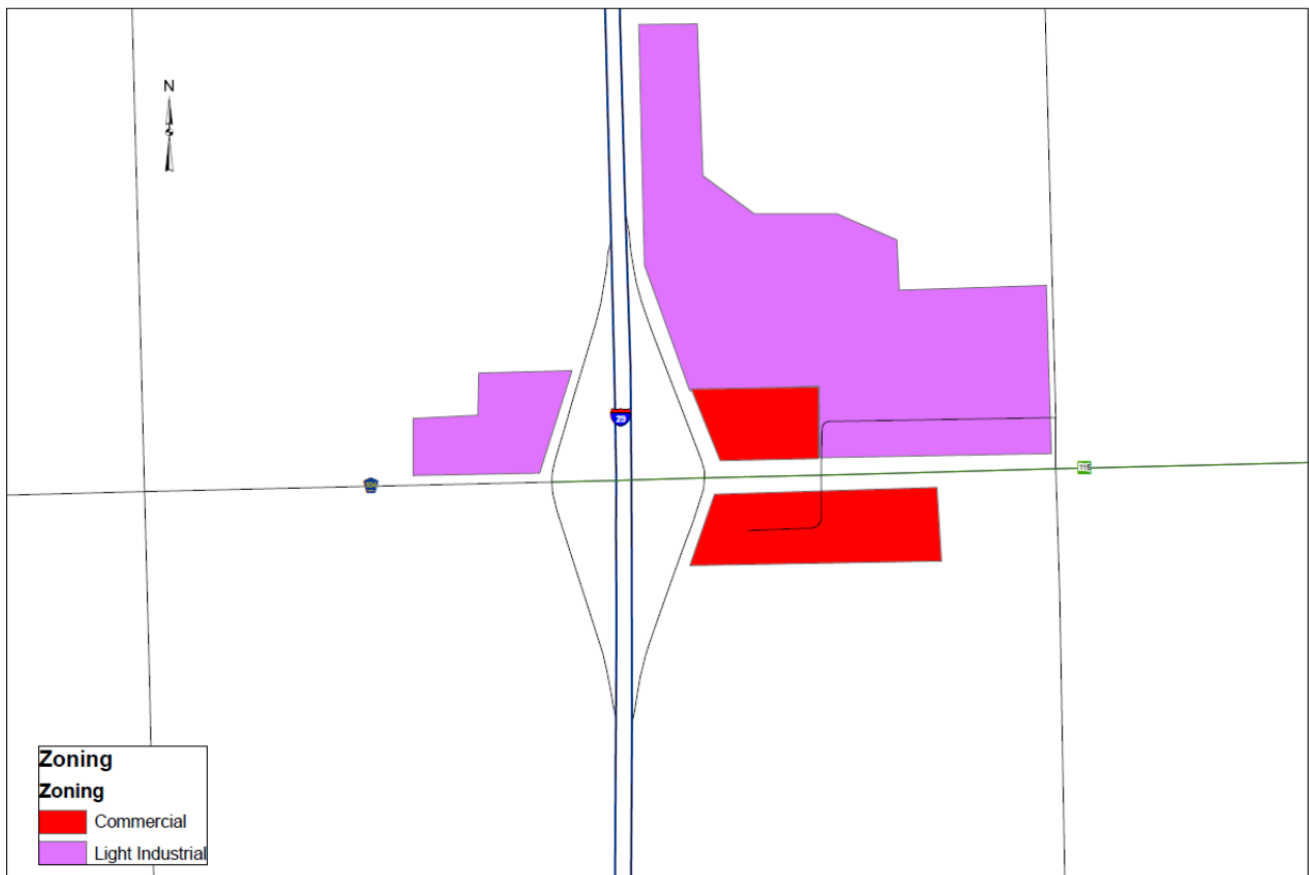


Figure 3 Current Minnehaha County Approved Non-Agricultural Zoning

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Existing Roadway Network

I-29 is the primary north-south route through the study area. The Exit 98 crossroad (246th Street) is the primary route east-west from Exit 98. The existing roadway network is shown along with the federal functional classification map in Figure 4.

I-29 currently has 2 lanes in each direction through the study area. All other roadways in the study area are currently one lane in each direction.

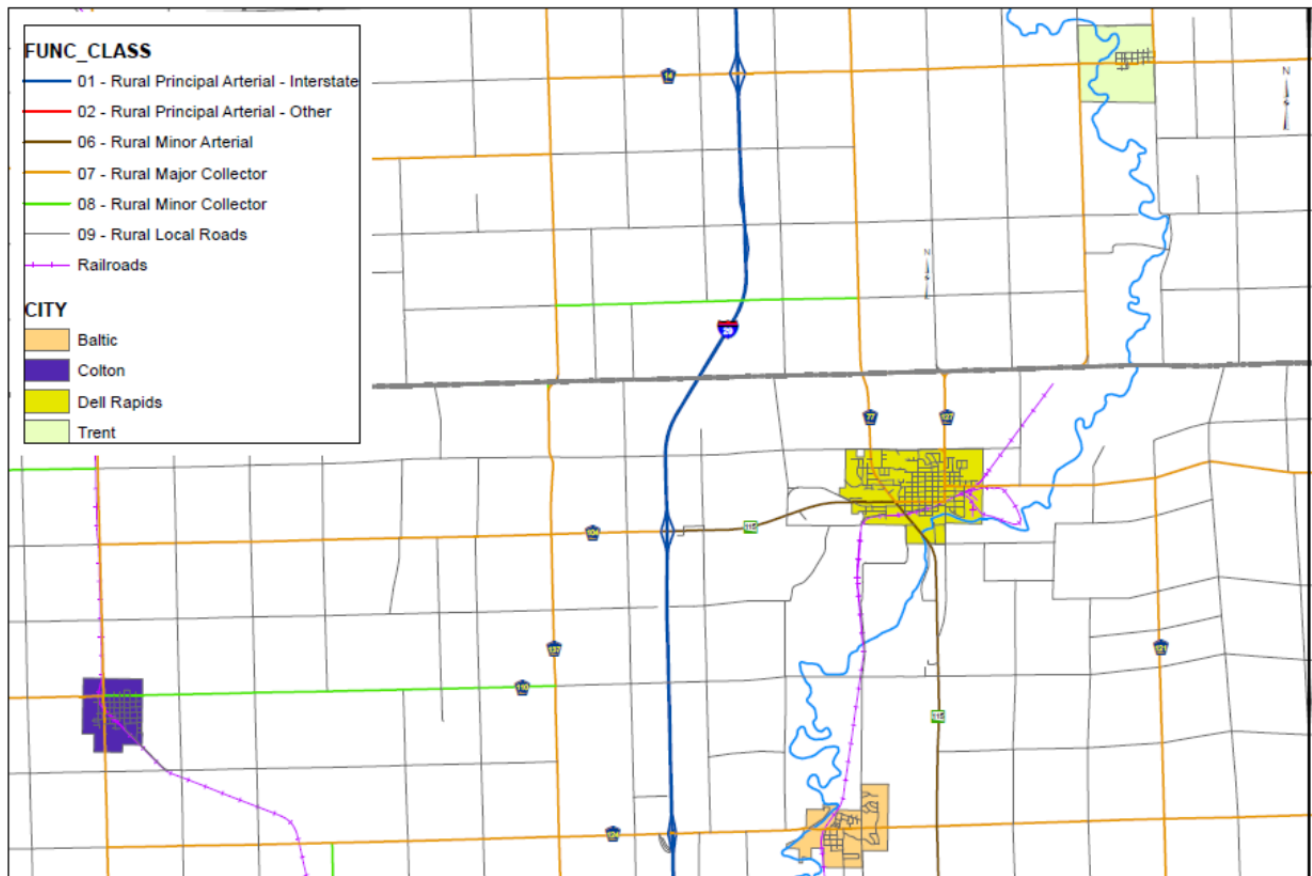


Figure 4

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Alternative Travel Modes

Given the rural nature of the area surrounding Exit 98, there is currently no routine transit stops within the interchange area. Jefferson Bus Lines runs daily service between Sioux Falls, SD and Fargo, ND along I-29 through the interchange, but does not routinely stop at the interchange.

The Weelborg Landing Field is located about 3 miles east of the interchange, although to drive there takes approximately 4 miles. The private airport provides general aviation services to northern Minnehaha County, South Dakota. The nearest airport providing commercial passenger and freight services is the Sioux Falls Regional Airport, located approximately 17 miles south of the interchange.

As Exit 98 is primarily a rural access interchange, bicycle and pedestrian activity in the interchange's influence area is rare, and there are no trails or sidewalks in the area.

Interchanges

I-29 Exit 98: 246th Street

The existing interchange for I-29 and 246th Street is a diamond configuration, with a spacing of approximately 900' between the interchange ramp intersections along 246th Street. Both intersections are presently stop controlled from the off ramp terminal, with nonstop conditions along the crossroad. All ramps were originally designed and striped as single lane ramps. The existing cross section of 246th Street is primarily a two lane section. The aerial photo in Figure 5 shows the configuration of the existing Exit 98 interchange.

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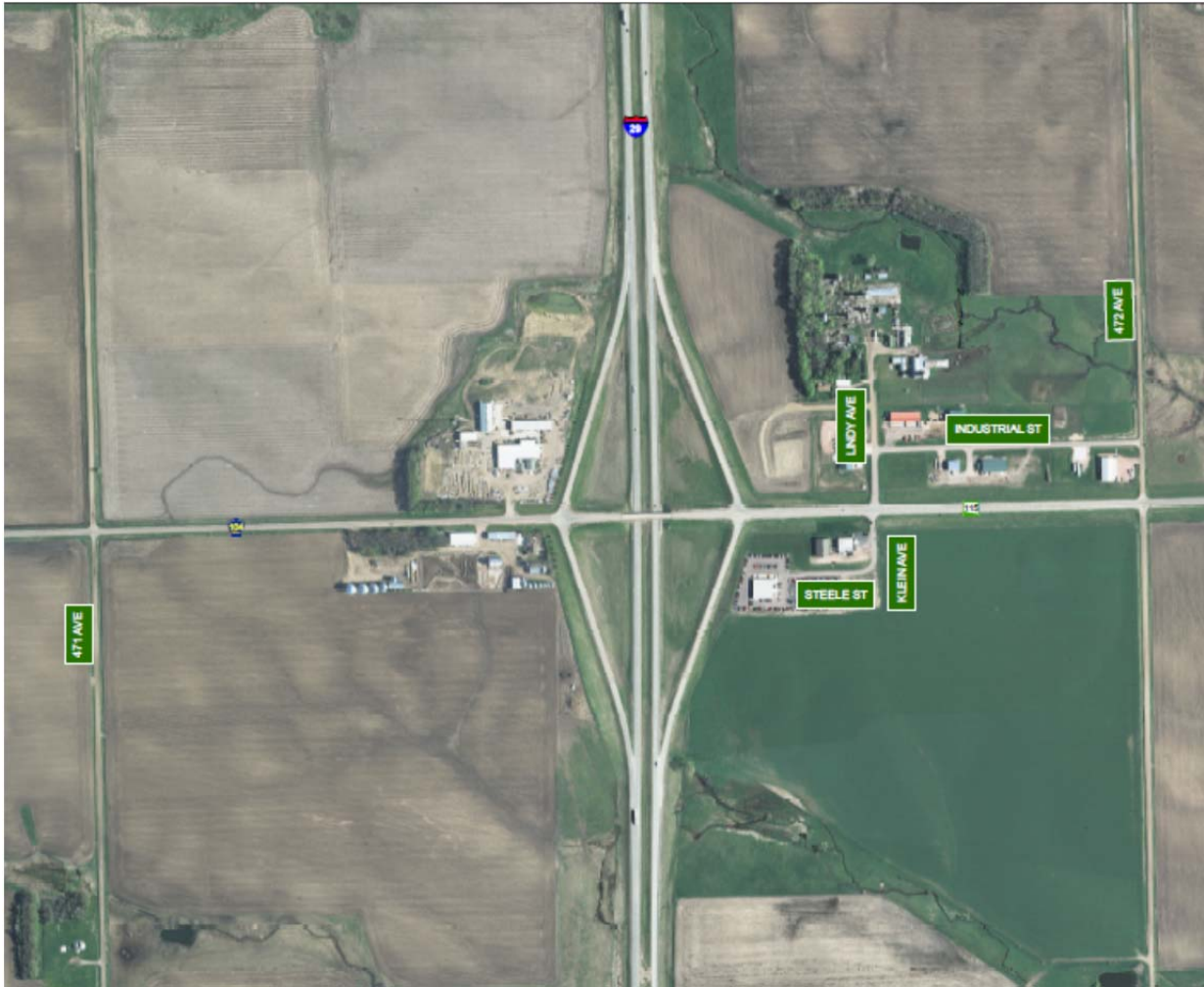


Figure 5: Existing I-29 / Exit 98 Interchange Configuration

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I-29 Exit 94: 250th Street / Minnehaha County Highway 114

The adjacent interchange south of the Exit 98 interchange is Exit 94: Baltic. The interchange is a typical diamond configuration. The interchange is shown in Figure 6 below.

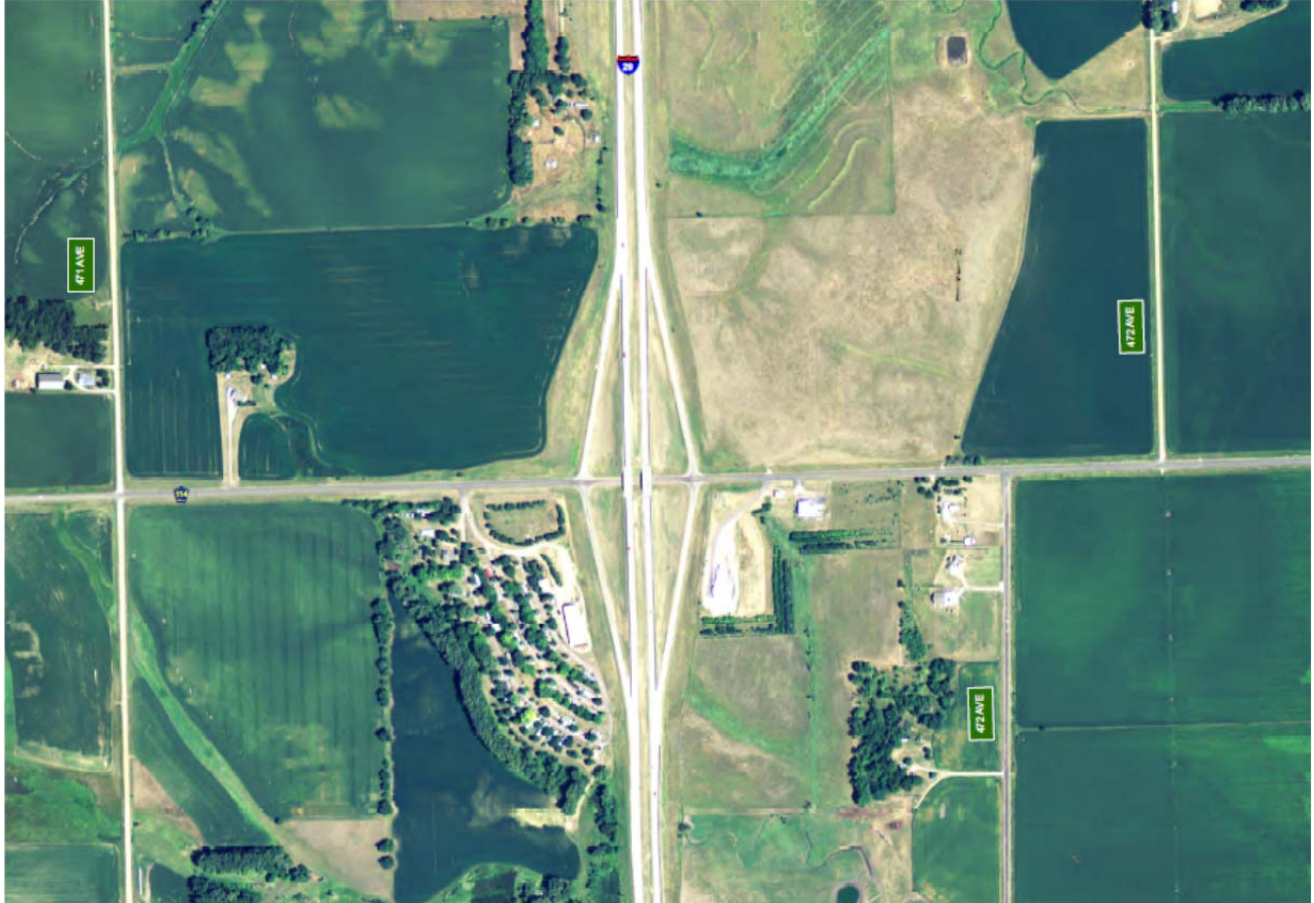


Figure 6: Existing I-29 Exit 94 Interchange Configuration

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I-29 Exit 104: Trent

The adjacent interchange north of the I-29 Exit 98 interchange is the Exit 104 interchange. The interchange is a diamond configuration. The aerial photo in Figure 7 shows the configuration of the existing I-29 Exit 104 interchange.

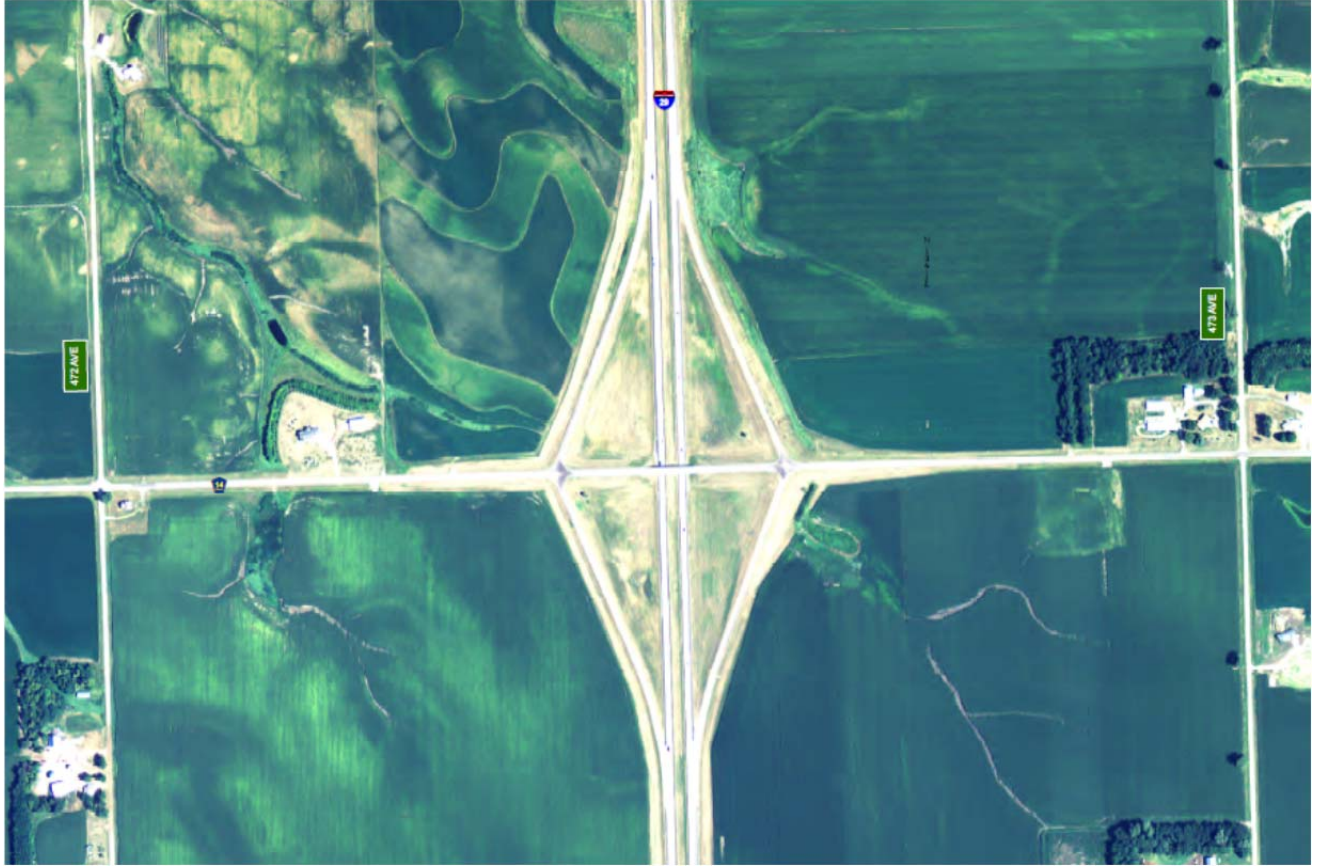


Figure 7: Existing I-29 Exit 104 Interchange Configuration

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Potential Adjacent Interchanges

The SDDOT has no expectation for any new interchanges that would affect the traffic operations at Exit 98 within the planning horizon.

Existing Data

The data used to create this document came from a combination of data sources belonging to the South Dakota Department of Transportation or the South Dakota Department of Public Safety. The most recent data available was used.

Operational Performance

A limited traffic operations study was conducted as part of the *2010 Decennial Corridor Study*, and showed no existing operational issues at the interchange. Given that the data used by that study is over 5 years old, a reevaluation of the interchange’s operations is prudent. As congestion is more often dictated by actions at intersections and ramp junctions, analysis on those movements were done independently.

Since the HCM2010 methodology for interchanges only pertains to signalized ramp terminals, the Level of Service (LOS) for unsignalized intersections according to the Highway Capacity Manual 2010 was used to measure traffic operation at each of the ramp terminal intersections. Each lane of traffic has delay associated with it and therefore a correlating LOS. The weighted average delay for each of these lanes of traffic for an intersection is the intersection LOS. LOS categories range from LOS “A” (best) to “F” (worst) as shown in the Table 1.

Table 1: Level of Service Criteria

Control Delay (s / vehicle)	LOS by Volume to Capacity Ratio		LOS Description
	v/c ≤ 1	v/c > 1	
0 – 10	A	F	Free flow, insignificant delays
>10 – 15	B	F	Stable operation, minimal delays
>15 – 25	C	F	Stable operation, acceptable delays
>25 – 35	D	F	Restricted flow, noticeable delays
>35 – 50	E	F	Maximum capacity, extended delays, long queues form upstream from intersection
>50	F	F	Forced flow, excessive delays, queues may block upstream intersections

Source: HCM2010, Exhibit 19-1 and 20-2

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The SDDOT typically triggers capacity improvements when the LOS is below a C on mainline highway corridors and below a LOS of C at intersections and ramp junctions.

As the previous studies showed that capacity was not the driving force behind the interchange modification for Exit 98, only a limited traffic operations study was conducted again for Exit 98, with ramp volume counts collected in May 2013, strictly for the purposes of this document. The east limit of the study was the northbound ramp terminal and the western limit was the southbound ramp terminal intersection. Intersections analyzed were the I-29 northbound ramp terminal and the I-29 southbound ramp terminal. An evaluation was also done to study the ramp merge/diverge areas along I-29 associated with the Exit 98 interchange.

Table 2 summarizes the results of the existing traffic analysis of the crossroad / ramp terminal intersections and Table 3 summarizes the existing operations at the ramp junctions at the I-29 Exit 98 interchange.

Table 2: Exit 98 Intersections Existing Level of Service

Intersection / Movement	AM Peak LOS*	PM Peak LOS*
246th Street / I-29 Northbound Ramp	A	A
246th Street / I-29 Southbound Ramp	A	A

Note: *Average Intersection LOS shown, individual movements may be different.

Table 3: Exit 98 Ramp Junction Existing Level of Service

Interchange	Ramp	Movement	AM Peak LOS	PM Peak LOS
Exit 98	29NB to Off-ramp	Diverge	A	A
Exit 98	29 SB to Off-ramp	Diverge	A	A
Exit 98	On-ramp to 29 NB	Merge	A	A
Exit 98	On-ramp to 29 SB	Merge	A	A

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Existing Safety Conditions

Sixteen (16) reported crashes were determined to be within the Exit 98 interchange influence area over the past five years (calendar years 2009, 2010, 2011, 2012, and 2013). Zero (0) of these 16 crashes were classified as a fatality during the reporting period and two (2) of the crashes were classified as an Injury or possible injury crash. Nine of the 16 crashes involved a single moving vehicle. Nine crashes were determined to be weather related. This data is shown in Table 4.

Table 4: Crash Classification* for Reported Crashes 2009-2013

Classification	Mainline	Ramps	Ramp Terminal Intersections	Crossroad	Total
Fixed Object	4	1	1	0	6
Animal	0	1	0	0	1
Pedestrian	0	0	0	0	0
Bicycle	0	0	0	0	0
Parked Car	0	0	0	0	0
Over Turn	1	1	0	0	2
Other Single Vehicle	0	0	0	0	0
Rear End	0	0	1	0	1
Head On	0	0	0	0	0
Angle	0	0	5 (2 I/F)	0	5 (2 I/F)
Sideswipe, same direction	0	1	0	0	1
Sideswipe, opposite direction	0	0	0	0	0
Other Multiple Vehicle	0	0	0	0	0
Total	5	4	7 (2 I/F)	0	16 (2 I/F)

(I//F) = Number Classified as an Injury/Fatality Accident

* Classification based upon Interchange Safety Analysis Tool (ISAT) methodology.

Figure 8 shows the location of all reported crashes for calendar years 2009, 2010, 2011, 2012 & 2013, including those outside of the Exit 98 interchange's influence area.

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Crash Location and Severity 2009 - 2013



Figure 8

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Existing Environmental Constraints

Figure 9 shows the location of the known environmental constraints within ½ mile of the Exit 98 interchange. It is anticipated that the project will qualify for a categorical exclusion.

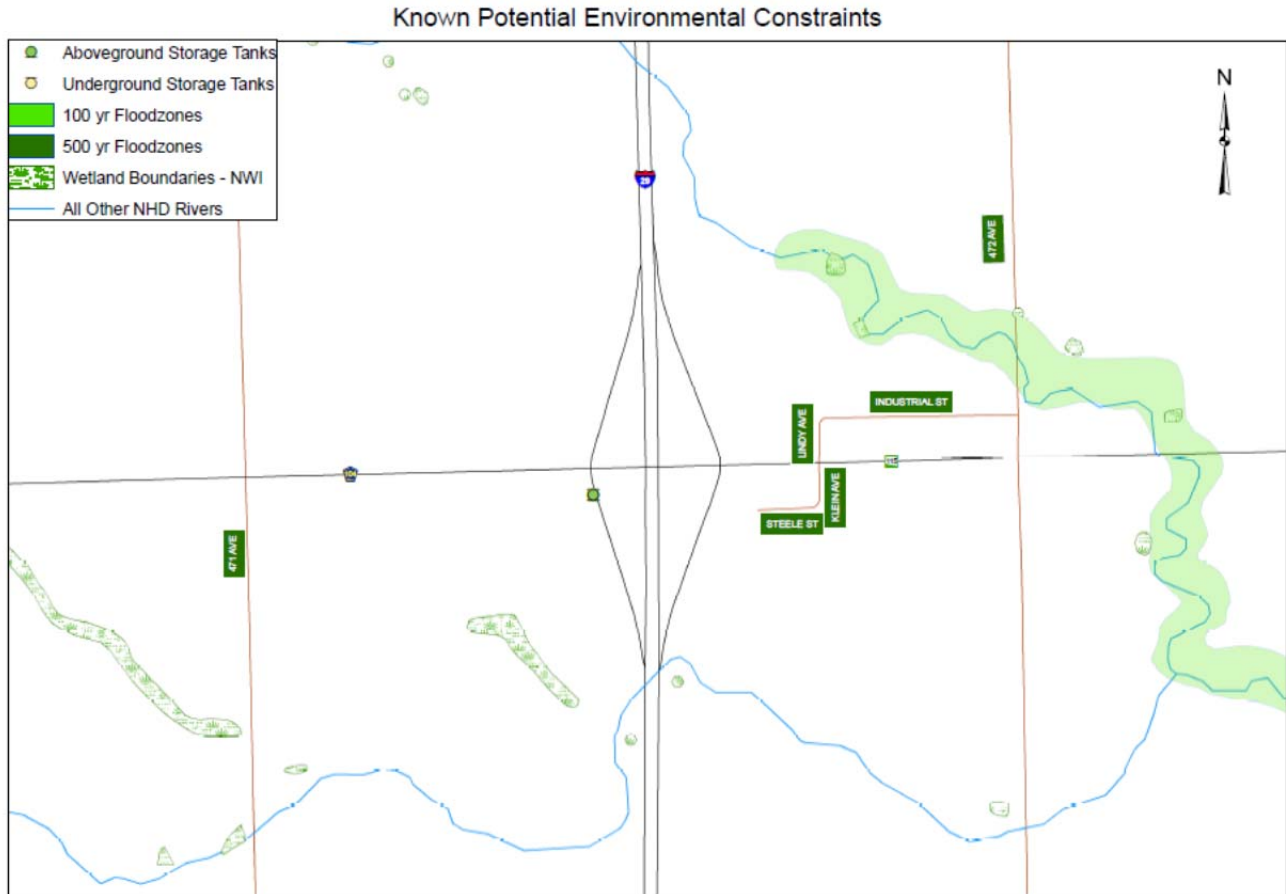


Figure 9

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Chapter 4: NEED

While the need to reconfigure an existing interchange is primarily for geometric, safety and traffic capacity reasons, the timing of such projects in South Dakota typically is controlled by the need to replace the existing pavement and/or structure(s). A combination of these five base need types defines the overall need for an interchange reconfiguration.

Geometric

Since the interchange's construction in 1964, geometric design standards have changed. As a result, though built to meet or exceed standards of the day, some geometric characteristics of the existing interchange no longer meet today's standards. The *Decennial Interstate Corridor Study* conducted in 2010 found some minor geometric issues with the interchange. Those geometric deficiencies found by corridor study include:

- The inslopes for all of the ramps are 4:1.
- The right shoulder width for all of the ramps is 3'.
- There are adjacent access points along the crossroad less than the minimum 300 feet from the ramp terminal intersections.

Pavement

The need to replace or rehabilitate the pavement is often the driving force behind the timing of when the majority of construction projects on the state highway system occur. The pavement of the existing I-29 mainline through Exit 98 is Continuously Reinforced Concrete (CRCP) with steel reinforcement built in 1997. The crossroad and ramps are asphalt surfaced, initially constructed in 1963 and last surfaced in 1986. As the crossroad pavement structure is now in need of replacement, it is appropriate to evaluate existing and future traffic operations of the existing interchange configuration before placing a new pavement surface with the expectations for a 40 to 50 year pavement service life.

Safety

The Exit 98 interchange was not seen as an immediate safety need at the time of the *Decennial Interstate Corridor Study*. Complaints have been received regarding the bridge causing an apparent sight distance issue from the ramp terminal intersections, with the bridge rail and guard rail blocking the line of sight for some lower profile vehicles, but geometric data suggests that the sight distance is adequate.

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Structural

The need to replace or rehabilitate a structure is the second most critical consideration behind the timing of construction projects on South Dakota's state highway system. The structure at the existing Exit 98 interchange currently has a Federal Sufficiency Rating of 75.9 and is classified as structurally deficient. The structure is in need of rehabilitation and also does not provide the minimum 16.0 feet clearance required over the mainline Interstate. The current minimum vertical clearance is 15.9 feet. The need for rehabilitation of the existing bridge to correct deficiencies, and the desire to provide adequate vertical clearance over the I-29 lanes led to the decision to reconstruct the structure and thus the reconstruction of the Exit 98 interchange.

Structurally, the bridge is currently in fair condition. The steel stringer/girder bridge was built in 1963 and has exceeded its 50 year design life. It is appropriate to evaluate the existing and future traffic operations of the existing interchange configuration before placing a new structure with the expectations for a 75 year structure service life.

Traffic

The *2010 Decennial Interstate Corridor Study* concluded that traffic operations are not currently an issue at the interchange. When the existing (No Build) configuration was evaluated for 2030, the interchange was determined to still be operating with acceptable levels of service in the AM and PM peak hours. These operational characteristics were verified by analyzing the ramp counts taken in May 2013. As volumes have not significantly increased along this segment of I-29, this seems to indicate that traffic operations of the interchange do not appear to be a significant factor. However, both ramp terminal intersections meet warrants for left turn lanes along the crossroad, which are lacking.

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Chapter 5: ALTERNATIVES

The lone build alternative for the Exit 98 interchange was initially developed and evaluated as part of the scoping process for the reconstruction of the SD115 corridor between I-29 and Dell Rapids. A brief description of the No Build and the Build options follows.

Alternative 0: No Build

This alternative does not alter the current configuration of the existing Exit 98 interchange or apply any improvements along Exit 98 or mainline I-29 and results in strictly removing and replacing the pavement and structure repairs.

Alternative 1: Diamond Interchange with vertical grade change.

This alternative maintains the existing diamond configuration but does modify the existing interchange by raising the vertical gradeline of the crossroad. This results in the ramps needing to be completely regraded to accommodate the adjustments to the crossroad. As warrants for turn lanes have been met, the crossroad will also be widened across the interchange to provide for left turn lanes at both ramp terminal intersections. Shoulders will also be widened to meet current shoulder standards. This will slightly improve bicycle and pedestrian accessibility along the crossroad for the rare occasion that those modes are used in the area. The horizontal alignment for the ramps will not change from the existing configuration.

As the first property access point to the west of the interchange is currently within the 300' minimum rural standard, it will be relocated to the west beyond the existing control of access limits. Further details on the control of access along the crossroad can be found in Appendix B.

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Figure 10: Alternative 1

Further details on the above alternatives can be found in Chapter 7: Alternatives Analysis.

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Chapter 6: FUTURE YEAR TRAFFIC

As congestion is more often dictated by actions at intersections and ramp junctions, analysis on those movements were done independently. Future traffic was estimated for the year 2037 using the May 2013 collected ramp volume data and traffic growth rates for rural Minnehaha County for each road facility type.

Alternative 0: No Build

The summation of the traffic operations analyses show that in the future analysis year of 2037, the movements at the Exit 98 interchange will continue to operate at a level of service of A. Table 5 summarizes the future traffic operations at the ramp terminal intersections whereas Table 6 summarizes the future traffic operations at the ramp junctions with mainline I-29 for the No Build option.

Table 5: 2037 Ramp Terminal Future No Build Level of Service

Intersection / Movement	AM Peak LOS*	PM Peak LOS*
246th Street / I-29 Northbound Ramp	A	A
246th Street / I-29 Southbound Ramp	A	A

Note: *Average Intersection LOS shown, individual movements may be different.

Table 6: 2037 Exit 98 Ramp Junction Future No Build Level of Service

Interchange	Ramp	Movement	AM Peak LOS	PM Peak LOS
Exit 98	29NB to Off-ramp	Diverge	A	A
Exit 98	29 SB to Off-ramp	Diverge	A	A
Exit 98	On-ramp to 29 NB	Merge	A	A
Exit 98	On-ramp to 29 SB	Merge	A	A

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Alternative 1: Diamond Interchange with vertical grade change.

The summation of the traffic operations analyses show that for the proposed improvements of Alternative 1, in the future analysis year of 2037, the movements at the Exit 98 interchange remains to be a level of service of A. Table 7 summarizes the future traffic operations at the ramp terminal intersections whereas Table 8 summarizes the future traffic operations at the ramp junctions with mainline I-29 for Alternative 1.

Table 7: 2037 Ramp Terminal Future Alternative 1 Level of Service

Intersection / Movement	AM Peak LOS*	PM Peak LOS*
246th Street / I-29 Northbound Ramp	A	A
246th Street / I-29 Southbound Ramp	A	A

Note: *Average Intersection LOS shown, individual movements may be different.

Table 8: 2037 Exit 98 Ramp Junction Future Alternative 1 Level of Service

Interchange	Ramp	Movement	AM Peak LOS	PM Peak LOS
Exit 98	29NB to Off-ramp	Diverge	A	A
Exit 98	29 SB to Off-ramp	Diverge	A	A
Exit 98	On-ramp to 29 NB	Merge	A	A
Exit 98	On-ramp to 29 SB	Merge	A	A

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Chapter 7: ALTERNATIVES ANALYSIS

Conformance with Transportation Plans

The build alternative evaluated conforms with current local and state transportation plans.

The existing Exit 98 interchange was first identified as having some minor geometric needs by the 2000 Statewide Interstate Corridor Study. An interchange improvement project for the Exit 98 interchange has been in the Statewide Transportation Improvement Program (STIP) in some form since 2011, and is in the current 2015-2018 STIP for Federal fiscal year 2017.

Compliance with Policies and Engineering Standards

Alternative 0 (No Build) by its definition will not address the known geometric needs of the existing interchange. As such, if Alternative 0 (No Build) is followed, the interchange will not comply with the current South Dakota design standards for inslopes (4:1 versus 6:1 standard), the right shoulder width (3' versus 8' standard), and the proximity of access points along the crossroad will remain within the minimum. The minimum vertical clearance over I-29 will remain at 15.9 feet.

The build alternative will correct these existing geometric issues.

Environmental Impacts

The environmental impacts (if any) of the interchange improvement are anticipated to be minimal and the project is anticipated to receive a categorical exclusion.

Safety

Upon reviewing the reported crash data shown in Table 4 of Chapter 3, one can easily ascertain that the majority of the crashes are single vehicle crashes, including over 29% of all the crashes within the interchange's influence area and 100% of the injury/fatality classified crashes during the reporting period (2008 thru 2012). Most of those crashes resulted in citations for over driving weather conditions, which would suggest that they are more driver caused than geometric issues. This would, however, suggest that new pavement with a higher friction factor could aid in the prevention of future crashes.

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Operational Performance

A limited traffic operations study was conducted and determined that there are no currently observed issues with any interchange specific movements, and it is anticipated that there will be minimal effect on those movements by any of the build options.

As the shoulders along the crossroad will be widened to meet current shoulder standards with Alternative 1, bicycle and pedestrian accessibility along the crossroad will be slightly better for the rare occasion that those modes are used in the area.

Evaluation Matrix

	Alternative 0 No Build	Alternative 1 Diamond
Meets all SDDOT Geometric Design Criteria	No	Yes
Meets SDDOT Access Criteria	No	Yes
Lowest Ramp Terminal Intersection Level of Service, 2036	A	A
ROW Impacts	None	Minimal
Environmental Impacts	None	Minimal
Safety Improvement	None	Some
Bicycle / Pedestrian Improvements	None	Some

Coordination

The SDDOT has a long history of public involvement in the development of transportation plans and projects. A public open house meeting was held as part of the scoping process on January 15, 2013.

As part of the public meeting, a webpage was established that provided access to the presentation and displays from that public open house. A screenshot of the website can be seen in Figure 11.

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The screenshot shows the South Dakota Department of Transportation (SDDOT) website. The header features the SDDOT logo with the tagline 'Connecting South Dakota and the Nation' and the text 'SOUTH DAKOTA DOT DEPARTMENT OF TRANSPORTATION'. Navigation links include 'Careers | Contacts', 'HOME', 'TRANSPORTATION', 'DOING BUSINESS', 'TRAVELERS', 'PROGRAMS/SERVICES', 'INSIDE THE DOT', 'RESOURCES', and 'SITE MAP'. Social media icons for Facebook and Twitter are also present.

Public Meetings

[Home](#) ▸ [Public Meetings](#) ▸ S.D. 115 near Dell Rapids

Project: P 0115(47)102 PCN 025C and P 0115(51)104 PCN 03RT, Minnehaha County

Location: S.D. 115 Fm 248th St, south of Dell Rapids, to I-29 West of Dell Rapids

Improvement Type: Grading & PCC Surfacing/Resurfacing, Interchange Reconstruction, Lighting, Replace Strs (Bridge), Str Widening

Public Meetings

The South Dakota Department of Transportation (SDDOT) has a long history of public involvement in the development of transportation plans and projects. The 2005 passage of the Safe, Accountable, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) requires a public involvement process. Public meetings for the project scope and/or design will occasionally be scheduled to collect public input, provide information and answer questions.

Public Information Meeting - January 15, 2013

- [Meeting Notice](#)
- [Meeting Presentation](#)
- [Display Graphic](#)

For further information regarding this project, contact Mark Malone, Project Identification Coordinator at 605-773-7191.

Figure 11: Screenshot of I-29 Exit 98 Public Meeting Webpage

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Chapter 8: FUNDING PLAN

The planned project that includes replacing the existing Exit 98 Interchange is currently estimated to cost \$18.178 million (in 2013 dollars). The SDDOT is currently anticipating funding the project with the combination of funding sources as shown in Table 10.

Project Number	State Funding Category	Federal Funding Category	Federal Funds	State Funds	Total Funds
IM 0293(102)98 PCN 04A8	Interstate	National Highway Performance Program	\$4.770 Million	\$0.725 Million	\$5.495 Million
P 0115(51)104 PCN 03RT	Minor Arterial	Surface Transportation Program	\$1.748 Million	\$0.385 Million	\$2.133 Million
P 0115(51)104 PCN 03RT	State Highway Municipal	Surface Transportation Program	\$5.244 Million	\$1.155 Million	\$6.399 Million
P 0115(51)104 PCN 03RT	Bridge	Surface Transportation Program	\$3.156 Million	\$0.695 Million	\$3.851 Million
Total			\$14.918 Million	\$2.960 Million	\$17.878 Million

Note: As funding is fluid, category breakdown may be different at time of project authorization.

As the project is anticipated to be let to contract in Federal fiscal year 2017, the inflated estimated cost for the overall project is \$19.676 Million.

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Chapter 9: RECOMMENDATIONS

This modification request is to slightly reconfigure the existing Exit 98 interchange, but maintain the diamond configuration, as shown in Figure 10 in Chapter 5.

This recommendation addresses the eight policy requirements for new or revised access points to the existing Interstate system published in the Federal Register Volume 74 Number 165; August 27, 2009.

1. The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design year traffic demands (23 CFR 625.2(a)).

This modification request is to reconfigure an existing interchange. No additional access to the Interstate System is being requested. The reconfiguration of the existing interchange will have a negligible effect on the Interstate's traffic operations when compared with the existing interchange's configuration.

2. The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23CFR 625.2(a)).

This modification request is to reconfigure the geometrics of an existing interchange. No additional access to the Interstate System is being requested. Existing characteristics and development in the vicinity of the existing interchange limited the cost feasible options for interchange reconfiguration.

There are no areas within the State of South Dakota that will consistently experience congestion levels extreme enough to make ramp metering or HOV facilities economically feasible in the foreseeable future.

3. An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The

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crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)).

Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

A limited analysis of the impact of the proposed interchange modification at Exit 98 on the Interstate's operations was completed as agreed upon by FHWA on June 24, 2013. This analysis indicates no operational issues at the interchange. As the adjacent interchanges are located four miles south and six miles north, operational analyses of those interchanges were not conducted as part of this IMJR. Results of any operational analyses conducted for the adjacent interchanges as part of the Decennial Interstate Corridor Study are located in Appendix D.

One of the key factors that can affect the safety and operations of an interchange is the permanent signing associated with the interchange. As the proposal is for maintaining the diamond configuration of the existing interchange, not much change in permanent signing is anticipated from the permanent signing that is currently in place. The preliminary signing plan for the immediate interchange area is shown in Figure 12. The full preliminary signing plan showing the approach signing along the Interstate mainline is shown in Appendix C.

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Figure 12: Proposed Signing Plan

4. The proposed access connects to a public road only and will provide for all traffic movements. Less than “full interchanges” may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a) (2), and 655.603(d)).

The access improvement will maintain a connection to a public road (246th Street) and will replace the current full access interchange with a reconfigured full access interchange. The reconfigured interchange will continue to provide for all traffic movements. The improvement will meet or exceed current standards for Federal-aid projects on the Interstate system.

5. The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.

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The proposed interchange improvement is consistent with local land use plans and the STIP.

6. In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).

Previous studies conducted in the past 20 years (the South Dakota Interstate Corridor Study completed in February 2001 and the 2010 South Dakota Decennial Interstate Corridor Study completed in November 2010) indicated no need for any future interchange additions along the segments of Interstate 29 between Exit 98 and the adjacent exits.

7. When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).

The proposed interchange modification is the result of project scoping for the SD115 corridor between I-29 and Dell Rapids.

The reconfiguration of the interchange is being proposed to address structural issues with the existing crossroad bridge over I-29 and will correct geometric deficiencies associated with the existing interchange..

8. The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).

Considering that minimal additional right-of-way is anticipated to be acquired, it is anticipated that the environmental impacts specific to this interchange modification compared to the Do-Nothing Scenario will be negligible. The proposed revised access is included in the 2015-2018 STIP and programmed for 2017. The status of the environmental process is tracking consistent as other projects classified for categorical exclusion programmed for the same year.