The City of MADERA

Public Meeting for the Lake Street/4th Street/Central Avenue Intersection Improvement Project

(January 16, 2020)

GHD

Presentation Agenda:

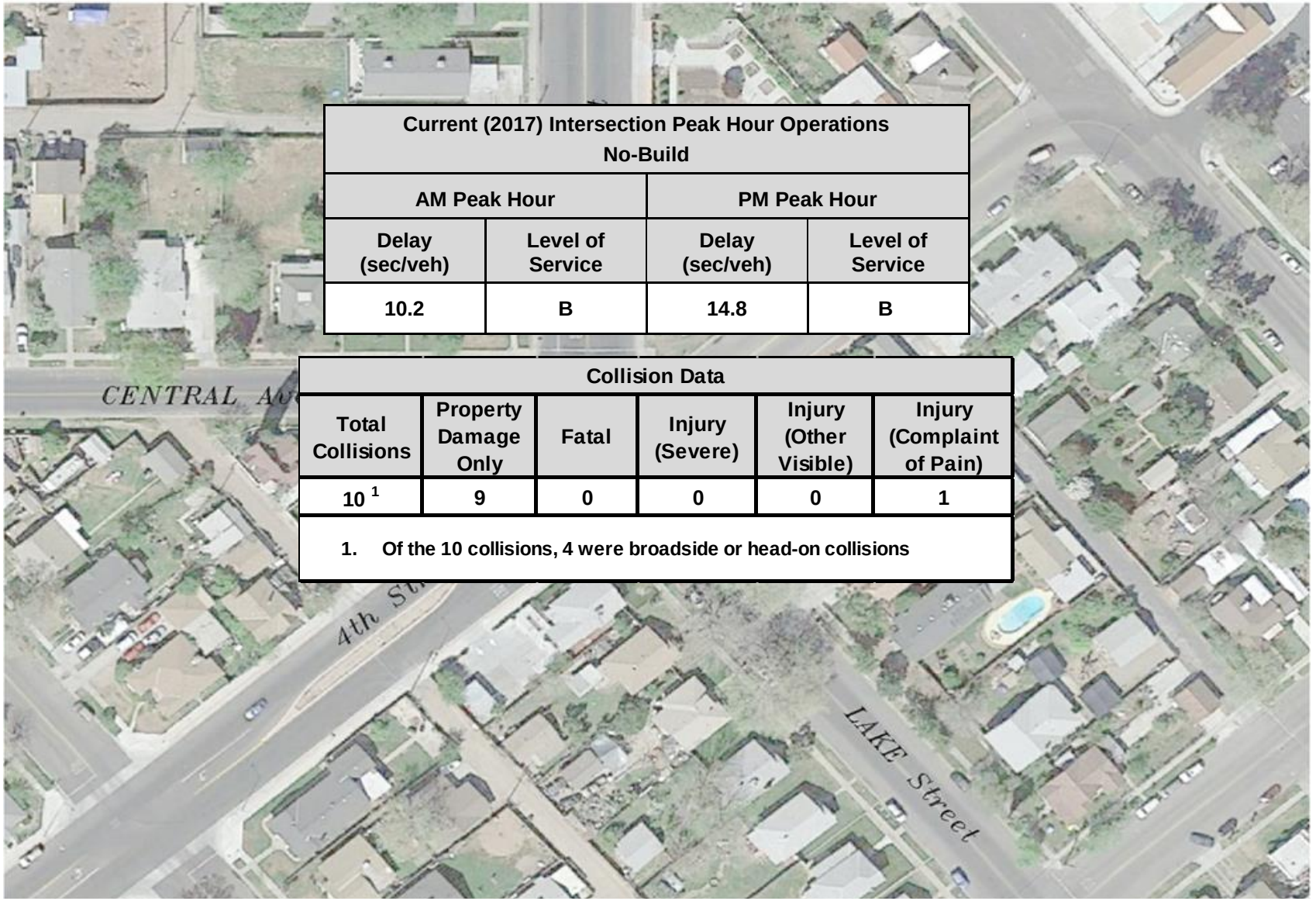
1. ***Why this Project?***
2. ***What are the Solutions?***
3. ***How do the Alternatives Compare?***
4. ***What are the Next Steps?***

Why this Project?

Current Conditions

Why this Project?

Current Conditions



Current (2017) Intersection Peak Hour Operations No-Build			
AM Peak Hour		PM Peak Hour	
Delay (sec/veh)	Level of Service	Delay (sec/veh)	Level of Service
10.2	B	14.8	B

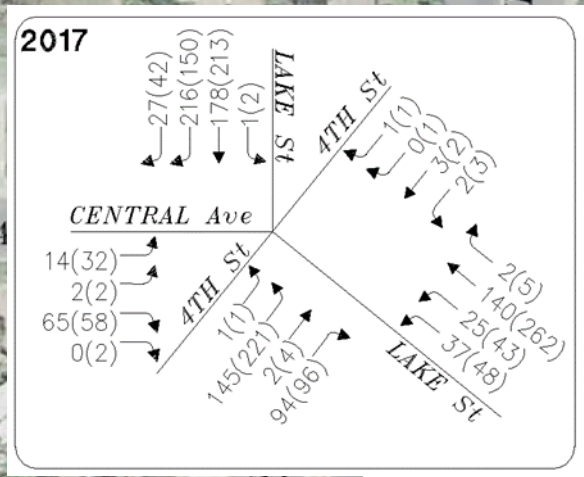
Collision Data					
Total Collisions	Property Damage Only	Fatal	Injury (Severe)	Injury (Other Visible)	Injury (Complaint of Pain)
10 [1]	9	0	0	0	1

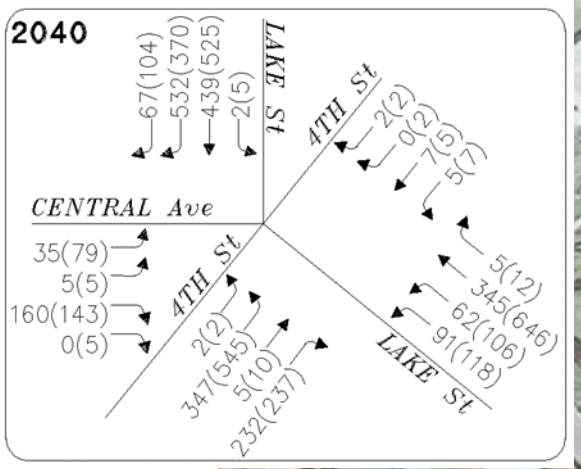
1. Of the 10 collisions, 4 were broadside or head-on collisions

Why this Project?

Significant Growth Anticipated

- Traffic volumes are forecasted to increase significantly over the next 20-years due to planned development within the City.





XX = AM Peak Hour Traffic Volumes
(XX) = PM Peak Hour Traffic Volumes

Peak Hours	Year 2017 Entering Vehicles	Year 2040 Entering Vehicles	% Increase
AM	955	2393	151%
PM	1188	2928	146%

Why this Project?

Significant Growth Anticipated

- Resulting in increased delays and congestion.

Current (2017) and Year 2040 Intersection Peak Hour Operations Comparison				
	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	Level of Service	Delay (sec/veh)	Level of Service
Current	10.2	B	14.8	B
2040	23.0	C	43.4	E

- Level of Service (LOS) is a qualitative measure of traffic conditions whereby a letter grade “A” through “F” is assigned representing progressively worsening traffic conditions.
- At this intersection, the City seeks to maintain LOS “D” or better.

Why this Project?

- The purpose of this project is to identify viable improvement alternatives to mitigate anticipated traffic congestions due to growth.

- The project will improve traffic circulation, access, and safety. It will also reduce delay and enhance mobility for all travel modes.

- Funding for the project is available through City transportation funding as well as through the Congestion Mitigation and Air Quality grant fund.

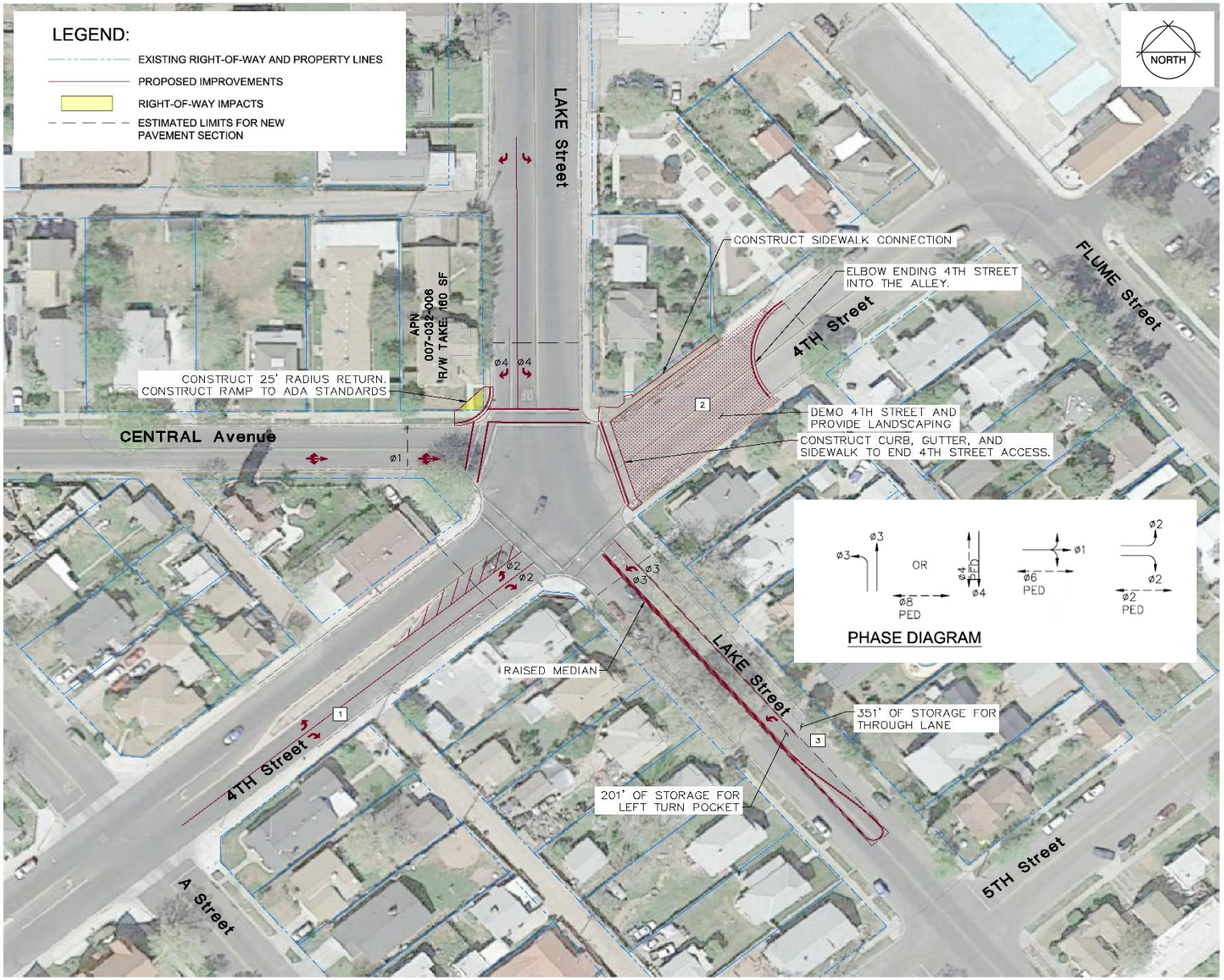
What are the Solutions?

Solutions to Unique Design Challenges

- There are five approaches to this intersection.
- The 5-legged nature presents unique design challenges.
- Two improvement options have been developed:
  - Traffic Signal Alternative
  - Roundabout Alternative

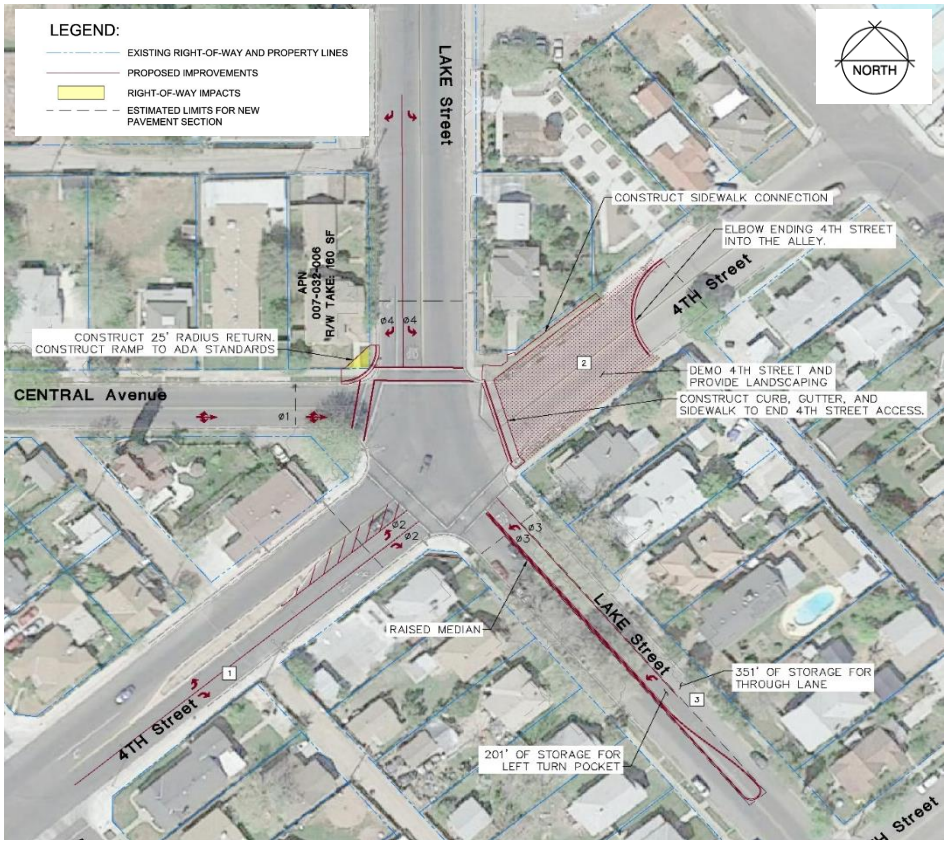
What are the Solutions?

Preliminary Traffic Signal Alternative



What are the Solutions?

Preliminary Traffic Signal Alternative



- On-street parking eliminated to accommodate design.

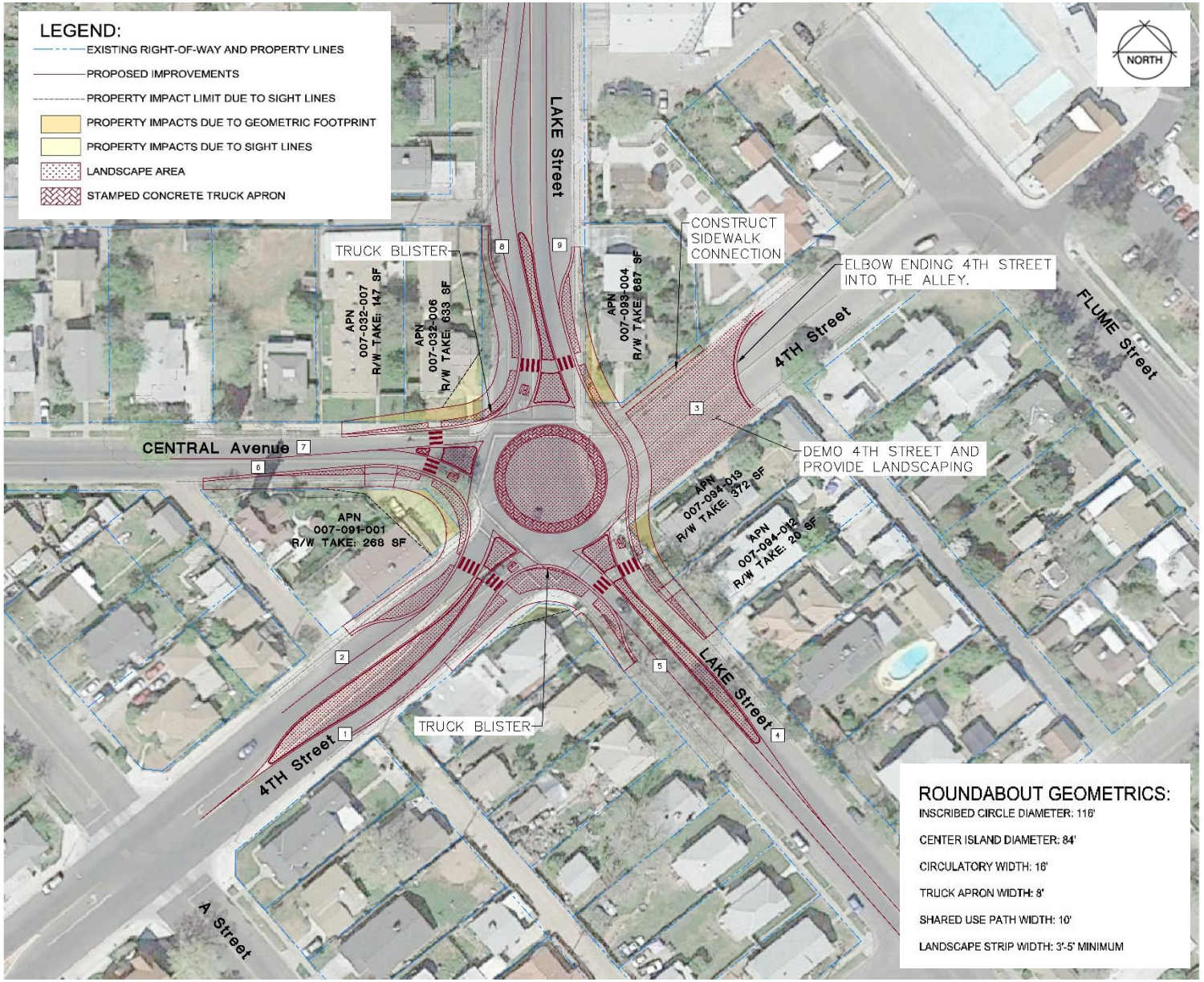
POTENTIAL ON-STREET PARKING IMPACTS
(APPROX. 34 PARKING SPACES ELIMINATED)

1. ±10 PARKING SPACES BETWEEN A Street AND LAKE Street
2. ±11 PARKING SPACES BETWEEN LAKE Street AND FLUME Street
3. ±13 PARKING SPACES BETWEEN 5TH Street AND 4TH Street

- Terminate the northeast leg of 4th Street at the alley with it no longer being part of the intersection.
- Reconstruct northwest curb return to provide ADA compliant pedestrian ramp.
- Provide sidewalk connection between Lake Street and the existing sidewalk on 4th Street.
- Improvements encroach into the adjacent property at the northwest corner of the intersection:
  - 160 SF estimated to be required from APN 007-032-006.

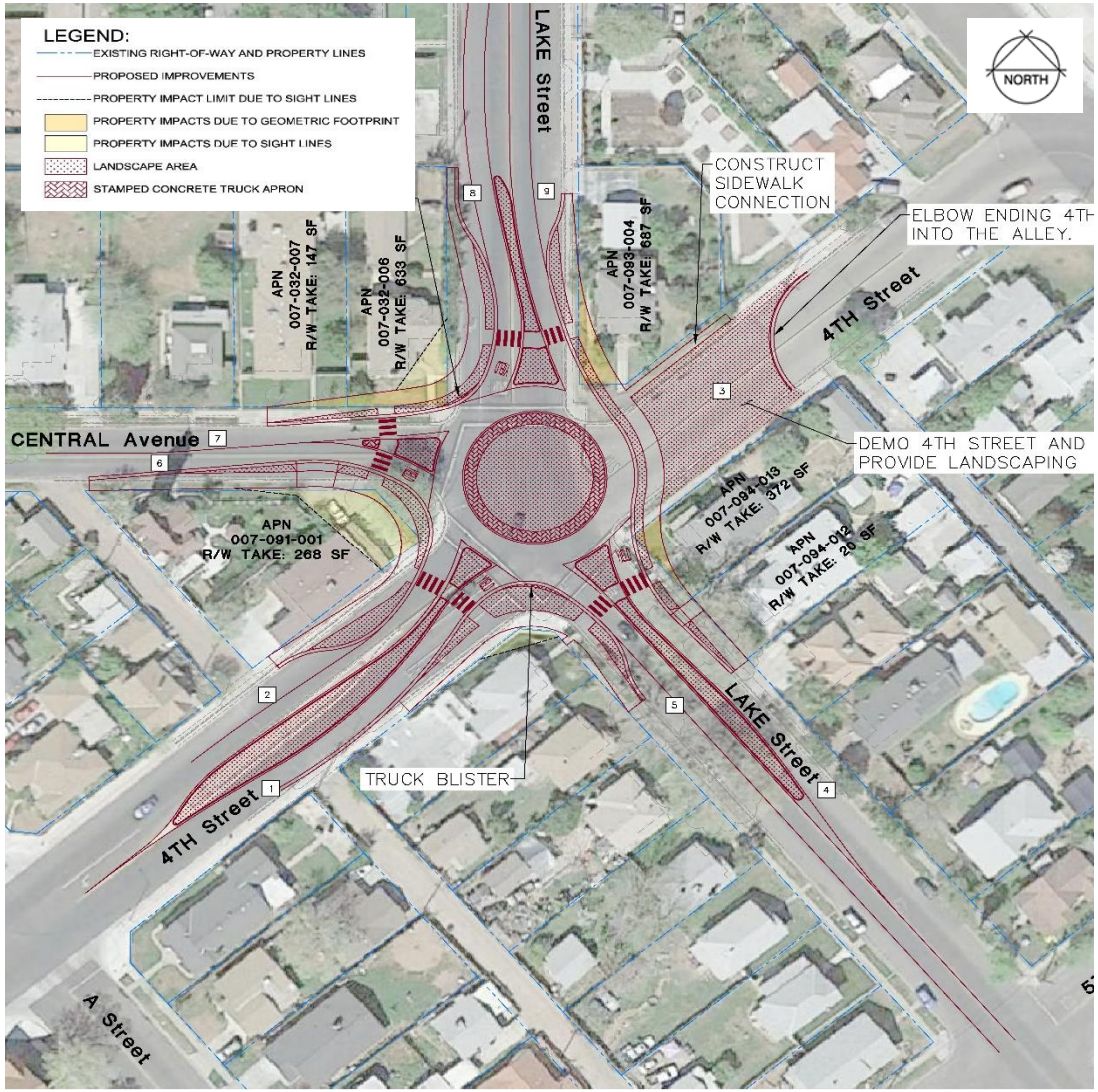
What are the Solutions?

Preliminary Roundabout Alternative



What are the Solutions?

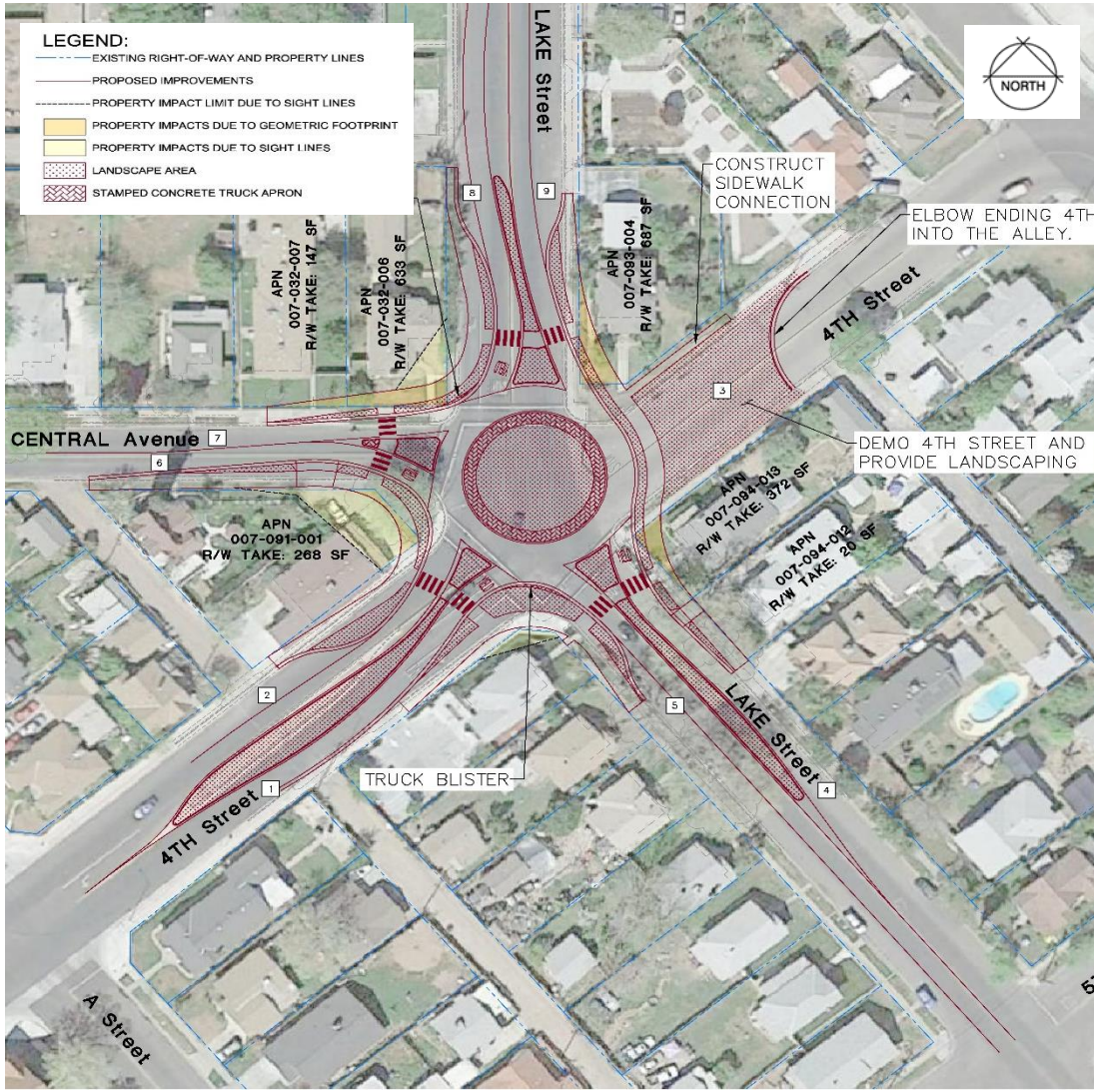
Roundabout Alternative – Design Elements



- Terminate the northeast leg of 4th Street at the alley with it no longer being part of the intersection.
- Provide sidewalk connection between Lake Street and the existing sidewalk on 4th Street.
- Provide shared-use paths (10’ wide) with landscape buffers on each corner of the intersection.

What are the Solutions?

Roundabout Alternative – Potential Property and Parking Impacts



- Improvements encroach into the following properties.

Preliminary Property Impacts	
Property / APN	**Square Feet (SF)**
NW Corner of Lake Street and Central Avenue / 007-032-006	633
North Side of Central Avenue West of Lake Street / 007-032-007	147
SW Corner of Central Avenue and 4th Street / 007-091-001	268
NE Corner of 4th Street and Lake Street / 007-093-004	687
SE Corner of 4th Street and Lake Street / 007-094-013	372
East Side of Lake Street South of 4th Street / 007-094-012	20

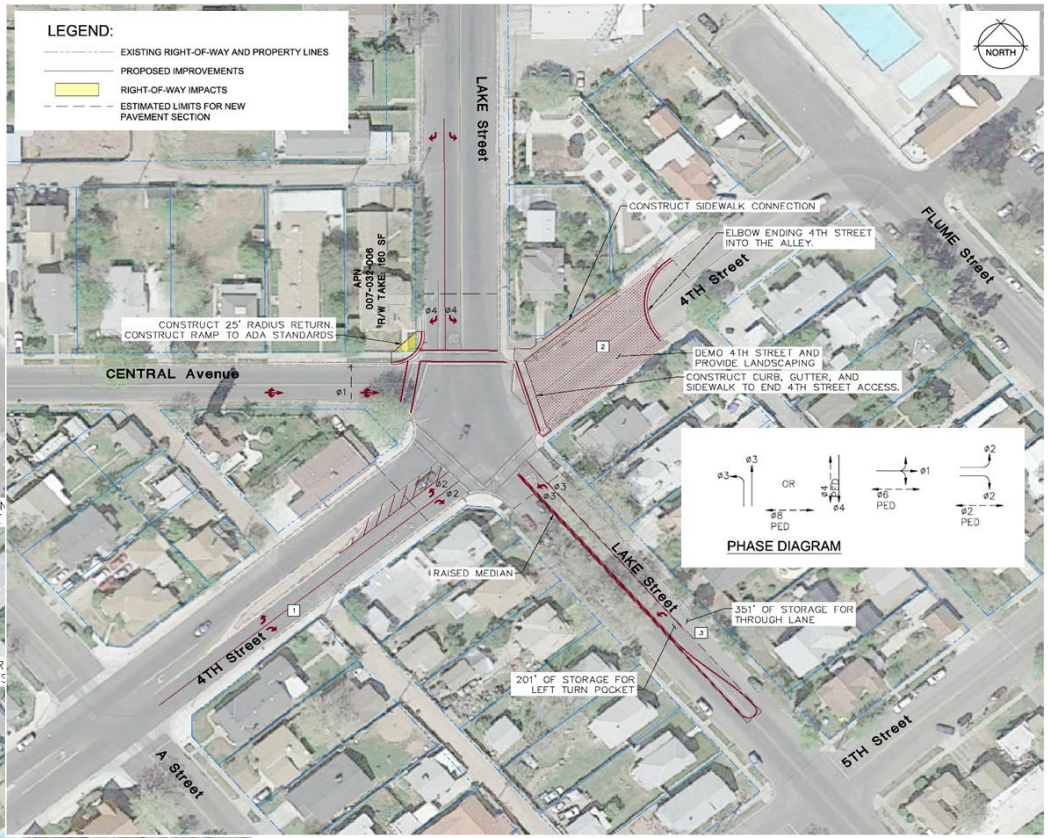
- On-street parking eliminated to accommodate design.

POTENTIAL ON-STREET PARKING IMPACTS
(APPROX. 62 PARKING SPACES ELIMINATED)

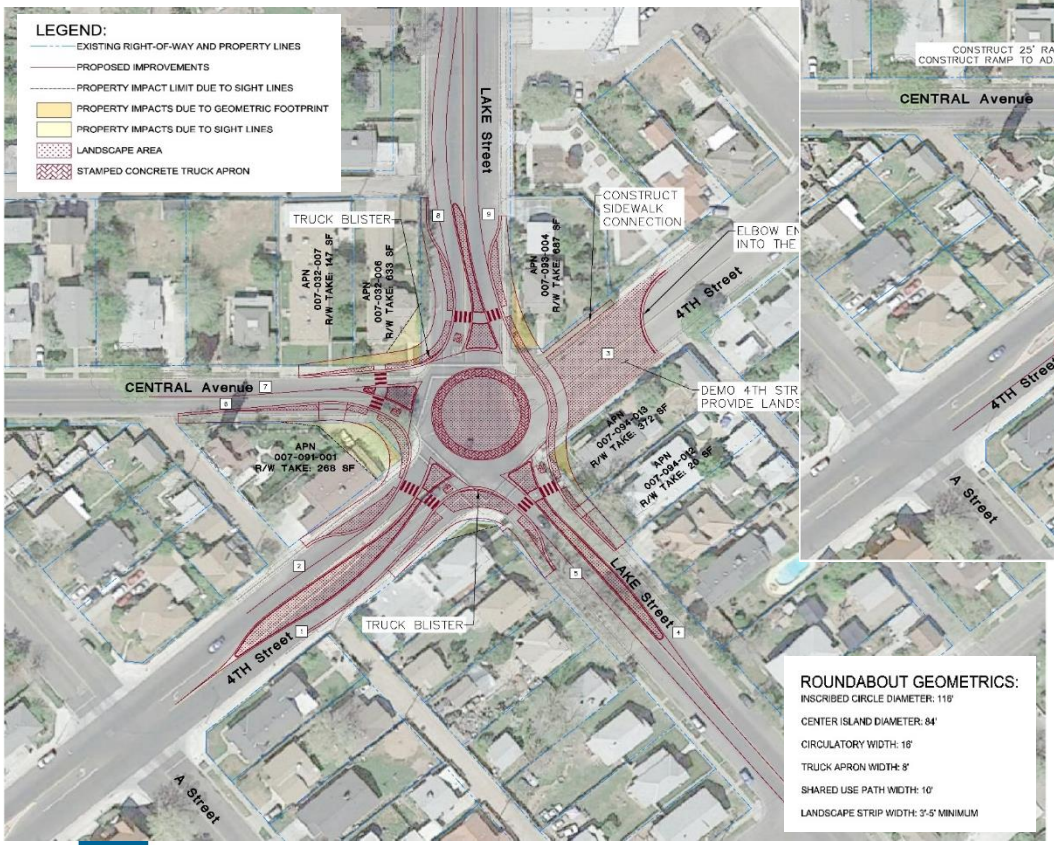
1. ±10 PARKING SPACES BETWEEN A Street AND LAKE Street
2. ±5 PARKING SPACES BETWEEN LAKE Street AND A Street
3. ±11 PARKING SPACES BETWEEN LAKE Street AND FLUME Street
4. ±10 PARKING SPACES BETWEEN 5TH Street AND 4TH Street
5. ±3 PARKING SPACES BETWEEN 4TH Street AND 5TH Street
6. ±4 PARKING SPACES BETWEEN A Street AND LAKE Street
7. ±7 PARKING SPACES BETWEEN LAKE Street AND A Street
8. ±8 PARKING SPACES WEST SIDE NORTH OF CENTRAL Avenue
9. ±4 PARKING SPACES EAST SIDE NORTH OF CENTRAL Avenue

How do the Alternatives Compare?

Preliminary Traffic Signal Alternative



Preliminary Roundabout Alternative

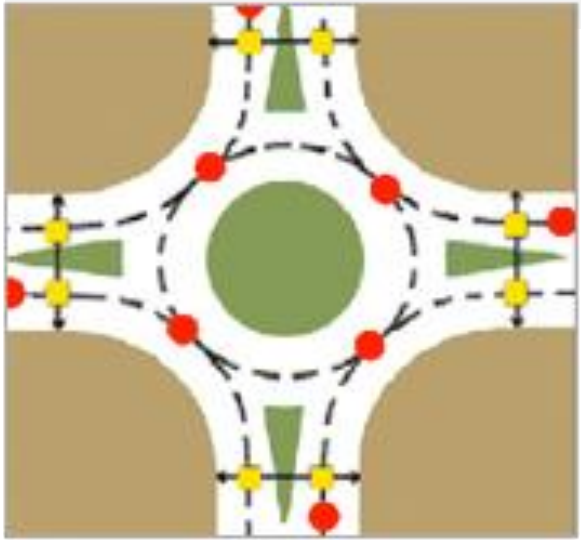


How do the Alternatives Compare?

Overall Intersection Safety

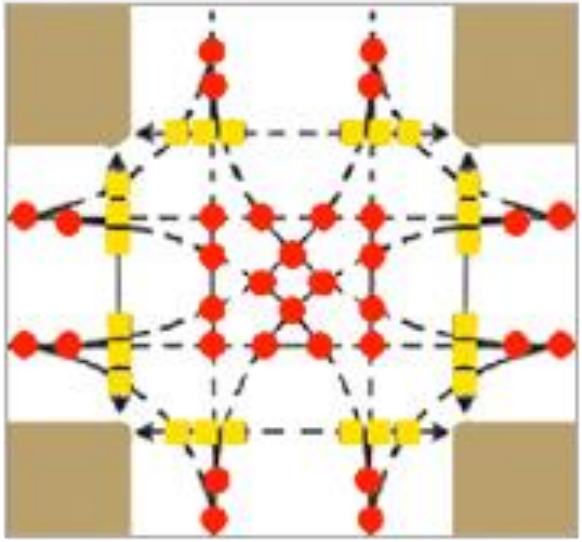
Conflict points on a regular 4-way intersection compared to a modern roundabout intersection

Roundabout



Vehicles: 8 Conflict Points
Peds: 8 Conflict Points

Intersection



Vehicles: 32 Conflict Points
Peds:24 Conflict Points

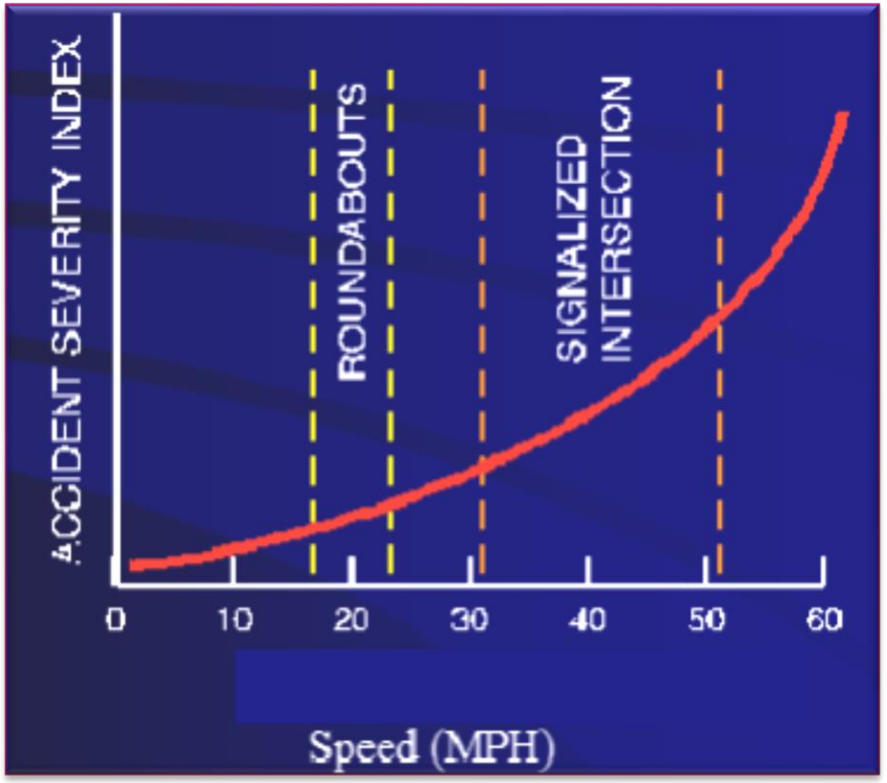
How do the Alternatives Compare?

Roundabouts Improve Motor Vehicle Safety

- Slower speeds (15-25 mph)
- No right angle accidents
- No running a red light
- No left turns
- Fewer overall conflict points

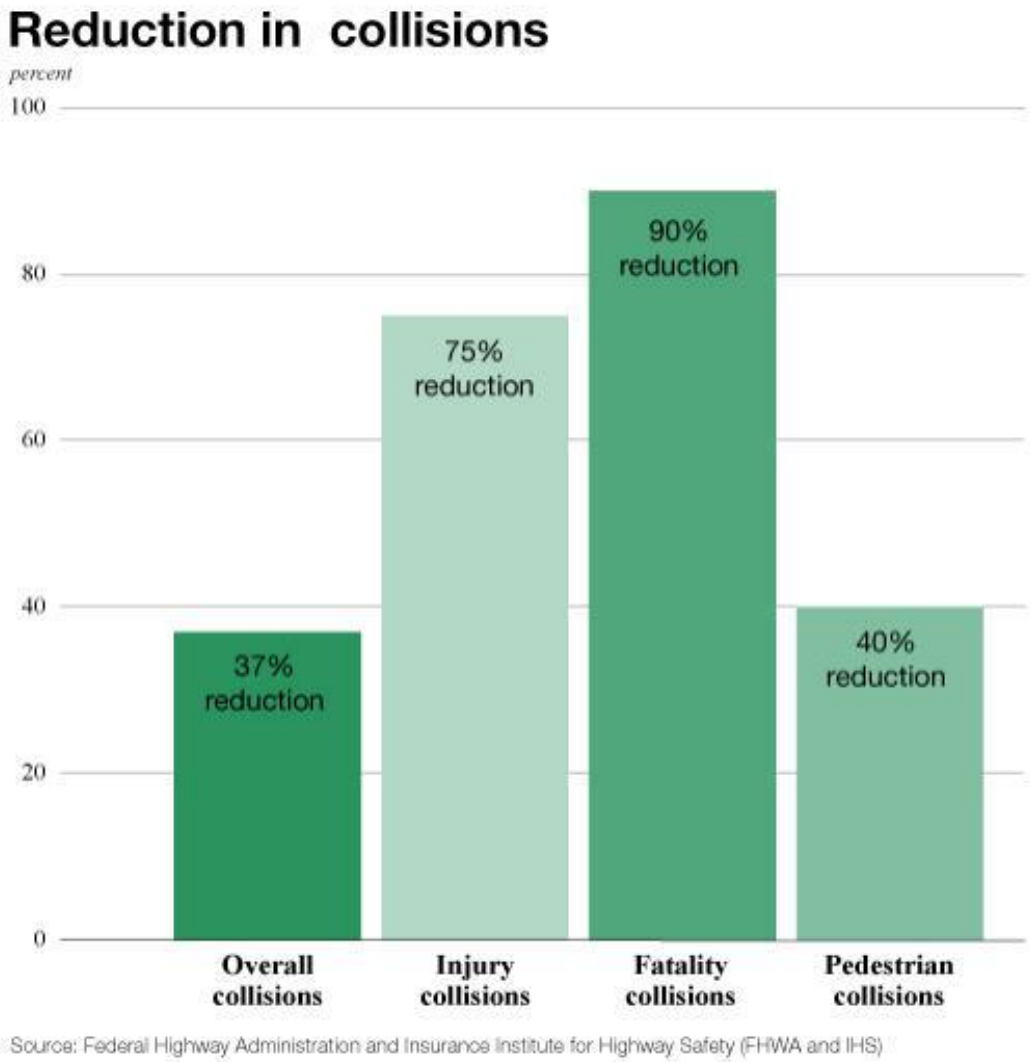
Collision Scene at a Signalized Intersection

Collision Severity Relating to Travel Speeds



How do the Alternatives Compare?

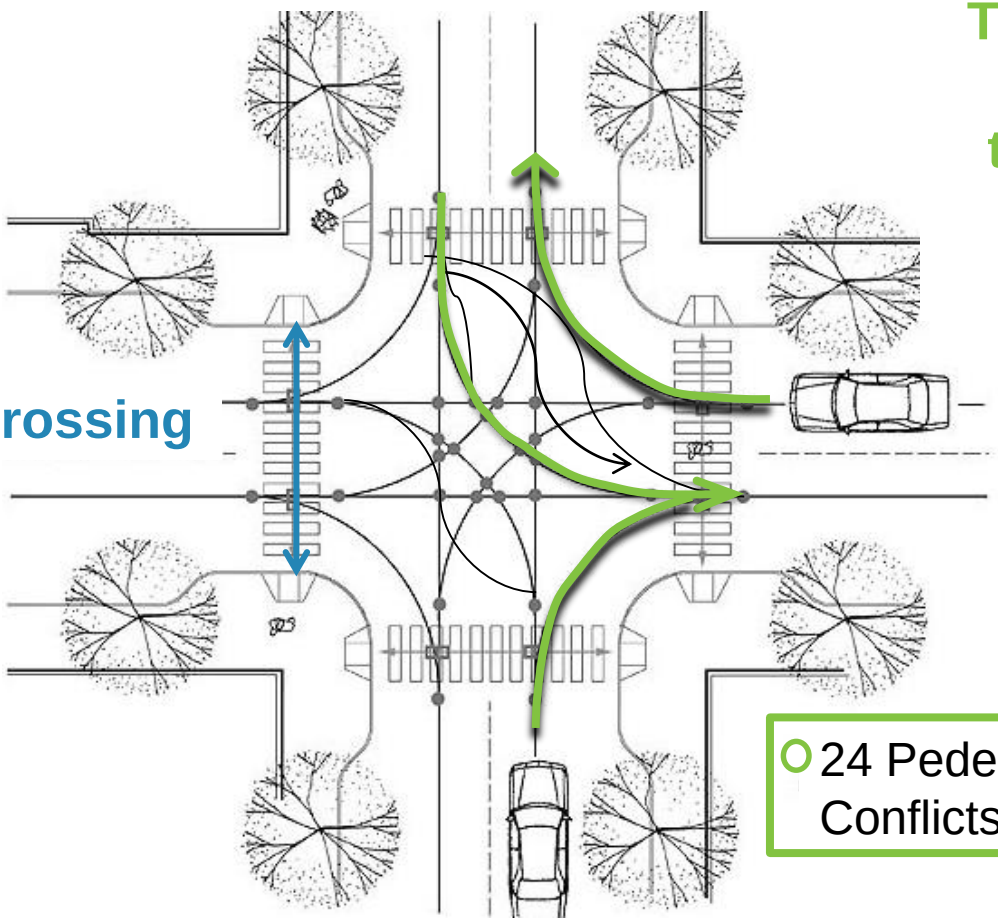
Roundabouts Improve Overall Intersection Safety



How do the Alternatives Compare?

Pedestrian Safety

Pedestrians at a Typical Intersection



Three directions of turning traffic through crossing zone, even with green light

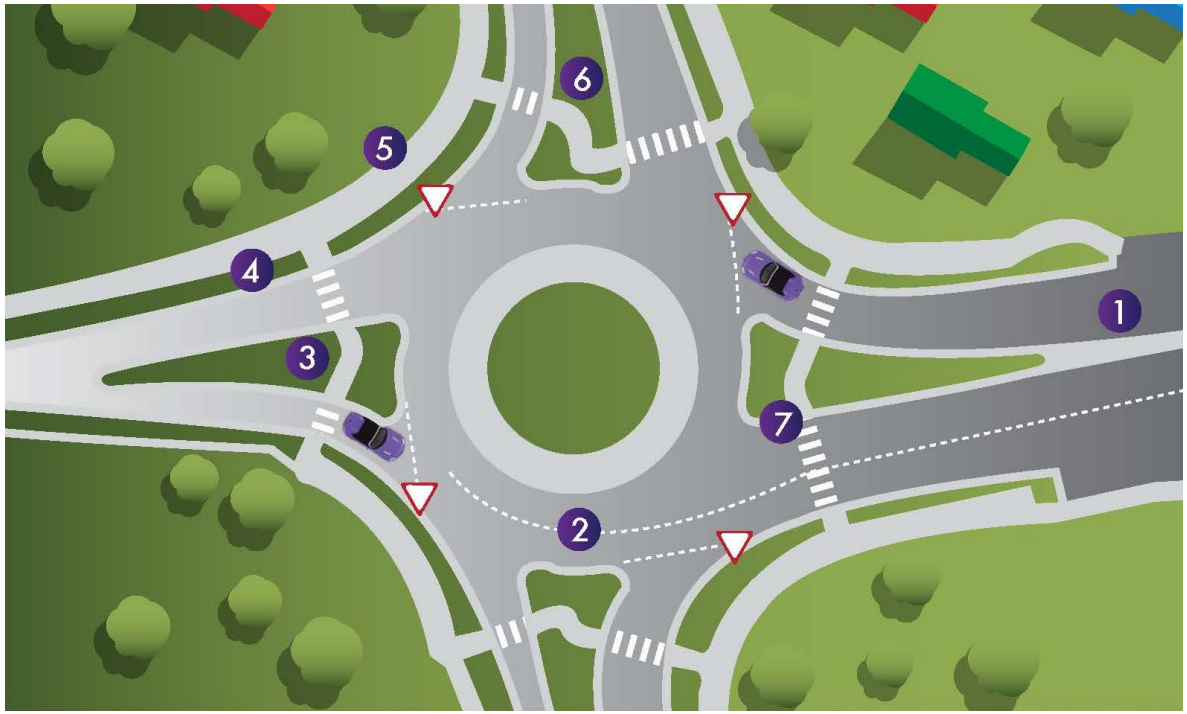
Wider street crossing

- 24 Pedestrian/Vehicle Conflicts

How do the Alternatives Compare?

Pedestrian Safety

Pedestrians at a Roundabout



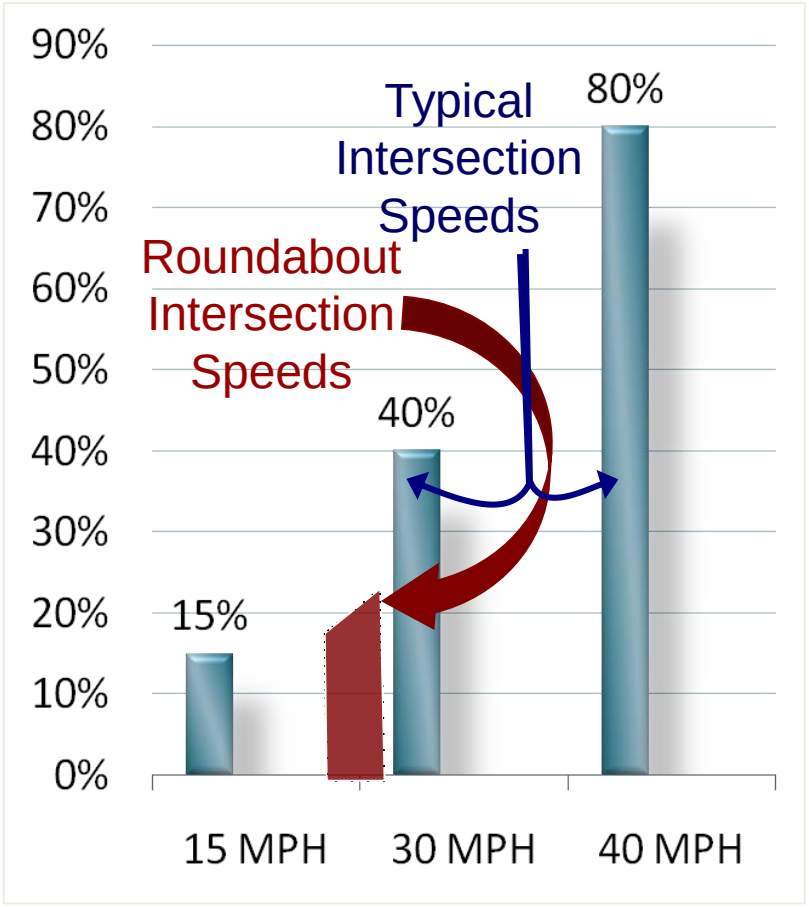
1. Shorter Crossings
2. Slower Traffic
3. Pedestrian Refuges
4. Landscape Separation
5. Shared-Use Path
6. Guided Crossings
7. You only need to watch for traffic coming from one direction at a time

How do the Alternatives Compare?

Pedestrian Safety

- Fewer points of conflict
- Slower vehicle speeds
- Reduced speed differential
- Crossing against one direction of traffic at a time
- Usually narrower crossing

Pedestrian's Chance of Death if Hit by a Motor Vehicle



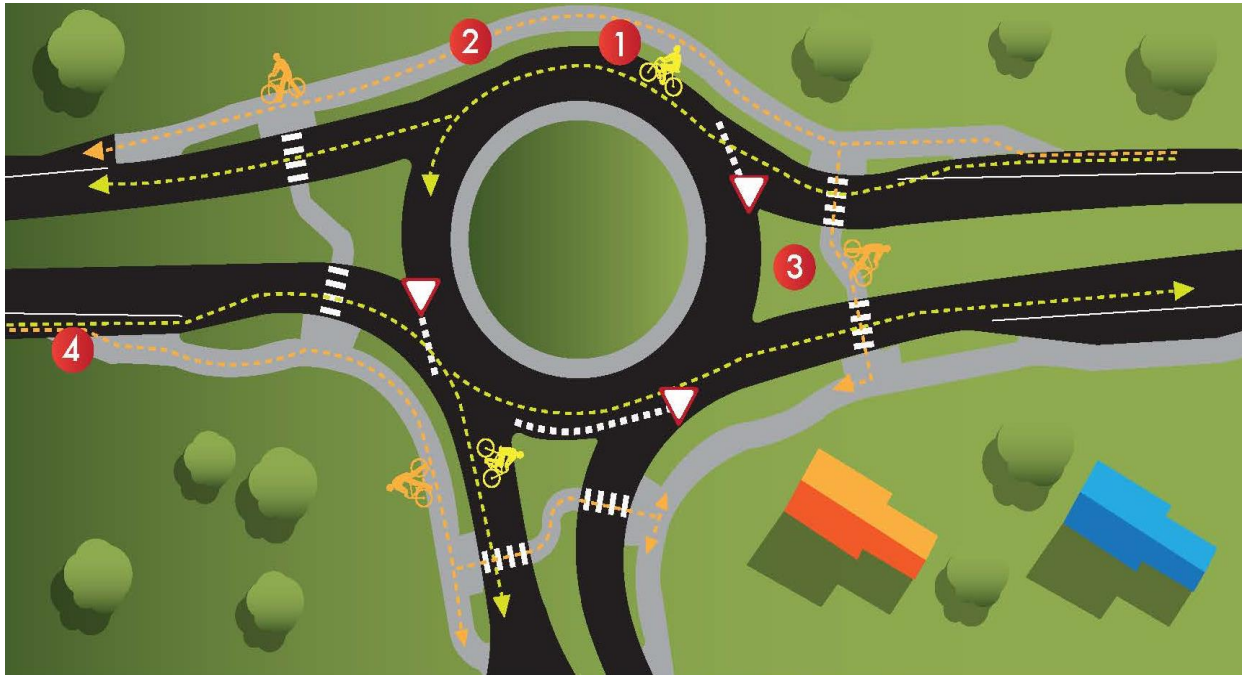
How do the Alternatives Compare?

Bicycles

Bicyclist at a Typical Intersection

- 32 potential bicycle/vehicle conflict points for street riders

Bicyclists at a Roundabout



1. Experienced Riders travel as a vehicle
2. Novice Riders use Shared Path
3. Pedestrian Refuges are wide enough to shelter bicyclists
4. Enter and Exit Shared Path from bike ramps located away from the intersection

How do the Alternatives Compare?

Increased Capacity & Reduced Delay

The City seeks to maintain Level of Service (LOS) "D" or better

- Both the traffic signal and roundabout alternatives will provide levels of service better than LOS "D".
- The roundabout alternative provides lower vehicle delays and better LOS.

Year 2040 Intersection Peak Hour Operations Alternatives Comparison				
	AM Peak Hour		PM Peak Hour	
Alternative	Delay (sec/veh)	Level of Service	Delay (sec/veh)	Level of Service
No Project	23.0	C	43.4	E
Traffic Signal	25.7	C	26.4	C
Roundabout	10.5	B	10.3	B

How do the Alternatives Compare?

Environmental Benefits

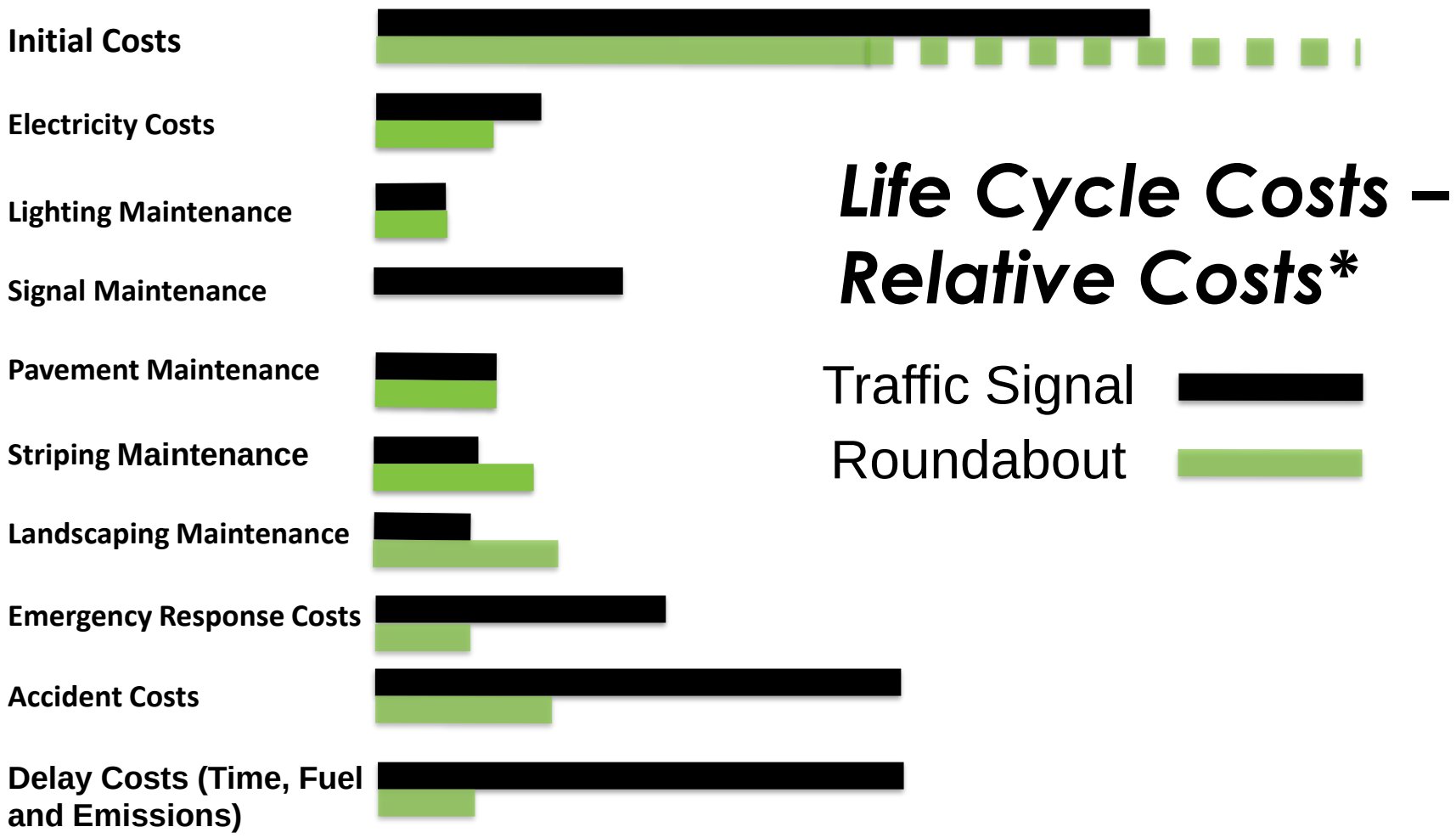
Compared to a Traffic Signal, a Roundabout results in:

- Less Delay
- Less Time Idling
- Less Emissions (50% decrease)
- Less Fuel Consumption

The traffic calming benefits also encourages biking and walking!

How do the Alternatives Compare?

Costs – Typical



*Cost relationships are project dependent and can vary from project to project

How do the Alternatives Compare?

Preliminary Costs – Project Alternatives

Alternatives Life Cycle Cost Summary Comparison

Life Cycle Costs (20 year design)	Traffic Signal Alternative	Roundabout Alternative
Collision and Mobility Costs		
Collision Costs of predicted crashes	$3,002,000	$2,016,000
Delay Costs	$860,000	$260,000
Fuel and GHG Costs	$537,000	$506,000
Project Costs including design, construction and maintenance		
Operations and Maintenance Costs	$60,000	$34,000
Project Costs (including R/W)	$1,172,299	$2,609,802
Total Life Cycle Costs (Opening Year $ - Net Present Value)	**$5,631,299**	**$5,425,802**

How do the Alternatives Compare?

Overall Alternatives Performance Comparison

Performance Measure	Traffic Signal Alternative	Roundabout Alternative
Cumulative Condition		
Delay - All approaches LOS "D" or better LOS A rated at 5 and E rated at 1.	2.4 ✓	**4.8** ✓✓
95th % Queue - Adequate queue storage	✓	✓✓
Future Investment Needs		
Service Life – function past the design year	D ✓	**B** ✓✓
Costs		
Operations & Maintenance - Annualized	$3,000	**$1,700** ✓
Collision Costs - Annualized	$150,100	**$100,800** ✓
Delay Costs - Annualized	$36,000	**$11,000** ✓
Fuel Costs - Annualized	$21,000	**$20,000** ✓
Environmental Costs - Annualized	$1,505	$1,505
Capital Costs - Annualized	**$48,000** ✓	$119,000
Truck Accommodations		
Serves design vehicle for all movements	✓	✓
Safety		
Predictive Measures - Greatest crash reduction potential for expected fatal and injury crashes	17%	**56%** ✓
Vehicle Conflicts - The number of potential conflict points that may occur at the intersection based on layout geometry	32	**8** ✓
Pedestrian Safety - Exposure to traffic in terms of number of lanes, conflict points, crossing times, and expected vehicular speeds.	4 35-45 mph	**1** **15-25mph** ✓✓
Bicycle Safety - Exposure to traffic in terms of number of lanes, conflict points, and speed differential		✓
Property Impacts		
Property Impacts	✓✓	
Local Access		
Maintains local access and circulation	✓	✓
Total Performance Measures Met	**8**	**17**

What are the Next Steps?

- Compile Comments from this Meeting
- Present Recommendation for Traffic Signal or Roundabout to City Council at the February 5th or February 19th City Council Meeting
- Begin Design Based on City Council Direction (Roundabout is subject to identifying funding)

Adjourn to Project Stations