Lowell Elementary Traffic Investigation

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SAINT LOUIS COUNTY MINNESOTA

Rice Lake Road Traffic History – Lowell Elementary

Prior 1992

- All Lowell Elementary school related traffic accessed by Barnes Rd

1992

- Campus expansion added entrance on Rice Lake Rd

2004/2005

- St. Louis County completed a traffic and engineering investigation for a school zone speed limit. It was determined this was not justified.

2005

- St. Louis County changed the Rice Lake Rd cross-section to include dedicated turn lanes for the Lowell Elementary entrance.

Source: Rice Lake Road Corridor & Traffic Impact Study, July 2006, Duluth-Superior Metropolitan Interstate Council

Traffic Engineering Investigation – Sight Distance

- Available sight distance to school entrance
  - Northbound traffic = 625 ft
  - Southbound traffic = unrestricted
- Minimum recommendations for Intersection Sight Distance (left-turn from stop)
  - 45 mph → 500 ft Sufficient
  - 50 mph → 555 ft Sufficient
- Minimum recommendations for Stopping Sight Distance
  - 45 mph with 6% downslope → 400 ft Sufficient
  - 50 mph with 6% downslope → 474 ft Sufficient

Traffic Engineering Investigation – Crash History

2017-2021 Rice Lake Road Corridor Unsignalized Intersections Crash History

South

Intersection	Type	Fatal	Serious Injury	Minor Injury	Possible Injury	Property Damage	Total Crashes	Crashes/ Year	Severity Index
13th St	T			1		5	6	1.2	8
14th St	T						0	0	0
Ivy St	T					1	1	0.2	1
Marshall School	2T					2	2	0.4	2
Baylis St	T					1	1	0.2	1
Pecan Ave	T						0	0	0
Boulder Dr	T						0	0	0
Hickory St/Chinook Dr	+				1	2	3	0.6	4
Lowell Elementary	T				1	1	2	0.4	3
Barnes Rd	T						0	0	0
Public Safety Dr	T					1	1	0.2	1

North

Severity Index = (Fatal x 5) + (Serious Injury x 4) + (Minor Injury x 3) + (Possible Injury x 2) + (Property Damage Only x 1)

Traffic Engineering Investigation – Speed Study

Traffic Engineering Investigation – Speed Study

- Speed study conducted on Rice Lake Road for the 24 hr period beginning Monday, September 24, 2018 at 11:00 am and ending Tuesday, September 25, 2018 at 11:00 am.
- Posted speed limit = 45 mph

Northbound Traffic		**Southbound Traffic**	
Average Speed	41 mph	Average Speed	42 mph
85th Percentile Speed	47 mph	85th Percentile Speed	48 mph
10 mph Pace	41-50 mph	10 mph Pace	41-50 mph
Percent in Pace	67%	Percent in Pace	71%

Traffic Engineering Investigation – Speed Study

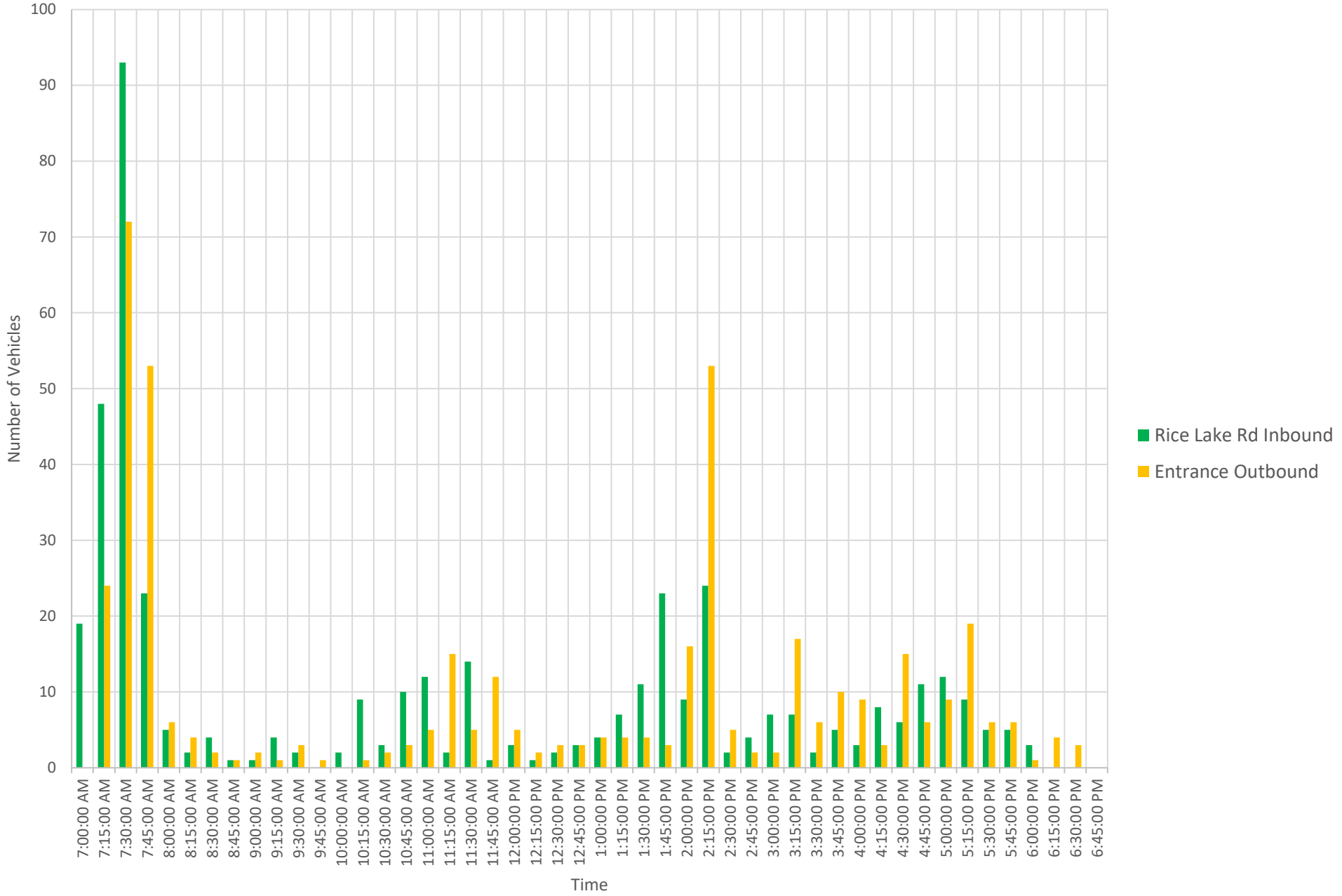
- A speed study was also conducted on Rice Lake Road on January 15-18, 2013 near the Lowell Elementary entrance.
- Posted speed limit = 45 mph

Both Directions	
Average Speed	41 mph
85th Percentile Speed	47 mph
10 mph Pace	39-49 mph
Percent in Pace	66%

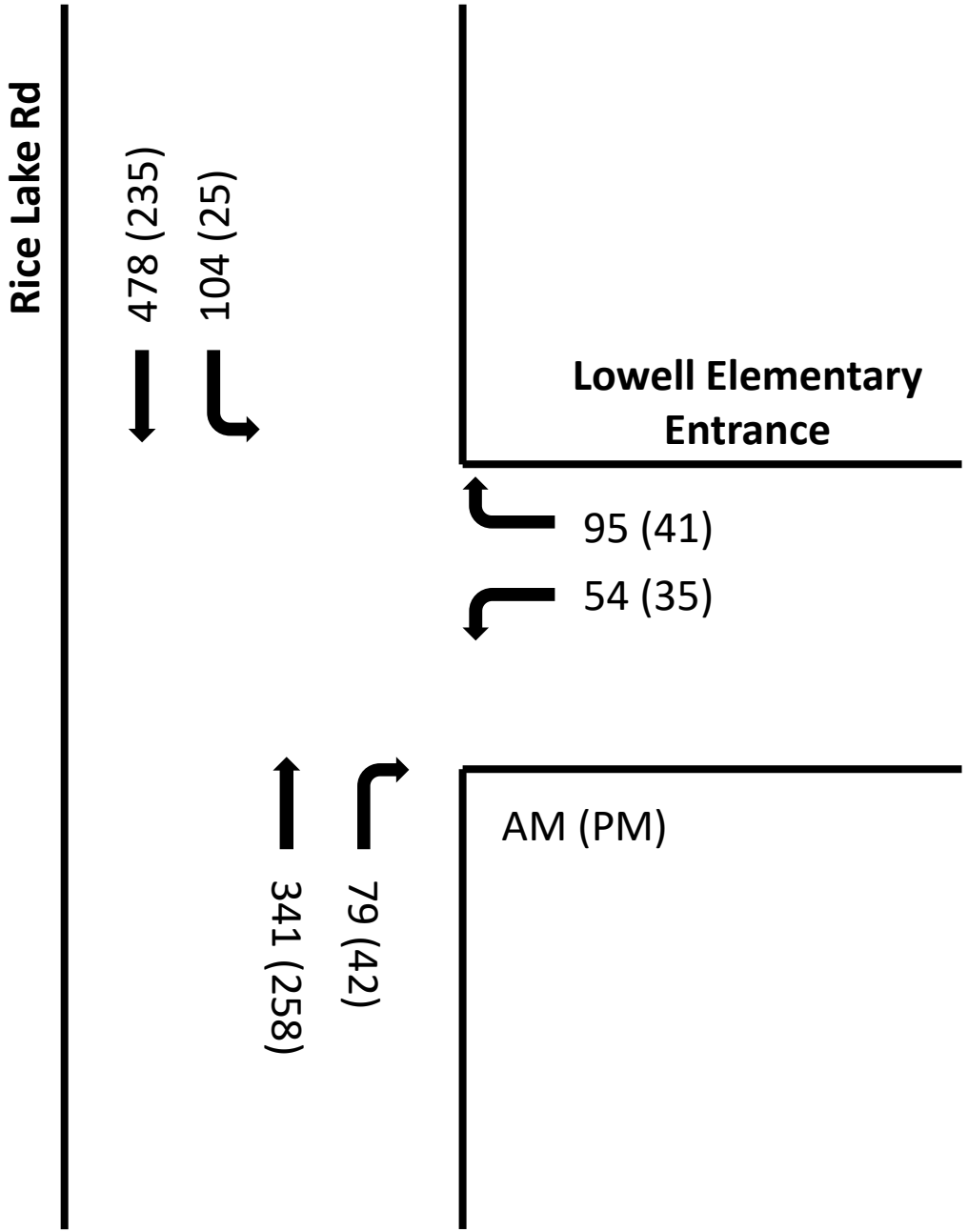
Traffic Engineering Investigation – Traffic Volume

- Turning movement count performed on Tuesday, September 25, 2018
- Peak hour arrival and departure times
  - Arrival Period – 7:00 am to 8:00 am
  - Departure Period – 1:30 pm to 2:30 pm
- Peak 15 min arrival and departure times
  - Arrival Period – 7:30 am to 7:45 am
  - Departure Period – 2:15 pm to 2:30 pm

Lowell Elementary Traffic Volume



Peak Hour Turning Movements



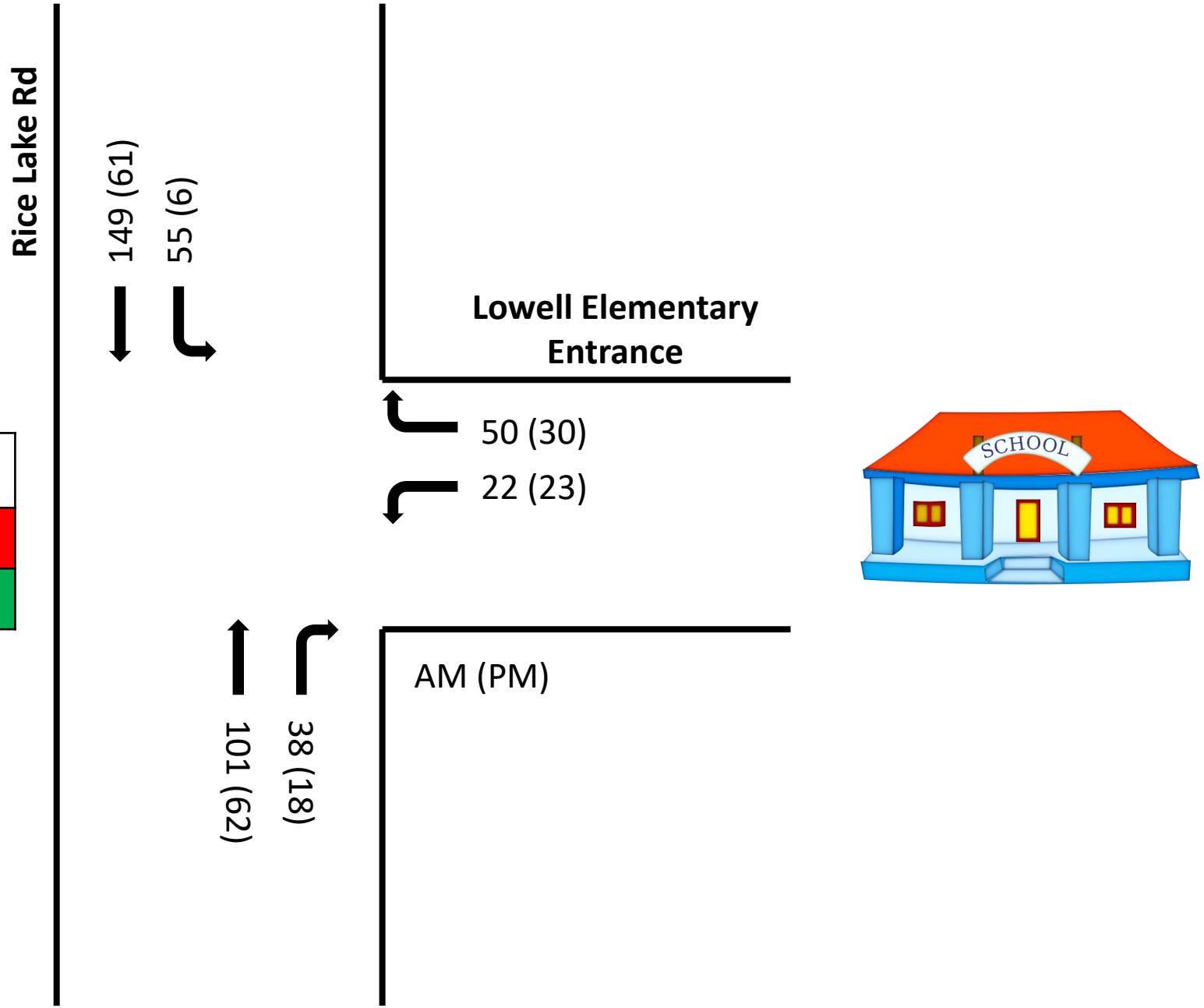
Peak Hour Factors

Approach	AM	PM
Rice Lake Rd Inbound	0.49	0.70
Lowell Elementary Outbound	0.52	0.36

Peak 15 min Turning Movements

Turning Movement	AM Conflicting Vehicles	PM Conflicting Vehicles
Outbound Left	3 sec/veh	7 sec/veh
Outbound Right	9 sec/veh	15 sec/veh

Left-Turn Gap = 7.5 sec
Right-Turn Gap = 6.5 sec




Red Line = 680 ft
30 ft/veh → 23 veh
Blue Line = 230 ft
30 ft/veh → 8 veh
Number of Parking Spaces = 67
Parking Lot Capacity = 98 veh
Standing Capacity = 75 veh
There are ~93 veh arriving to the parking lot during the AM peak 15 min period. There are ~24 veh arriving to the parking lot during the PM peak 15 min period.

Traffic Engineering Investigation – Summary

- There is sufficient intersection sight distance for the Lowell Elementary entrance.
- Vehicles turning into Lowell Elementary have dedicated turn lanes on Rice Lake Rd.
- Most vehicles on Rice Lake Rd are driving at or under the posted speed limit. There is generally good compliance with the posted speed limit. Vehicle speeds on Rice Lake Rd have been consistent over time.
- The outbound left-turn movement from the parking lot has insufficient gaps to turn onto Rice Lake Rd during the AM and PM peak 15 min. The outbound right-turn movement from the parking lot has sufficient gaps to turn onto Rice Lake Rd during the AM and PM peak 15 min.
- The parking lot does not have sufficient standing space for arriving vehicles.

Traffic Engineering Alternatives

- Alternative 1: Staggered Drop-Off and Pick-Up Times
  - Assign students by grade to a specific time slot.
  - Would spread out arriving vehicles over a longer time period.
  - May only have to stagger the AM drop-off.
  - May require additional staff time and schedule changes.

Traffic Engineering Alternatives

- Alternative 2: Drop and Ride Busing
  - Have students being transported by private vehicles be dropped off and picked up at a designated parking lot and ride a bus to/from school.
  - Would require additional school transportation resources.
  - Logistical challenges (e.g. parent did not come pick up child at the designated parking lot).

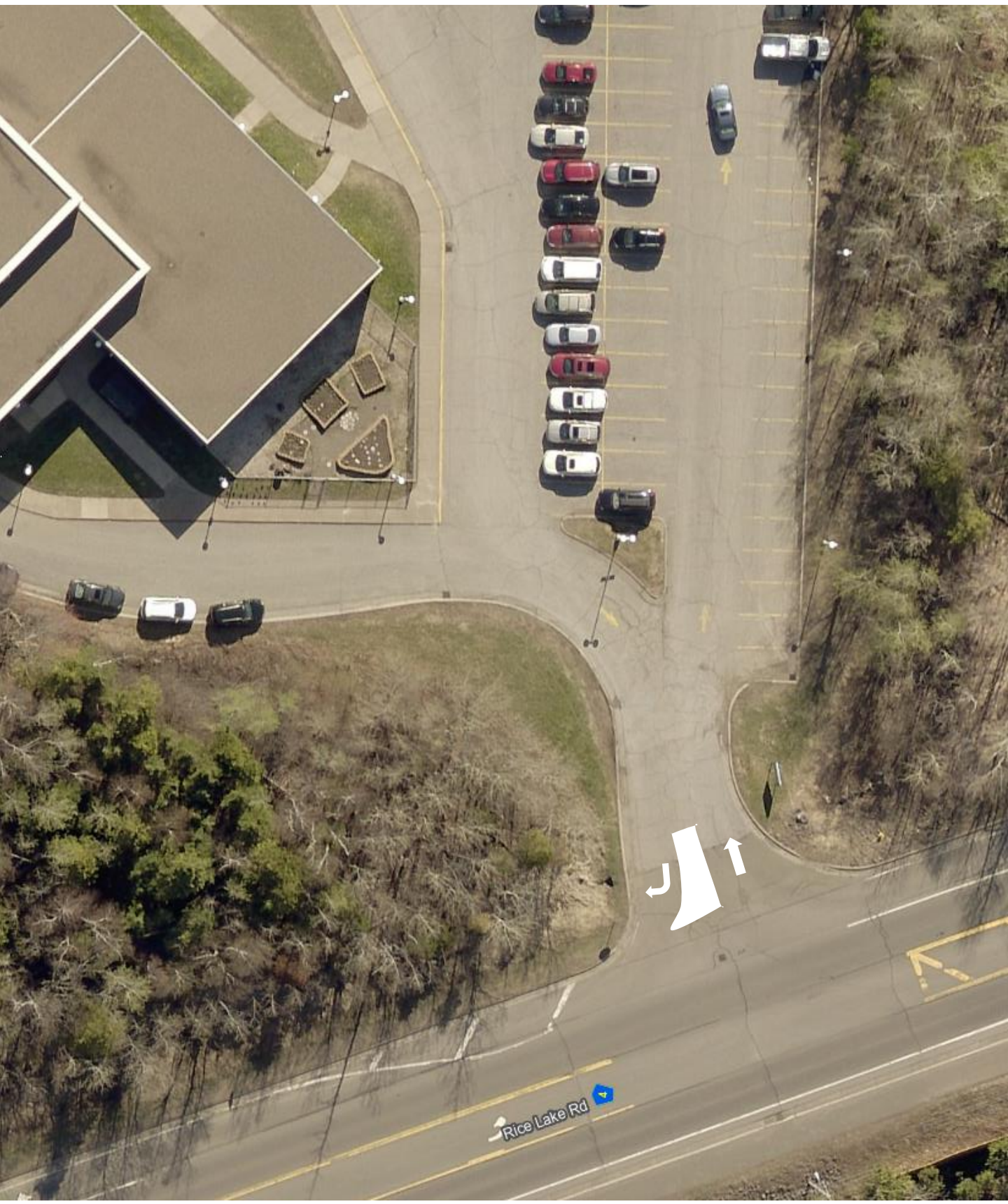
Traffic Engineering Alternatives

- Alternative 3: Dedicated Turn Lanes in Entrance
  - Widen the school entrance to accommodate a single inbound lane, a left-turn outbound lane and a right-turn outbound lane.
  - Would allow outbound right-turning vehicles to turn onto Rice Lake Rd without waiting for a left-turning vehicle to find an appropriate gap to turn onto Rice Lake Rd.
  - Would improve flow within the parking lot.


Rice Lake Rd

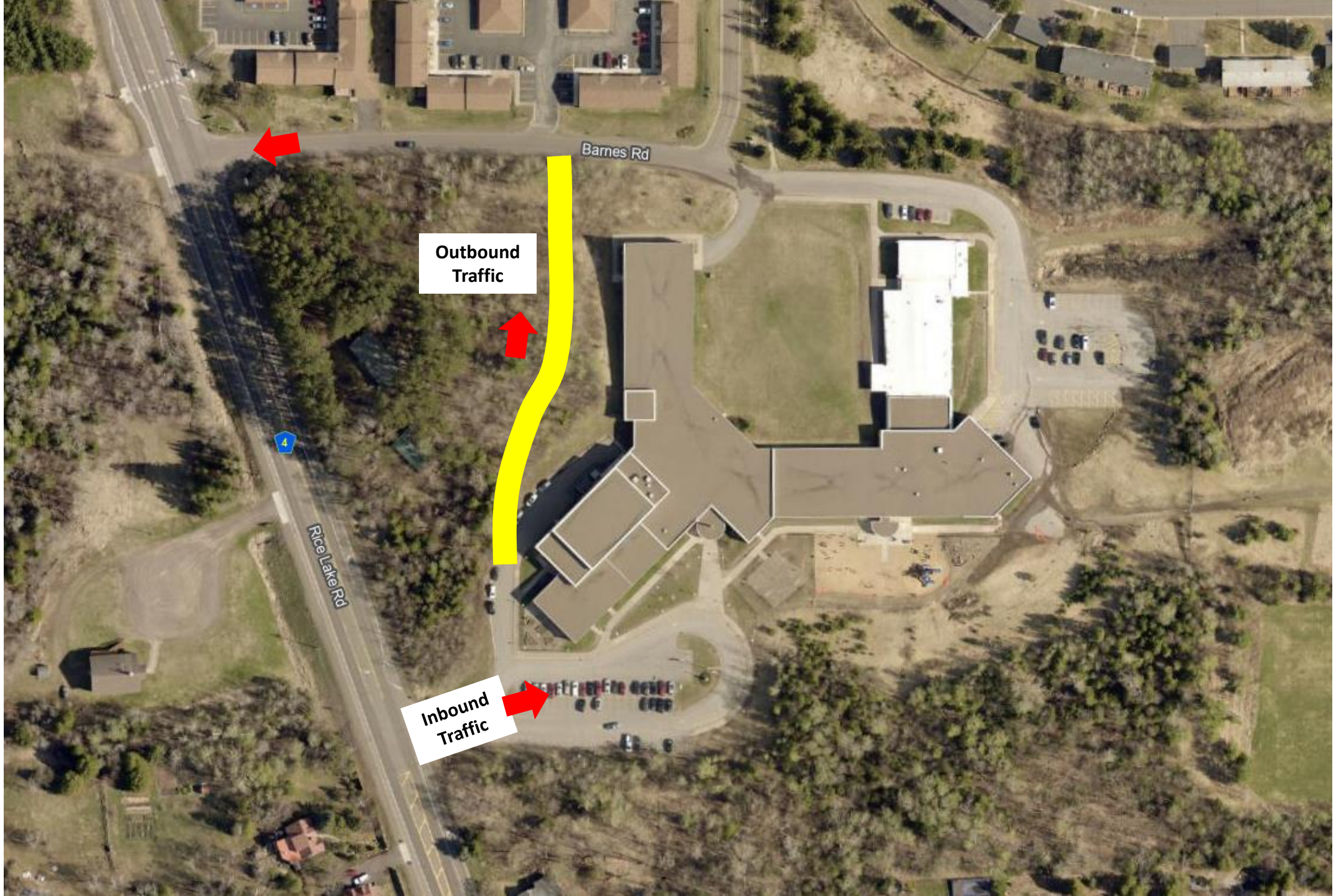
Traffic Engineering Alternatives

- Alternative 4: ¾ Access Entrance
  - Construct a channelized island in the throat of the entrance to prohibit outbound left-turn movements.
  - Would allow inbound left-turn movements, inbound right-turn movements and outbound right-turn movements only.
  - Would improve flow within the parking lot.


Rice Lake Rd

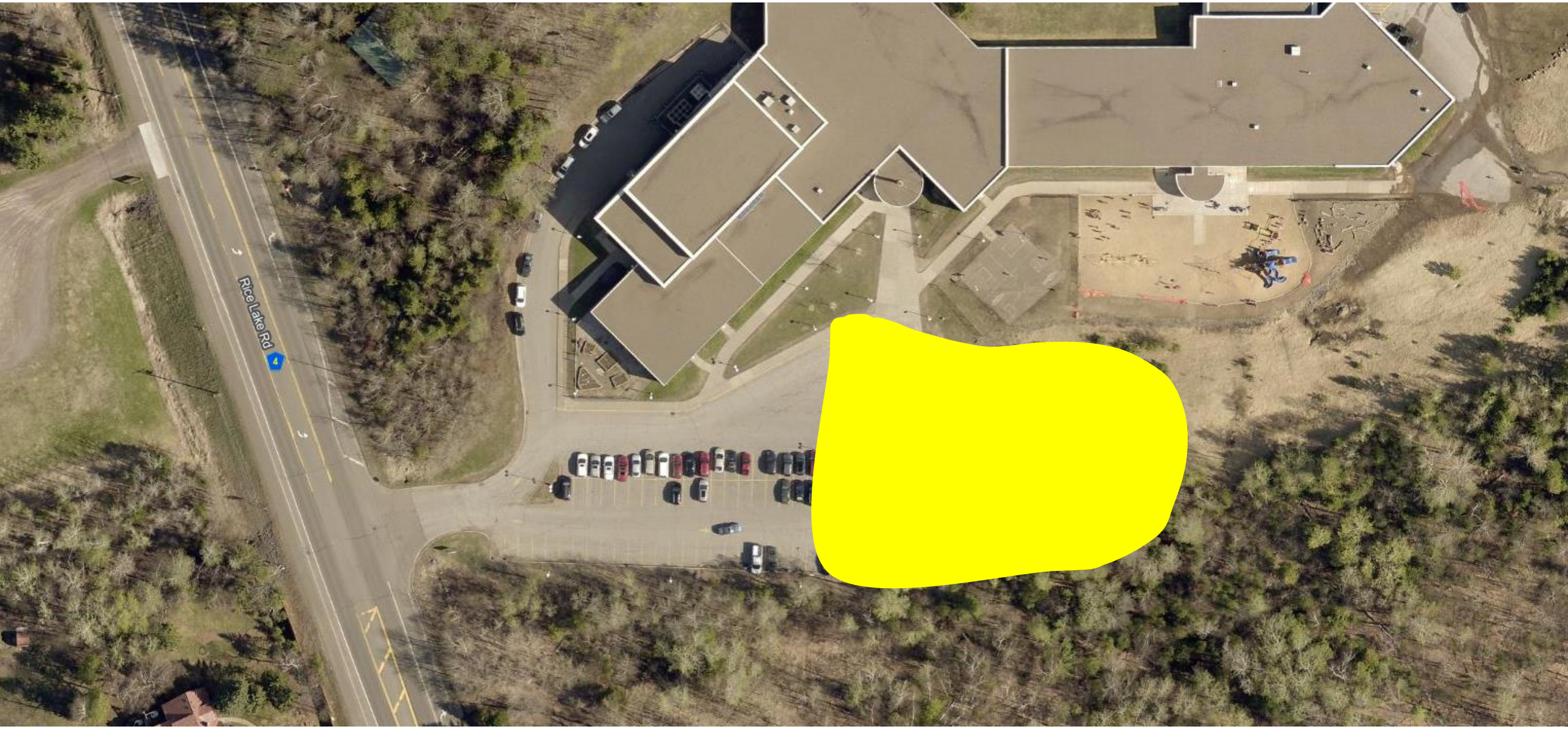
Traffic Engineering Alternatives

- Alternative 5: Rerouted Access to Parking Lot
  - Connect the upper parking lot (main) to Barnes Rd.
  - Restrict outbound movements to Barnes Rd.


Barnes Rd
Outbound Traffic
Rice Lake Rd
4
Inbound Traffic

Traffic Engineering Alternatives

- Alternative 6: Enlarge Parking Lot
  - Enlarge parking lot to increase parking and standing capacity.


Rice Lake Rd