
13th Street Traffic Calming Analysis

Technical Memorandum

City of Riviera Beach Public Works Department



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1 Introduction

West 13th Street between Avenue U and Avenue R runs through a residential neighborhood known as Federal Gardens (neighborhood). The residents of the City have brought up concerns that the trucks traveling on West 13th Street are presenting a safety hazard. The purpose of this memorandum is to present traffic calming alternatives that may reduce the speed of vehicles in the project area or discourage through truck traffic. For this memorandum the Project Area is defined as West 13th Street from Avenue U to Avenue R.

2 Background

The Federal Gardens neighborhood is bounded on the west by Avenue U, on the north by West 14th Street, on the east by Avenue R and on the south by West 11th Street. The neighboring properties consist of residential, municipal, educational and industrial uses. West 13th Street bisects the neighborhood and connects on the west end to Congress Avenue, a Palm Beach County thoroughfare road. On the east side of the neighborhood West 13th Street connects to various City streets for residential and industrial uses before intersecting with Australian Avenue, another Palm Beach County thoroughfare road. See Exhibit 1 for project location, land use and roadway network.

The roadway section for West 13th Street consists of two lanes, each 12-feet wide, curb and gutter, grass strip and sidewalk. The roadway cross section from the West 13th Street design plans, prepared by Jordan, Jones & Goulding, is shown below in Figure 2.a.

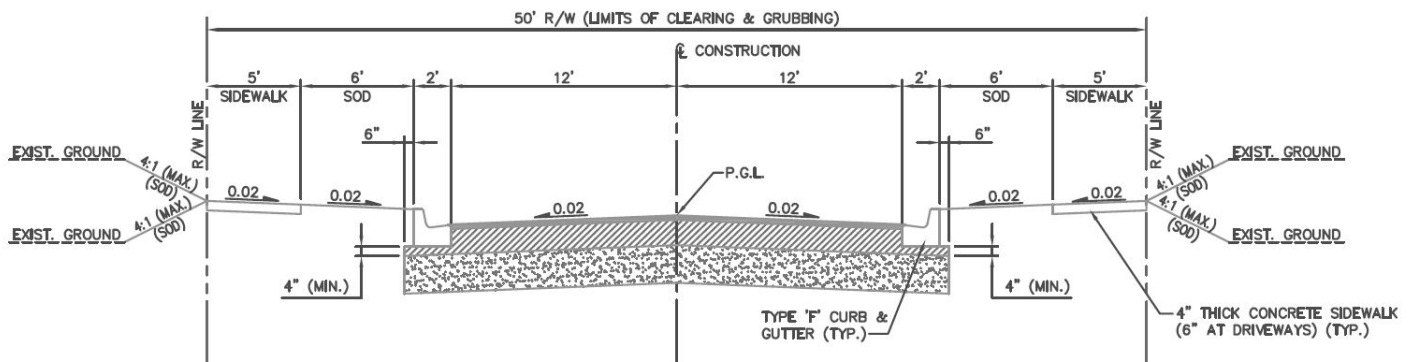
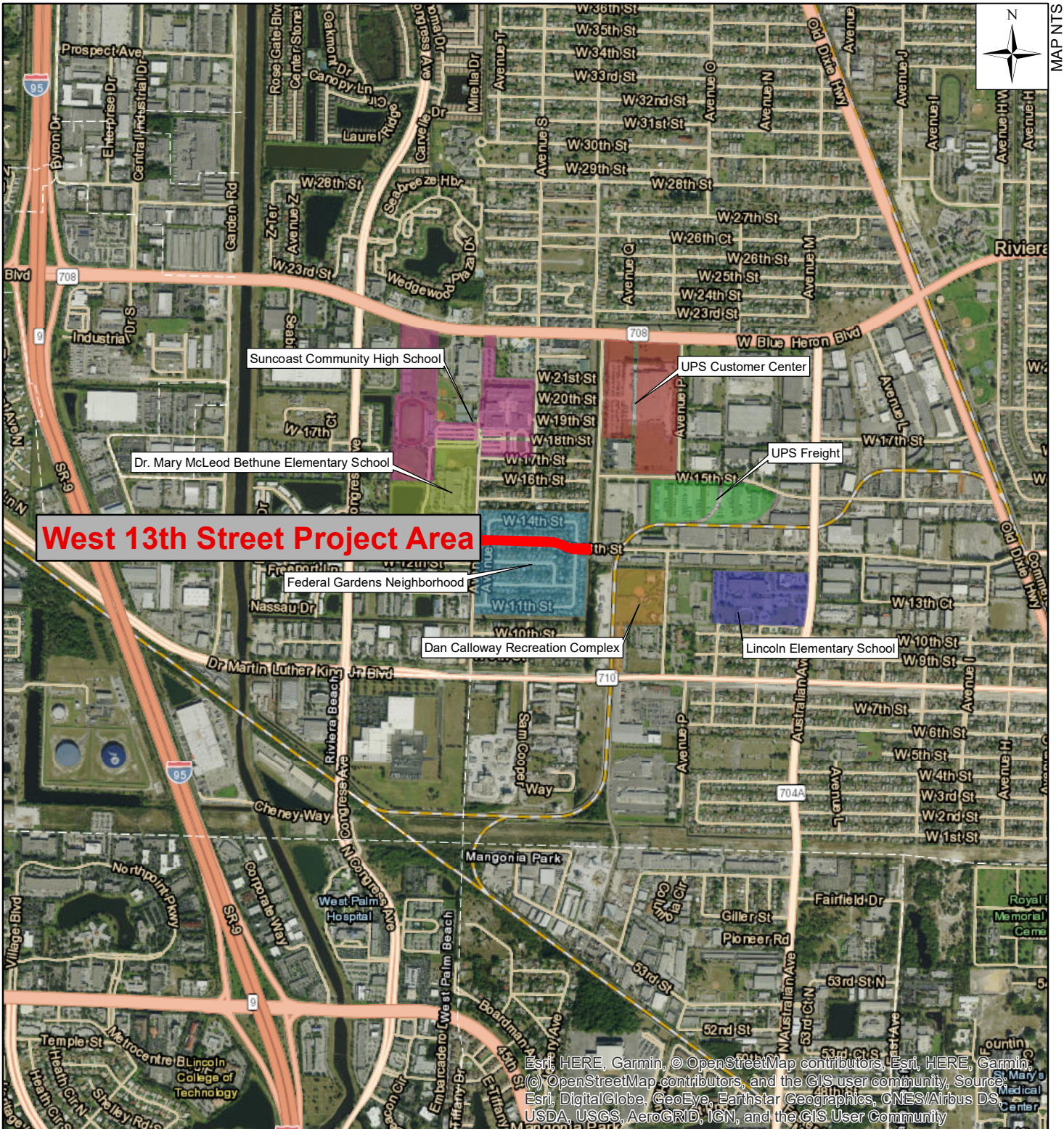


Figure 2.a: West 13th Street Typical Section

Some existing features in the current roadway that are recognized for their potential to slow traffic are speed humps and neighborhood entryway signage. The speed humps require the vehicle to slow down to prevent damage and the neighborhood entryway signs signify to the motorist that they are entering a neighborhood that has different traffic behavior than the surrounding areas. The existing neighborhood currently has two (2) speed humps and two (2) entry sign features. These devices are currently not providing the level of traffic calming for resident's satisfaction.

CITY OF RIVIERA BEACH

West 13th Street Traffic Calming Analysis



West 13th Street Project Area

Legend

- Project Area
- Federal Gardens Neighborhood
- Dan Calloway Recreation Complex
- Dr. Mary McLeod Bethune Elementary School
- Lincoln Elementary School
- Suncoast Community High School
- UPS Customer Center
- UPS Freight

Exhibit 1: Project Location Map



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3 Coordination Efforts

Traffic calming measures have the greatest chance of success when the stakeholders are involved to discuss their issues and expectations. The traffic calming measures presented in this memorandum should be coordinated with the following stakeholders at a minimum prior to implementation:

- Residents of Federal Gardens about traffic concerns and convenience for neighborhood entry and exit;
- Surrounding business owners for business traffic entry and exit;
- Palm Beach County School Board regarding impacts to the school routes for both buses, passenger vehicles and pedestrians;
- Palm Tran for bus route impacts;
- Riviera Beach Fire Department and Police Department for possible effects to emergency response time

4 Traffic Calming Alternatives

The Institute of Transportation Engineers defines traffic calming as “the combination of measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users. Traffic calming consists of physical design and other measures put in place on existing roads to reduce vehicle speeds and improve safety for pedestrians and cyclists.” Sections 4.1 through 4.8 describe traffic calming measures that may be applicable for the Project Area. The traffic calming measures included in these sections have been studied for effectiveness by the Federal Highway Administration (FHWA). Also included in this section are conceptual designs for each alternative. Section 4.9 provides budget level costs for implementation and Section 4.10 provides a comparison for the various alternatives.

4.1 Alternative 1: Narrowed Travelway

Narrowing of travel lanes reduces speeds and makes drivers more aware of their surrounding areas, including other users of the right-of-way. This lane narrowing can be achieved through the use of pavement markings in various configurations. For this Project Area, it is recommended that the lanes be narrowed to a 10-foot width. Figure 4.1.a shows examples of pavement markings for narrowing lanes including solid stripe and cross striping. Figure 4.1.b shows the location of proposed pavement markings in the Project Area.



Figure 4.1.a: Narrowing Lanes Striping Examples

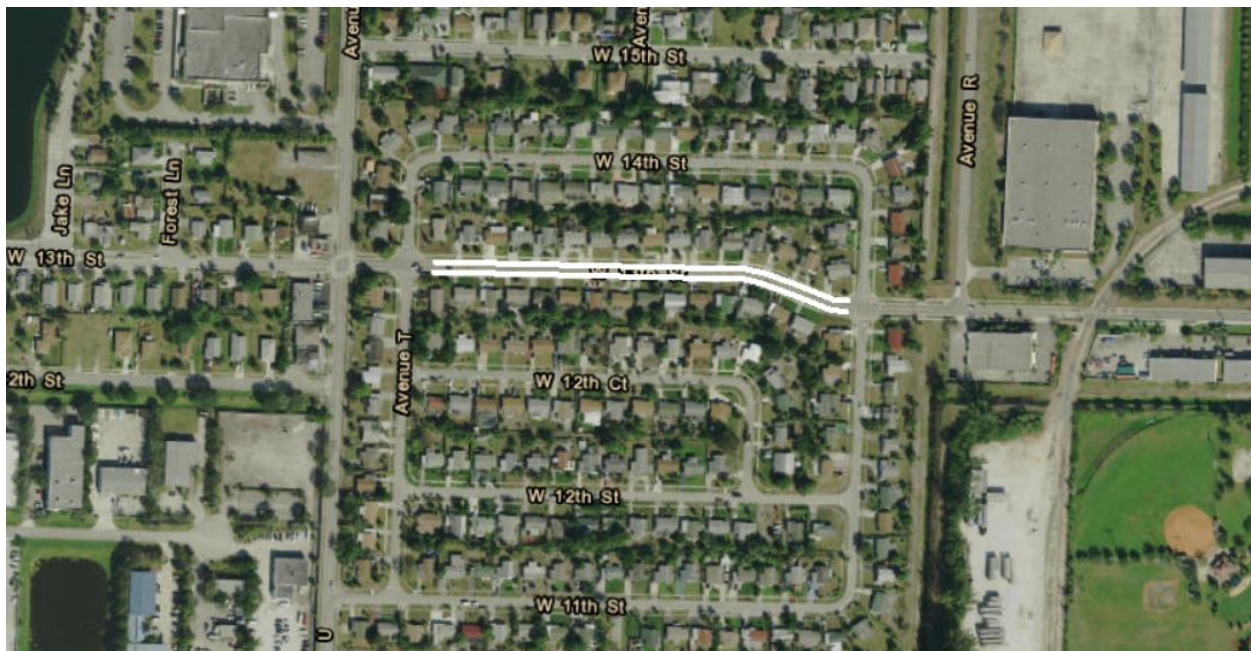


Figure 4.1.b: Proposed Design Alternative 1: Narrowing Lanes

4.2 Alternate 2: Traffic Calming Signage

Announcing signage to indicate an area has traffic calming devices will make drivers slow their speed in anticipation of the traffic calming devices. An example of traffic calming signage is shown in Figure 4.2.a below. These devices would be placed on either side of the Neighborhood entrance, at the intersections of West 13th Street with Avenue T and Avenue R, as shown in Figure 4.2.b.

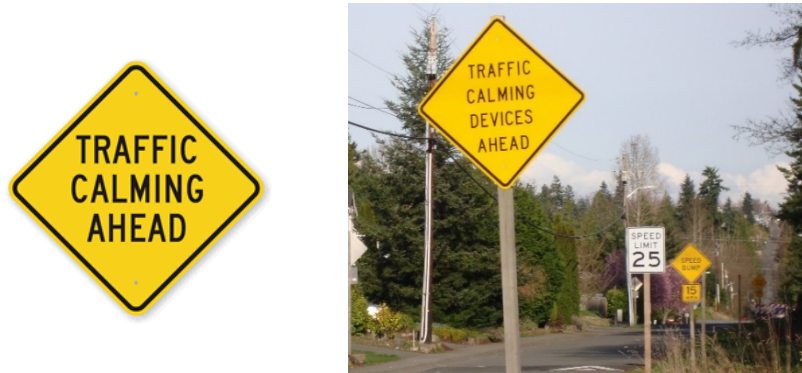


Figure 4.2.a: Traffic Calming Signage Example

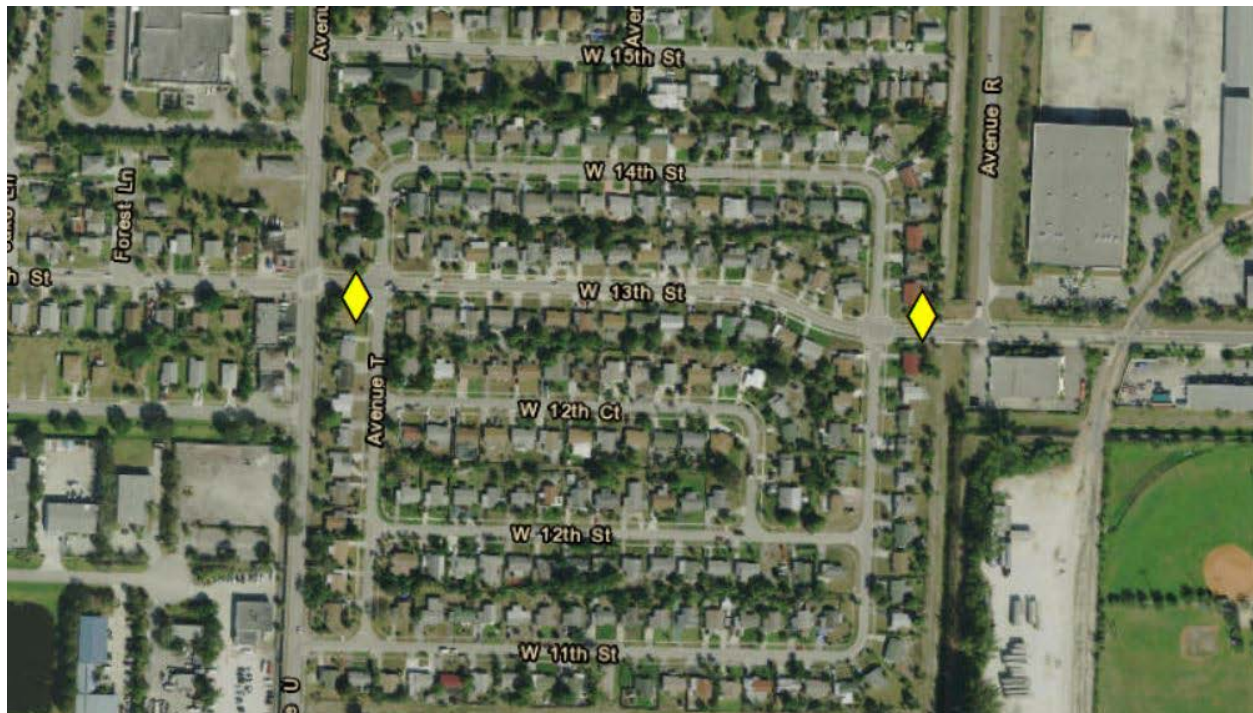


Figure 4.2.b: Proposed Design Alternative 2: Traffic Calming Signage

4.3 Alternate 3: Raised Intersection

Raised intersections are a form of speed tables for an entire intersection, that incorporate the raised profile of a speed hump with a more gradual transition. The average reduction in speed for raised intersections is approximately 7 – 9 mph. Raised intersection also provide an opportunity for specialty pavement materials which can provide neighborhood beautification and unique character. An example of a raised intersection with specialty pavement is shown in Figure 4.3.a. The raised intersections would be proposed at the intersections of West 13th Street with Avenue U and Avenue R as shown in Figure 4.3.b.



Figure 4.3.a: Raised Intersection Example

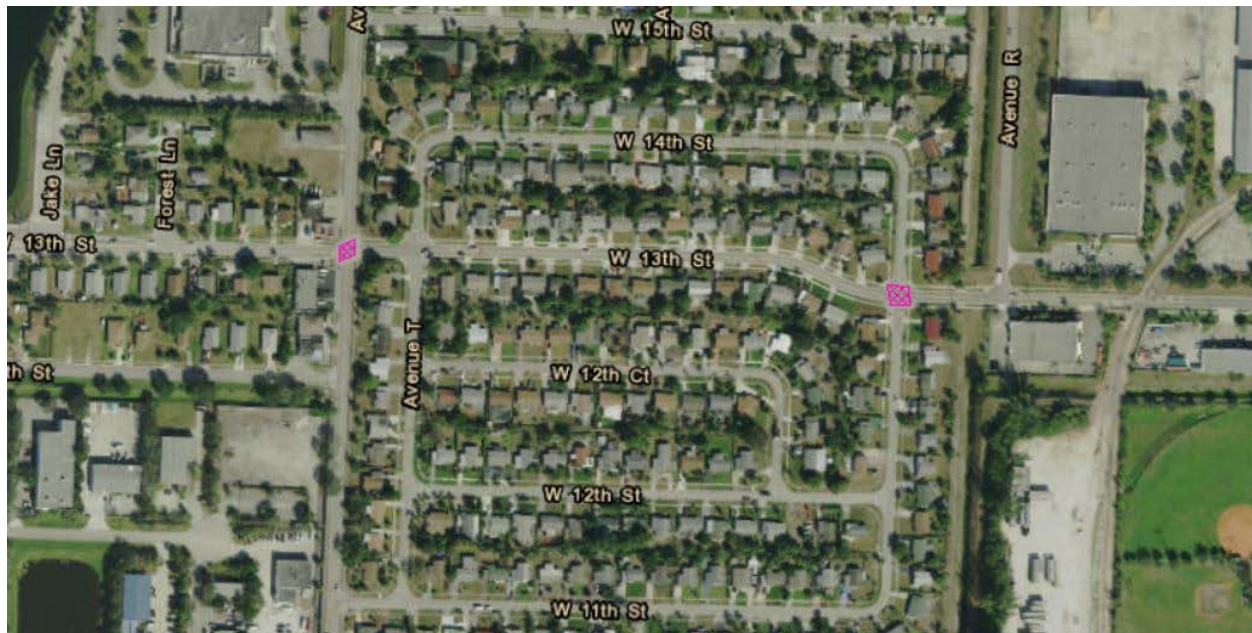


Figure 4.3.b: Proposed Design Alternative 3: Raised Intersection

4.4 Alternate 4: Raised Crosswalks

Raised crosswalks provide the same general speed reduction and beautification benefits as the raised intersection. An example of a raised crosswalk and signage is shown in Figure 4.4.a. The raised crosswalks would be proposed at the intersections of West 13th Street with Avenue U and Avenue R, for the pathway going across West 13th Street as shown in Figure 4.4.b.



Figure 4.4.a: Raised Crosswalk Example

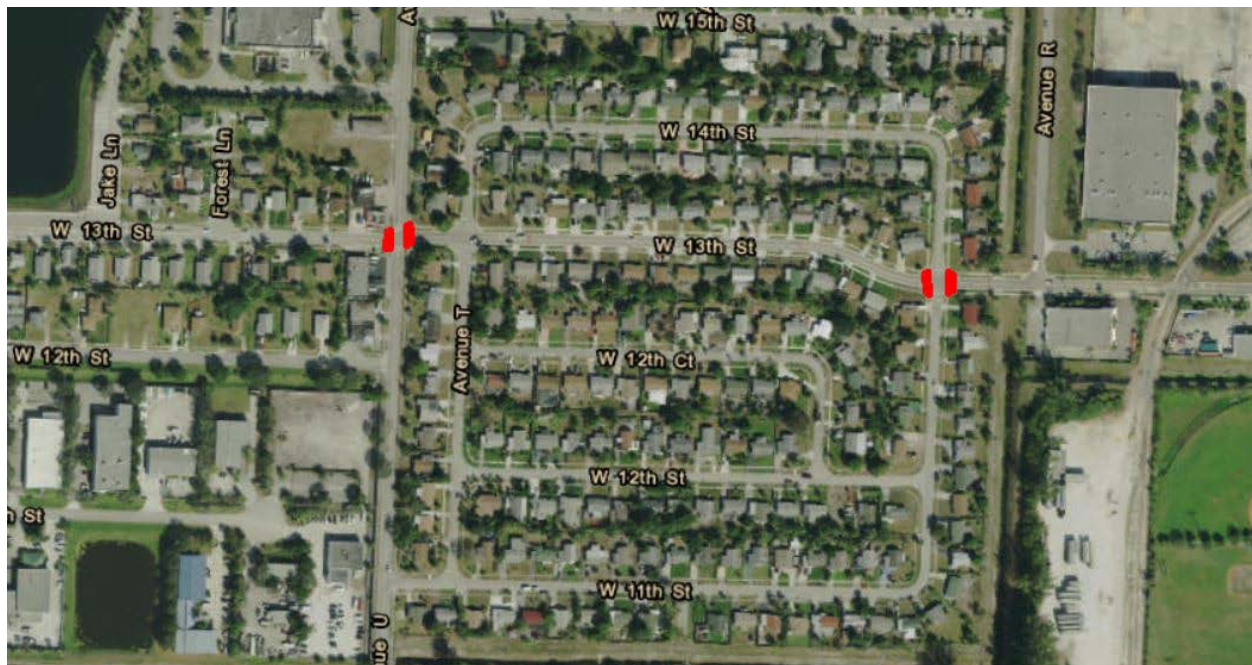


Figure 4.4.b: Proposed Design Alternate 4: Raised Crosswalk

4.5 Alternate 5: Chicanes

Chicanes are curbed bulb outs set adjacent to the curb on alternating sides of the street that cause vehicles to travel in an “S” pattern and therefore reduce speed. Chicanes can be made of concrete, sod, specialty pavement materials, or landscape features. Examples of chicanes area shown below in Figure 4.5.a.



Figure 4.5.a: Chicanes Example

Chicanes should be spaced at intervals that slow traffic but still allow vehicles to pass safely. Also, they shall not interfere with driveways. Proposed locations for the chicanes are shown in Figure 4.5.b.

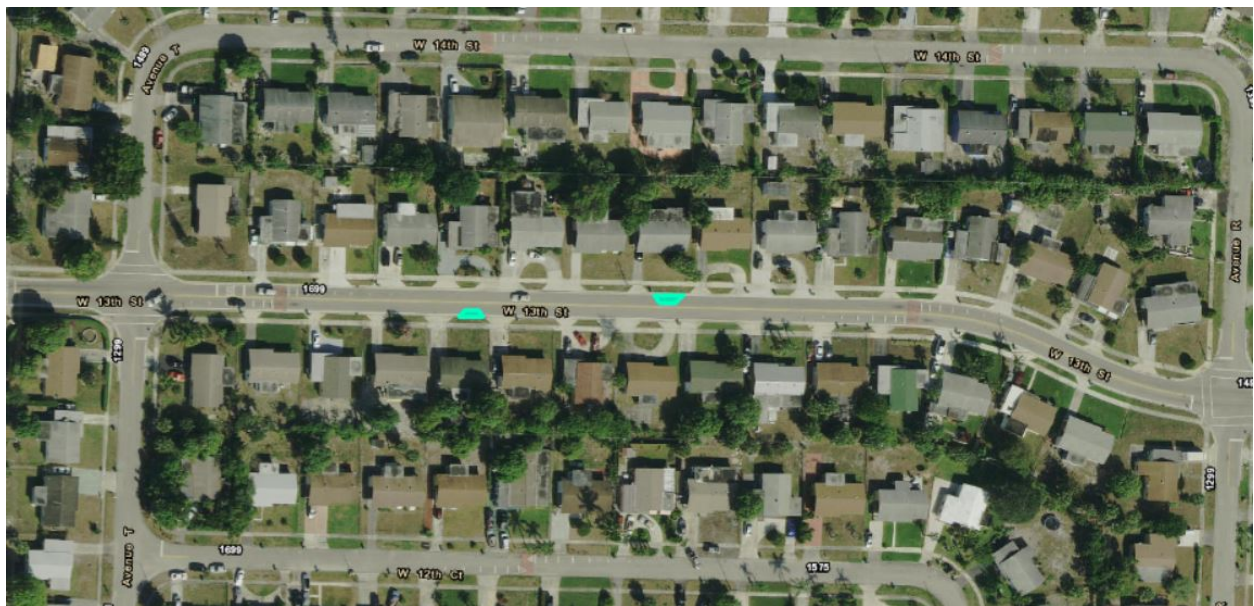


Figure 4.5.b: Proposed Design Alternative 5: Chicanes

4.6 Alternate 6: Traffic Circle

Traffic circles are channelizing devices that direct traffic clockwise around an intersection. They are typically raised with landscape or signage in the center to increase visibility. These traffic circles are designed such that emergency vehicles can navigate through them, however large trucks would need to drastically slow down in speed through the intersection. Figure 4.6.a shows examples of traffic circles.



Figure 4.6.a: Traffic Circles Example

The proposed location for the traffic circle is shown in Figure 4.6.b.

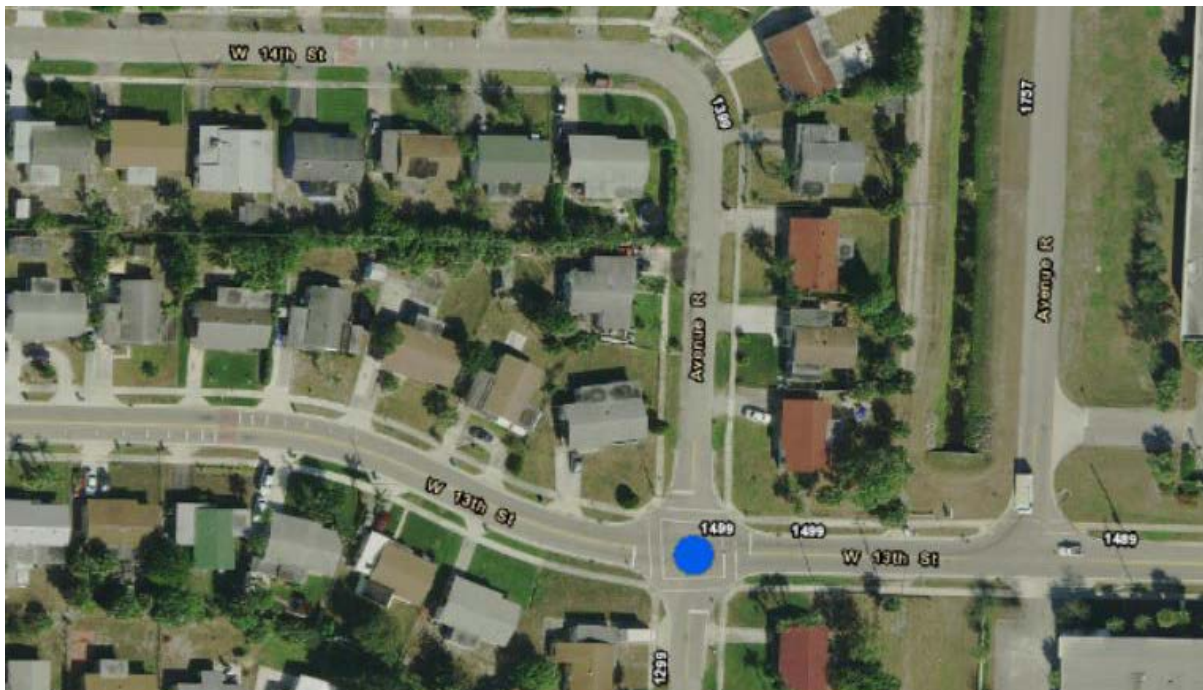


Figure 4.6.b: Proposed Design Alternative 6: Traffic Circle

4.7 Alternate 7: Permanent Road Closure

A permanent road closure terminates one leg of an intersection. An example of a permanent road closure is shown in Figure 4.7.a. The road would be eliminated on West 13th Street from Avenue R, west of the City canal, to Avenue R, east of the City canal. This road closure would eliminate any through traffic on West 13th Street from Avenue T to Avenue R as shown in Figure 4.7.b. All traffic within the Project Area would be related to the residential properties of the Neighborhood.



Figure 4.7.a: Permanent Road Closure Example

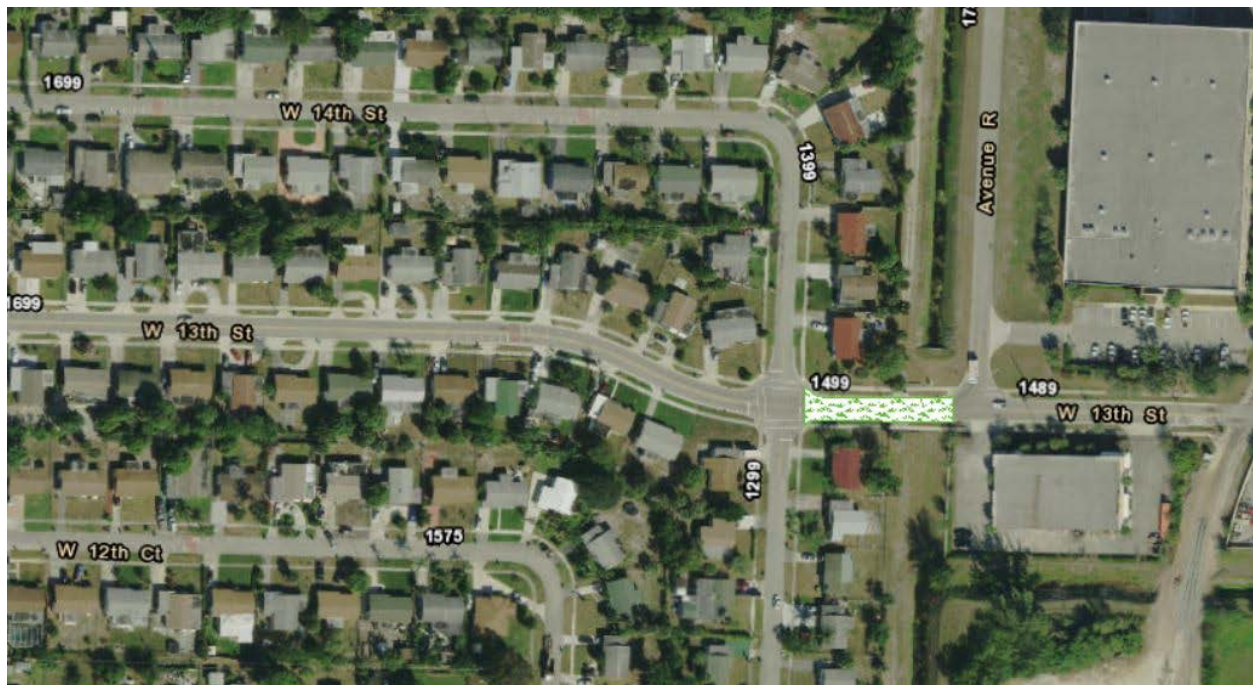


Figure 4.7.b: Design Alternative 7: Permanent Road Closure

4.8 Alternative 8: Partial Road Closure

A partial road closure would allow traffic to flow in one direction only. An example of a partial road closure is shown in Figure 4.8.a. The road would be closed to westbound traffic on West 13th Street from Avenue R, west of the City canal, to Avenue R, east of the City canal as shown in Figure 4.8.b. This would reduce the volume of westbound traffic along West 13th Street.



Figure 4.8.a: Permanent Partial Road Closure Example

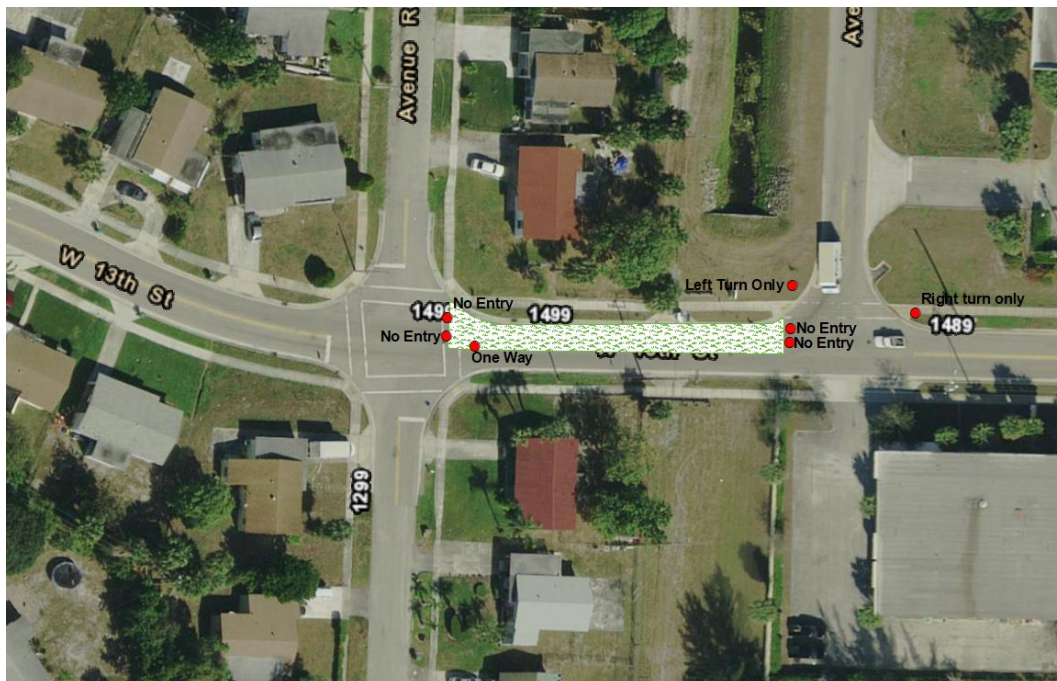


Figure 4.8.b: Design Alternative 8: Permanent Road Closure

4.9 Cost Estimates

A cost estimate has been prepared and shown in Table 4.9.1 for each design alternative for the City's consideration when choosing which traffic calming measures to implement. The proposed costs included in this memorandum are based on industry standard pricing and conditions of the project area. Costs are preliminary and may change when detailed design is performed.

Table 4.9.1: Cost Estimates for Design Alternatives

Alternative No.	Alternative Description	Cost	Assumptions
1a	Narrowed Travelway - Single White Stripe	\$19,200.00	2,400 LF of 6" solid white striping at \$8/LF
1b	Narrowed Travelway - Cross Hatch Stripes	\$26,400.00	2,400 LF of 6" solid solid white striping at \$8/LF, plus 720 LF of 12" white striping at \$10/LF.
2	Traffic Calming Signage	\$1,500.00	Includes two (2) signs.
3	Raised Intersection	\$30,375.00	Stamped asphalt for center of intersection, 45'x45', \$135/SY
4	Raised Crosswalk	\$27,000.00	Stamped asphalt for center of crosswalk, 50 SY each crosswalk, \$135/SY, 4 total crosswalks
5	Chicanes	\$40,000.00	No drainage improvements are required for installation; sod (no trees); 4 chicanes at \$10,000/EA
6	Traffic Circle	\$20,000.00	Stamped concrete in center, standard signage; 35 SY raised traffic circle
7	Permanent Road Closure	\$10,000.00	Pavement will be replaced with asphalt, 500 SY at \$20/SY
8	Partial Road Closure	\$8,100.00	Pavement will be replaced with asphalt, 250 SY at \$20/SY; 7 signs; and pavement markings

4.10 Comparison of Alternatives

Many factors should be considered before implementing the traffic calming measures proposed in this memorandum. Table 4.10.1 outlines costs, speed reduction and beautification possibilities for comparison purposes. The effectiveness for each alternative can be measured in terms of the anticipated speed reduction. The speed reduction in turn has an effect on the reduction of volume of traffic, as motorists will choose other routes without traffic calming.

Table 4.10.1: Traffic Calming Alternative Analysis

Alternative No.	Alternative Description	Cost	Speed Reduction ⁽¹⁾	Considered a Beautification?
1a	Narrowed Travelway - Single White Stripe	\$19,200	0.5 mph	No
1b	Narrowed Travelway - Cross Hatch Stripes	\$26,400	0.5 mph	No
2	Traffic Calming Signage	\$1,500	3 mph ⁽²⁾	No
3	Raised Intersection	\$30,375	0.3 - 1 mph	Yes
4	Raised Crosswalk	\$27,000	7 - 9 mph	Yes
5	Chicanes	\$40,000	3 - 9 mph	Yes
6	Traffic Circle	\$20,000	5 mph ⁽³⁾	Yes
7	Permanent Road Closure	\$10,000	N/A	Yes
8	Partial Road Closure	\$8,100.00	3 - 9 mph	Yes

(1) Per FHWA “Traffic Calming ePrimer” https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm.

(2) Results will vary based on fines and enforcement

(3) Based on posted road speed limit of 25 mph and traffic circle recommended speed of 20 mph

5 Conclusion

This technical memorandum presents alternatives for the purpose of evaluating traffic calming, including speed and volume reduction, on West 13th Street within the Federal Gardens neighborhood. These alternatives can be used individually or combined to achieve the desired results. It is recommended that the alternatives be brought to the public and surrounding business owners for input and feedback. Also, certain alternatives, such as the permanent road closure, may need to be further analyzed by a traffic engineer to confirm that the re-routing of vehicles will not adversely impact adjacent roadways. Coordination for access within and through West 13th Street with these traffic calming measures should be discussed with the Palm Beach County School Board, Palm Tran, Riviera Beach Police Department and Riviera Beach Fire Department to further understand the impacts to each stakeholder.

6 References

FHWA “Traffic Calming ePrimer” https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm.

Institute of Transportation Engineers (ITE) “Speed Control in Residential Areas”