

# Summit Bridge Road (SR 71) at Main Street/ Pine Tree Road

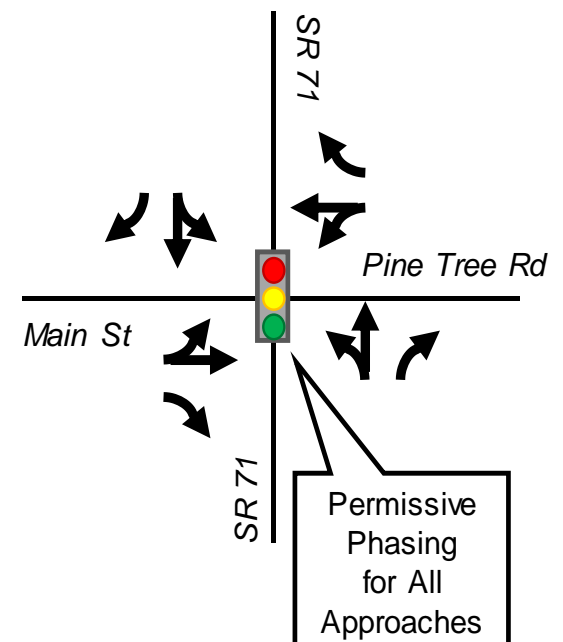
## Improvement Options

March 2024



# Existing Conditions

- Isolated traffic signal
- Geometrics
  - All 4 approaches are 2-lane 2-way undivided roadway with exclusive right and shared thru/left-turn lanes
- Speed Limit
  - SR-71 = 40 mph
  - Main St/Pine Tree Rd = 25 mph
- Functional classification
  - SR-71 = Minor Arterial
  - Main St/Pine Tree Rd = Major Collector
- 2019 AADT
  - 8,270 on NB SR-71
  - 7,273 on SB SR-71
  - 4,231 on EB Main St
  - 4,153 on WB Pine Tree Rd
- SB approach queues reach over 0.5-mile during PM peak



# Crash Analysis

## Pre-Pandemic (2017-2019)

- 29 total crashes at the intersection
  - 8 NB
  - 12 SB
  - 8 EB
  - 1 WB

NB	Angle	2
	Rear End	6
SB	Angle	3
	Rear End	5
	Head On	3
	Sideswipe Same Dir	1
EB	Angle	3
	Rear End	1
	Head On	1
	Sideswipe Same Dir	1
	Sideswipe Opp Dir	1
	Non-Collision	1
WB	Sideswipe Same Dir	1

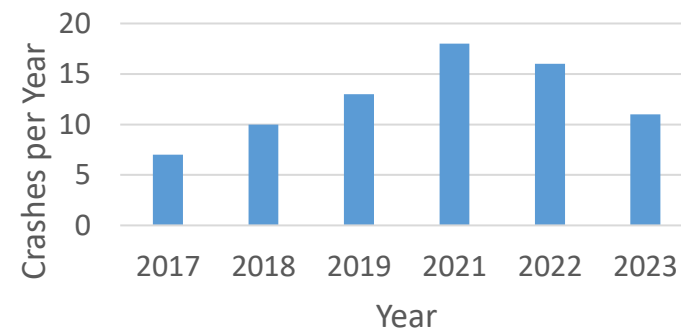
Ranked #90 in the 2021 Hazard Elimination Program (HEP); #172 in the 2022 HEP; and #82 in the 2023 HEP among signalized intersections

## Post-Pandemic (2021-2023)

- 45 total crashes at the intersection
  - 18 NB
  - 16 SB
  - 6 EB
  - 3 WB
  - 2 Unknown

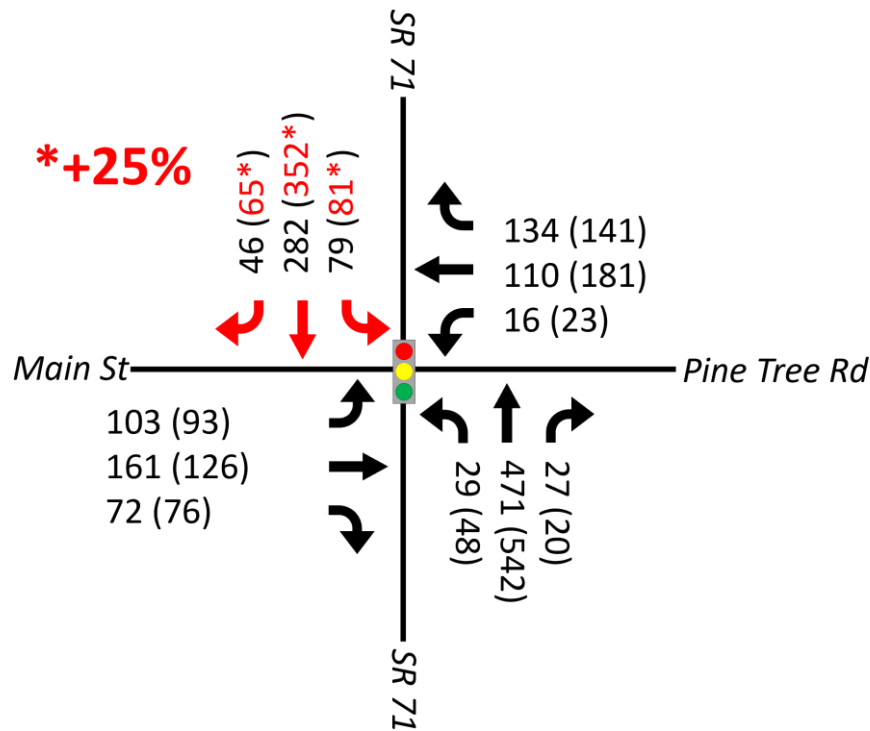
NB	Angle	9
	Rear End	6
	Head On	3
SB	Angle	11
	Rear End	4
	Head On	1
EB	Angle	4
	Rear End	1
	Head On	1
WB	Angle	3
Unknown	Angle	1
	Head On	1

## Crashes per Year

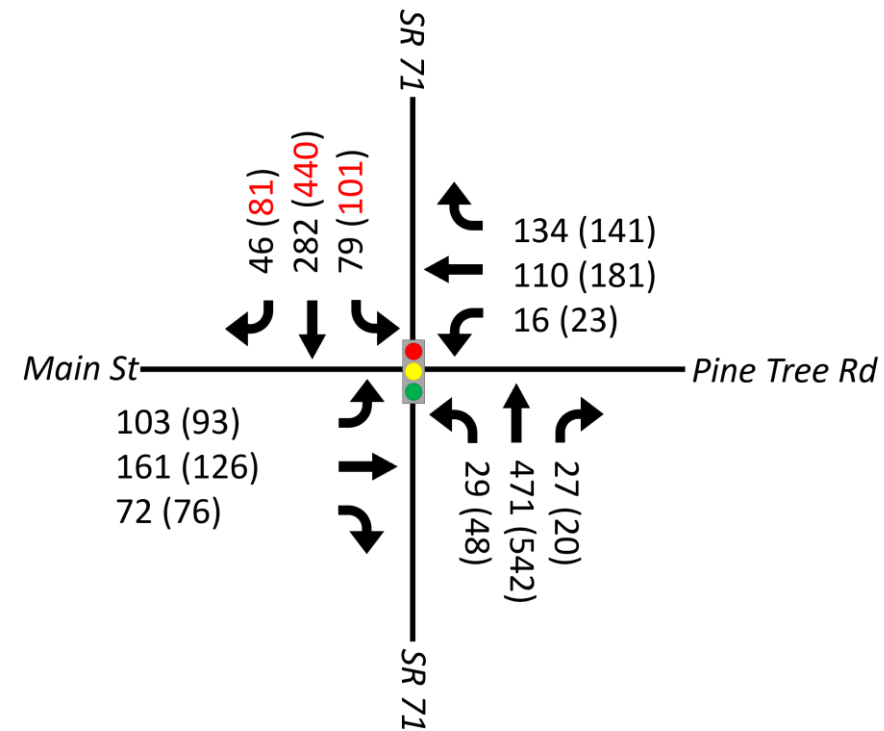


# Existing Volumes

Counts Collected May 2022



Calibrated Demand Volumes



SB SR 71 throughput is impacted by signal operations and cannot clear the intersection within the PM peak hour. Volumes were increased by 25% to reflect PM peak demand and match observed queues.

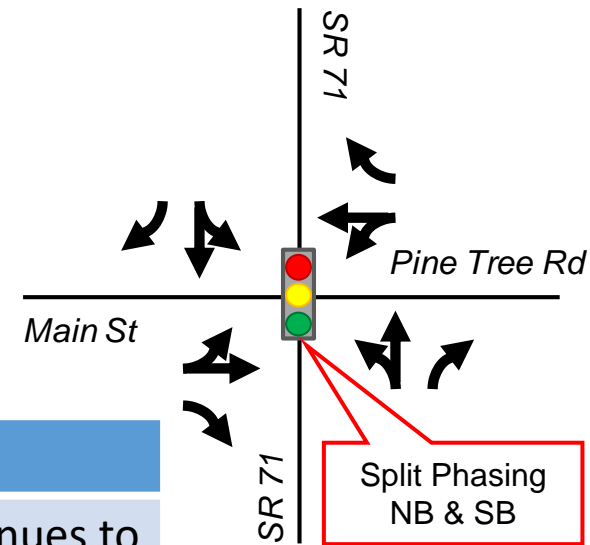
Volumes used for analysis

# Improvement Options

- Two short-term improvement options
  - Option A: Split Phasing
  - Option B: Partial Lane Reconfiguration
- Two long-term improvement options
  - Option C: Full Intersection Rebuild
  - Option D: Hybrid Roundabout
- Used calibrated demand volumes for analysis
  - Future year forecasts were not developed

# Option A: Split Phasing

- No changes to lane configurations
- Split phasing for NB & SB SR 71 approaches
  - EB/WB remains permissive

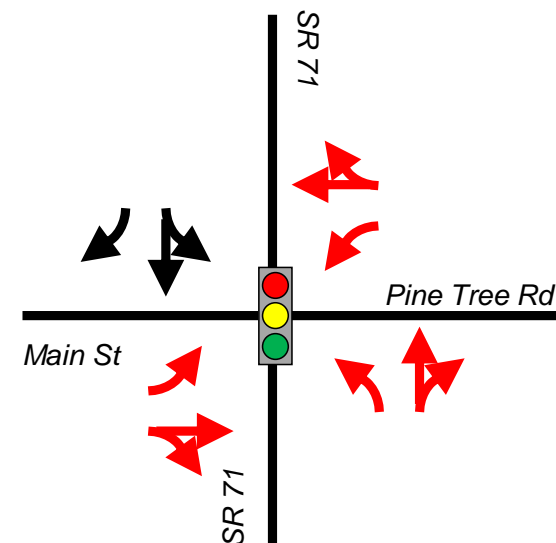


Advantages	Disadvantages
No construction costs	Excessive SB queues (continues to reach 0.5-miles)
Slight reduction to SB queues	Excessive NB queues (over 3,000 ft in PM peak)
~6% crash reduction (Change from permissive to protected)	Excessive EB queues (over 1,000 ft in PM peak)
	Left-turning vehicles would continue to block thru vehicles
	Aggressive gap acceptance
	Overall LOS F (F)
	Multiple failing movements

**Recommend dropping from consideration**

# Option B: Partial Lane Reconfiguration

- Separate left-turn lane for NB, EB, WB
- All approaches permissive phasing
- Partial pavement reconstruction, patching, milling, and repaving; reconstruction of signal infrastructure; restriping; removal of flex posts

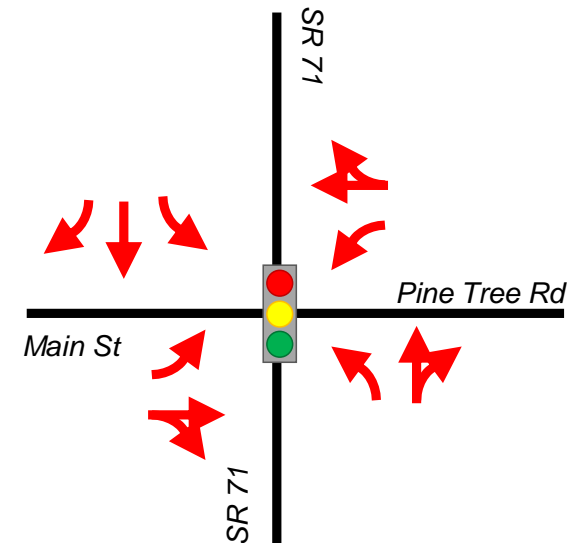


Advantages	Disadvantages
Reduction in SB queues (under ¼ mile)	Increase in EB queue (up to 2,200 ft in PM peak)
Overall LOS B (D)	Left-turning vehicles would continue to block thru vehicles for SB approach
~18% crash reduction (Provide a left-turn lane on one major-road approach)	Aggressive gap acceptance would continue for SB approach
	EB left-turn movement would fail in PM peak
	Requires extensive reconstruction

**Recommend dropping from consideration**

# Option C: Full Intersection Rebuild

- Assumed lane configuration:
  - Exclusive left-turn and right-turn lanes for SB approach
  - Exclusive left-turn lanes for EB, WB, and NB approaches
  - Shared through/right-turn lane for EB, WB, and NB approaches
- All approaches permissive phasing



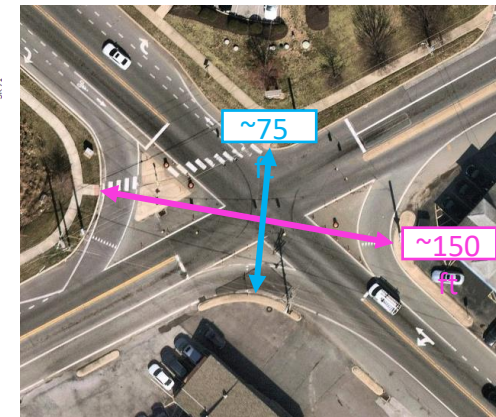
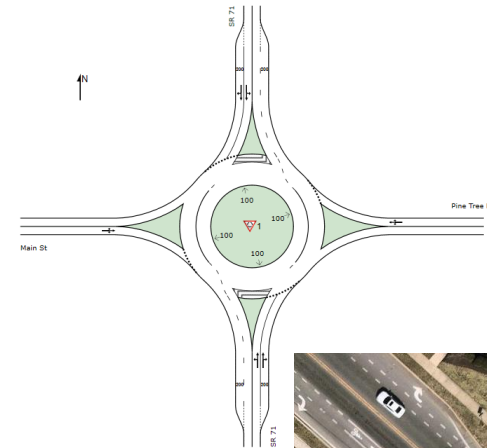
Advantages	Disadvantages
Reduction in SB queues (under 350 ft in both peak periods)	Increase in EB queue (up to 950 ft in PM peak)
Reduction in NB queues (under 300 ft in both peak periods)	High construction cost
Overall LOS B (B)	May have right-of-way and utility impacts
No failing approaches or movements	
~33% crash reduction (Provide a left-turn lane on both major-road approaches)	

**Retain for consideration as a Capital Improvement Project**



# Option D: Hybrid Roundabout

- Lane configuration:
  - 1-lane approach from EB/WB approaches
  - 2-lane flared approach and exit legs for NB/SB approaches to mitigate capacity
- Diameter (conceptually)
  - Approximately 172 ft at widest point
  - Approximately 100 ft central island diameter
- Right of way and utility impacts



Advantages	Disadvantages
Under capacity in both peak periods ( $v/c < 0.85$ )	Does not fit within existing right-of-way
Reduction in all queues (under 225 ft all approaches in both peaks)	High construction cost + right-of-way acquisition
~7%-31% crash reduction (Convert to roundabout)	

**Retain for consideration as a Capital Improvement Project**

# Summary

- **Concerns to Address**
  - Left-turn blocking thru vehicles
  - Excessive queuing
  - Aggressive gap acceptance
- **Recommend Dropping from Consideration**
  - Option A: Signal Phasing Adjustments (Split Phasing)
    - Intersection expected to fail in both peak periods
  - Option B: Partial Lane Reconfiguration
    - Requires extensive reconstruction for minor improvements
- **Options to Consider for Capital Improvement Project**
  - Option C: Full Intersection Rebuild
  - Option D: Hybrid Roundabout

# Potential Next Steps for Consideration

- Submit a project nomination for intersection reconstruction as one of the following:
  - Signalized intersection with dedicated left-turn lanes
  - Hybrid Roundabout
- Future project would take into account future year forecasting in relationship to the long-term improvement
- Consider alternate lane configurations based on future-year volumes