Regional Solicitation Before & After Study Phase II

May 2021

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METROPOLITAN COUNCIL

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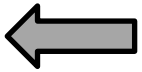
Study Objectives

- **Task 1: Measure the benefits of funded projects by comparing their before & after conditions.**

- **Task 2 - 6: Research Ways to Streamline the Application Process.**
  - Focus Groups
  - Bicycle and Pedestrian Usage Measure
  - Projects Not Funded by Regional Solicitation
  - Risk Assessment
  - Best Practices for Crash Modification Factors (CMFs)



Update was provided at the April 22, 2021 TAC F&P Meeting

Phase I Study Measures

- Performance Measure #1: Roadway Congestion
- Performance Measure #2: Roadway Safety
- Performance Measure #3: Transit
- Performance Measure #4: Bicycle & Pedestrian Safety
- Performance Measure #5: RBTN Contribution
- Performance Measure #6: Pedestrian/Bicycle Connections Achieved
- Performance Measure #7: HSIP Safety Benefits

Measuring Before & After Conditions

Challenges: Best practices suggest two to three years of "after" condition data is needed to provide an accurate picture of benefits (e.g., reduction in roadway congestion and crashes). This has presented challenges in measuring a number of projects since the 2014 funding cycle.

Regional Solicitation Year	Program Years
2014	2017, 2018 & 2019
2016	2020 & 2021
2018	2022 & 2023
2020	2024 & 2025

Measuring Before & After Conditions

Challenges: 2020 and 2021 data sets (e.g., crash data, traffic volumes, and transit ridership) are not accurate/reliable – too many anomalies on how people were moving throughout the region during the pandemic.

Measuring Before & After Conditions

- Explored New Methodologies
  - Streamline the reporting process
  - Utilize “Big Data” sets
- Developed How to Manuals
  - The congestion methodology has been refined to use StreetLight Data.
  - A tailored crash reporting system (using GIS and MnCMAT data) was developed to monitor “after” conditions.

Congestion Measure

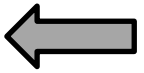
- Roadway congestion benefits are typically measured by conducting a no-build (without improvement) and build (with improvement) condition by using traffic modeling software (i.e., Synchro analysis).
- This requires a larger level of effort to replicate to conduct after analysis of a built project.
  - Data collection
  - Turning movement counts
  - Traffic model development

Congestion Measure

- StreetLight data was tested to measure before & after conditions for six roadway expansion projects to determine travel time reductions.
- StreetLight data is subscription-based service that provides an aggregate of location-based service records collected from cellphone providers that track traffic congestion and traffic times, amongst other attributes.

Congestion Measure

Developed “How To Guide” for more efficient before and after data collection



- StreetLight data offers data sets that have been populated as early as 2011, giving greater confidence in using the data to analyze before & after conditions.
- 2014 Regional Solicitation: Roadway Expansion Projects
  - TH 41 Expansion (Carver County)
  - 70th St and Robert Trail Roundabout (Dakota County)
  - CSAH 42/52 Interchange (Rosemount)
  - CSAH 13/I-94 Crossing (Woodbury)
  - CSAH 31 Expansion (Eagan)

Congestion Measure

2014 Regional Solicitation: Funded Roadway Expansion Projects	VHT Reduction AM	PM	All Day
TH 41 Expansion (Carver County)	19%	2%	11%
70th St and Robert Trail Roundabout (Dakota County)	1%	17%	7%
CSAH 42/52 Interchange (Rosemount)	10%	-3%	13%
CSAH 13/I-94 Crossing (Woodbury)	6%	5%	4%
CSAH 31 Expansion (Eagan)*	-50%	-37%	-28%

*Central Park Commons shopping center partially opened during analysis periods, causing incomparable results

Congestion Measure

2014 Regional Solicitation: Funded Roadway Expansion Projects	Travel Time Reduction AM	PM	All Day
TH 41 Expansion (Carver County)	14%	29%	20%
70th St and Robert Trail Roundabout (Dakota County)	6%	15%	7%
CSAH 42/52 Interchange (Rosemount)	5%	6%	16%
CSAH 13/I-94 Crossing (Woodbury) *	-3%	-8%	0%
CSAH 31 Expansion (Eagan) **	-43%	-19%	-24%

*Due to later construction finish analysis periods were different then others and the after was closer to the start of COVID

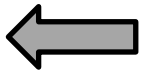
**Central Park Commons shopping center partially opened during analysis periods, causing incomparable results

Safety Measure

- Roadway safety benefits have typically been collected by manually comparing the before and after crash analysis often collected from MnCMAT
- This requires time to extract and assemble data to conduct after analysis of a built project.
  - Data collection
  - Calculation to determine total crashes reduced
  - MnDOT crash listing and diagram

Safety Measure

- A customized Geographic Information System (GIS) tool was created to automate monitoring and reporting results.
- The following is reported for the 2014 Roadway Expansion and Reconstruction/Modernization projects:
  - Total crashes
  - Crash costs
  - Fatal and serious crashes
  - Pedestrian or bike crashes
  - Crash rate
  - Fatal and serious crash rate

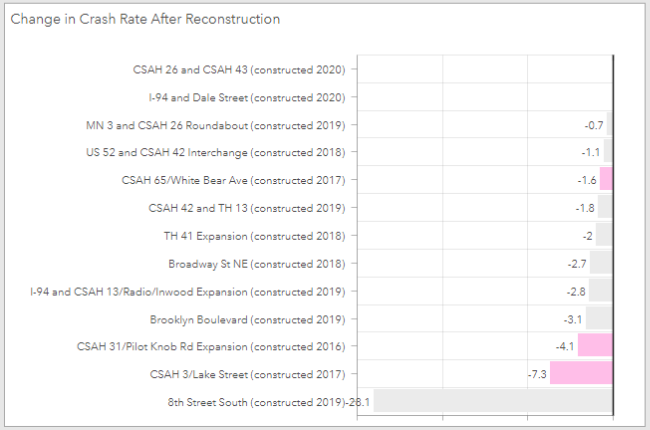


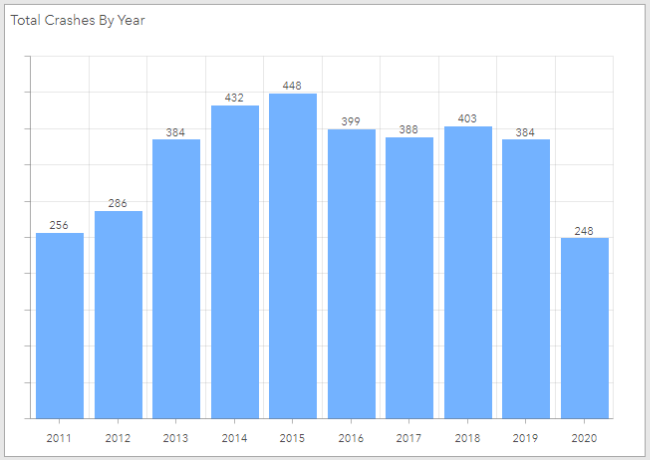
Developed “How To Guide” for more efficient before and after data collection

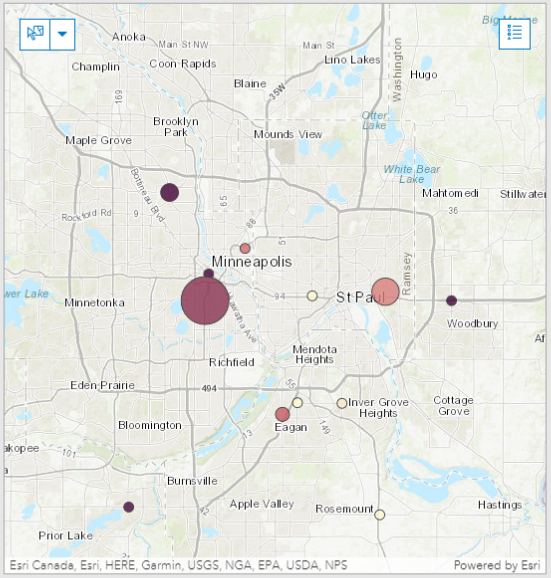
Safety Measure

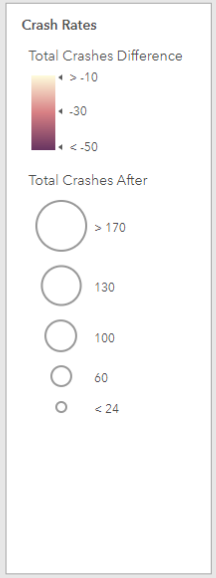
2014 Regional Solicitation Projects - Before & After Analysis

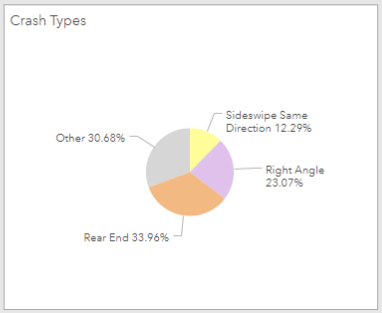
Project: All Projects

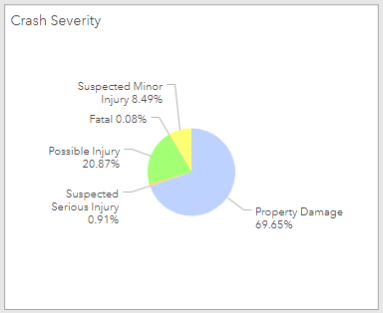












8th Street South Reconstruction (Construction Finished 2019)

	Before	After	Difference
Total Crashes	232	24	-208
Crash Cost	$10,259,800	$1,390,400	$-8,869,400
Total K&A	1	0	-1
Total Ped&Bike	25	3	-22
Crash Rate	32.08	4.01	-28.07
K&A Crash Rate	13.83	0.00	-13.83

Broadway St NE Reconstruction (Construction Finished 2018)

	Before	After	Difference
Total Crashes	44	16	-28
Crash Cost	$2,456,800	$524,600	$-1,932,200
Total K&A	1	0	-1
Total Ped&Bike	1	0	-1
Crash Rate	4.24	1.52	-2.73
K&A Crash Rate	9.64	0.00	-9.64

Brooklyn Boulevard Reconstruction (Construction Finished 2019)

	Before	After	Difference
Total Crashes	158	53	-105
Crash Cost	$11,565,400	$2,420,000	$-9,145,400
Total K&A	6	0	-6
Total Ped&Bike	10	0	-10

Safety Measure

- A three year window (minimum) of crash data is best to measure safety outcomes. Projects with less than three years of after data should be considered “preliminary findings”.
- Projects completed after 2017 are preliminary.
- The following projects were completed before January 2018 and have a full three years of crash data.
  - CSAH 3/Lake Street Reconstruction (Hennepin County)
  - CSAH 31/Pilot Knob Road (City of Eagan)
  - CSAH 65/White Bear Ave Reconstruction (Ramsey County)

Safety Measure

Crash Analysis Summary

2014 Regional Solicitation: Funded Expansion & Modernization Projects	Total Crashes	Crash Cost	Total K & A	Total Ped & Bike	Crash Rate*	K & A Crash Rate**
CSAH 3/Lake Street Reconstruction (Hennepin County)	-40	-$2.5M	-2	-2	-7.31	-32.61
CSAH 31/Pilot Knob Road (City of Eagan)	-31	-$400K	0	+1	-4.07	0
CSAH 65/White Bear Ave Reconstruction (Ramsey County)	-26	-$97K	0	+1	-1.55	0

*Crash rate is per million vehicle miles traveled

**K&A is per 100M vehicle miles traveled

Thank You