
Memorandum

The City of Traverse City
Engineering Department



TO: Tim Lodge, P.E., City Engineer *TL*
FROM: Colby Winter, Seasonal Engineering Aide *Colby Winter*
DATE: Monday, July 11, 2016
SUBJECT: Munson Ave/Three Mile Rd to 14th St/Division Rd Trip Timing

City Engineering conducted multiple trips between Silver Lake/14th and Munson/Three Mile between Friday, July 1st 2016 and Friday, July 8th 2016 via multiple routes. All routes were performed in both eastbound and westbound directions. The first route, which will be referred to as the Grandview Parkway Route in this memo, started on Munson Avenue at Three Mile Rd, continued westbound onto Grandview Parkway, and after a left turn onto Division St, ended at the intersection. The second route, which will be referred to as the Eighth Street Route in this memo, started on Munson Avenue at Three Mile Rd, continued until the intersection of Eighth St and Munson Ave, where a left turn was made onto Eighth St. After making a left turn onto Eighth St, the route was followed until Eighth St at Union St, where another left turn was made onto Union St, followed by a right turn six blocks later onto Fourteenth St, which then ended after continuing on Fourteenth St until the Division St and Fourteenth St Intersection. The final route followed, which will be referred to as the South Airport Route in this memo, started at the intersection of Munson Avenue and Three Mile Rd heading southbound on Three Mile Rd until a right turn is made onto South Airport Rd. After following South Airport Road for many miles, another right turn is made onto Division St. The South Airport Route ends after following Division St to the Fourteenth St intersection. As a note for this memo, the "Distance Optimization" percentage is calculated by taking the linear length between Munson Ave/Three Mile Rd and Division St/Fourteenth St and dividing it by the average of the linear length and the trip length.

The Grandview Parkway Route has the shortest average trip time with the average trip time clocking in at 0:12:24. The Grandview Parkway also has the least amount of turns, with only one turn heading westbound, and two turns heading eastbound (westbound traffic never has to stop at Grandview Parkway/E Front St, eastbound does). The distance optimization percentage is 83.5%. The mean speed, including stops, is 22.51 MPH and the average time per mile is 0:02:40. The average amount of gasoline used on this trip is .3099 gallons (2.5 pints) with the average gasoline cost for this trip being \$0.70.

The Eighth St Route has an average trip time clocking in at 0:12:32. The Eighth St Route is the most fuel efficient, with a distance optimization percentage at 89.4%, the average gasoline consumed at .2749 gallons (2.2 pints), and the average fuel cost for the trip being \$0.62. The average speed is the slowest of the three routes, being 22.5 MPH and the average time per mile being 0:02:40. There is also the most amount of turns on this route, with three turns on the Eighth St Route.

The South Airport Route has the longest average trip time, with the average trip time being 0:17:52. With the longest average trip time, it also has the least amount of distance

optimization, with the percentage being 64.4% and the most amount of fuel consumed at .4678 gallons (3.75 pints), costing \$1.05. However, this trip did have the fastest mean speed at 26.86 MPH on average including all stops.

Encl: Statistics and Raw Data Workbook
 Trip Routes

Silver Lake Rd/14th to Munson Ave/3 Mile Rd		via Grandview Parkway		S T A T I S T I C S	
LINEAR LENGTH BETWEEN POINTS (MILES)		TRIP LENGTH IN MILES			
3.80		5.30		Mean Speed (MPH) 25.65	
				Minutes per Mile 0:02:20	
				Average Trip 00:12:24	
				Distance Optimization 83.52%	
				Average Fuel for Trip (gallons) 0.3099	
				Average Fuel Cost for Trip \$ 0.70	
				Average Gas Price per Gallon \$ 2.254	
Trip Time Recorded		Date and Time			
0:11:14		7/5/2016 12:30 PM			
0:10:47		7/8/2016 9:03			
0:10:39		7/5/2016 2:00 PM			
0:14:18		7/6/2016 2:55 PM			
0:11:10		7/7/2016 9:30 AM			
0:17:51		7/7/2016 12:25 PM			
0:10:49		7/7/2016 9:24 AM			
Eastbound					
Westbound					

Source(s)
http://www.rta.dot.gov/bts/sites/rta.dot.gov/bts/files/publications/national_transportation_statistics/html/table_04_23.html
<http://gasprices.aaa.com/>

Silver Lake Rd/14th to Munson Ave/3 Mile Rd

via 8th St

S T A T I S T I C S

LINEAR LENGTH BETWEEN POINTS (MILES)

3.80

TRIP LENGTH (MILES)

4.70

Mean Speed (MPH)	22.51
Minutes per Mile	0:02:40
Average Trip	00:12:32
Distance Optimization	89.41%

Average Fuel for Trip
(gallons) 0.2749

Average Fuel Cost for
Trip \$ 0.62

Average Gas Price
per Gallon \$ 2.254

Trip Time Recorded	Date and Time
0:13:02	7/5/2016 10:00 AM
0:12:57	11:20 AM
0:11:37	7/7/2016 8:50 AM

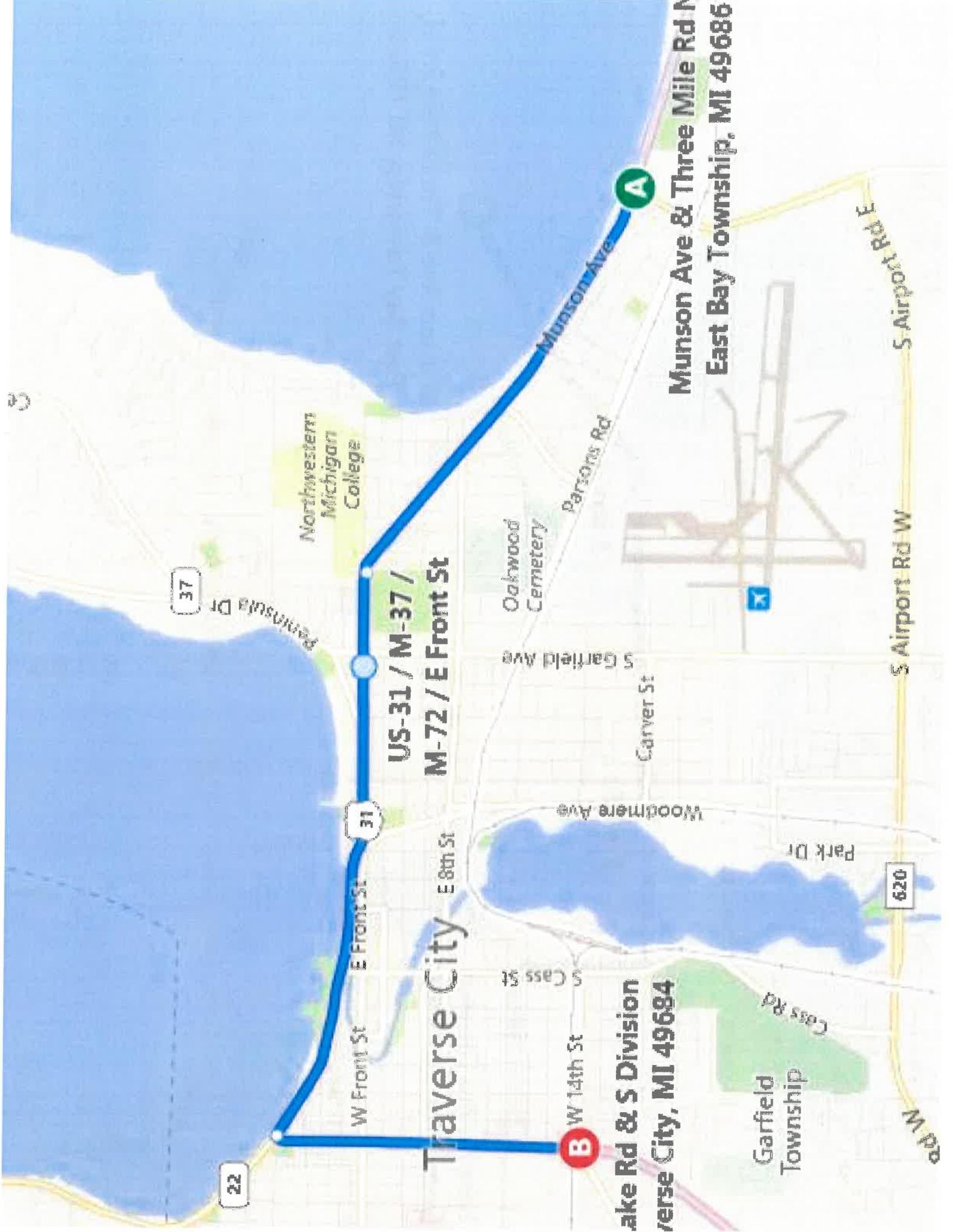
0:12:53	7/5/2016 10:15 AM
0:13:02	7/6/2016 2:09 PM
0:11:50	10:59 AM
0:12:20	7/7/2016 9:05 AM

Eastbound

Westbound

Silver Lake Rd/14th to Munson Ave/3 Mile Rd via S. Airport Rd.		S T A T I S T I C S	
LINEAR LENGTH BETWEEN POINTS (MILES)		TRIP LENGTH IN MILES	
3.80		8.00	
Eastbound	Trip Time Recorded	Date and Time	
	0:16:32	7/6/2016 2:30 PM	
Westbound	0:17:42	7/5/2016 12:45	
	0:16:55	7/5/16 12:30 PM	
	0:17:35	7/6/2016 1:01 PM	
	0:19:01	7/7/2016 12:15	
	0:19:29	7-7-16 12:45 PM	
Mean Speed (MPH)		26.86	
Minutes per Mile		0:02:14	
Average Trip		00:17:52	
Distance Optimization		64.41%	
Average Fuel for Trip (gallons)		0.4678	
Average Fuel Cost for Trip		\$ 1.05	
Average Gas Price per Gallon		\$2.254	

Source(s)
http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/national_transportation_statistics/html/table_04_23.html
<http://gasprices.aaa.com/>



B Lake Rd & S Division
Traverse City, MI 49684

**US-31 / M-37 /
M-72 / E Front St**

A Munson Ave & Three Mile Rd
East Bay Township, MI 49686

Northwestern
Michigan
College

Oakwood
Cemetery



W Front St
E Front St

Traverse City
E 8th St

Woodmere Ave

S Cass St

W 14th St

Carver St

S Garfield Ave

Parsons Rd

Munson Ave

Garfield
Township

Cass Rd

Park Dr

620

S Airport Rd W

S Airport Rd E

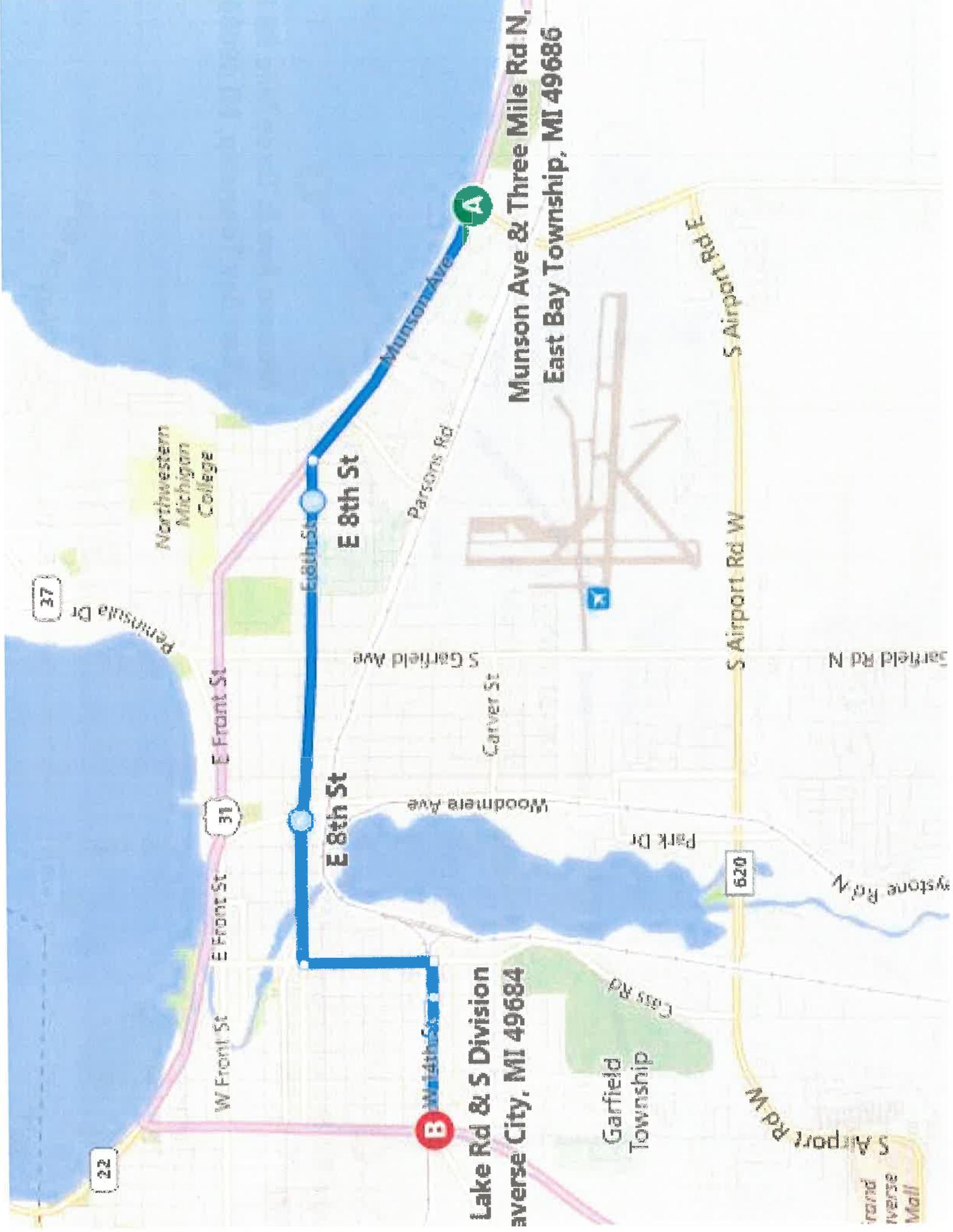
W Rd

37

31

22

36



**Munson Ave & Three Mile Rd N,
East Bay Township, MI 49686**

**Lake Rd & S Division
Avenue City, MI 49684**

B

A

E 8th St

E 8th St

Munson Ave

Northwestern
Michigan
College

Garfield
Township

37

31

22

620

W Front St

E Front St

E Front St

Peninsula Dr

E 8th St

S Garfield Ave

Carver St

Woodmeir Ave

Park Dr

Cass Rd

S Airport Rd W

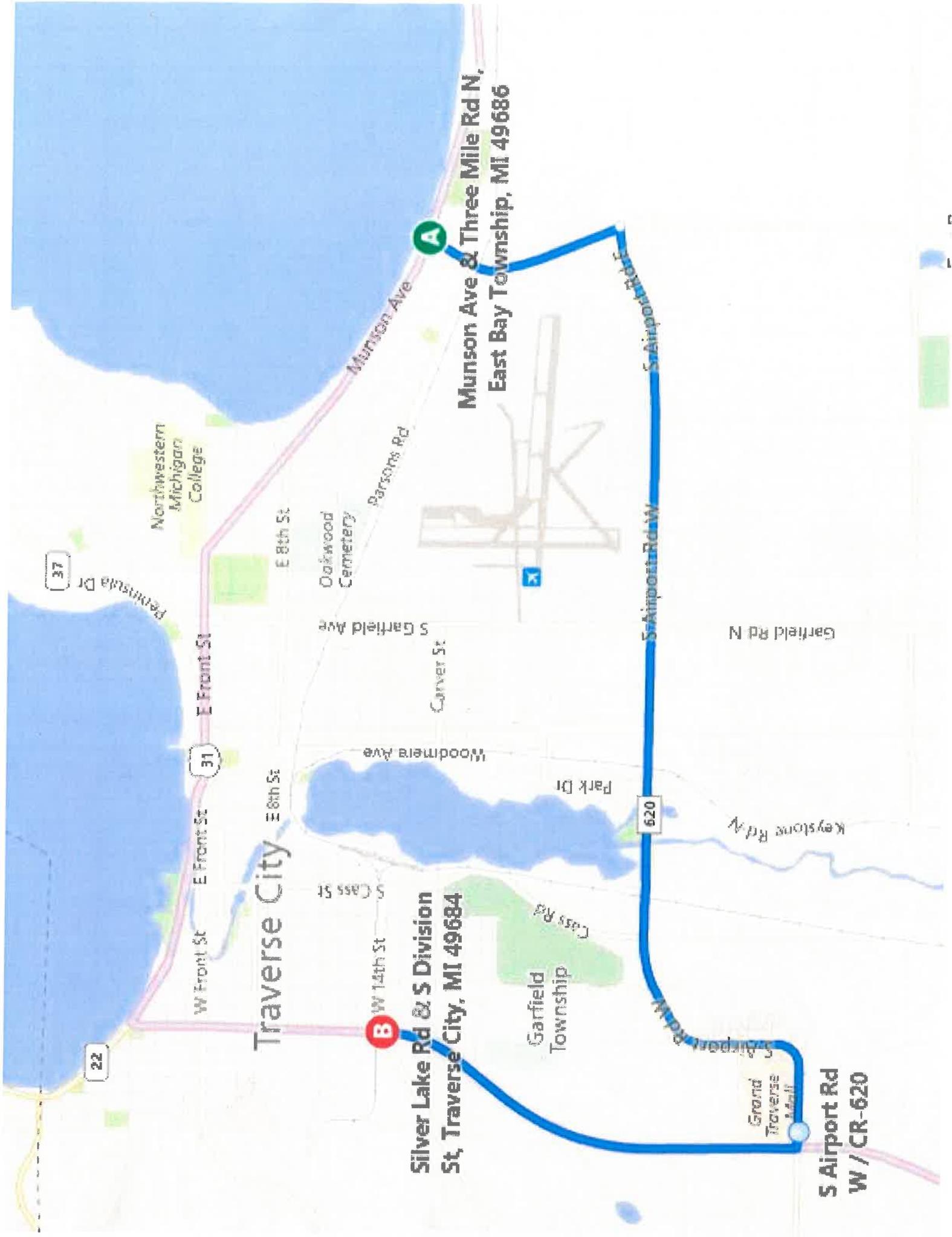
S Airport Rd E

Garfield Rd N

Ystone Rd N

S Airport Rd W

Grand
Avenue
Mail



Silver Lake Rd & S Division St, Traverse City, MI 49684

Munson Ave & Three Mile Rd N, East Bay Township, MI 49686

S Airport Rd W / CR-620

Traverse City

B

A

22

31

620

Northwestern Michigan College

Oakwood Cemetery

Garfield Township

Keystone Rd N

Garfield Rd N

E Front St

E 8th St

S Cass St

W 14th St

S Garfield Ave

Carver St

Woodmere Ave

Parsons Rd

Munson Ave

S Airport Rd W

S Airport Rd W

Grand Traverse Mall

S Airport Rd E

37

Peninsula Dr

