

Technical Memo

Date: April 12, 2017

Project: I-29 Exit 77 (41st Street) Interchange Modification Justification Report,
Project # PL0100(84) 3616P, PCN 05MH

To: Study Advisory Team

From: HDR

Subject: 41st Street Alternatives West of I-29 Evaluation and Recommendation

1. Background

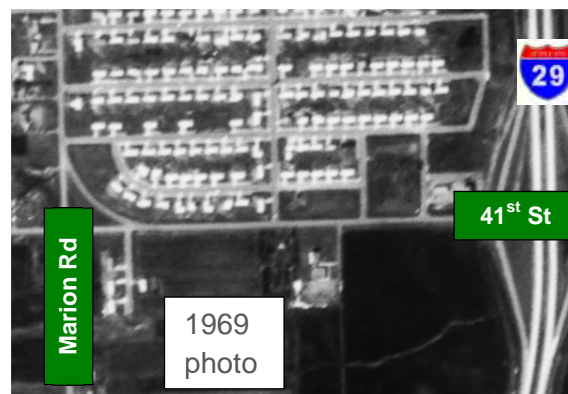
The photos at right show the progression of land use along 41st Street from 1958 (upper photo) to 1969 (center photo) though 2014 (lower photo). During that time, 41st Street transformed from a two-lane rural gravel road into the five-lane urban arterial street that it is today.

Adjacent land use changed from farm fields to fully-developed residential and commercial properties.

Traffic on 41st Street transformed from very low volume rural use to the 28,000 vehicles that currently drive on this section of 41st Street each day.

As the City of Sioux Falls continues to develop toward the west, 41st Street will need to be widened to three through lanes in each direction to adequately accommodate the anticipated traffic. With the currently proposed project, 41st Street would be 3 through lanes in each direction east of Marion Road and 2 through lanes in each direction west of Marion Road. Eventually, the City plans to extend the 3 through lanes to Sertoma Avenue.

The City's long range plan for Marion Road is a five-lane arterial street north and south of 41st Street. The five-lane section has already been constructed north of 39th Street. Current daily traffic volumes on Marion Road in the vicinity of 41st Street are in the 14,000 vehicle per day range.



2. Purpose

As part of the current I-29 Exit 77 (41st Street) interchange study, four build alternatives between Marion Road and the I-29 interchange are proposed. The features common to these alternatives are:

- 3 through lanes on 41st Street in each direction from Marion Road to I-29
- 2 through lanes on 41st Street west of Marion Road
- 2 through lanes on Marion Road in each direction
- Signalized intersections at:
 - Marion Road
 - Terry Avenue
 - I-29

Specific differences in the alternatives are:

- Alternative A – 41st Street raised center median with openings only at signalized intersections
- Alternative B1 – 41st Street raised center median with a 3/4 access movement configuration at the 41st Street/Madelyn Lane/Gateway Boulevard intersection
- Alternative B2 – 41st Street raised center median with a second 3/4 access movement configuration at a combined Godfathers Pizza/Mount Marty College driveway on the south side of 41st Street; this alternative was added as a result of landowner requests.
- Alternative C – Center two-way left turn lane from Marion Road to I-29

Attachment A to this memo provides a graphic of the existing conditions and the proposed build alternatives. Reduced size versions of the alternatives are also provided with the discussion of each alternative.

The purpose of this memo is to provide a brief evaluation of each of the build alternatives and provide recommendations on:

- Which alternative(s) to carry forward for further evaluation.
- Which alternative(s) to eliminate from further evaluation.

3. Evaluation Criteria

The main criteria used to evaluate the 41st Street alternatives west of I-29 are:

3.1 Fulfillment of the Project Purpose and Need¹

For each item, the evaluation is either yes or no.

- For traffic capacity, is an acceptable LOS provided at signalized intersections?
- Is vehicular safety improved? The basis for this evaluation are the crash comparisons for similar roadways with and without a raised median. This was discussed in the 2012 Corridor Study.²
- Are safe pedestrian facilities provided that comply with the Americans with Disabilities Act?

¹ HDR, April 2017. Purpose and Need Memo for I-29 Exit 77

² HDR, June 2012. I-29 Exit 77 (41st Street) Crossroad Corridor Study, pages 25 and 26

- Does the alternative meet SDDOT and City Design Policy? Both SDDOT and the City of Sioux Falls design policies state that a raised center median should be used for a facility like the proposed 41st Street build alternatives. This was also documented in the 2012 Corridor Study.³

3.2 Traffic Operations

Year 2023 (year of opening to traffic) and year 2045 (horizon year) level of service⁴ is a measurement of traffic conditions at these signalized intersections:

- 41st Street and Marion Road
- 41st Street and Terry Avenue

The traffic operations at the 41st Street and I-29 ramp terminals are considered in the interchange alternatives evaluation memo.⁵

3.3 Property Impacts

3.3.1 What are the property acquisitions?

- Total and partial acquisitions have been quantified for each of the alternatives.
- Based on recent similar property purchases along 41st Street and Louise Avenue, property acquisition costs are estimated at \$30 per square foot. Future appraisals will identify the cost more precisely.
- For the total acquisition there would be excess property that could be re-sold to adjacent properties or re-developed after completion of the roadway improvements. The re-sale value is estimated at \$20 per square foot.

3.3.2 What is the acceptance level of affected businessowners and landowners to the access and acquisition impacts of each of the alternatives? This evaluation is based on public meeting written comments and landowner meeting documentation from both the 2012 Corridor Study⁶ and the current interchange study project.⁷

- A poor rating indicates that landowners have been strongly opposed to the alternative.
- A moderate rating indicates that landowners have not been totally supportive of the alternative but have indicated some level of acceptance.
- A good rating indicates that landowners have expressed acceptance of the alternative.
- An unknown listing indicates that the alternative has not yet been reviewed by enough landowners to determine the level of acceptance.

³ HDR, June 2012. I-29 Exit 77 (41st Street) Crossroad Corridor Study, page 26

⁴ HDR, April 2017. Technical Memo 3 Future Traffic Conditions I-29 Exit 77

⁵ HDR, April 2017. Technical Memo 6 Interchange Alternatives Evaluation I-29 Exit 77

⁶ HDR, June 2012. I-29 Exit 77 (41st Street) Crossroad Corridor Study, Appendix B – Public Involvement

⁷ HDR, September 28, 2016. I-29 41st Street Meeting Notes I-29 to Marion Road Landowners

3.3.3 **Attachment B** to this memo provides a list of concerns that have been raised by participants in the various public and business/landowner meetings. This list also documents responses to those concerns.

3.4 Costs

Major cost considerations are:

- Initial ROW acquisitions
- Net ROW acquisitions assuming resale of a portion of the total take acquisition at the southeast quadrant of 41st Street and Marion Road
- Roadway construction
- Addition of these both before and after re-sale of excess property

3.5 Environmental Impacts

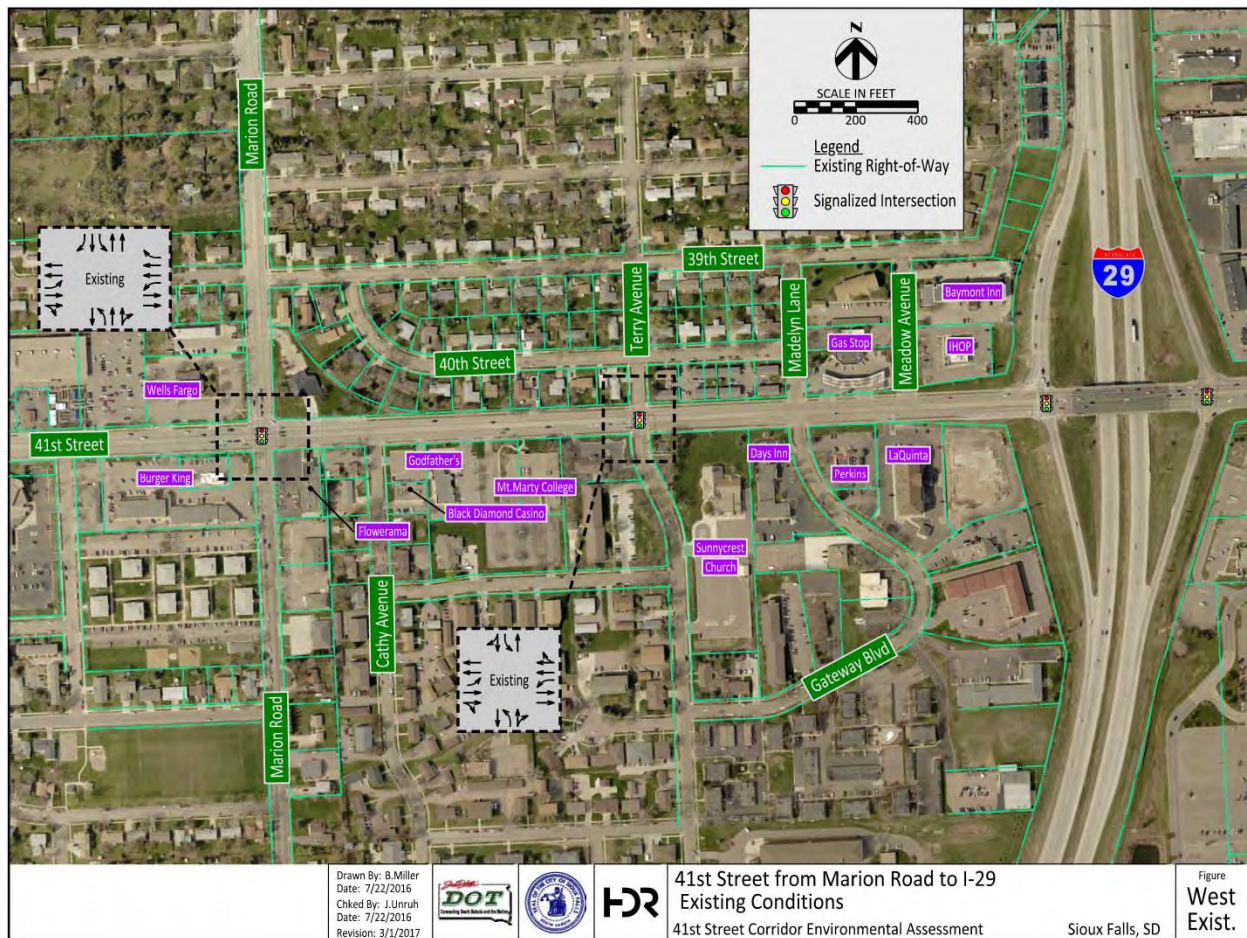
The environmental impacts applicable in this analysis are:

- Number of impacted structures that meet the criteria for historic structures
- Number of impacted properties that meet Section 4(f) criteria
- Number of property acquisitions that have environmental justice implications
- Number of property acquisitions where contaminated materials are known to exist
- Number of locations where Noise Abatement Criteria are exceeded with year 2045 traffic conditions

4. No-Build Alternative

The No-Build Alternative (**Figure West-Exist**) will be carried forward as a base-line comparison for the build alternatives. However, as noted in the Alternatives Comparison Matrix, the No-Build Alternative does not meet the Project Purpose and Need for:

- Meeting traffic capacity criteria
- Improving safety
- Improving pedestrian facilities – Landowners have specifically expressed concern over the lack of adequate wheelchair accommodations along 41st Street between Marion Road and I-29. This is especially important because there is a relatively high concentration of handicapped and assisted living facilities near 41st Street and Marion Road. Access to the Empire Mall shopping area is difficult because of these pedestrian facility limitations.



5. Build Alternatives Evaluation

Alternative A – Raised median with full access only at signalized intersections

Alternative A (**Figure West-A**) provides three 41st Street through lanes in each direction and a raised center median with openings only at the signalized Marion Road, Terry Avenue, and I-29 interchange intersections. Widening required for this alternative will be on the south side of 41st Street to avoid major impacts to existing homes and apartment buildings on the north side of 41st Street.

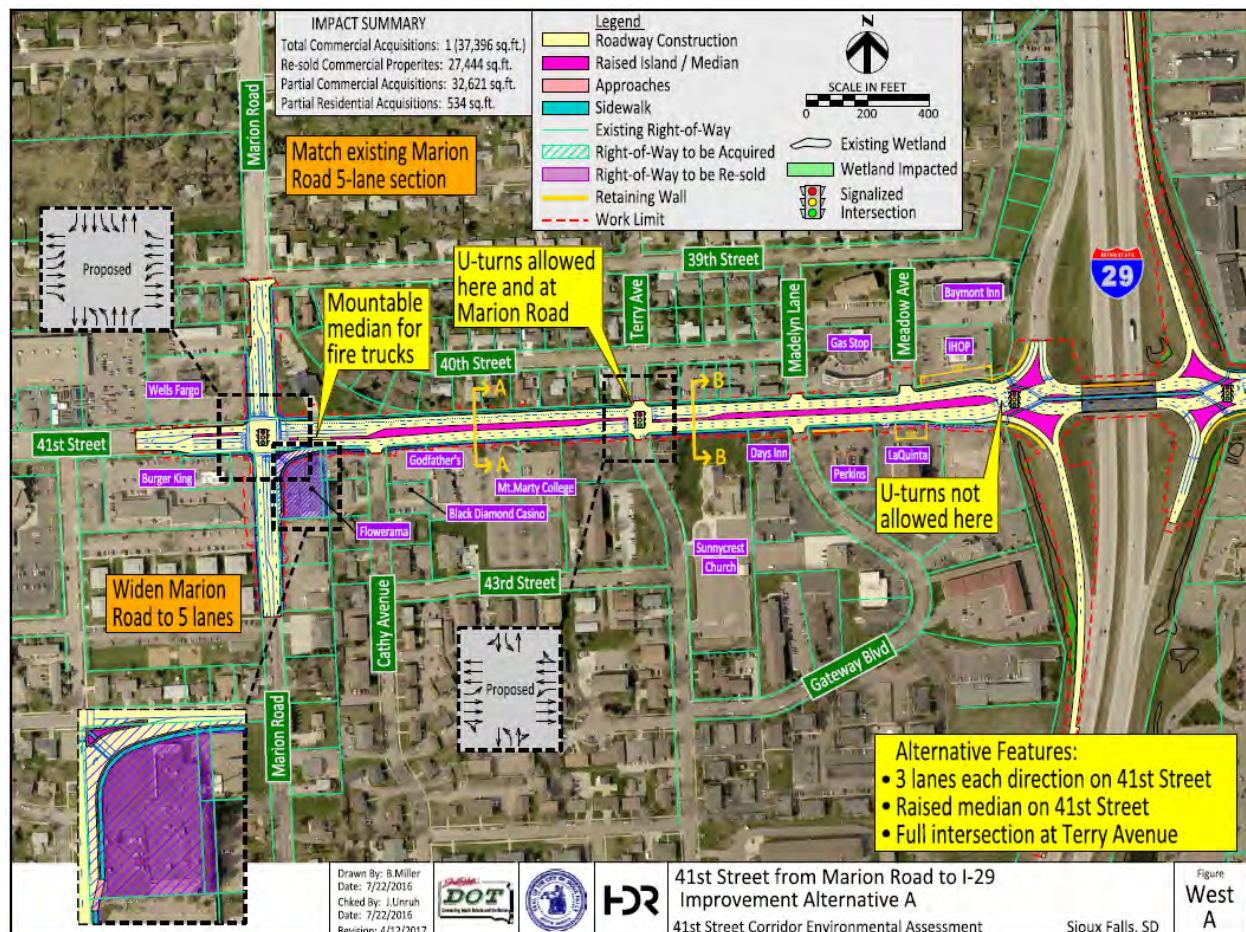
Main benefits of Alternative A include:

- Level of service criteria are met at the signalized intersections.
- The raised median provides safety benefits.
- SDDOT and City design policies for application of raised medians are met.

Main drawbacks of Alternative A include:

- Because of perceived access limitations, especially at the 41st Street/Madelyn Lane/Gateway Boulevard intersection, landowners have opposed this alternative.

It is recommended that Alternative A be dropped from further evaluation because other alternatives address the access concerns and resulting opposition by business/landowners to Alternative A.



Alternative B1 – Raised median with 3/4 access at 41st Street/Madelyn Lane/Gateway Boulevard intersection

Alternative B1 (**Figure West-B1**) is the same as Alternative A except a 3/4 access configuration is provided at the 41st Street/Madelyn Lane/Gateway Boulevard intersection. The 3/4 access configurations have been installed at multiple locations around Sioux Falls and provide reasonable access to adjacent properties while eliminating the left-turn out movement that typically has a high proportion of crashes.

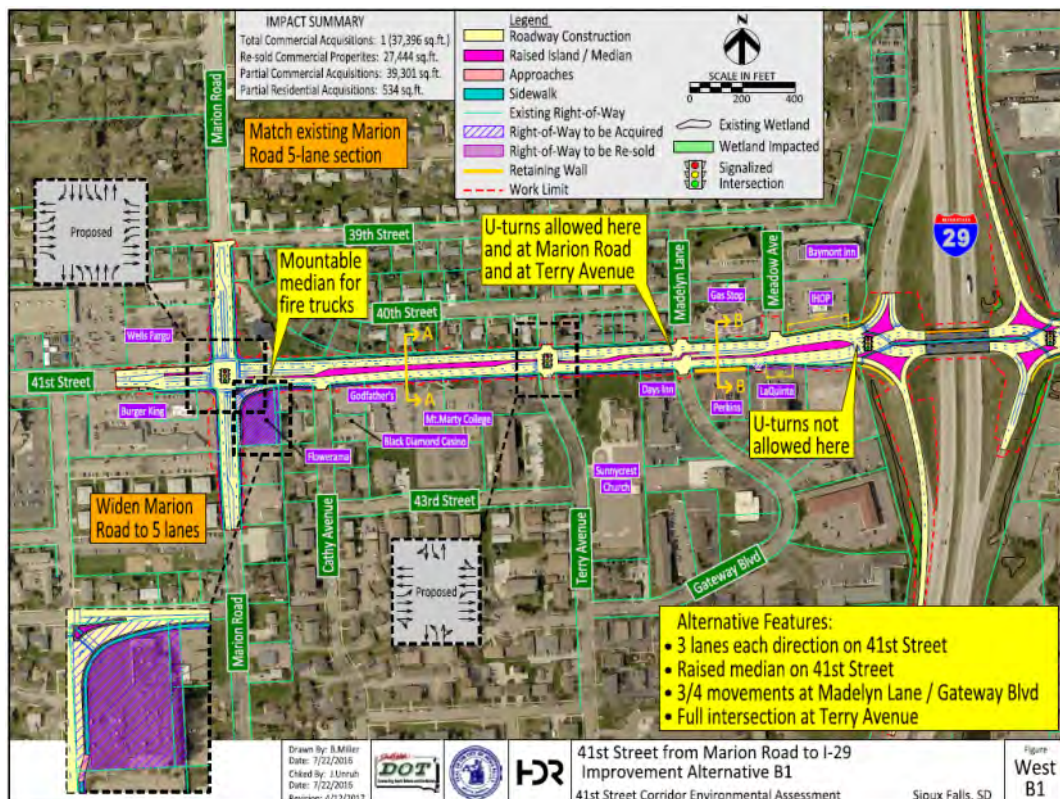
Main benefits of Alternative B1 include:

- Level of service criteria are met at the signalized intersections.
- The raised median provides safety benefits.
- SDDOT and City design policies for application of raised medians are met.
- 3/4 access configuration at 41st Street/Madelyn Lane/Gateway Boulevard intersection provides reasonable access to properties.

Main drawbacks of Alternative B1 include:

- Widening along south side of 41st Street will require acquisition of strips of commercial property. However, no structures are impacted and adequate separation is maintained between sidewalks and parking/landscaped areas.

It is recommended that Alternative B1 be carried forward for further evaluation because of its raised median safety benefits and because it reasonably addresses landowner concerns about access. **Attachment B** to this memo provides a list of concerns that have been raised by participants in the various public and business/landowner meetings and how Alternative B1 specifically addresses those concerns.



Alternative C – Center two-way left turn lane on 41st Street from Marion Road to I-29

Alternative C (**Figure West-C**) provides 3 through lanes in each direction and a center two-way left turn lane.

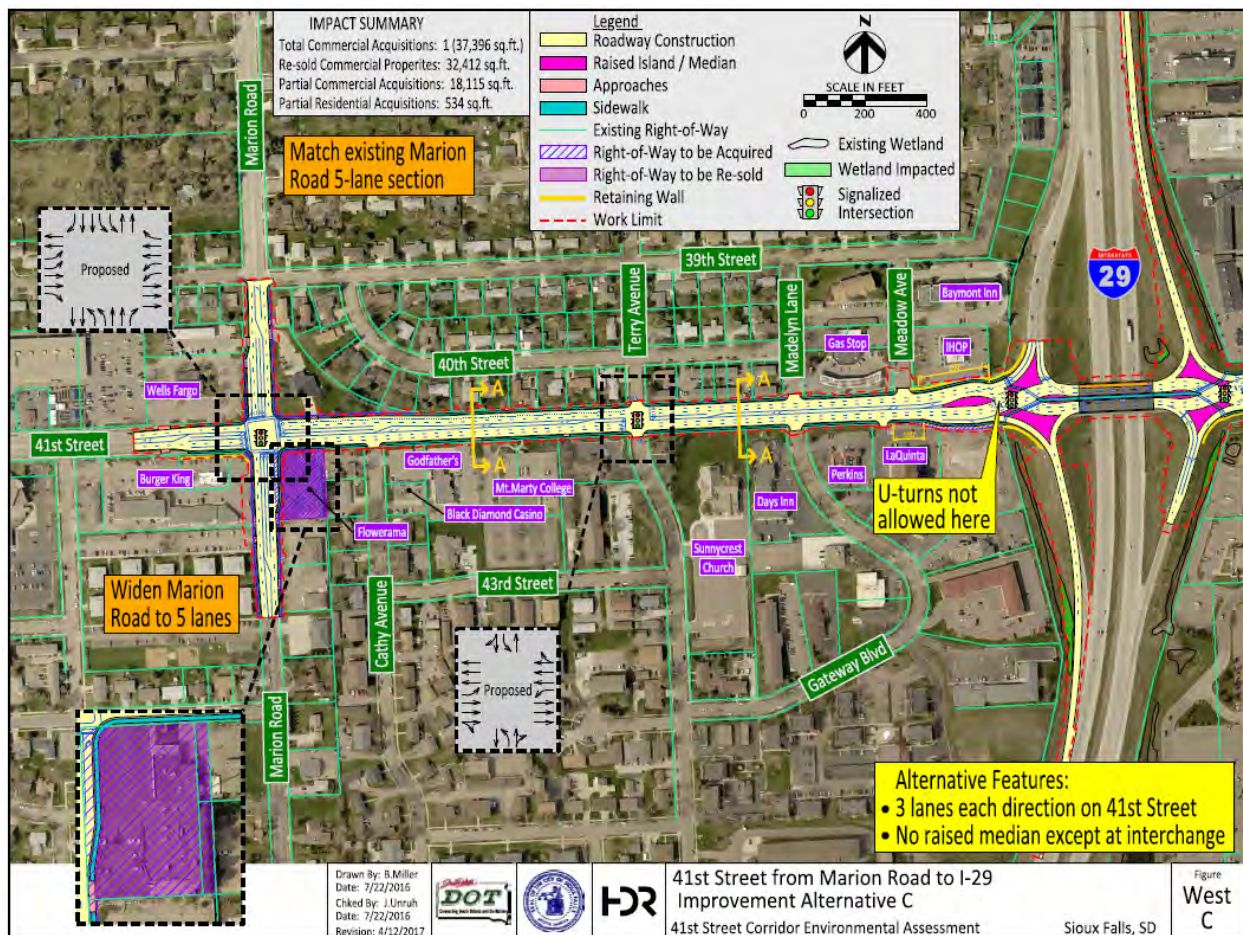
Main benefits of Alternative C include:

- Level of service criteria are met at the signalized intersections.
- Business/landowners were generally supportive of this alternative.

Main drawbacks of Alternative C include:

- Project Purpose and Need for improving safety is not met.
- SDDOT and City design policies for application of raised medians are not met.

It is recommended that Alternative C be eliminated from further evaluation because safety is not improved and SDDOT and City design policies are not met.



6. Build Alternatives Recommendations Summary

Alternatives recommended to be carried forward:

Alternative	Description	Main reason(s) for carrying forward
B1	Raise center median with 3/4 access at 41 st St /Madelyn Lane/Gateway Blvd	<ul style="list-style-type: none"> • Provides safety benefits of raised median • Meets SDDOT and City design policies • Provides reasonable access to properties

Alternatives recommended to be eliminated from further consideration:

Alternative	Description	Main reason(s) for elimination
A	Raise center median with full access only at signalized intersections	<ul style="list-style-type: none"> • Landowner opposition to perceived access restrictions • Alternative B1 addresses access concerns
B2	Raise center median with 3/4 access at 41 st St /Madelyn Lane/Gateway Blvd <u>and</u> 3/4 access at Godfathers/Mount Marty College entrance	<ul style="list-style-type: none"> • Impacts to Black Diamond Casino parking lot and Godfathers Pizza drive-through lane • City policy is to provide the 3/4 access configurations at street intersections or at a combination of multiple driveways.
C	Center two-way left turn lane	<ul style="list-style-type: none"> • Does not provide safety improvements. • SDDOT and City design policies for application of raised medians are not met.

**Comparison Matrix
41st Street West of I-29 Alternatives**

**I-29 Exit 77 (41st Street) Interchange Study
Project # PL0100(84) 3616P, PCN 05MH**

4/12/17

Alternative	Description	Purpose and Need				Traffic Operations (2)				Property Impacts							Costs					Applicable Environmental Impacts				
		Meets City LOS Criteria	Safety Improvement	Pedestrian Facilities Improvement	Meets SDDOT and City Design Policy	Year 2023		Year 2045		Total commercial acquisitions	Total Commercial Acquisitions	Partial commercial acquisitions	Re-sale commercial properties	Net Commercial Acquisition	Partial Residential Acquisitions (4)	Affected Business / Landowner Acceptance for Access and Impacts	Initial ROW Acquisition	Net ROW Acquisition	Construction	Initial Total	Final Total (after property re-sale)	Historic Structures	Section 4(f) Properties	Environmental Justice	Contaminated Materials	Noise
						41st St/Marion Rd Intersection	41st St/Terry Ave Intersection	41st St/Marion Rd Intersection	41st St/Terry Ave Intersection																	
LOS AM/PM	LOS AM/PM	LOS AM/PM	LOS AM/PM	#	sq ft	sq ft	sq ft	sq ft	sq ft	M \$	M \$	M \$	M \$	M \$	#	#	#	#	#							
A	Raised median with full access signalized intersections at 41st/Marion, 41st/Terry, and 41st/I-29	yes (1)	yes	yes	yes	D/C	B/B	E/E (1)	B/B	1	37,396	32,621	27,444	42,573	534	poor	2.2	1.6	9.9	12.1	11.5	0	0	0	(6)	11 (7)
B-1	Raised median with same intersections as Alt A and 3/4 access at 41st/Madelyn/Gateway	yes (1)	yes	yes	yes	D/C	B/B	E/E (1)	B/B	1	37,396	39,301	27,444	49,253	534	moderate	2.4	1.8	10.1	12.5	11.9	0	0	0	(6)	11 (7)
B-2	Raised median with same intersections as Alt A and 3/4 accesses at 41st/Madelyn/Gateway and Godfathers/Mount Marty College entrance	yes (1)	yes	yes	no	D/C	B/B	E/E (1)	B/B	1	37,396	40,696 (3)	27,444	49,872	534	unknown (5)	2.4	1.8	10.2	12.6	12.0	0	0	0	(6)	(8)
C	Center two-way left turn lane with same signalized intersections as Alt A	yes (1)	no	yes	no	D/C	B/B	E/E (1)	B/B	1	37,396	18,115	32,412	23,099	534	good	1.7	1.0	9.2	10.9	10.2	0	0	0	(6)	11 (7)
NB	No-Build	no	no	no	no	C/E	B/B	F/F	B/E	0	0	0	0	0	0	good	NA	NA	NA	NA	NA	0	0	0	0	(9)

NA: Not Applicable

(1) To meet year 2045 LOS criteria, 41st Street will need to be widened to 3 through lanes west of Marion Road between year 2023 and year 2045 as shown in the 2012 Corridor Study.

(2) LOS shown is with the Diverging Diamond Interchange at I-29; LOS with Single Point Interchange at I-29 is similar.

(3) Impacts to Black Diamond Casino parking spaces and Godfathers Pizza drivethrough lane would be considered significant impacts to these properties.

(4) Residential acquisitions are for narrow strips (3' to 10' width) along Marion Road.

(5) The alternative was developed specifically to address a request by the Mount Marty College representative.

(6) Total acquisition parcel is at southeast quadrant of 41st & Marion (former 7-Eleven Store); underground gasoline storage tanks were removed in 1998 and contaminated soils were removed.

(7) Year 2045 predicted noise levels are above Noise Abatement Criteria but noise mitigation measures do not meet SDDOT policy for cost effectiveness

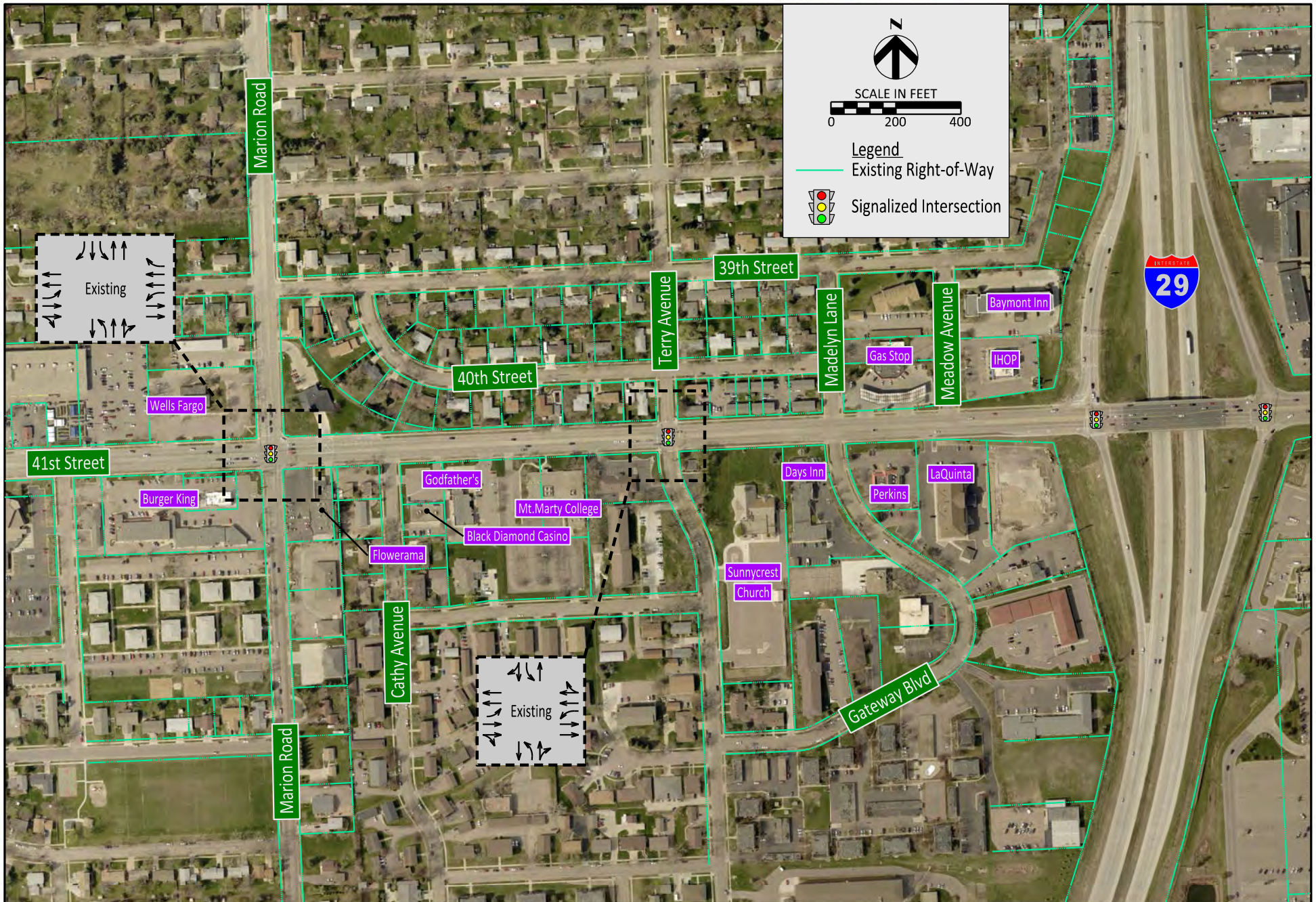
(8) Noise impacts would be the same as for alternative B-1

(9) SDDOT policy does not require evaluation of noise impacts for future no-build conditions.

Options recommended for elimination from further evaluation



Attachment A
41st Street Alternatives
Figures West-Exist to West-C



Drawn By: B. Miller
 Date: 7/22/2016
 Chkd By: J. Unruh
 Date: 7/22/2016
 Revision: 3/1/2017

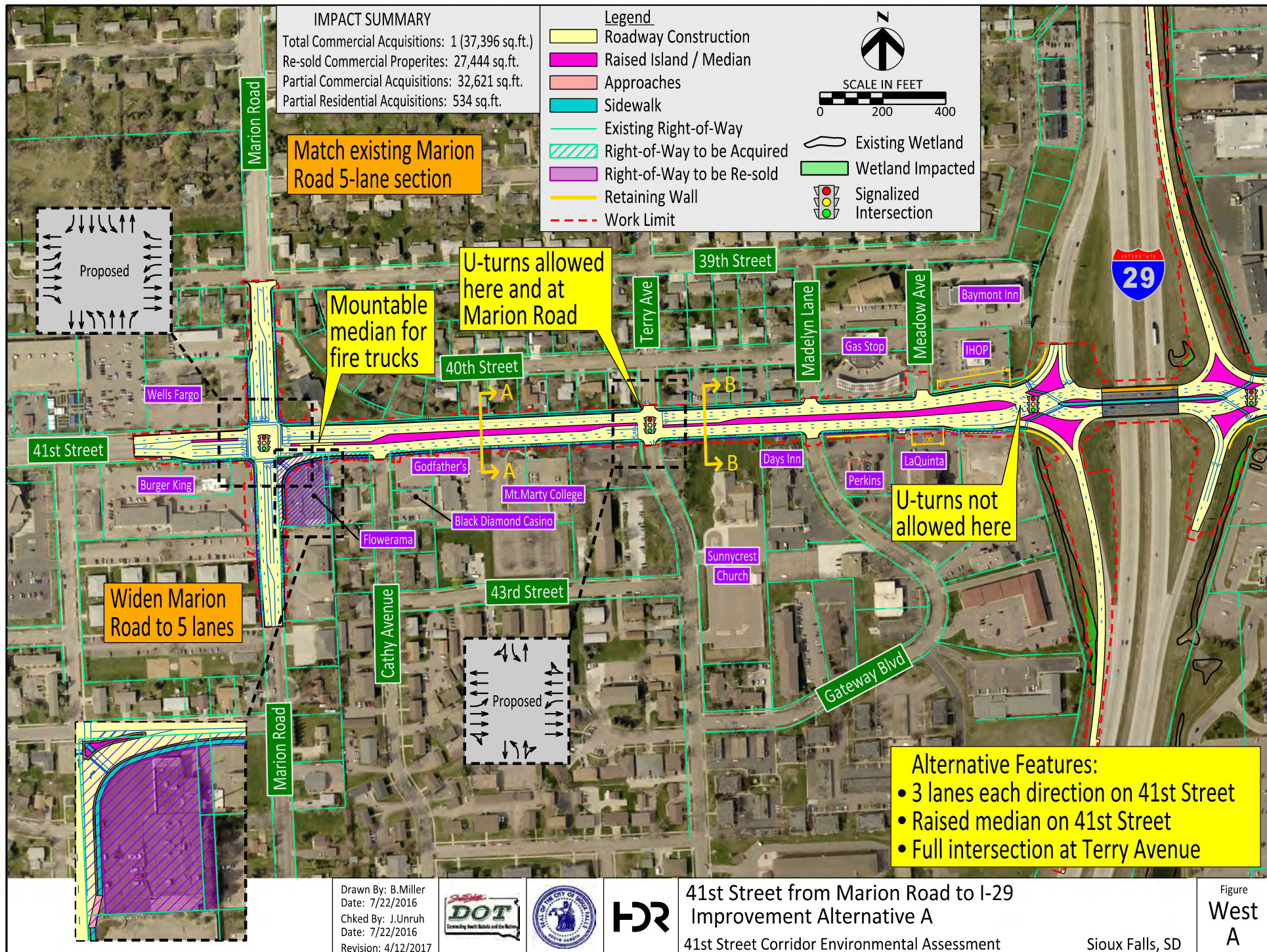


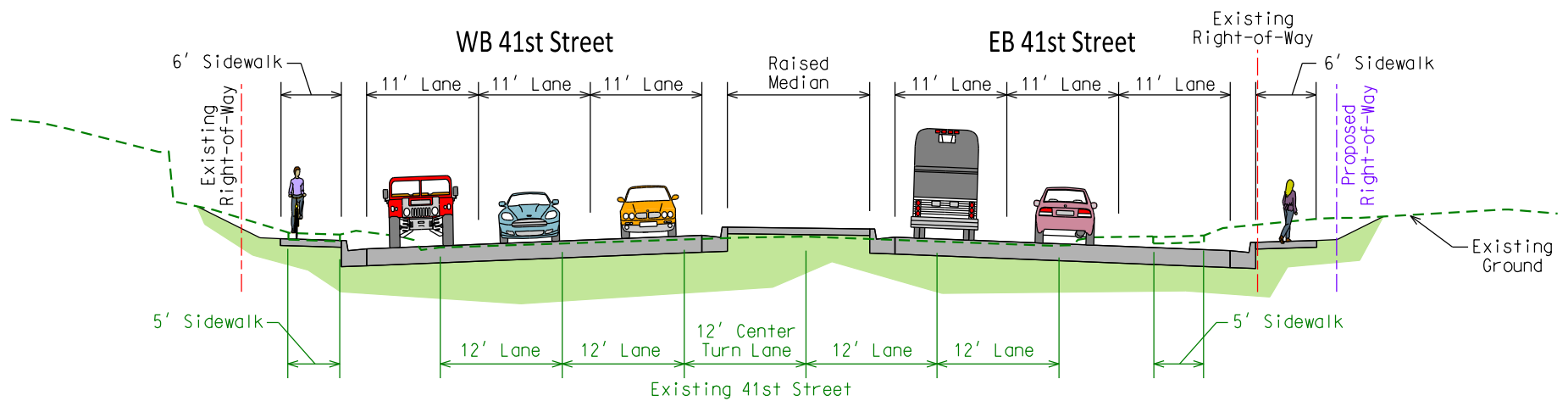
41st Street from Marion Road to I-29 Existing Conditions

41st Street Corridor Environmental Assessment

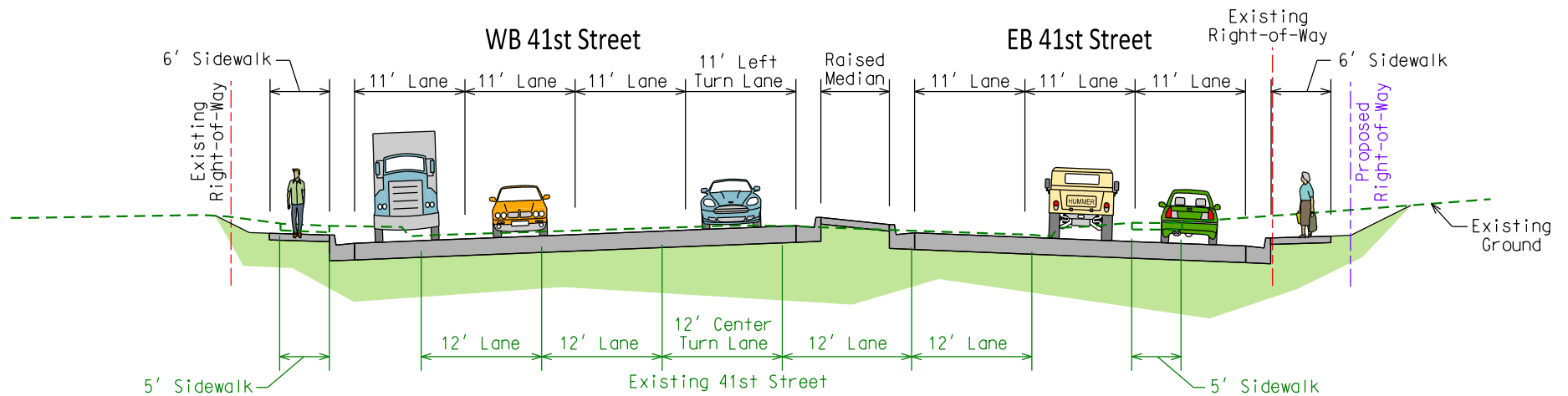
Sioux Falls, SD

Figure
 West
 Exist.



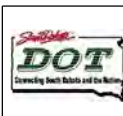


SECTION A-A
LOOKING EAST



SECTION B-B
LOOKING EAST

Drawn By: B. Miller
Date: 3/1/2017
Chkd By: J. Unruh
Date: 3/1/2017
Revision:

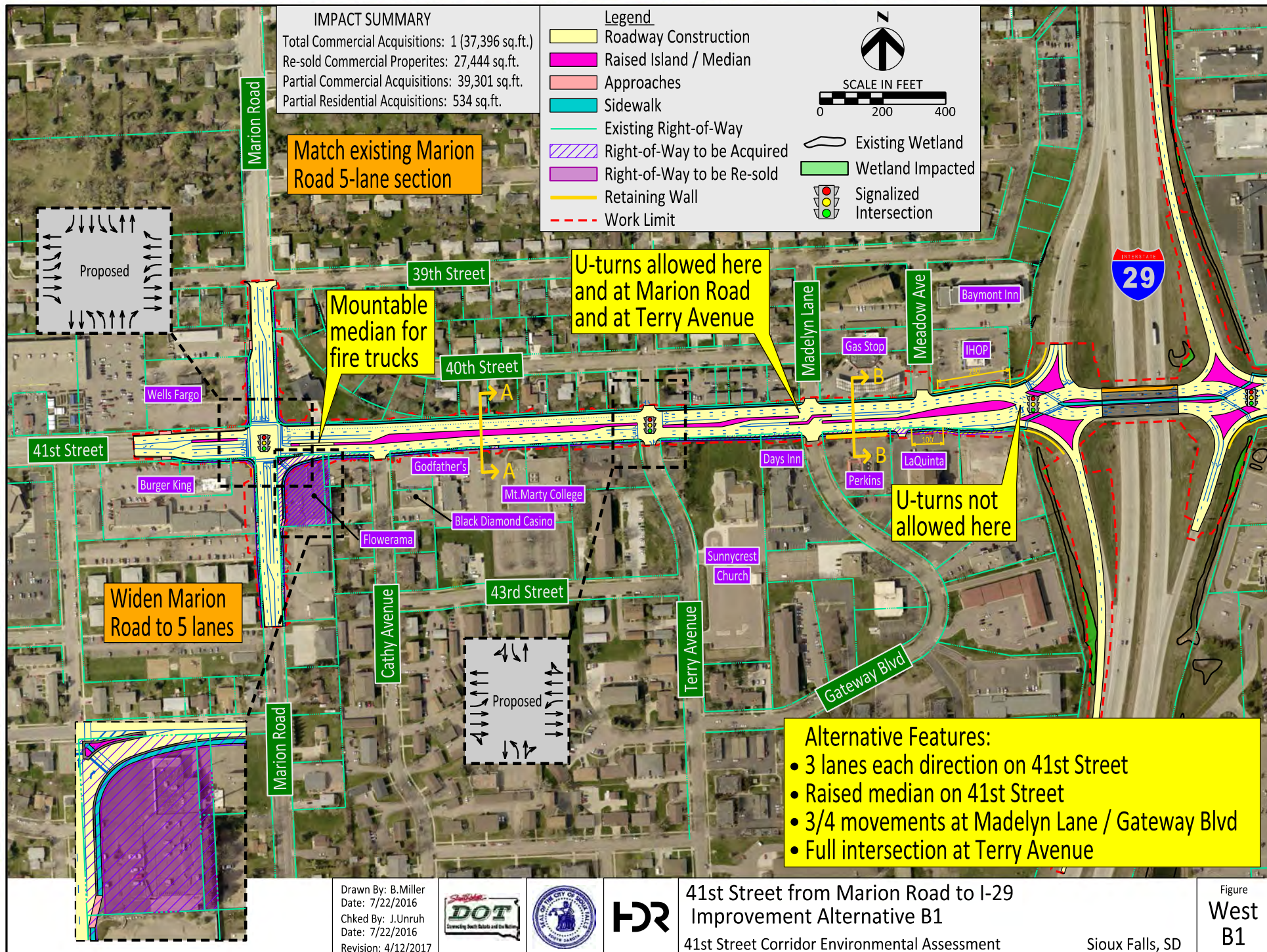


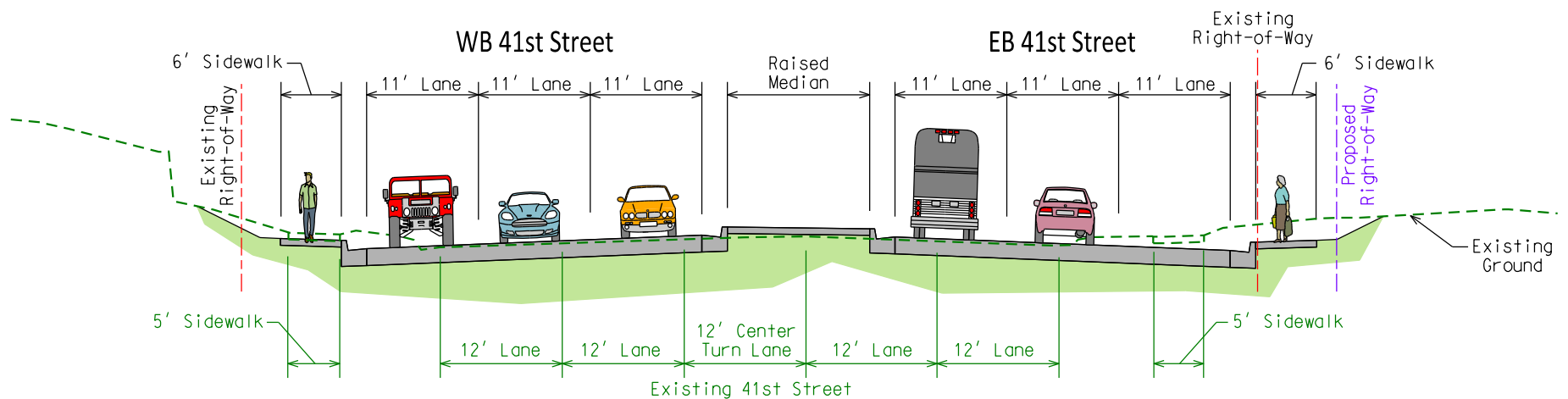
41st Street from Marion Road to I-29
Improvement Alternative A - Typical Sections

41st Street Corridor Environmental Assessment

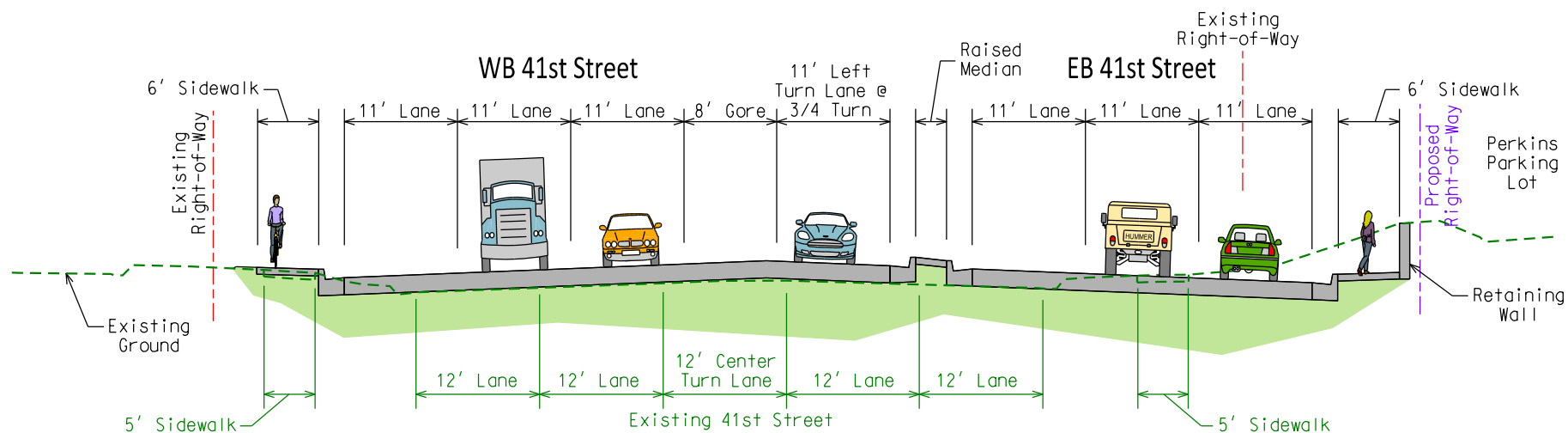
Sioux Falls, SD

Figure
**West
A**



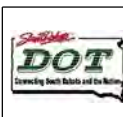


SECTION A-A
LOOKING EAST



SECTION B-B
LOOKING EAST

Drawn By: B. Miller
Date: 3/1/2017
Chkd By: J. Unruh
Date: 3/1/2017
Revision:

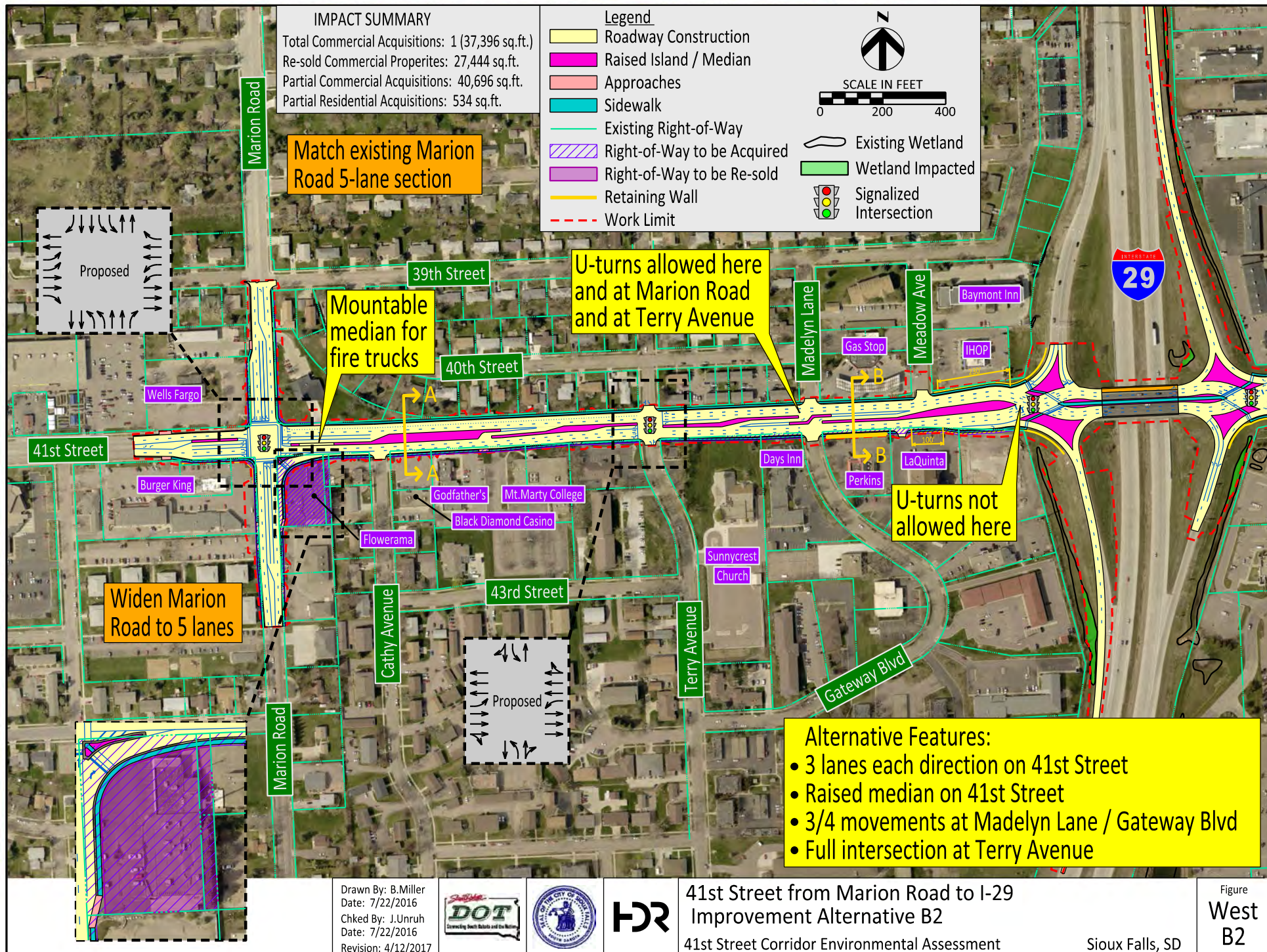


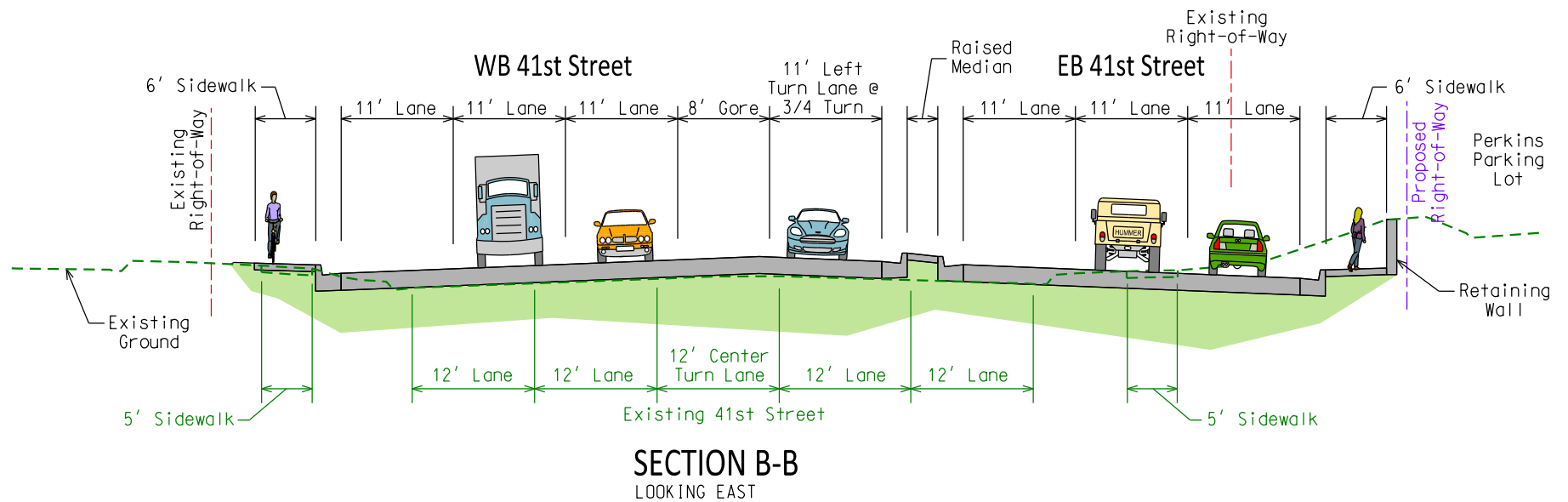
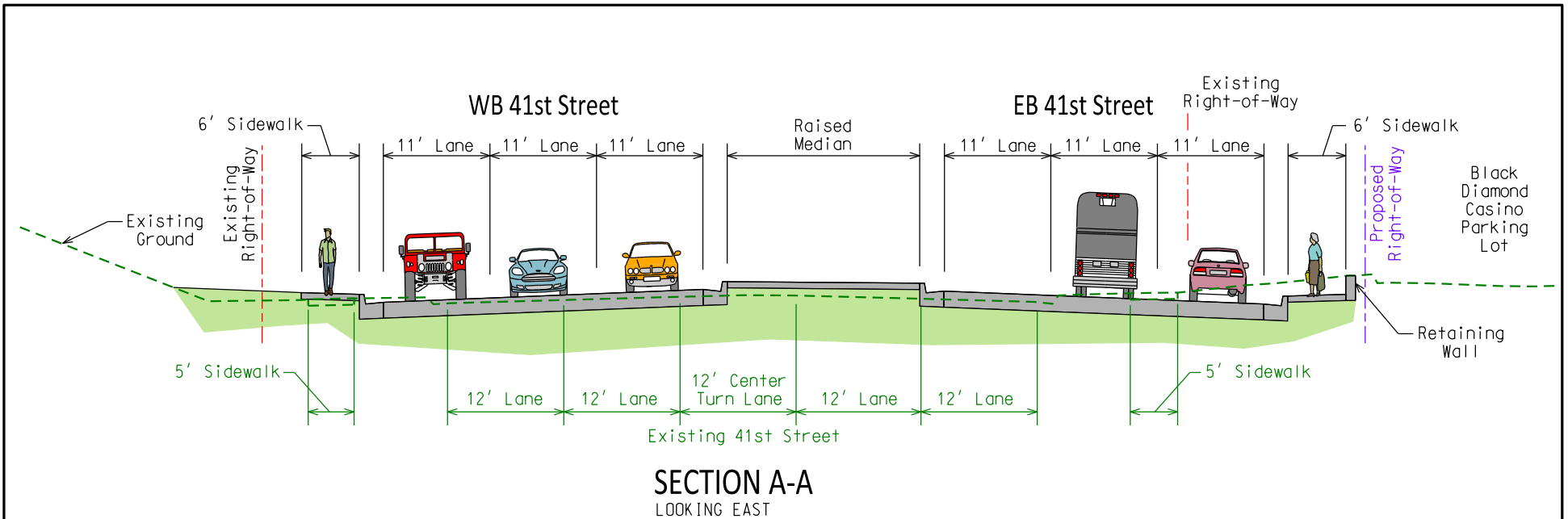
41st Street from Marion Road to I-29
Improvement Alternative B1 - Typical Sections

41st Street Corridor Environmental Assessment

Sioux Falls, SD

Figure
West B1





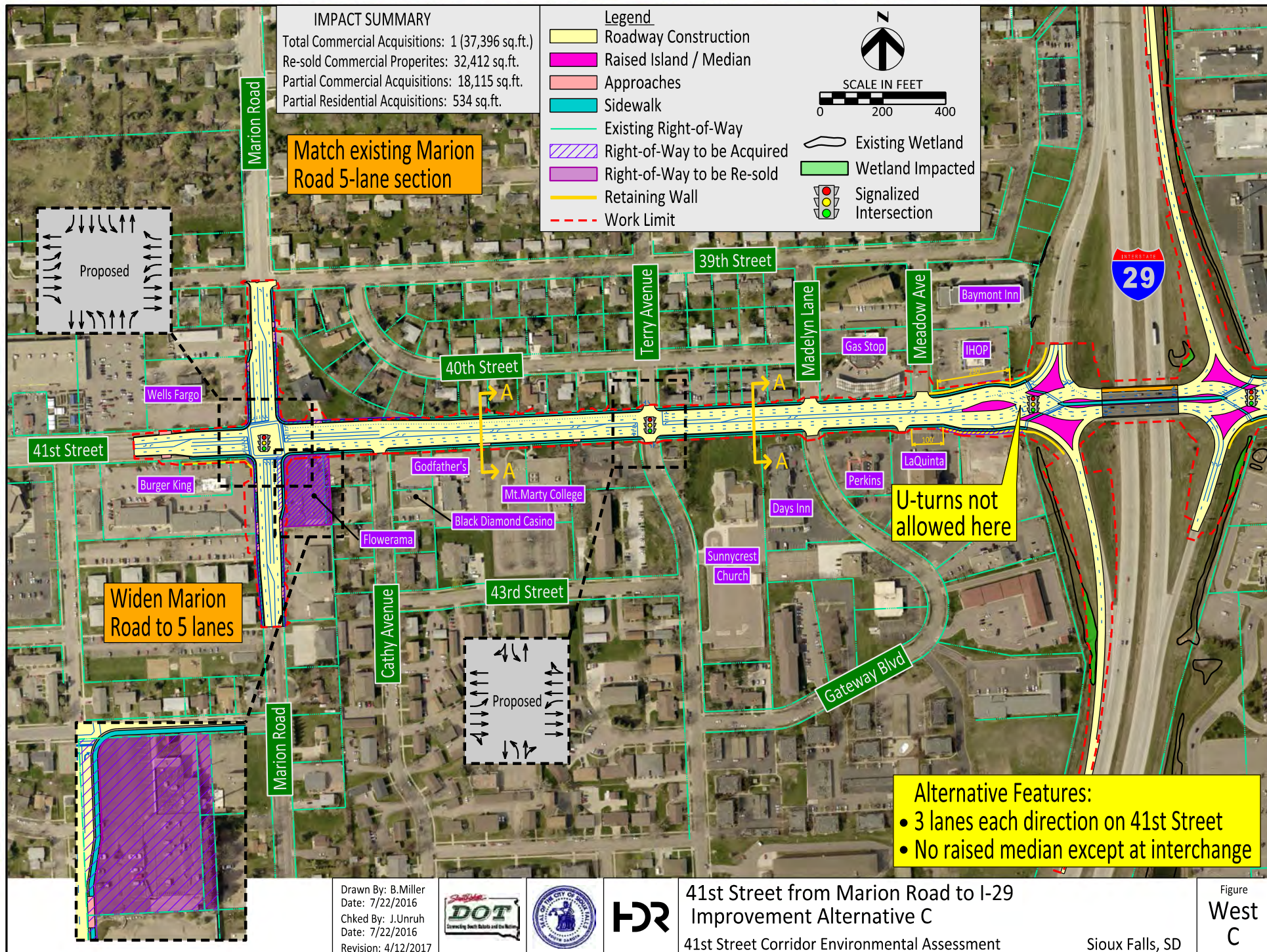
Drawn By: B. Miller
Date: 3/1/2017
Chkd By: J. Unruh
Date: 3/1/2017
Revision:

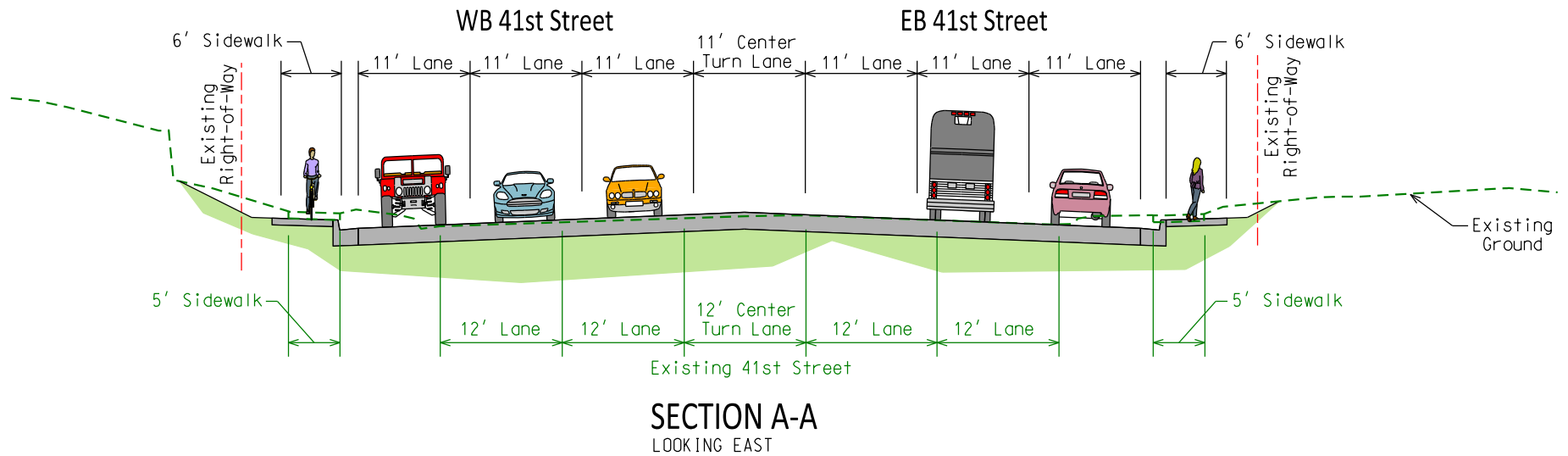


41st Street from Marion Road to I-29
Improvement Alternative B2 - Typical Sections
41st Street Corridor Environmental Assessment

Sioux Falls, SD

Figure
**West
B2**





Drawn By: B. Miller
Date: 3/1/2017
Chkd By: J. Unruh
Date: 3/1/2017
Revision:



41st Street from Marion Road to I-29
Improvement Alternative C - Typical Section
41st Street Corridor Environmental Assessment

Sioux Falls, SD

Figure
West
C



Attachment B

Response to Business/Landowner Concerns

How does recommended Alternative B1 meet landowner concerns?

South side of 41 st Street from Marion Road to I-29				
Property	Representative	Meeting	Concern(s)	Response(s)
Burger King at SW quadrant of 41 st and Marion Road	Tom Walsh	Public meeting 3/14/12	<ol style="list-style-type: none"> 41st Street raised median west of Marion Road would reduce access Cannot lose any parking spaces Must maintain all access points from Marion Road 	<ol style="list-style-type: none"> Raised median will end on the east side of Marion Road with the currently proposed project. Impacts to parking spaces are not proposed. All Marion Road access points are maintained.
Flowerama at SE quadrant of 41 st and Marion Road	Chuck Kuntze	Landowner meeting on 9/27/11	Improvements at 41 st Street and Marion Road are not necessary due to traffic.	41 st Street/Marion Road intersection does not meet peak hour LOS criteria under future traffic conditions without additional lane capacity.
	Vick Patel	Landowner meeting on 9/28/16	Why is Flowerama property the only total acquisition along 41 st Street?	All alternatives require total acquisition of the Flowerama property. Widening of 41 st Street is proposed on the south side because space is available. Widening 41 st Street to the north would require acquisition of many homes and apartment buildings.
Godfathers Pizza	Helen Anfinson	Public meeting 9/21/11	Raised median will make leasing the building much more difficult, if not impossible.	Godfathers and Black Diamond Casino access to and from westbound 41 st Street will be via u-turn movements at Marion Road and Terry Avenue. This has worked reasonably well at other locations such as west 12 th Street. We have also considered a 3/4 access movement for joint Godfathers/MMC driveway. Casino parking spaces and Godfathers drive-through would be compromised with the 3/4 access movement.
Mount Marty College at 5001 W 41 st Street	Steve Hermanson, Chad Zafft, Greg Heine	Landowner meetings on 9/27/11 and 9/28/16	Direct access to the 41 st Street driveway for all traffic directions is preferred. With raised median alternatives, access to westbound traffic via Terry Avenue and 43 rd Street is not desirable.	For MMC students and staff utilizing westbound 41 st Street, access to the MMC property via 43 rd Street and the signalized intersection at 41 st Street/Terry Avenue is reasonable and safer than crossing 3 or 6 through lanes on 41 st Street. U-turns will also be allowed at Marion Road. We have also considered a 3/4 access movement for joint Godfathers/MMC driveway. Casino parking spaces and Godfathers drive-through would be compromised with the 3/4 access movement.
Nielson Office Building at SE quadrant of 41 st and Terry	Terry Nielson	Public meeting 9/21/11	Proposed widening of 41 st Street will put the roadway very close to our building.	South edge of existing sidewalk is 33' from building. Proposed 41 st Street widening will place the south edge of sidewalk at 21' from building. This separation is adequate.
Former Carmike Theater site at SW quadrant of 41 st and I-29	Brian Shiu	Public meeting 3/14/12	<ol style="list-style-type: none"> Raised median will diminish the convenient property access that makes properties along 41st Street desirable for retail sites. Adding lanes to 41st Street is not worth the effort and expense. 	<ol style="list-style-type: none"> The recommended alternative combines the benefit of safety and reasonable access to adjacent properties. Adding lanes on 41st Street west of I-29 is necessary to keep up with growing traffic volumes.

How does recommended Alternative B1 meet landowner concerns?

South side of 41 st Street from Marion Road to I-29 continued				
Property	Representative	Meeting	Concern(s)	Response(s)
Perkins at SE quadrant of 41 st and Gateway	Robert Miller Gary Kuhn	Landowner meetings 4/18/11 and 9/28/16	<ol style="list-style-type: none"> Any access restriction on 41st Street will result in a 40% loss of business. Intersection of 41st and Gateway should have signal instead of Terry Avenue. 	<ol style="list-style-type: none"> 3/4 access at 41st and Gateway only restricts the westbound out movement at 41st and Gateway. A safer and adequate westbound out movement is Gateway Boulevard to Terry Avenue to the signalized intersection at 41st and Terry Avenue. The City has previously examined the request to signalize the 41st and Gateway Avenue intersection and determined that spacing requirements are not met. Terry Avenue is much more of a through route than Gateway Boulevard.

North side of 41 st Street from Marion Road to I-29				
Property	Representative	Meeting	Concern(s)	Response(s)
SF Fire and Rescue at NE quadrant of 41 st and Marion Road	Jay Titus	Landowner meeting 9/28/16	Alternatives with raised median need a mountable section for fire trucks to turn to eastbound 41 st Street	Alternatives A and B have been adjusted to include a section of mountable median to allow fire trucks to cross.
Homeowner at 5005 W 40 th St	Paula Jones	Public meeting 9/21/11 & 3/12/12	Add noise barrier along north side of 41 st Street	Noise barrier was analyzed but found to not be cost feasible. This is the same issue for all build alternatives
Homeowner at 4909 W 40 th St	Marlene Olivier	Public meeting 3/12/12	Reduce speeds on 41 st Street	This is a matter of enforcement of posted speed limits. For an arterial street like 41 st Street, a significant lowering of the speed limit would not fit the purpose of the roadway. This is the same issue for all build alternatives
Homeowners along north side of 41 st Street	general comment	Landowner meeting 9/28/16	Minimize impacts to properties	North side sidewalk will generally remain in the same location as the existing sidewalk so property impacts will be minimal. Widening of 41 st Street is proposed to the south where more space is available. This is the same issue for all build alternatives
Gas Stop at NE quadrant of 41 st and Madelyn	letter from legal representative	follow-up to 3/12/12 public meeting	<ol style="list-style-type: none"> Loss of access and property with all build alternatives would be unacceptable. No-build alternative is preferred. 	<ol style="list-style-type: none"> The proposed improvements do not require additional ROW from Gas Stop property. Access via 3/4 movement at 41st and Madelyn and at Meadow Avenue are considered reasonable and adequate. The Gas Stop now has 4 access points, two from 41st Street, one from Madelyn Lane, and one from Meadow Avenue. To help maintain traffic capacity on 41st Street, closure of both 41st Street entrances is proposed. To accommodate anticipated traffic volumes, 3 through lanes on 41st Street between Marion Road and I-29 are necessary.