IM 0292(50)63 PCN 1241
LINCOLN COUNTY

Structure 42-065-130 over I-29 @ 281st Street

November 2, 2017

Background Information

- Structure is located over I-29 at MRM 63.34 in Lincoln County.
- Structure was built in 1958 and is 254’ in length with a 24’ roadway width.
- Latest Sufficiency Rating of 53.1 (1 to 100 scale).
- Latest NBI Deck Rating = 4 (1 to 9 scale).
- Latest NBI Superstructure Rating = 4 (1 to 9 scale).
- Bridge is classified structurally deficient.
- Average Daily Traffic over structure: 25 (inventory), 22 (2016 count)
- Vertical Clearance over I-29: 16.333’

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Current Issues

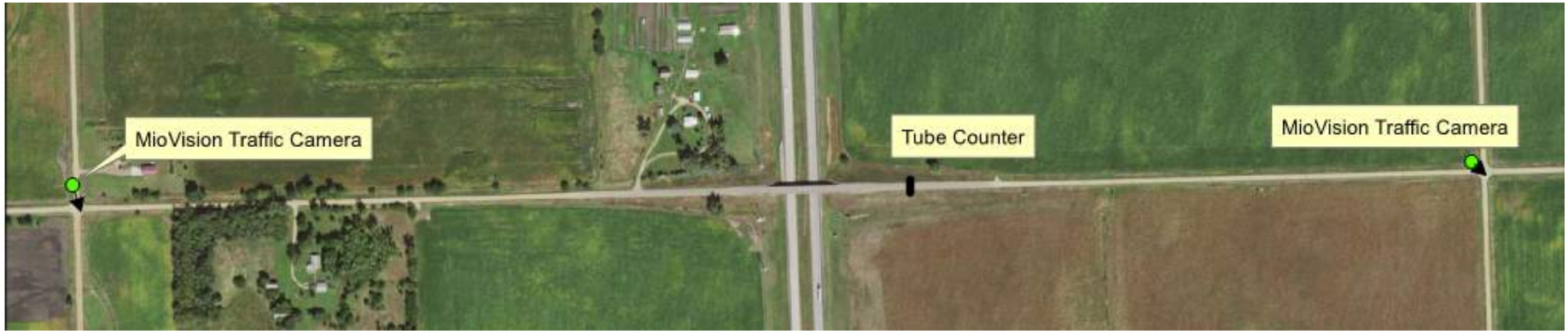
Curb spalling

Deck overlay starting to crack and deteriorate

Leakage through the abutment back wall

Traffic Volume, Classification Count and Origin-Destination Study Conducted

CONDUCTED MAY 9TH THROUGH 13TH AND OCTOBER 24TH THROUGH 31ST, 2016.



281st Street & 470th Avenue

281st Street & 471st Avenue

Traffic Volume & Classification Count

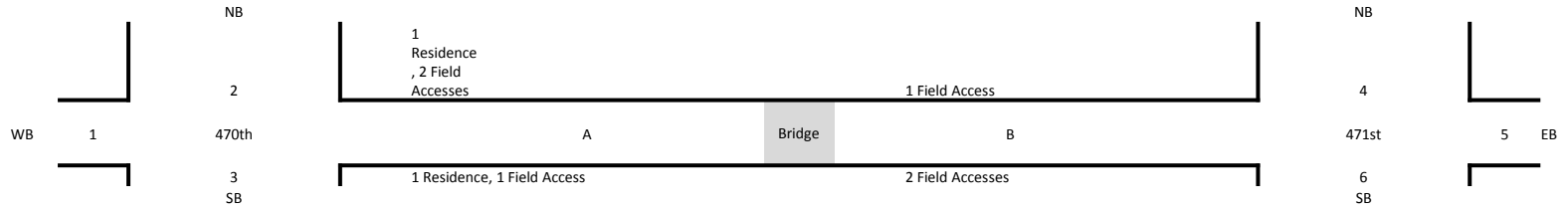
CONDUCTED MAY 9TH THROUGH 13TH AND OCTOBER 24TH THROUGH 31ST, 2016.

Class Volumes from Tube Count @ Bridge						Percent Trucks		
Date	Direction							
	EB		WB			EB	WB	Both
Spring	Cars/Pickups	Trucks	Cars/Pickups	Trucks	Total			
05/09/2016 (partial)	7	1	10	0	18	12.5%	0.0%	5.6%
05/10/2016	9	0	9	0	18	0.0%	0.0%	0.0%
05/11/2016	15	3	18	0	36	16.7%	0.0%	8.3%
05/12/2016	15	1	12	1	29	6.3%	7.7%	6.9%
05/13/2016 (partial)	3	0	1	0	4	0.0%	0.0%	0.0%
	EB		WB			EB	WB	Both
Fall	Cars/Pickups	Trucks	Cars/Pickups	Trucks				
10/24/2016 (partial)	4	1	6	0	11	20.0%	0.0%	9.1%
10/25/2016	5	0	2	1	8	0.0%	33.3%	12.5%
10/26/2016	9	4	8	1	22	30.8%	11.1%	22.7%
10/27/2016	7	2	3	4	16	22.2%	57.1%	37.5%
10/28/2016	11	1	11	1	24	8.3%	8.3%	8.3%
10/29/2016*	3	1	11	0	15	25.0%	0.0%	6.7%
10/30/2016*	4	0	5	0	9	0.0%	0.0%	0.0%
10/31/2016 (partial)	0	0	2	0	2	0.0%	0.0%	0.0%
	EB		WB			EB	WB	Both
Summary	Cars/Pickups	Trucks	Cars/Pickups	Trucks				
Spring Total	49	5	50	1		9.3%	2.0%	5.7%
Fall Total	43	9	48	7		17.3%	12.7%	15.0%
Total	92	14	98	8		13.2%	7.5%	10.4%
Average (24 hour days)	9	1	9	1	20	12.1%	13.1%	11.4%
Average (24 hour weekdays)	10	2	9	1	22	12.0%	16.8%	13.8%

* Weekend Counts

Origin-Destination Study Results

CONDUCTED MAY 11TH THROUGH 13TH AND OCTOBER 25TH THROUGH 28TH, 2016.



Total

Origin		Dest.	#	%. Using Bridge
1	to	A	7	
2	to	A	16	
3	to	A	3	
4	to	A	3	3.2%
5	to	A	5	5.3%
6	to	A	5	5.3%
A	to	A	0	
B	to	A	3	3.2%
Total to Destination			42	

Origin		Dest.	#	%. Using Bridge
1	to	B	0	0.0%
2	to	B	0	0.0%
3	to	B	0	0.0%
4	to	B	0	
5	to	B	0	
6	to	B	2	
A	to	B	3	3.2%
B	to	B	0	
Total to Destination			5	

Origin		Dest.	#	%. Using Bridge
1	to	1	0	
2	to	1	21	
3	to	1	10	
4	to	1	1	1.1%
5	to	1	9	9.5%
6	to	1	2	2.1%
A	to	1	4	
B	to	1	0	0.0%
Total to Destination			47	

Origin		Dest.	#	%. Using Bridge
1	to	2	28	
2	to	2	0	
3	to	2	58	
4	to	2	3	3.2%
5	to	2	8	8.4%
6	to	2	4	4.2%
A	to	2	17	
B	to	2	0	0.0%
Total to Destination			118	

Origin		Dest.	#	%. Using Bridge
1	to	3	8	
2	to	3	71	
3	to	3	0	
4	to	3	0	0.0%
5	to	3	0	0.0%
6	to	3	0	0.0%
A	to	3	3	
B	to	3	0	0.0%
Total to Destination			82	

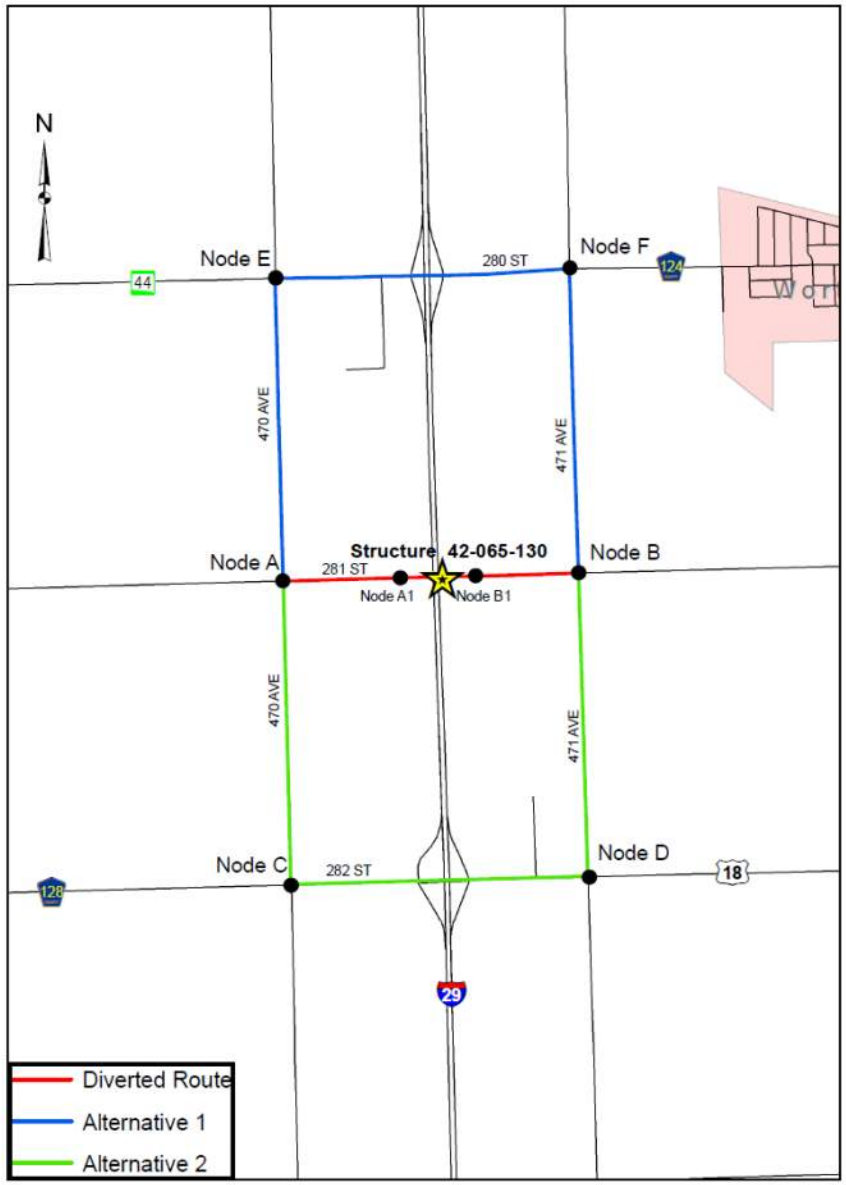
Origin		Dest.	#	%. Using Bridge
1	to	4	7	7.4%
2	to	4	2	2.1%
3	to	4	1	1.1%
4	to	4	1	
5	to	4	32	
6	to	4	72	
A	to	4	6	6.3%
B	to	4	0	
Total to Destination			121	

Origin		Dest.	#	%. Using Bridge
1	to	5	6	6.3%
2	to	5	13	13.7%
3	to	5	0	0.0%
4	to	5	21	
5	to	5	0	
6	to	5	21	
A	to	5	5	5.3%
B	to	5	0	
Total to Destination			66	

Origin		Dest.	#	%. Using Bridge
1	to	6	2	2.1%
2	to	6	1	1.1%
3	to	6	0	0.0%
4	to	6	54	
5	to	6	9	
6	to	6	0	
A	to	6	6	6.3%
B	to	6	1	
Total to Destination			73	

Total Across Bridge Trips:	95
EB	52
WB	43

Route Diversion Alternatives



Route Alternative	Origin – Destination Pair					
	A – B via C - D	A – B via E – F	A – D	A – F	B –C	B - E
1	100 %	0 %	0 %	0 %	0 %	0 %
2	0 %	100 %	0 %	0 %	0 %	0 %
3	16%	16 %	16%	22%	0%	30%
4	4%	4%	22%	28%	6%	36%

Cost Estimate of Options

- Replace Structure* @ $ 2,009,000

  * Does not include reoccurring, annual maintenance costs or future bridge preservation costs.

- Remove Structure @ $ 312,000

User Cost Analysis

Removal with 55 mph on Gravel Roads

Alternative	Net Present Value of Increase in User Costs (75 years)	Benefit / Cost
1	$1,085,757.29	1.56
2	$1,312,030.02	1.29
3	$1,201,929.53	1.41
4	$1,031,233.64	1.65

Removal with 45 mph on Gravel Roads

Alternative	Net Present Value of Increase in User Costs (75 years)	Benefit / Cost
1	$1,059,648.11	1.60
2	$1,285,920.84	1.32
3	$1,157,597.90	1.47
4	$980,463.71	1.73

User Cost Analysis Summary

Assuming that the bridge provides the shortest & quickest trip for all 25 vehicles currently using it each day and that all 25 vehicles would follow Route Alternative 2 (which provides the shortest detour by 42 feet) in its entirety.*

It will take 43,490 days (119+ years) for the increase in user costs to exceed the $1,697,000 savings to the Department to remove versus replace assuming a travel speed of 55mph on the township gravel roads and 10% Trucks.

The estimated life for the replacement bridge is 75 years.

*Origin-Destination Data obtained in May and October of 2016 suggests less than half of the vehicles would actually make the full detour.

Questions?

Either leave comment sheet or mail to:

Steve Gramm
SDDOT-Project Development Office
700 East Broadway Avenue
Pierre, SD 57501

Comments due November 30, 2017