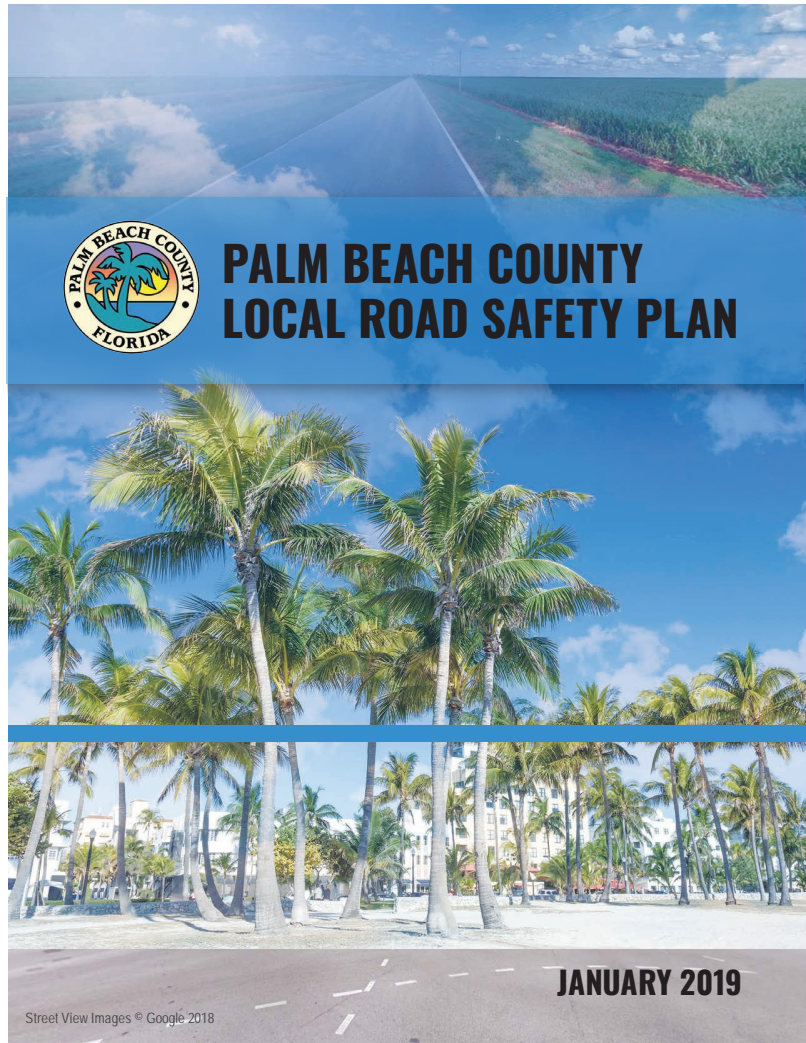


# LOCAL ROAD SAFETY PLAN

## Project Decision Tree Example



[View the full Palm Beach County Local Road Safety Plan](#)

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U.S. Department of Transportation  
**Federal Highway Administration**

# Project Decision Tree Example

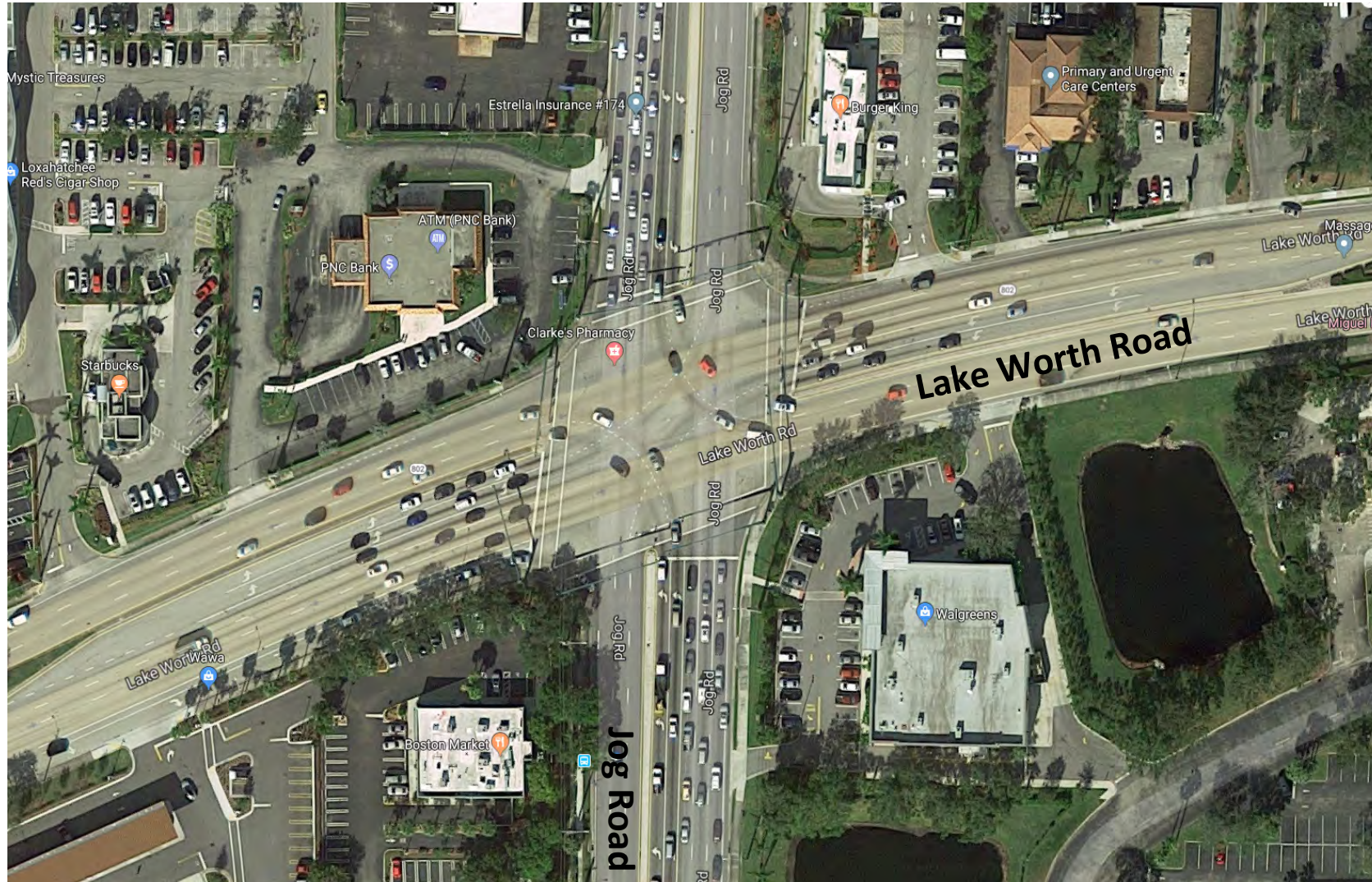
## PALM BEACH COUNTY LOCAL ROAD SAFETY PLAN DEVELOPMENT

Urban/Suburban Intersection

Intersection of Lake Worth Rd (FL 802) & S. Jog Road

Rank 12, Intersection ID 1712

# Site Overview

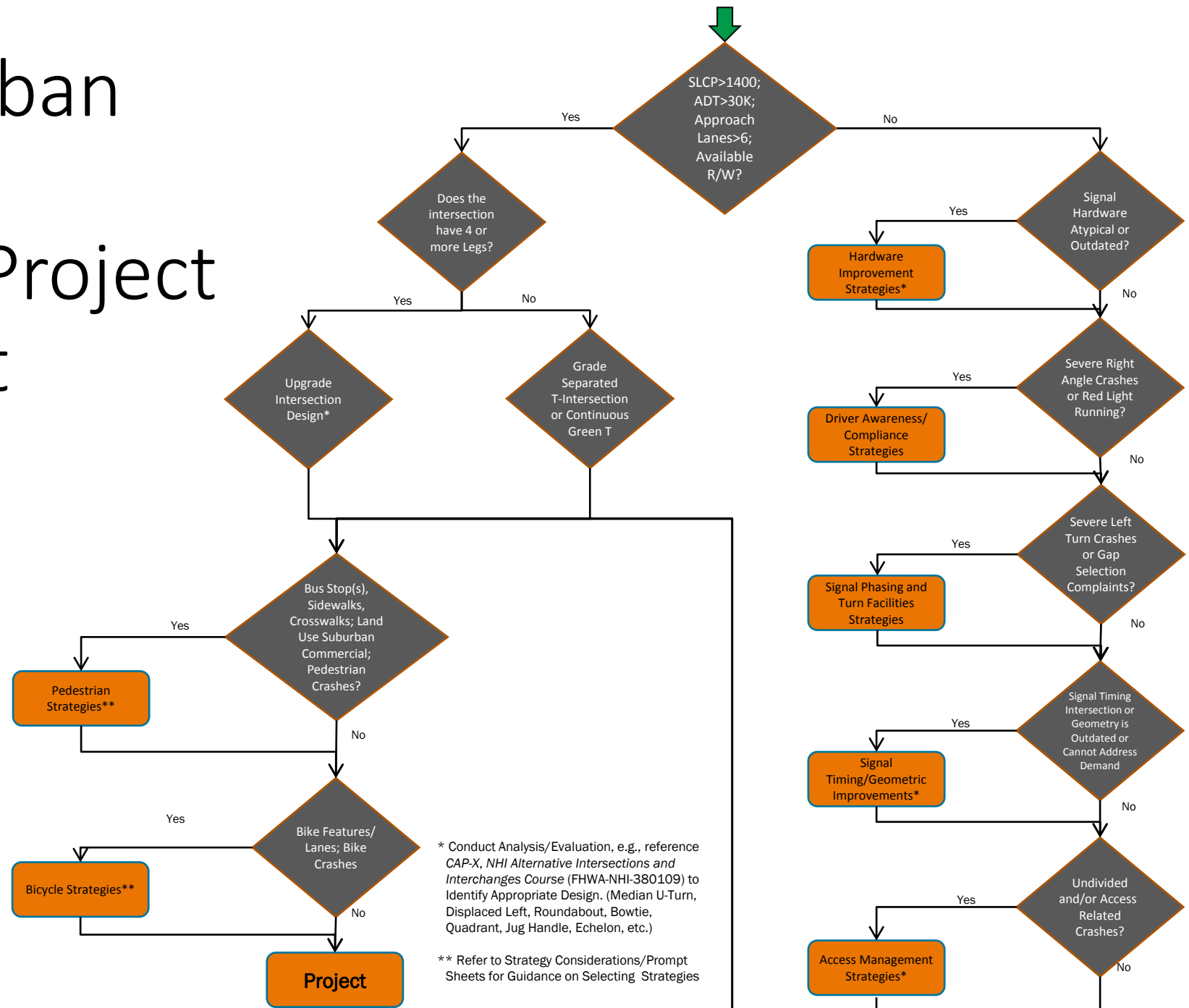


Source: Google map, 2018 imagery

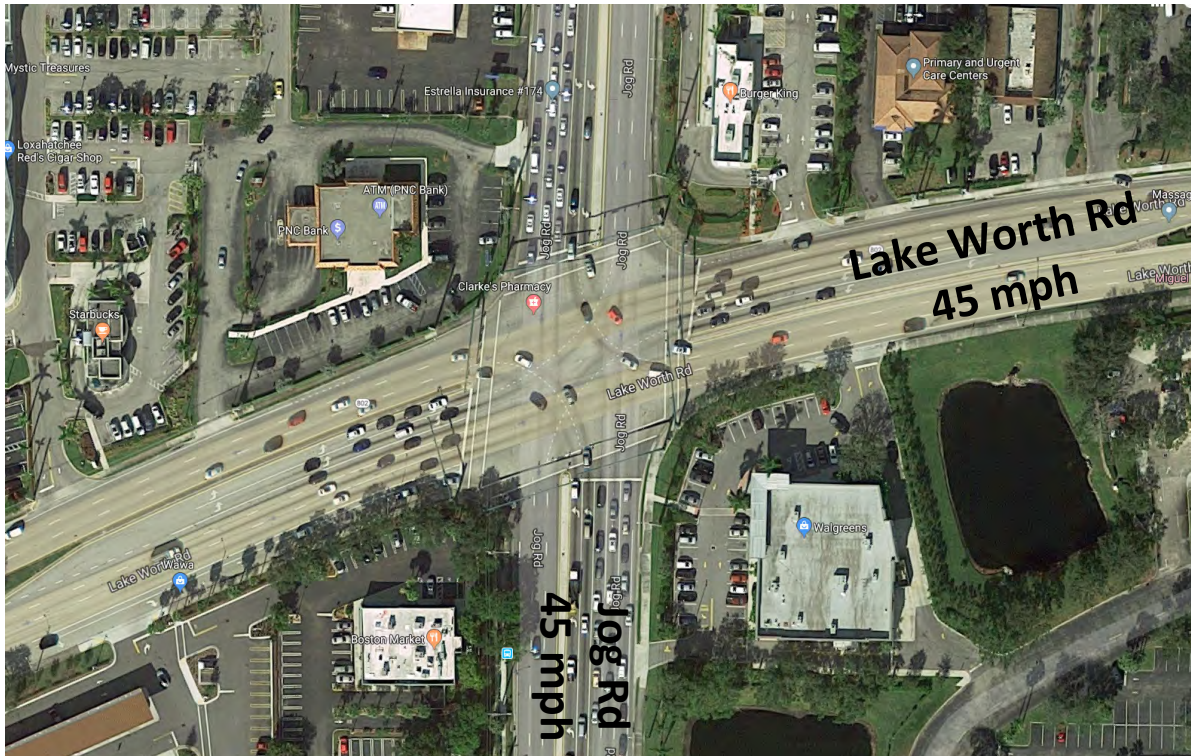
# Site Overview

- Four leg signalized urban intersection
- Total entering vehicles = 86,000 vehicles per day (VPD) (2016)
- Speed limit on all approaches is 45 mph
- All approaches are media divided beyond intersection extents
- Exclusive double left turns on all approaches
- Exclusive right turn on eastbound (EB) approach (heading south)
- Pedestrian crosswalks at all approaches
- Both roads have existing bicycle lanes in both directions
- Northbound (NB), southbound (SB), and westbound (WB) are 5-lane approaches; EB is a 6-lane approach

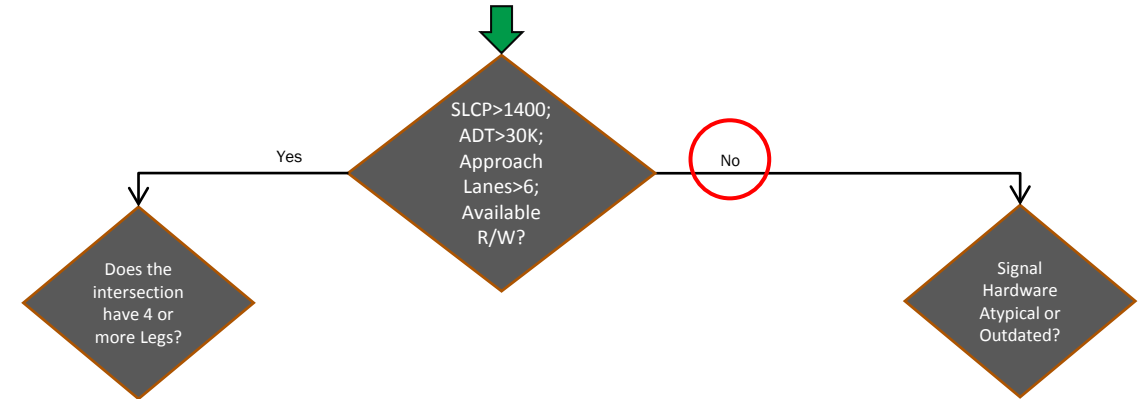
# Urban/Suburban Signalized Intersection Project Development Process



# Step 1 – Site Demographics



Source: Google map, 2018 imagery



Speed Limit Cross Product > 1400? **Yes**  
 $SLCP = 45 \text{ MPH} \times 45 \text{ MPH} = 2,025$

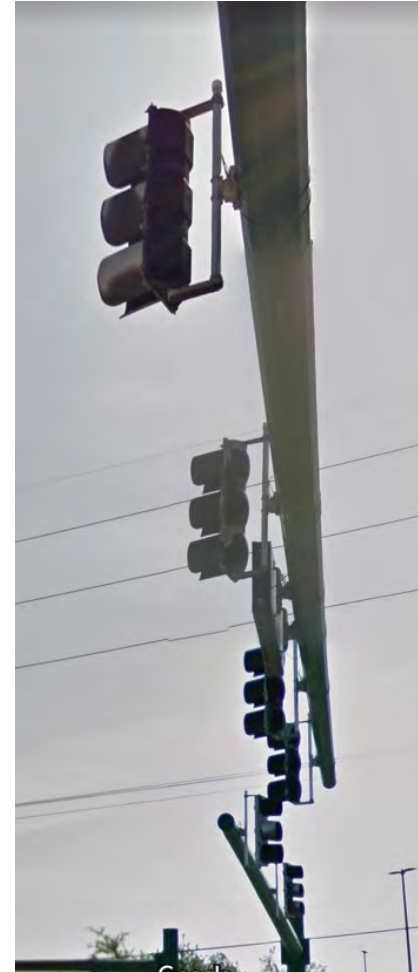
ADT > 30,000 VPD? **Yes**  
 Entering Vehicles=86,000 VPD

Approach Lanes > 6? **Yes**  
 Eastbound is a 6-lane approach

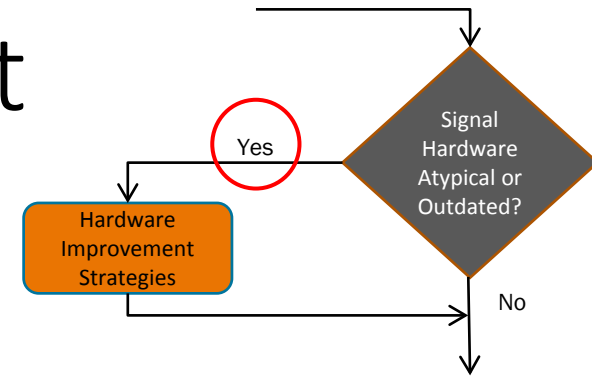
Available R/W? **No**  
 Intersection is surrounded by several  
 businesses and property acquisition is a  
 costly alternative

# Step 2 – Signal Hardware Assessment

- ❑ Signal heads appear to be outdated (chipped paint) and are inconsistent (based on visual inspection)
  - Some signal heads have LED lenses while some do not
  - EB and WB signal heads have background shields, while NB and SB approaches do not
- ❑ Current signal heads are 12”



Signal heads mounted on the SW corner mast arm  
Source: Google Street View  
Image capture: May 2017



# Step 2 – Signal Hardware Improvements

- ❑ Improve Signal Visibility:
  - Install signal background shields on northbound and southbound heads to improve visibility.
  - Install supplemental mast arm-mounted signal heads so that each lane has a dedicated signal head. This included mast arms on the approach side and far side of the intersection.
    - Note: this upgrade requires a structural analysis of each mast arm/span wire where a signal will potentially be added.
- ❑ Place lane dedication regulatory sign at the beginning and the end of channelizing line per USDOT MUTCD Requirements:
  - Place R3-H8ec on northbound, southbound, and westbound (one each)
  - Place R3-H8eb on eastbound
- ❑ Retroreflectivity of the existing signs and markings appears to be in good shape. Upgrading existing signs for retroreflectivity is not recommended.
- ❑ There are existing raised markings for all longitudinal markings and a project to implement is not required.



Source: Google Street View, Image capture: June 2017



R3-H8ec



R3-H8eb

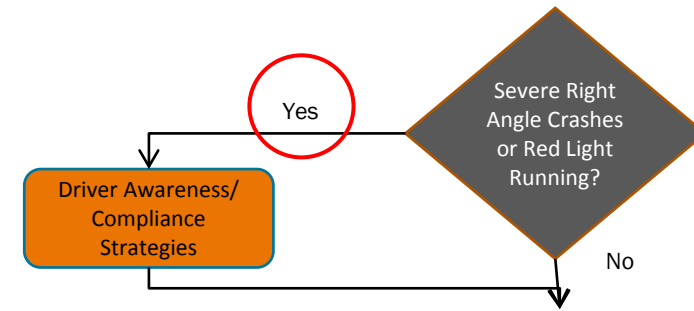


Source: Google Street View, Image capture: June 2017



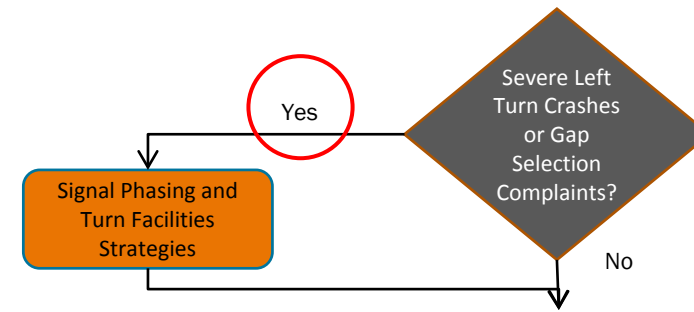
# Step 3 – Driver Awareness, Compliance Strategies

- ❑ The intersection experienced 1 fatal crash and 2 serious injury crashes from 2011 through 2015. Of these crashes, the single fatal crash and one of the serious injury crashes were right-angle crashes.
  - Neither of the angle crashes were noted as visibility-related; however, **visibility will be addressed with upgraded signals as previously noted.**
  - The fatal crash involved a pedestrian and will be best addressed with pedestrian-specific countermeasures.
  - The volume of angle crashes is low – advanced dilemma warning systems may address the crashes but the cost is significant. **An advanced dilemma system is not recommended at this time.**
- ❑ There were 6 red-light running crashes from 2011 through 2015, of which 3 were minor injury, 1 was possible injury, and 2 were property damage only.
  - Red-light running compliance lights combined with enforcement may reduce these crashes; however, these are not the target crashes. Confirmation lights are not recommended.



# Step 4 – Signal Phasing and Turn Facilities Strategies

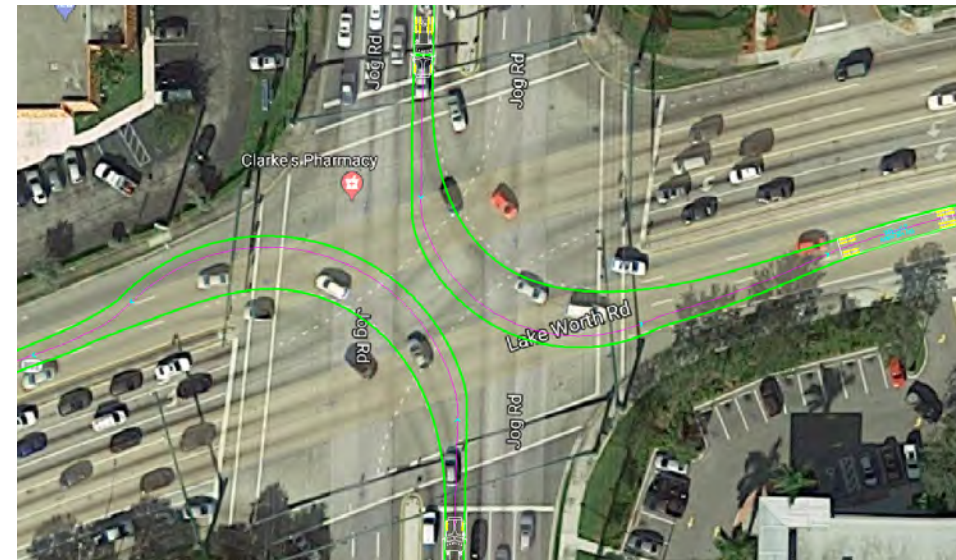
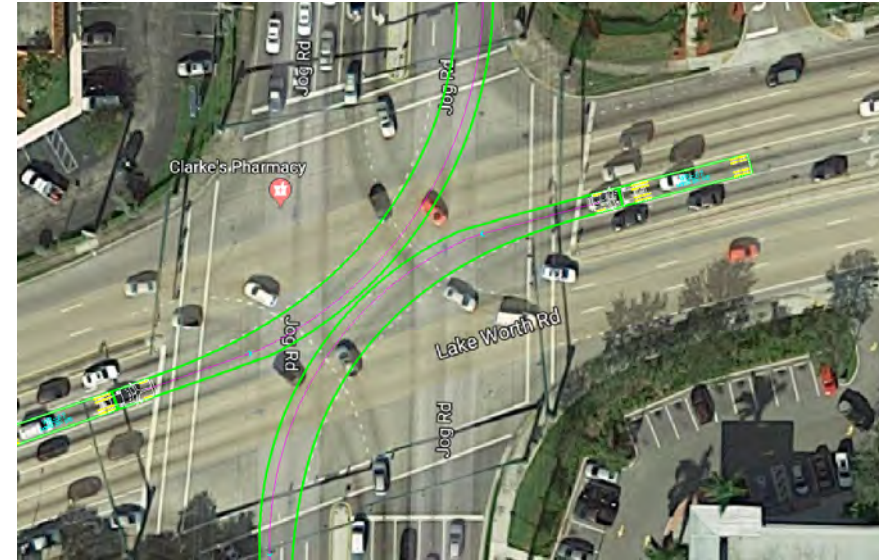
- ❑ 11 crashes involved left turns of which 3 were severe. Specific details on gap acceptance were not available, though they are presumed unrelated given the protected left turn signal timing (assumed based on number of lanes).
  - Storage length of turn facilities is enough to accommodate peak turning movements without through blocking.
- ❑ Turn radius analysis was completed using AutoTurn (design vehicle: WB-62). (Details next figure)
  - It appears concurrent eastbound to northbound and westbound to southbound left turn movements have almost no clearance, which may be slowing down turning traffic. This may be leading to the high level of “Following Too Closely” Crashes (29 crashes).



Source: Google Street View, Image capture: July 2017

# Step 4 – Signal Phasing and Turn Facilities Strategies

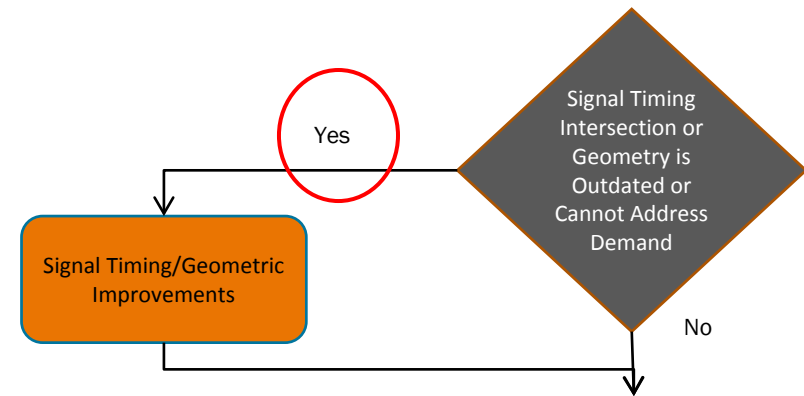
- ❑ Left turn movements on opposite approaches are related to design vehicle WB-62 drafted with AutoTurn. Green path represents total turning width of design vehicle.
- ❑ Signal Phasing improvements
  - Update signal phasing to avoid concurrent protected left turns of opposite approaches, especially on eastbound and westbound approaches.
  - Since there is an urgent care facility 200' east of intersection, and a fire station 0.6 miles west of intersection, and a fire station almost a mile north of intersection, preemption should be utilized.



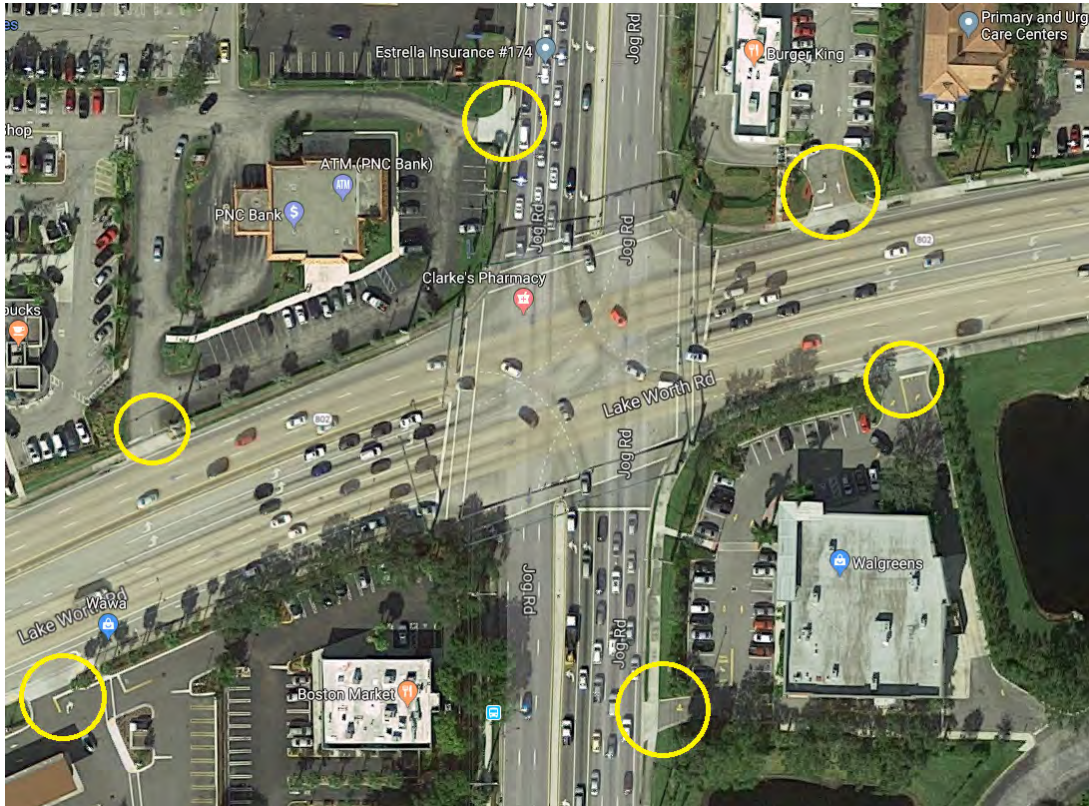
Source: Google map, 2018 imagery

# Step 4 – Signal Timing/ Geometric Improvements

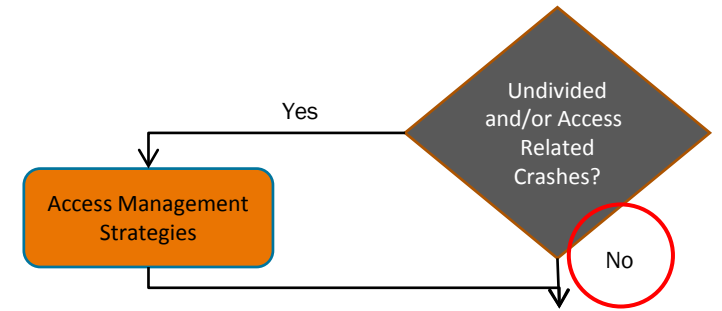
- ❑ It is unknown when the last signal timing/capacity analysis was completed. Therefore, **it is recommended to study the signal to improve Capacity/LOS by updating timing/phasing of intersection to improve operation.**
- ❑ Intersection geometry improvements
  - **Shift back stop-bars and crossing lines to make more space for design vehicle movements (see AutoTurn Analysis).**
  - Restripe pavement markings.
  - Due to cost and existing heavy left turn volumes on all approaches, **alternative intersection types are not recommended.**



# Step 5 – Access Management



Source: Google Map, Image capture: July 2017

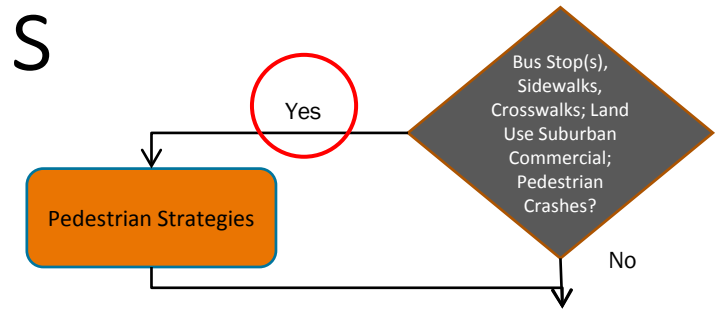


All of the approaches are divided and all of the access points are right-in/right-out. Therefore, **access management improvements are not recommended.**

# Step 6 – Pedestrian Considerations



Source: Google Street View, Image capture: July 2017

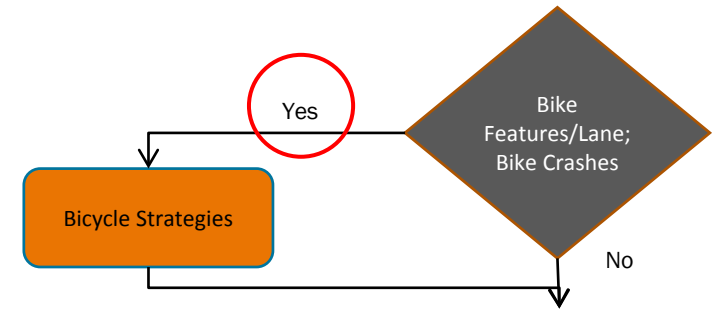


- ❑ The one fatal crash at the site involved a pedestrian. Additionally there is:
  - Evidence of high volume pedestrian traffic
  - Presence of handicapped sidewalk/crosswalk users
  - Two bus stops within 500' on all four legs (totally eight bus stops)
  - Existence of surrounding businesses that generate high volume of pedestrian traffic
  - Crosswalks with long crossing distances (150'-170')
- ❑ Recommended pedestrian upgrades include
  - **Pedestrian countdown timers with pedestrian leading interval signal timing**
  - **Future consideration for raised pedestrian refugee islands** (likely width would have to be taken from lanes and added to median)

# Step 7 – Bicyclist Considerations



Source: Google Street View, Image capture: July 2017



- Bike lanes already exist along all approaches in all directions.
- 5 injury crashes involving bicycles occurred from 2011-2015.
- Proposed bicycle features include **leading bicycle interval signal timing**, and marking the **full bike lane with green markings and white bicycle markings**.
- Advanced bicyclist facilities, like bike bokes and bicycle detectors, should be considered only after lower cost countermeasures do not improve bicyclist safety.

# Planning Level Cost Estimate

Below is the break-down of cost estimates of the recommendation:

Strategy	Unit	Cost	Quantity	Sub-total
Retroreflective Signal Backplates	Signal Head	\$ 110.00	23	\$ 2,530
Supplemental Signal Heads	Intersection	\$ 2,700.00	1	\$ 2,700
Structural Analysis for Additional Signal Heads	Mast Arm/ Span Wire	\$ 2,400.00	8	\$ 19,200
Upgrade Signs and Markings	Approach	\$ 3,000.00	4	\$ 12,000
Signal Phasing and Timing Improvements	Intersection	\$ 5,000.00	1	\$ 5,000
Install Pedestrian Countdown Timers with leading pedestrian interval	Intersection	\$ 14,300.00	1	\$ 14,300
Total approximate project cost				\$ 55,730