

# Adding Turbo Lanes to T-intersections Study

## Appendices



# Adding Turbo Lanes to T-Intersections Study Appendices

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# TABLE OF CONTENTS

## **Volume II: Appendices**

- A. CTAC Resolution #1-08
- B. MD PWD Report 1
- C. MD PWD Report 2
- D. Concept Design Parameters
- E. Field Observations
- F. Screening Results
- G. Approach Capacity Increase
- H. Estimated Costs
- I. Priorities



# **Appendix A**

## **CTAC Resolution #1-08**





## CTAC RESOLUTION #1-08

### RESOLUTION REQUESTING THE MIAMI-DADE PUBLIC WORKS DEPARTMENT (PWD) IDENTIFY ALL T-INTERSECTIONS THAT CAN BE SAFELY CONVERTED TO TURBO-LANE OPERATIONS AND PLACE THIS EFFORT AS A LINE ITEM IN THE TRANSPORTATION IMPROVEMENT PROGRAM (TIP) FOR FULL FUNDING TO HELP CREATE A MORE EFFICIENT ARTERIAL NETWORK IN MIAMI-DADE COUNTY

WHEREAS, the Board of County Commissioners and the Metropolitan Planning Organization (MPO) have established the Citizens Transportation Advisory Committee (CTAC) to advise it on transportation related matters, and

WHEREAS, there are T- Intersections throughout Miami-Dade County that could be converted to 'Turbo-Lane operations', and

WHEREAS, Turbo-Lanes are the result of properly configured T-Intersections, with physical barriers and traffic signalization, to allow the free flow of traffic along the segment of the roadway furthest from the intersecting roadway, and

WHEREAS, CTAC is requesting PWD to identify all T-Intersections not currently configured with Turbo-Lanes and make necessary adjustments to achieve this configuration.

NOW, THEREFORE, BE IT RESOLVED BY THE CITIZENS TRANSPORTATION ADVISORY COMMITTEE (CTAC) OF THE METROPOLITAN PLANNING ORGANIZATION FOR THE MIAMI URBANIZED AREA:

**SECTION 1:** That the CTAC requests the Miami-Dade PWD identify all T-Intersections that can be safely converted to Turbo-Lane operations and place this effort as a line item in the TIP for full funding to help create a more efficient system arterial network in Miami-Dade County.

The foregoing resolution was offered by Daniel Yglesias, who moved its adoption. The motion was seconded by Naomi Wright, and upon being put to a vote, the vote was as follows:

Rolando Acosta	- Absent	David Patlak	- Absent
Miguel A. Alvarado	- Aye	Eric D. Prince	- Absent
Andrew Burgess	- Aye	Emma Pringle	- Absent
Claudius A. Carnegie	- Aye	Ramon Ramos	- Absent
Crystal Connor-Lane	- Aye	David Reiter	- Aye
Daniel Fils-Aime	- Aye	Mario Rojas	- Absent
Alan B. Fishman	- Aye	Ariel Sagre	- Aye
Hudson Gaulman, Jr.	- Aye	Christian Schoepp	- Aye
David B. Haber	- Absent	Bonnie Sterling	- Aye
Ramon Irigoyen	- Absent	Lee Swerdlin	- Absent
Marlon L. Kelly, Sr.	- Aye	Barbara Walters	- Absent
Zvi Krugliak	- Aye	Naomi Wright	- Aye
Mario Martinez-Malo	- Aye	Daniel Yglesias	- Aye
Robert Murray	- Absent	Andrea Young	- Aye
Herb Parlato	- Aye		

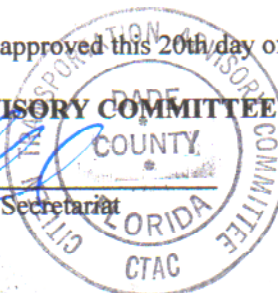
Chairman Norman Wartman - Aye

The Chairperson thereupon declared the resolution duly passed and approved this 20th day of February 2008.

CITIZENS TRANSPORTATION ADVISORY COMMITTEE

By

Elizabeth Rockwell, CTAC Secretary







# **Appendix B**

## **MD PWD Report 1**



# IDENTIFICATION OF SIGNALIZED THREE-LEG INTERSECTIONS ON COUNTY ROADS THAT CAN BE SAFELY CONVERTED TO TURBOLANE OPERATIONS

## I. EXECUTIVE SUMMARY

The Citizen Transportation Advisory Committee (CTAC) Resolution 1-08 requested Miami-Dade Public Works to identify all T-intersections that can be safely converted to turbolane operations and place this effort as a line-item in the Transportation Improvements Plan (TIP) for full funding. It is expected that the implementation of turbolanes will significantly improve the traffic flow on the arterial network in Miami-Dade County.

In a previous report, a consultant for the Florida Department of Transportation (FDOT) identified the T-intersections on state roads to be converted to turbolanes. This report identifies the T-intersections on non-state roads that should be considered for design and implementation of turbolanes. The intersections with suitable geometry to operate with turbolanes were categorized according to preliminary issues related to geometric configuration, safety, operational, and right-of-way constraints. Also, the existing turbolanes were identified.

A total of 105 signalized three-leg intersections were identified in the County Road System. Of those:

- Eight (8) intersections are already operating with turbolanes.
- Thirty (30) intersections were found to have suitable conditions to be converted to turbolane operation.
- Twenty-one (21) intersections showed minor issues that need further examination.
- Forty-six (46) intersections do not have the conditions to be converted to turbolane operation.

The next steps required to further this process are for CTAC to approve the lists prepared by FDOT and MDPW and for the Metropolitan Planning Organization to create a program in the TIP to fund the design and construction of the turbolane operations.

# IDENTIFICATION OF SIGNALIZED THREE-LEG INTERSECTIONS ON COUNTY ROADS THAT CAN BE SAFELY CONVERTED TO TURBOLANE OPERATIONS

## II. TURBOLANE CONSIDERATIONS

### 1. Introduction

Turbolane intersections, also known as Continuous Green T-intersections or Florida T-intersections are a special case of T-intersection configurations where one or more through lanes of the main street at the top of the "T" are allowed to operate continuously even when the left-turn signal phase of the side street is active. The left turning traffic from the side street is allowed to flow parallel to the through traffic on the main street departures separated by a physical barrier until the left turning vehicles can safely merge into the through or turbolanes. The traffic in the turbolanes receives a red indication only when and if a pedestrian signal is activated.

### 2. Background

In Miami-Dade County there are currently 35 intersections on state roads and eight (8) intersections on the county road system operating with turbolanes, up from only a few that existed in the late '70's.

### 3. Advantages and Disadvantages of Turbolanes Operations

- Turbolanes increase intersection capacity.
- Turbolanes have resulted in significant delay reduction for the traffic using the turbolanes.
- Turbolanes usually enable a signal to be timed for perfect progression in the non-turbolane direction, improving traffic flow in that direction as well as in the turbolane direction.
- Turbolanes usually decrease rear-end and right-angle collisions, but increase weaving collisions. Total collisions and their severity usually decrease.
- Turbolanes cause increased weaving in the turbolane direction, both upstream and downstream of the intersection. This problem often prevents a "T" intersection from being implemented with turbolanes.
- Depending on design, turbolanes may require additional right-of-way.

Preliminary studies conducted by FDOT have led to the conclusion that an appropriate design of turbolanes maximizes safety and operations.

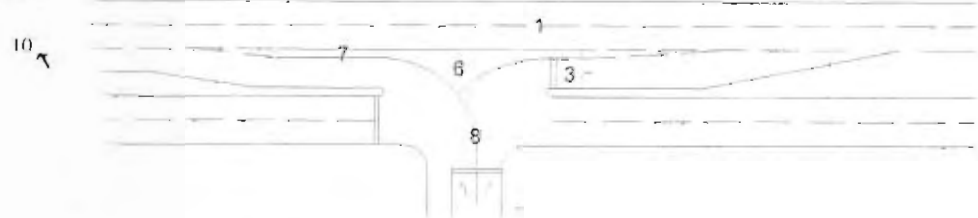
### 4. Geometric Configurations

There are no standard guidelines for the design and implementation of turbolanes. Most of the existing turbolanes have each being designed differently. The designs are based on the intersection geometry, traffic volumes, upstream and downstream main street conditions, speed limits, right-of-way availability, and other pertinent variables. **Figure 1** illustrates four typical turbolane intersection designs.

# IDENTIFICATION OF SIGNALIZED THREE-LEG INTERSECTIONS ON COUNTY ROADS THAT CAN BE SAFELY CONVERTED TO TURBOLANE OPERATIONS

## TURBO LANE INTERSECTION DESIGNS

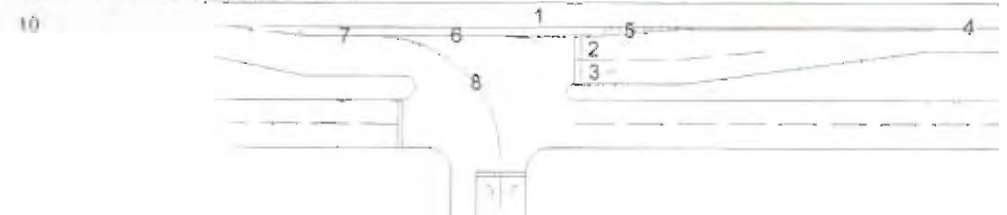
EXAMPLE A  
IDEAL



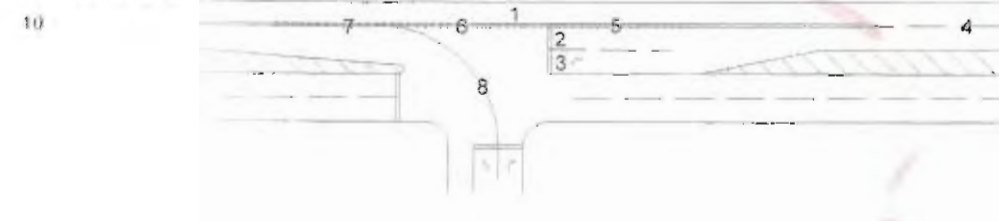
EXAMPLE B  
WITH PEDS &/OR MINOR 4TH LEG  
AND DOWNSTREAM MERGE



EXAMPLE C  
WITH 1 THROUGH STOPPED LANE



EXAMPLE D  
WITH CURB &/OR PILONS INSTEAD OF MEDIAN



- |                               |                             |
|-------------------------------|-----------------------------|
| 1 Turbo Lanes                 | 6 Center divider            |
| 2 Stoppable through lanes     | 7 Downstream divider        |
| 3 Main street left turn lanes | 8 Side street turn guidance |
| 4 Upstream weaving area       | 9 Merge area                |
| 5 Upstream divider            | 10 Downstream weaving area  |

FIGURE 1 TYPICAL TURBOLANE INTERSECTION DESIGNS

## IDENTIFICATION OF SIGNALIZED THREE-LEG INTERSECTIONS ON COUNTY ROADS THAT CAN BE SAFELY CONVERTED TO TURBOLANE OPERATIONS

The four typical turbolane intersection designs depicted in Figure 1 can be classified into two main turbolanes configurations as follows:

*Full turbolane configuration* - No through lanes on the top of the "T" have to stop for the left turning traffic from the side street because the side-street lefts turn into an exclusive lane in the median. Continuous green through arrows can be displayed to the turbolanes or they can be completely unsignalized. Stop bars and standard signal heads are not required unless a pedestrian crossing phase for the main lane is required, or if the intersection configuration includes a minor fourth approach.

*Partial turbolane configuration* - Intersection geometry and/or right-of-way constraints require the stopping of one or more inside through-lane(s) when the side-street traffic enters the intersection. Only the outside lane(s) operate as turbolane(s). In this case, the non-turbo main street lanes must be provided with traffic signal heads in conformance with the MUTCD. The traffic signals controlling the stoppable lane(s) must not be visible to motorists in the turbolanes. Also the through green arrows serving the turbolanes must not be visible to motorists in the stoppable through lanes.

### III. INTERSECTION SELECTION WITHIN THE MIAMI-DADE COUNTY ROAD SYSTEM

The approach developed for the study, involved the identification of all signalized T-intersections in the County Road System (on non-state roads) for a preliminary examination. At each one of the signalized T-intersections, geometric and physical conditions were observed using the aerial photographs from the Miami-Dade Advance Traffic Management System (AToMS) software. The aerial views were very important in helping to preliminarily identify issues that should be considered in the design and implementation of turbolanes. The preliminary issues that were considered during the observations and categorization of the potential turbolanes were related to geometric configuration, safety, operational, and right-of-way constraints.

### IV. INTERSECTION CATEGORIES

#### 1. Existing turbolanes

The preliminary examination indicated that there are eight (8) T-intersections on county roads already provided with a turbolane configuration. **Table 1** shows the list of existing turbolane intersections and a summary of the existing conditions.



**IDENTIFICATION OF SIGNALIZED THREE-LEG INTERSECTIONS ON COUNTY ROADS THAT CAN BE SAFELY  
TO TURBOLANE OPERATIONS**

<b>TABLE 1</b>				
<b>EXISTING TURBOLANE INTERSECTIONS ON COUNTY ROADS</b>				
<b>ID</b>	<b>LOCATION</b>	<b>CONFIGURATION</b>	<b>No. TURBOLANES &amp; DIRECTION</b>	<b>STOPPING LANES ON MAIN ST</b>
2775	PineTree Dr at 51 St	Full Turbolane	1 NB	0
6457	NW 41 St at NW 112 Ave	Full Turbolane	3 EB	0
5937	NW 12 St at NW 11400 Blk	Partial Turbolane	2 EB	1
3957	Perimeter at Red Rd/NW 57 Ave	Full Turbolane	2 WB	0
5143	Old Cutler Rd at SW 13500 Blk	Full Turbolane	2 WB	0
6449	Miller Dr at SW 140 Ave	Partial Turbolane	1 EB	1
5477	SW 137 Ave at Sr-821 (SB Ramp)	Partial Turbolane	2 SB	1
4866	SW 117 Ave at SW 120 St	Full Turbolane	2 NB	0

MIAMI-DADE COUNTY PUBLIC WORKS TRAFFIC SIGNALS AND SIGNS DIVISION

## IDENTIFICATION OF SIGNALIZED THREE-LEG INTERSECTIONS ON COUNTY ROADS THAT CAN BE SAFELY CONVERTED TO TURBOLANE OPERATIONS

### 2. **Intersections with suitable geometric conditions**

During the screening of the aerial photographs it was found that there are 30 T-intersections with suitable conditions to be converted to turbolane operation. The observed physical characteristics of the intersections, upstream and downstream main roadway conditions, adjacent traffic signals, and right-of-way seem to be suitable for turbolanes implementation. Field observations and a more detailed analysis of the existing conditions, such as traffic volumes, feasibility for traffic signal synchronization, safety issues and impact of the turbolanes implementation will be required in order to make a final recommendation. See **Table 2** for a list of these intersections.

### 3. **Intersections with minor issues**

This category included those intersections that apparently will need additional right-of-way, closing or relocation of driveways, bus stops, and/or need additional examination of exiting conditions. A list of 21 intersections and a summary of issues is included as **Table 3**.

### 4. **Intersections unfeasible to operate with turbolanes**

Major issues identified at these T-intersections restrict the implementation of turbolane operations. Right-of-way constraints and upstream and/or downstream right and/or left turns might cause unsafe weaving/merging conditions (See **Table 4**).

**IDENTIFICATION OF SIGNALIZED THREE-LEG INTERSECTIONS ON COUNTY ROADS THAT  
CAN BE SAFELY CONVERTED TO TURBOLANE OPERATIONS**

<b>TABLE 2</b>		
<b>COUNTY T-INTERSECTIONS WITH SUITABLE GEOMETRY FOR TURBOLANE OPERATION</b>		
<b>ID</b>	<b>LOCATION</b>	<b>TURBOLANE DIRECTION</b>
4847	Ludlam Rd at NW 188 Ter	SB
4624	NW 22 Ave at NW 139 St	SB
5989	NW 22 Ave at NW 127 St	SB
4917	Douglas-LeJeune at NW159 St	NB
4625	Ludlam Rd at Windmill Gate	SB
4149	Ludlam Rd at W 74 St	SB
4387	Ludlam Rd at W 26 St	SB
3963	SW 72 Ave at SW 85 St	EB
5033	SW 117 Ave at SW 112 St	SB
4390	Miami Lakes Dr at NW 60 Ave	NWB
5692	NW 25 St at 84 Ave	WB
5584	NW 84 Ave at NW 12 St	EB
4659	NW 78 Ave at NW 12 St	EB
5031	NW 7 St at NW 53 Ave	WB
4648	Aventura Blvd at Country Club Dr	NB
5258	Fontainebleau Blvd at NW 97 Ave	SEB
6057	Ludlam Rd at NW 34 St	SB
5034	SW 117 Ave at SW 128 St	SB
5697	SW 117 Ave at SW 134 St	SB
6027	SW 137 Ave at SW 180 St	NB
4607	Ives Dairy Rd at NE 800 Blk	SWB
4635	Ives Dairy Rd at NE 195 St Dr	SWB
5892	NW 107 Ave at NW 19 St	SB
6737	SW 117 Ave at SW 136 St	SB
5730	NW 22 Ave at NW 111 St	SB
5675	SW 112 Ave at SW 104 St	WB
5222	SW 117 Ave at SW 47 Ter	SB
5217	SW 137 Ave at SW 160 St	NB
2774	Pine Tree Dr at 47 St	NB
4832	Coral Way at SW 11900 Blk	EB

**IDENTIFICATION OF SIGNALIZED THREE-LEG INTERSECTIONS ON COUNTY ROADS THAT  
CAN BE SAFELY CONVERTED TO TURBOLANE OPERATIONS**

<b>TABLE 3</b>			
<b>COUNTY INTERSECTIONS WITH MINOR ISSUES TO OPERATE AS TURBOLANE INTERSECTIONS</b>			
<b>ID</b>	<b>LOCATION</b>	<b>TURBOLANE DIRECTION</b>	<b>ISSUES</b>
4779	NW 12 Ave at NW 47 Ter	SB	R-O-W
4000	NW 17 Ave at NW 60 St	NB	R-O-W
3561	NW 22 Ave at NW 56 St	SB	RT Downstream
5768	Palm Ave at 29 St	NB	R-O-W
4406	NW 7 St at NW 29 & 39 Ave	EB	R-O-W & RT Downstream
5870	Hammocks Blvd at SW 147 Ave	NB	R-O-W/2LT to 2NBT
5001	Miller Dr at SW 118 Ave	WB	R-O-W
4484	Perimeter Rd at NW 15 St	SB	Downstream Merging
3938	Perimeter Rd at NW 22 St	SB	GEOMETRY
5438	Rickenbacker at Virginia Beach Rd	SEB	SM 4th LEG
5694	SW 72 Ave at SW 48 St	NB	R-O-W
5703	SW 127 Ave at SW 43 Dr	NB	R-O-W
5416	SW 127 Ave at SW 62 St	NB	R-O-W
5512	SW 147 Ave at SW 120 St	EB	R-O-W/2LT to 2NBT
6500	W 18 Ave at W 37 St	SB	R-O-W
5254	NW 32 Ave at NW 151 St	EB	LT downstream
5665	NW 87 Ave at NW 146 St	NB	LT downstream
6023	Drexel Ave at 17 St	WB	R-O-W
5755	Cottonwood Cir at SW 152 Ave	SB	R-O-W
5677	Palm Ave at 39 St	SB	R-O-W
4660	NW 82 Ave at NW 12 St	EB	LT downstream



**IDENTIFICATION OF SIGNALIZED THREE-LEG INTERSECTIONS ON COUNTY ROADS THAT  
CAN BE SAFELY CONVERTED TO TURBOLANE OPERATIONS**

<b>TABLE 4</b>		
<b>COUNTY T-INTERSECTIONS UNFEASIBLE TO OPERATE WITH TURBOLANES</b>		
<b>ID</b>	<b>LOCATION</b>	<b>ISSUES</b>
4691	NW 32 Ave at NW 52 St	R-O-W & RT downstream
5059	Douglas-LeJeune at NW 151 St	R-O-W
5140	Douglas at Minorca Ave	R-O-W
4336	NW 14 St at NW 13 Ct	R-O-W & LT downstream
4793	NW 7 St at NW 53 Ave	R-O-W & LT downstream
5414	Flagler St at W 118 Ave	R-O-W
5221	Coral Way at SW 10900 Blk	LT downstream
5114	Coral Way at SW 74 Ave	LT & RT downstream
3552	Coral Way at SW 68 Ave	Bus stop on top
5147	Bird Rd at SW 144 Ave	R-O-W
6439	SW 123 Psge at SW 120 St	LT downstream
5763	Red Rd at SW 120 St	R-O-W
5951	Aventura Mall Rd at Ring Rd	R-O-W
4499	Coral Reef Dr at SW 124 Ave	LT downstream
6637	Coral Way at SW 132 Ave	LT downstream
5673	Hammocks Blvd at SW 152 Ave	LT downstream
5949	Miami Lakes Dr at Miami Lkway N	Geometry
5220	Miami Lakes Dr at Miami Lkway S	Geometry
3564	NE 10 Ave at NE 171 St	R-O-W
4359	NE 15 Ave at NE 171 St	BRIDGE
4471	NE 23 Ave at NE 207 St	R-O-W
5664	NE 29 Ave at NE 190 St	R-O-W
4585	NW 30 Ave at NW 11 St	R-O-W
3867	NW 47 Ave at NW 178 St	LT downstream
5807	NW 87 Ave at NW 14100 Blk	R-O-W
6435	Old Cutler Rd at SW 92 Ave	Geometry
5403	Old Cutler Rd at SW 176 St	R-O-W
6417	Old Cutler Rd at SW 224 St	R-O-W
5969	Palm Ave at 53 St	R-O-W
6165	Ponce De Leon at San Lorenzo	R-O-W
4684	SW 70 Ave at SW 80 St	R-O-W
4573	SW 72 Ave at SW 2600 Blk	R-O-W
5036	SW 137 Ave at SW 84 St	R-O-W
5118	SW 147 Ave at SW 80 St	R-O-W
4904	SW 167 Ave at SW 328 St	R-O-W
6470	West Ave at 11 St	R-O-W
4567	Douglas Rd at SW 28 St	R-O-W
4690	Douglas Rd at Peacock Ave	R-O-W
5959	Coral Way at SW 93 Ct	Bus stop on top
4588	SW 132 Ave at SW 104 St	Bus stop on top
5195	SW 117 Ave at SW 2300 Blk	R-O-W
5188	NW 25 St at NW 89 Pl	LT downstream
5029	NW 22 Ave at NW 71 St	School downstream
2807	Lincoln Rd at Washington Ave	Pedestrians & R-O-W
4240	SW 117 Ave at SW 177 Ter	School on top
4856	NW 79 Ave at NW 47 St	R-O-W & 2 Parallel driveways

## IDENTIFICATION OF SIGNALIZED THREE-LEG INTERSECTIONS ON COUNTY ROADS THAT CAN BE SAFELY CONVERTED TO TURBOLANE OPERATIONS

### V. CONCLUSIONS

Implementation of turbolanes in Miami-Dade County started in the '70's with a goal of maximizing safety and efficiency. There are currently 35 intersections on state roads and eight (8) intersections on the county road system operating with turbolanes. As per request of the CTAC, all signalized three-leg intersections on the county road system were evaluated for suitability to be converted to turbolane operations. Of those:

- Eight (8) intersections are already operating with turbolanes.
- Thirty (30) intersections have suitable conditions to be converted to turbolane operation.
- Twenty-one (21) intersections showed minor issues that need further examination.
- Forty-six (46) intersections do not have the conditions to be converted to turbolane operation.

The next steps required to further this process are for CTAC to approve the lists prepared by FDOT and MDPW and for the Metropolitan Planning Organization to create a program in the TIP to fund the design and construction of the turbolane operations.

# **Appendix C**

## **MD PWD Report 2**





# COST ESTIMATES FOR CONVERSION OF THREE-LEG INTERSECTIONS TO TURBOLANE OPERATIONS

## INTRODUCTION

The cost estimates included in this report should be considered as a planning level estimate and it is an addendum to the report entitled "Identification of Signalized Three-Leg Intersections on County Roads that Can Be Safely Converted to Turbolane Operations". This report was prepared in response to The Citizen Transportation Advisory Committee (CTAC) Resolution 1-08 that requested Miami-Dade Public Works to identify all T-intersections that can be safely converted to turbolane operations.

The objective is to place this effort as a line-item in the Transportation Improvements Plan (TIP) for full funding. It is expected that the implementation of turbolanes will significantly improve the traffic flow on the arterial network in Miami-Dade County.

In the previous study, a total of 105 signalized three-leg intersections were identified in the County Road System. Of those:

- Eight (8) intersections are already operating with turbolanes.
- Thirty (30) intersections were found to have suitable conditions to be converted to turbolane operation.
- Twenty-one (21) intersections showed minor issues that need further examination.
- Forty-six (46) intersections do not have the conditions to be converted to turbolane operation.

The cost estimates were developed for the thirty (30) intersections that were found to have suitable conditions to be converted to turbolane operations (Table 1). This planning level estimation only includes the quantities for items that are generally anticipated in this type of construction. The estimates did not include the items that are considered as not recurrent on this type of jobs, such as utility conflicts, removal/relocation of signs, etc. Figure 1 illustrates typical turbolane intersection designs that were used as a base to develop the cost estimates.

**COST ESTIMATES FOR CONVERSION OF THREE-LEG INTERSECTIONS TO  
TURBOLANE OPERATIONS**

<b>TABLE 1</b>		
<b>COUNTY T-INTERSECTIONS WITH SUITABLE GEOMETRY FOR TURBOLANE OPERATION</b>		
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4847	Ludlam Rd at NW 188 Ter	SB
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5031	NW 7 St at NW 53 Ave	WB
4648	Aventura Blvd at Country Club Dr	NB
5258	Fontainebleau Blvd at NW 97 Ave	SEB
6057	Ludlam Rd at NW 34 St	SB
5034	SW 117 Ave at SW 128 St	SB
5697	SW 117 Ave at SW 134 St	SB
6027	SW 137 Ave at SW 180 St	NB
4607	Ives Dairy Rd at NE 800 Blk	SWB
4635	Ives Dairy Rd at NE 195 St Dr	SWB
5892	NW 107 Ave at NW 19 St	SB
6737	SW 117 Ave at SW 136 St	SB
5730	NW 22 Ave at NW 111 St	SB
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# COST ESTIMATES FOR CONVERSION OF THREE-LEG INTERSECTIONS TO TURBOLANE OPERATIONS

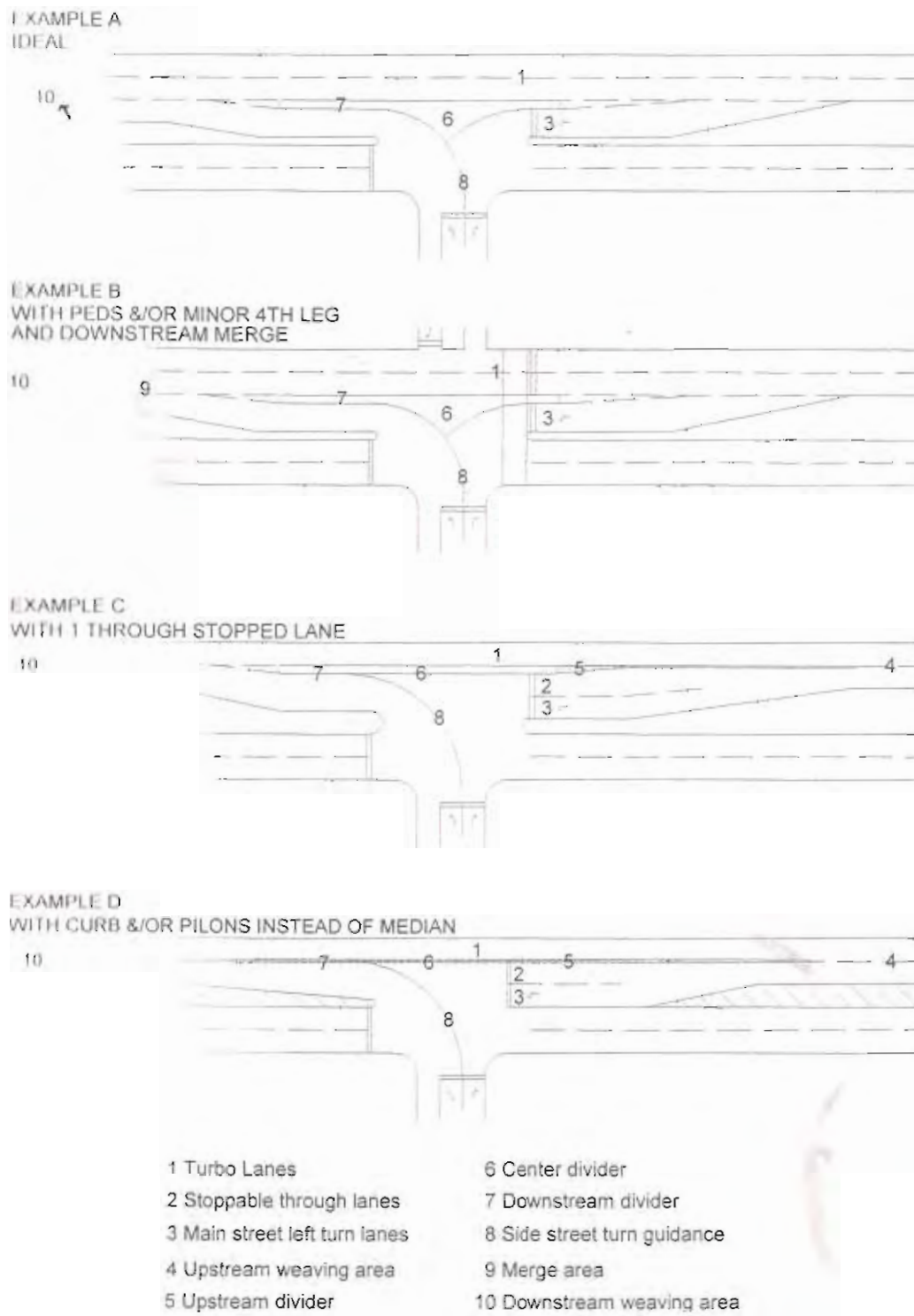


FIGURE 1 TYPICAL TURBOLANE INTERSECTION DESIGNS

# **COST ESTIMATES FOR CONVERSION OF THREE-LEG INTERSECTIONS TO TURBOLANE OPERATIONS**

## **DEVELOPMENT OF COST ESTIMATES**

The cost estimates were developed for the thirty (30) intersections shown in Table 1 that were found to have suitable conditions to be converted to turbolane operations. The study three-leg intersections were grouped according to the main design elements generally encountered in the typical turbolane intersection designs depicted in Figure 1, which are intended to provide a general idea as to the extent of the work that can be expected in the implementation of each one of the configurations.

This planning level estimation only included the quantities for items that are generally anticipated in this type of construction. TABLES 2, 3 and 4 show the pay items, quantities and cost by item considered in obtaining the total cost estimate for the conversion of the study 30 intersections to turbolane operation.

## **TYPICAL TURBOLANE INTERSECTION DESIGNS**

### **Example A – Ideal Turbolane Configuration**

The main design elements considered for grouping the study intersection within this Ideal Configuration were:

- Right-of-way availability to have standard width for the continuous travel lanes, enough buffer area between the through lanes and receiving lane, and sufficient offset from the traffic separator.
- No through lanes on the top of the “T” have to stop for the left turning traffic from the side street because the side-street lefts turn into an exclusive lane in the median.
- A physical traffic separator between the through lanes and the receiving lane is provided for preventing the potential for left-turning traffic from the side street to have unsafe conflicts with the continuous lanes.

Table 2 shows the pay items, quantities and cost by item considered in obtaining the cost estimate for the conversion of the intersections to this turbolane configuration.

**COST ESTIMATES FOR CONVERSION OF THREE-LEG INTERSECTIONS TO  
TURBOLANE OPERATIONS**

**TABLE 2  
TABULATION OF QUANTITIES - EXAMPLE A  
IDEAL CONFIGURATION**

Pay Item #	Description	Unit	Quantity	Cost
101-1	Mobilization	LS	10% Cost	\$12,841.46
102-1	Maintenance of Traffic	LS	10% Cost	\$12,841.46
110-1-1	Clearing and Grubbing	LS	15% Cost	\$19,262.19
160-4	Type B Stabilization	SY	430	\$2,016.70
285-709	Optional Base Group 09	SY	430	\$8,600.00
327-70-1	Milling Exist. Asphalt Concrete, Traffic D	SY	4470	\$19,399.80
334-1-14	Superpave Asphaltic Concrete, Traffic D	TN	71	\$8,520.00
337-7-32	Asphalt Concrete FC, Traffic C, FC-9.5, Rubber	TN	246	\$26,203.92
520-1-10	Concrete Curb & Gutter, Type F	LF	815	\$26,267.45
520-5-21	Traffic Separator Concrete – Type II, 4' Wide	LF	380	\$16,929.00
660-2-101	Loop Assembly – F&I Type A	AS	1	\$1,086.22
705-11-3	Delineator, FLEX, High Flexibility Med.	EA	114	\$13,680.00
706-3	Reflective Pavement Marker	EA	240	\$1,200.00
710-11-121	Painted Pavement Mark, STD, White, Solid, 6"	LF	2030	\$974.40
710-11-122	Painted Pavement Mark, STD, White, Solid, 8"	LF	2070	\$1,469.70
710-11-124	Painted Pavement Mark, STD, White, Solid, 18"	LF	400	\$768.00
710-11-125	Painted Pavement Mark, STD, White, Solid, 24"	LF	59	\$118.00
710-11-131	Painted Pavement Mark, 10-30 Skip White	LF	1250	\$750.00
710-11-170	Painted Pavement Mark, STD, White, Arrow	EA	3	\$134.43
710-11-221	Painted Pavement Mark, STD, Yellow, Solid, 6"	LF	825	\$297.00
	Sub-total (Excluding Lump Sum Items)			\$128,414.62
	Lump Sum Items			<u>\$44,945.74</u>
	Sub-total Direct Construction Cost			\$173,359.74
	Contingency		20%	<u>\$34,671.95</u>
	Total Direct Construction Cost			\$208,031.68
	Design + CEI		15%	<u>\$31,204.75</u>
	<b>TOTAL COST</b>			<b>\$239,236.44</b>



## COST ESTIMATES FOR CONVERSION OF THREE-LEG INTERSECTIONS TO TURBOLANE OPERATIONS

The following twenty (20) three-leg intersections have the proper characteristics to be considered as the Typical "Example A" Turbolane Configuration:

ID	Location
1. 4847	Ludlam Rd at NW 188 Ter
2. 4624	NW 22 Ave at NW 139 St
3. 5989	NW 22 Ave at NW 127 St
4. 4917	Douglas-LeJeune at NW159 St
5. 3963	SW 72 Ave at SW 85 St
6. 5033	SW 117 Ave at SW 112 St
7. 5692	NW 25 St at 84 Ave
8. 5584	NW 84 Ave at NW 12 St
9. 4659	NW 78 Ave at NW 12 St
10. 5258	Fontainebleau Blvd at NW 97 Ave
11. 5034	SW 117 Ave at SW 128 St
12. 5697	SW 117 Ave at SW 134 St
13. 4607	Ives Dairy Rd at NE 800 Blk
14. 5892	NW 107 Ave at NW 19 St
15. 6737	SW 117 Ave at SW 136 St
16. 5730	NW 22 Ave at NW 111 St
17. 5675	SW 112 Ave at SW 104 St
18. 5222	SW 117 Ave at SW 47 Ter
19. 5217	SW 137 Ave at SW 160 St
20. 4832	Coral Way at SW 11900 Blk

### Example C – With One (1) Through Stopped Lane

The main design elements considered for grouping the study intersection within this Configuration were:

- Sufficient right-of-way to shift the continuous travel lanes to the top of the "T" to accommodate a physical traffic separator between the continuous lanes and the receiving lane.
- The inside through lane remains signal controlled as part of the signal operation.
- Sidewalk, curve and gutter reconstruction, pavement widening, and potential relocation of existing signal on the top of the intersection are considered.

Table 3 shows the pay items, quantities and cost by item considered in obtaining the cost estimate for the conversion of the intersections to this turbolane configuration.



**COST ESTIMATES FOR CONVERSION OF THREE-LEG INTERSECTIONS TO  
TURBOLANE OPERATIONS**

**TABLE 3  
TABULATION OF QUANTITIES - EXAMPLE C  
WITH ONE THROUGH STOPPED LANE CONFIGURATION**

<b>Pay Item #</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Cost</b>
101-1	Mobilization	LS	10% Cost	\$23,610.37
102-1	Maintenance of Traffic	LS	10% Cost	\$23,610.37
110-1-1	Clearing and Grubbing	LS	15% Cost	\$35,415.56
160-4	Type B Stabilization	SY	421	\$1,974.49
285-709	Optional Base Group 09	SY	421	\$8,420.00
327-70-1	Milling Exist Asphalt Concrete, Traffic D	SY	6100	\$26,474.00
334-1-14	Superpave Asphaltic Concrete Traffic D	TN	70	\$8,400.00
337-7-32	Asphalt Concrete FC, Traffic C, FC-9.5, Rubber	TN	359	\$38,240.68
520-1-10	Concrete Curb & Gutter, Type F	LF	1100	\$35,453.00
520-5-21	Traffic Separator Conc. - Type II, 4' Wide	LF	380	\$16,929.00
522-1	Sidewalk Conc., 4" Thick	SY	710	\$42,081.70
632-7-1	Signal Cable	PI	1	\$4,804.93
635-1-11	Signals-Pull & Junction Boxes	EA	1	\$628.12
649-31-215	Steel Mast Arm	EA	1	\$25,000.00
653-191	Pedestrian Signal	AS	2	\$2,444.42
660-2-101	Loop Assembly - F&I Type A	AS	1	\$1,086.22
665-11	Pedestrian Detector	EA	1	\$384.47
699-1	Internally Illuminated Sign, F&I	EA	2	\$3,855.84
705-11-3	Delineator, FLEX, High Visibility Med.	EA	114	\$13,680.00
706-3	Reflective Pavement Marker	EA	272	\$1,360.00
710-11-121	Painted Pavement Mark, STD, White, Solid, 6"	LF	2080	\$998.40
710-11-122	Painted Pavement Mark, STD, White, Solid, 8"	LF	2400	\$1,704.00
710-11-124	Painted Pavement Mark, STD, White, Solid, 18"	LF	450	\$864.00
710-11-125	Painted Pavement Mark, STD, White, Solid, 24"	LF	23	\$46.00
710-11-131	Painted Pavement Mark, 10-30 Skip White	LF	1180	\$708.00
710-11-170	Painted Pavement Mark, STD, White, Arrow	EA	3	\$134.43
710-11-221	Painted Pavement Mark, STD, Yellow, Solid, 6"	LF	1200	\$432.00
	Sub-total (Excluding Lump Sum Items)			\$236,103.70
	Lump Sum Items			\$82,636.30
	Sub-total Direct Construction Cost			\$318,740.00
	Contingency		20%	\$63,748.00
	Total Direct Construction Cost			\$382,487.99
	Design + CEI		15%	\$57,373.20
	<b>TOTAL COST</b>			<b>\$439,861.19</b>

## COST ESTIMATES FOR CONVERSION OF THREE-LEG INTERSECTIONS TO TURBOLANE OPERATIONS

The following four (4) three-leg intersections have the proper characteristics to be considered as the Typical "Example C" Turbolane Configuration:

ID	Location
1. 4625	Ludlam Rd at Windmill Gate
2. 4648	Aventura Blvd at Country Club Blvd
3. 6027	SW 137 Avenue at SW 180 Street
4. 4635	Ives Dairy Rd at NE 125 Street Dr.

### **Example D – With Curb and/or Pilons Instead of a Median**

This configuration is the least intrusive of all configurations since reconstruction of the existing roadway elements is limited. The main characteristics considered for including the study intersection within this Configuration were:

- Minimum provision of new pavement markings and milling and resurfacing work is required.
- A buffer area can be provided using chevron type pavement markings complemented with tubular markers visually separating the stopping through lane and left-turning lane from the continuous lanes.
- The inside through lane remains signal controlled as part of the signal operation.

Table 4 shows the pay items, quantities and cost by item considered in obtaining the cost estimate for the conversion of the intersections to this turbolane configuration.

**COST ESTIMATES FOR CONVERSION OF THREE-LEG INTERSECTIONS TO  
TURBOLANE OPERATIONS**

**TABLE 4  
TABULATION OF QUANTITIES - EXAMPLE D  
WITH CURB &/OR PILONS INSTEAD OF MEDIAN**

Pay Item #	Description	Unit	Quantity	Cost
101-1	Mobilization	LS	10% Cost	\$7,898.81
102-1	Maintenance of Traffic	LS	10% Cost	\$7,898.81
110-1-1	Clearing and Grubbing	LS	15% Cost	\$11,848.21
160-4	Type B Stabilization	SY	156	\$731.64
285-709	Optional Base Group 09	SY	156	\$3,120.00
327-70-1	Milling Exist Asphalt Concrete, Traffic D	SY	3410	\$14,799.40
334-1-14	Superpave Asphaltic Concrete, Traffic D	TN	26	\$3,120.00
337-7-32	Asphalt Concrete FC, Traffic C, FC-9.5, Rubber	TN	188	\$20,025.76
520-1-10	Concrete Curb & Gutter, Type F	LF	240	\$7,735.20
660-2-101	Loop Assembly – F&I Type A	AS	1	\$1,086.22
705-11-3	Delineator, FLEX, High Visibility Median	EA	204	\$24,480.00
706-3	Reflective Pavement Marker	EA	205	\$1,025.00
710-11-121	Painted Pavement Mark, STD, White, Solid, 6"	LF	960	\$460.80
710-11-122	Painted Pavement Mark, STD, White, Solid, 8"	LF	1600	\$1,136.00
710-11-124	Painted Pavement Mark, STD, White, Solid, 18"	LF	220	\$422.40
710-11-125	Painted Pavement Mark, STD, White, Solid, 24"	LF	22	\$44.00
710-11-131	Painted Pavement Mark, 10-30 Skip White	LF	710	\$426.00
710-11-170	Painted Pavement Mark, STD, White, Arrow	EA	3	\$134.43
710-11-221	Painted Pavement Mark, STD, Yellow, Solid, 6"	LF	670	\$241.20
	Sub-total (Excluding Lump Sum Items)			\$78,988.05
	Lump Sum Items			<u>\$27,645.82</u>
	Sub-total Direct Construction Cost			\$106,633.87
	Contingency		20%	<u>\$21,326.77</u>
	Total Direct Construction Cost			\$127,960.64
	Design + CEI		15%	<u>\$19,194.10</u>
	<b>TOTAL COST</b>			<b>\$147,154.74</b>

## COST ESTIMATES FOR CONVERSION OF THREE-LEG INTERSECTIONS TO TURBOLANE OPERATIONS

The following six (6) three-leg intersections have the proper characteristics to be considered as the Typical "Example D" Turbolane Configuration:

- | ID      | Location                        |
|---------|---------------------------------|
| 1. 4149 | Ludlam Rd at W 74 Street        |
| 2. 4387 | Ludlam Rd at W 26 Street        |
| 3. 4390 | Miami Lakes Dr. at NW 60 Avenue |
| 4. 5031 | NW 7 Street at NW 53 Avenue     |
| 5. 6057 | Ludlam Rd at NW 34 Street       |
| 6. 2774 | Pine Tree Dr. at 47 Street      |

Table 5 summarizes the cost estimate for the design and construction of each typical turbolane intersection.

TABLE 5 TYPICAL TURBOLANE CONFIGURATION COST ESTIMATE SUMMARY			
Typical Configuration	Number of Intersections	Cost per Intersection	Subtotal Cost
Example A – Ideal Configuration	20	\$239,000.00	\$4,780,000.00
Example C – With One (1) Through Stopped Lane	4	\$440,000.00	\$1,760,000.00
Example D – With Curb and/or Pylons instead of M6dian	6	\$147,000.00	\$882,000.00
<b>TOTAL COST</b>			<b>\$7,422,000.00</b>

The next steps required to further this process are for CTAC to approve the proposed three-leg intersections to be converted to turbolane operation and for the Metropolitan Planning Organization to create a program in the TIP to fund the total cost for their design and construction.

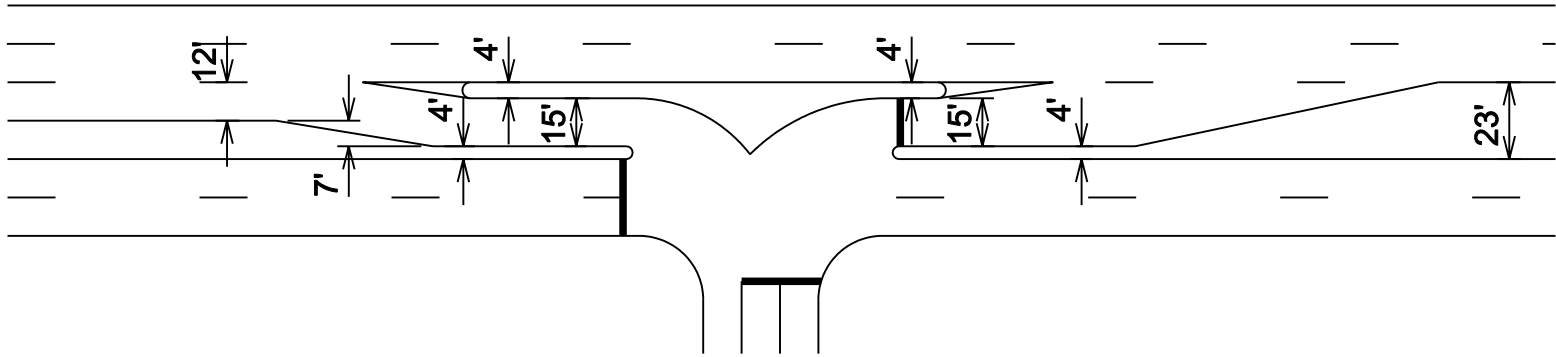
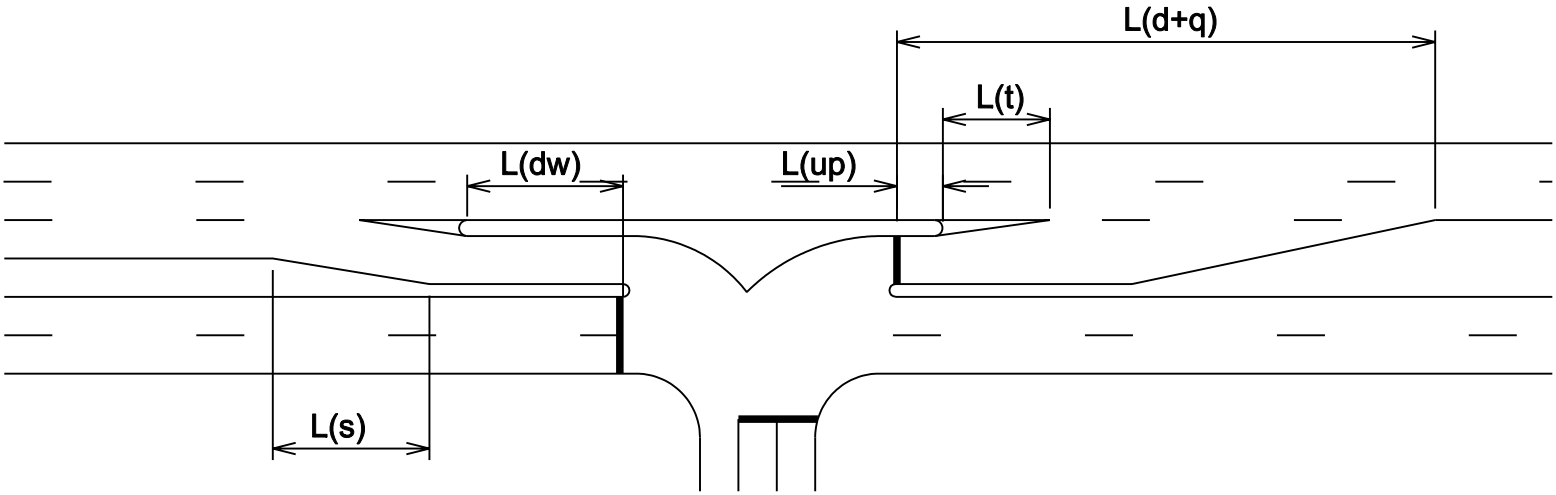
# **Appendix D**

## **Concept Design Parameters**



TURBO LANE INTERSECTION DESIGNS

TYPE A  
IDEAL

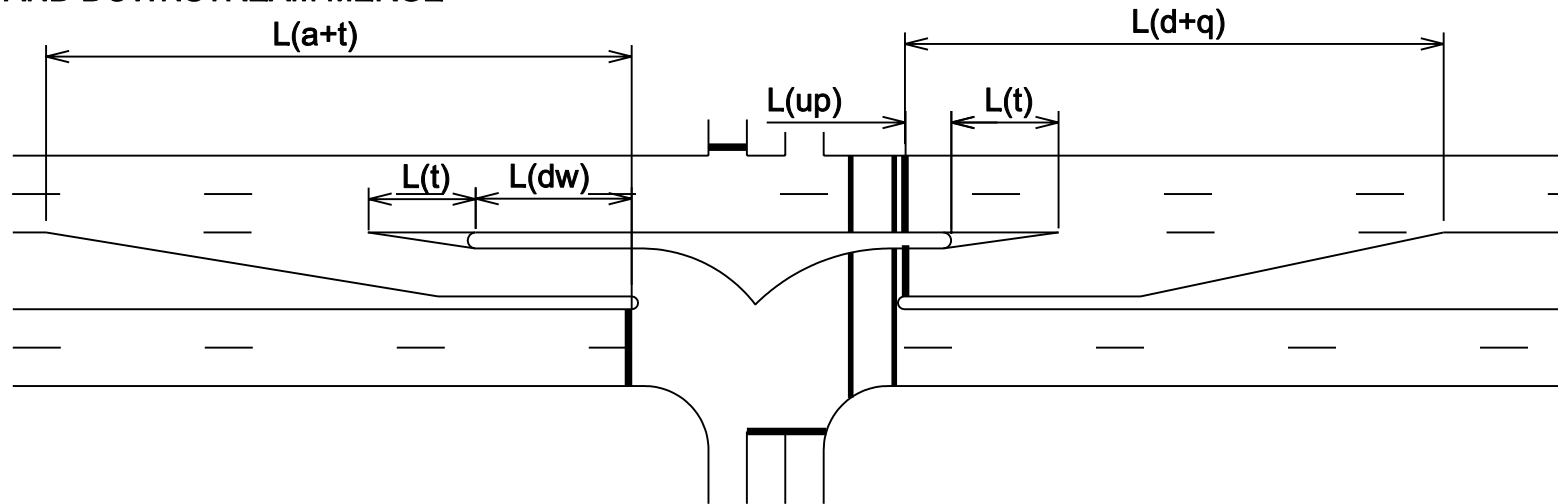


A-1

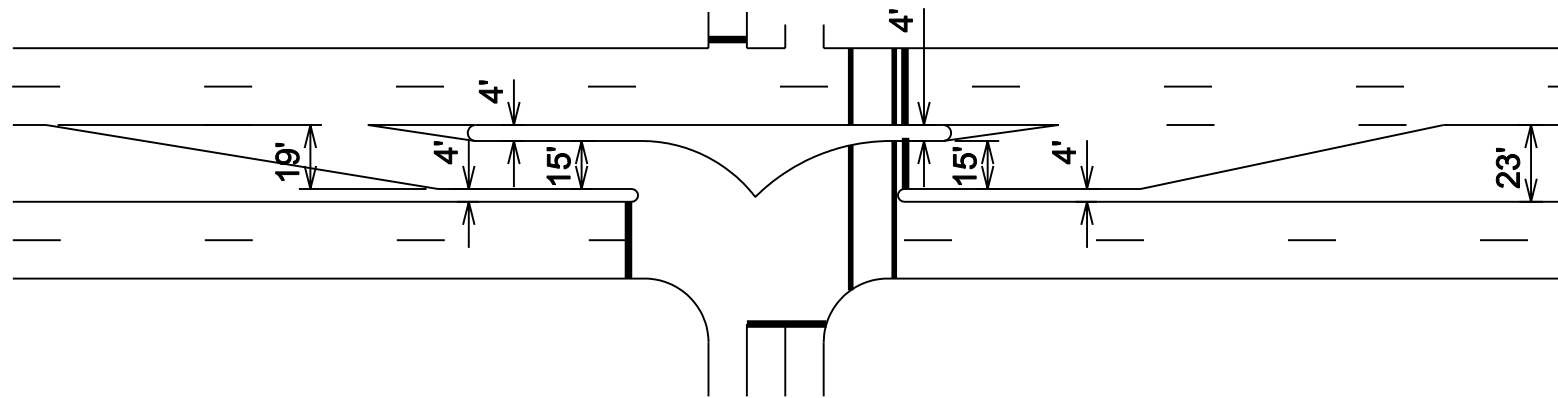


# TURBO LANE INTERSECTION DESIGNS

TYPE B  
WITH PEDS &/OR MINOR LEG  
AND DOWNSTREAM MERGE



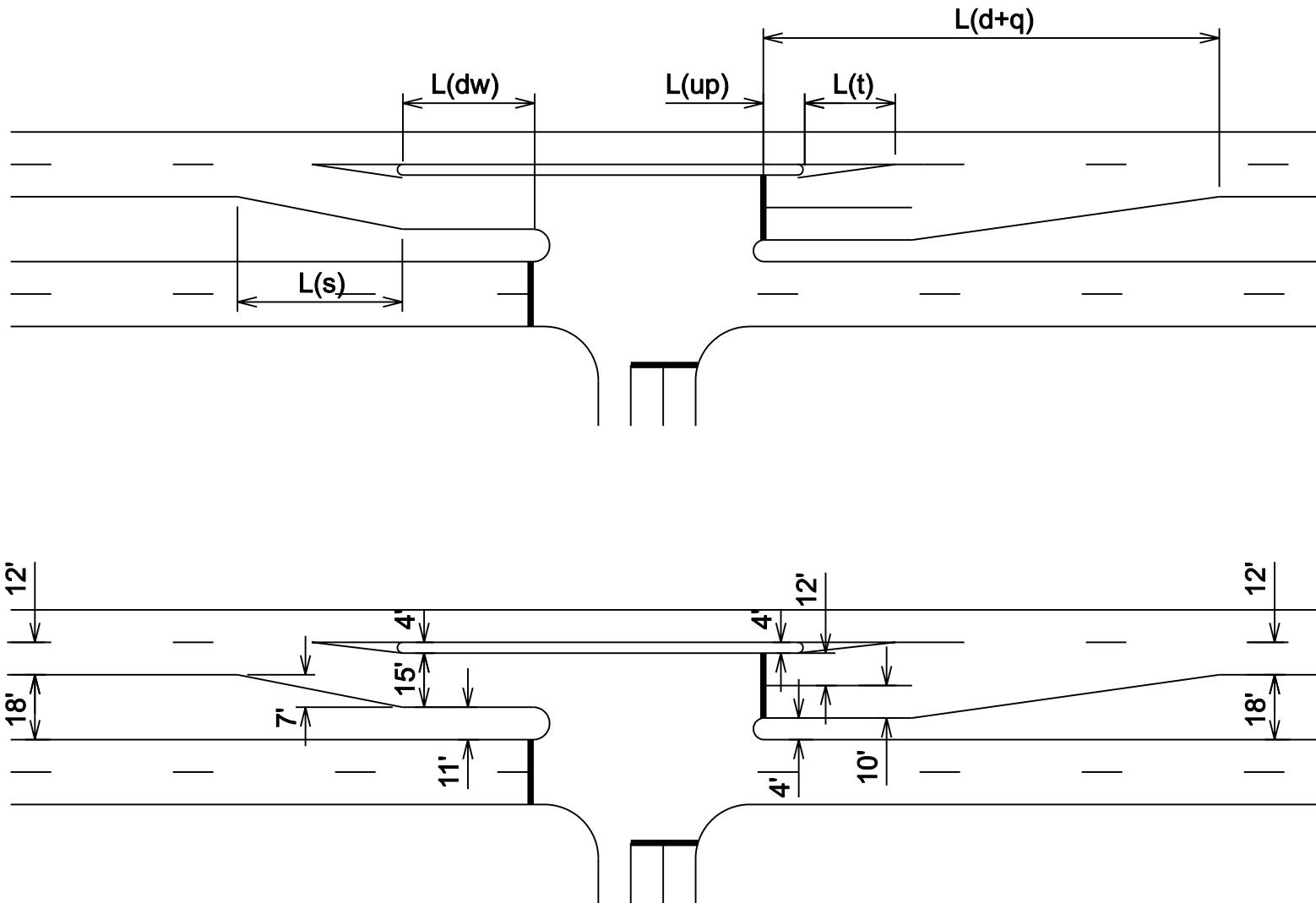
A-2



# TURBO LANE INTERSECTION DESIGNS

## TYPE C WITH THROUGH STOPPED LANE

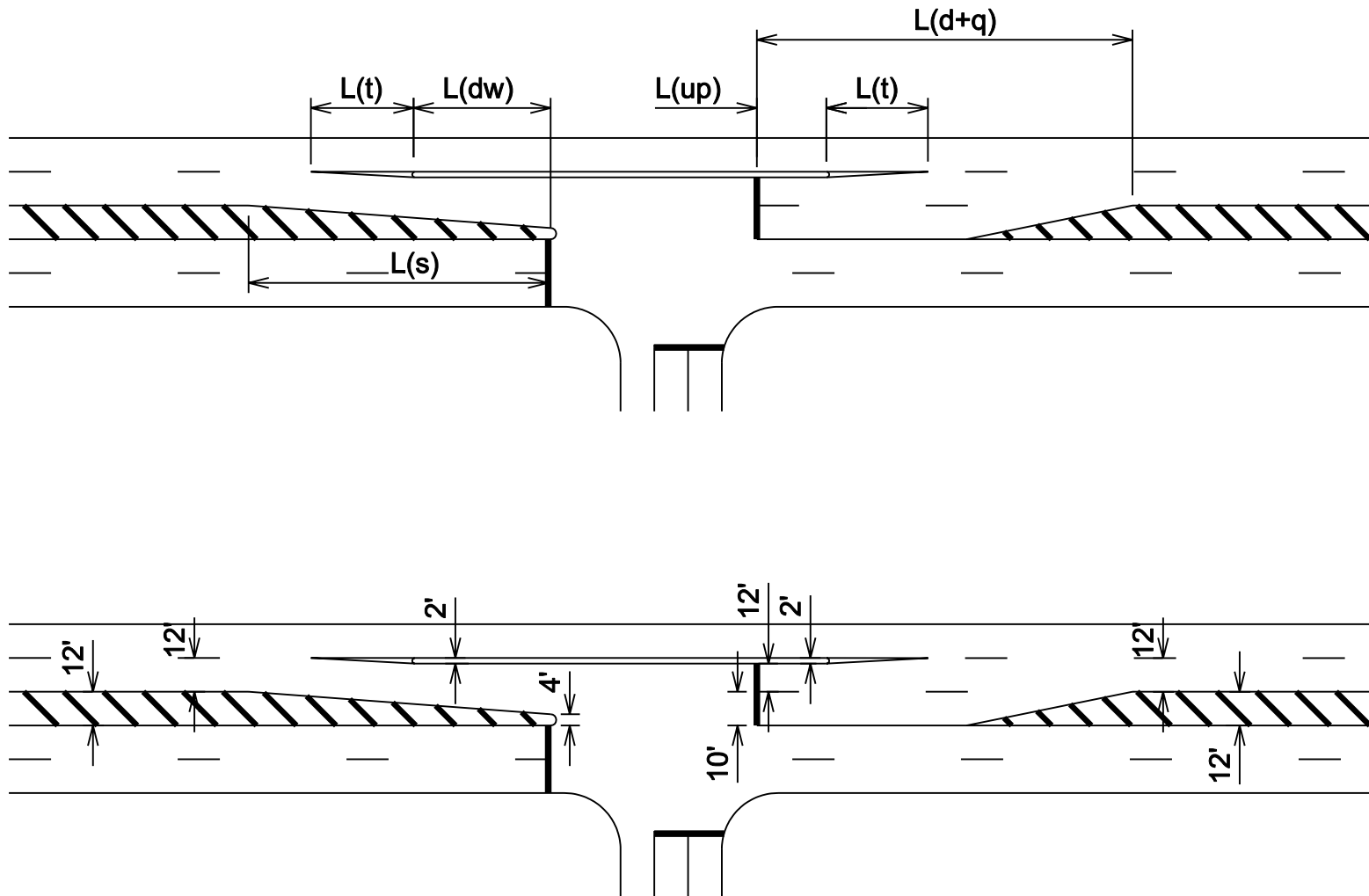
A-3



# TURBO LANE INTERSECTION DESIGNS

TYPE D  
WITH CURB &/OR PILONS INSTEAD OF MEDIAN

A-4



## TYPE A

concrete separator width = 4 ft

UPSTREAM							
Posted Speed MPH	Design Speed MPH	Left Turn Lane			Divider & Separator		
		L <sub>deceleration</sub> ft	L <sub>queue</sub> ft	L <sub>total</sub> ft	L <sub>transition (4' shift)</sub> ft	L <sub>trafsepup</sub> ft	L <sub>total</sub> ft
30	35	145	100	245	82	50	132
35	40	155	100	255	107	50	157
40	45	185	100	285	180	50	230
45	50	240	100	340	200	50	250

concrete separator width = 4 ft

DOWNSTREAM							
Posted Speed MPH	Design Speed MPH	Acceleration Lane & Taper			Divider & Separator		
		L <sub>acceleration</sub> ft	L <sub>taper (19' shift)</sub> ft	L <sub>total</sub> ft	L <sub>transition (4' shift)</sub> ft	L <sub>trafsepdwn</sub> ft	L <sub>total</sub> ft
30	35	280	140	420	82	150	232
35	40	360	160	520	107	150	257
40	45	560	180	740	180	150	330
45	50	720	210	930	200	150	350

R/W WIDTH							
Posted Speed MPH	Design Speed MPH	n= 4 lanes			n=6 lanes		
		Median ft	Roadway ft	Total ft	Median ft	Roadway ft	Total ft
30	35	23	58	81	23	80	103
35	40	23	58	81	23	80	103
40	45	23	58	81	23	80	103
45	50	23	62	85	23	86	109

The values for the Acceleration Lane Length are from AASHTO 2004, Exhibit 10-70 (same as in the Greenbook Table 3-16).

The values for the Taper Length are from the Greenbook , Table 3-16.

The Median Width is measured from edge of pavement to edge of pavement.

The Roadway Width includes the width of two curb & gutter "Type F" , two 5' swks. and the width of "n" traffic lanes.

## TYPE B

concrete separator width = 4 ft

UPSTREAM							
Posted Speed MPH	Design Speed MPH	Left Turn Lane			Divider & Separator		
		L <sub>deceleration</sub> ft	L <sub>queue</sub> ft	L <sub>total</sub> ft	L <sub>transition (4' shift)</sub> ft	L <sub>trafsepup</sub> ft	L <sub>total</sub> ft
30	35	145	100	245	82	50	132
35	40	155	100	255	107	50	157
40	45	185	100	285	180	50	230
45	50	240	100	340	200	50	250

concrete separator width = 4 ft

DOWNSTREAM							
Posted Speed MPH	Design Speed MPH	Acceleration Lane & Taper			Divider & Separator		
		L <sub>acceleration</sub> ft	L <sub>taper (19' shift)</sub> ft	L <sub>total</sub> ft	L <sub>transition (4' shift)</sub> ft	L <sub>trafsepdown</sub> ft	L <sub>total</sub> ft
30	35	280	140	420	82	150	232
35	40	360	160	520	107	150	257
40	45	560	180	740	180	150	330
45	50	720	210	930	200	150	350

R/W WIDTH							
Posted Speed MPH	Design Speed MPH	n= 4 lanes			n=6 lanes		
		Median ft	Roadway ft	Total ft	Median ft	Roadway ft	Total ft
30	35	23	58	81	23	80	103
35	40	23	58	81	23	80	103
40	45	23	58	81	23	80	103
45	50	23	62	85	23	86	109

The values for the Acceleration Lane Length are from AASHTO 2004, Exhibit 10-70 (same as in the Greenbook Table 3-16).

The values for the Taper Length are from the Greenbook , Table 3-16.

The Median Width is measured from edge of pavement to edge of pavement.

The Roadway Width includes the width of two curb & gutter "Type F" , two 5' swks. and the width of "n" traffic lanes.

## TYPE C

concrete separator width = 2 ft

UPSTREAM							
Posted Speed MPH	Design Speed MPH	Left Turn Lane			Divider & Separator		
		L <sub>deceleration</sub> ft	L <sub>queue</sub> ft	L <sub>total</sub> ft	L <sub>transition (2' shift)</sub> ft	L <sub>trafsepup</sub> ft	L <sub>total</sub> ft
30	35	145	100	245	41	50	91
35	40	155	100	255	53	50	103
40	45	185	100	285	90	50	140
45	50	240	100	340	100	50	150

concrete separator width = 2 ft

DOWNSTREAM				
Posted Speed MPH	Design Speed MPH	Divider & Separator		
		L <sub>transition (2' shift)</sub> ft	L <sub>trafsepup</sub> ft	L <sub>total</sub> ft
30	35	41	150	191
35	40	53	150	203
40	45	90	150	240
45	50	100	150	250

R/W WIDTH							
Posted Speed MPH	Design Speed MPH	n= 4 lanes			n=6 lanes		
		Median ft	Roadway ft	Total ft	Median ft	Roadway ft	Total ft
30	35	18	58	76	18	80	98
35	40	18	58	76	18	80	98
40	45	18	58	76	18	80	98
45	50	20	62	82	20	86	106

The Median Width is measured from edge of pavement to edge of pavement.

The Roadway Width includes the width of two curb & gutter "Type F" , two 5' swks. and the width of "n" traffic lanes.

## TYPE D

concrete separator width = 2 ft

UPSTREAM							
Posted Speed MPH	Design Speed MPH	Left Turn Lane			Divider & Separator		
		L <sub>deceleration</sub> ft	L <sub>queue</sub> ft	L <sub>total</sub> ft	L <sub>transition (2' shift)</sub> ft	L <sub>trafsepup</sub> ft	L <sub>total</sub> ft
30	35	145	100	245	41	50	91
35	40	155	100	255	53	50	103
40	45	185	100	285	90	50	140
45	50	240	100	340	100	50	150

concrete separator width = 2 ft

DOWNSTREAM				
Posted Speed MPH	Design Speed MPH	Divider & Separator		
		L <sub>transition (2' shift)</sub> ft	L <sub>trafsepdown</sub> ft	L <sub>total</sub> ft
30	35	41	150	191
35	40	53	150	203
40	45	90	150	240
45	50	100	150	250

R/W WIDTH							
Posted Speed MPH	Design Speed MPH	n= 4 lanes			n=6 lanes		
		Median ft	Roadway ft	Total ft	Median ft	Roadway ft	Total ft
30	35	12	58	70	12	80	92
35	40	12	58	70	12	80	92
40	45	12	58	70	12	80	92
45	50	12	62	74	12	86	98

The Median Width is measured from edge of pavement to edge of pavement.

The Roadway Width includes the width of two curb & gutter "Type F" , two 5' swks. and the width of "n" traffic lanes.

# **Appendix E**

## **Field Observations**





**Turbo Lanes**  
**Field Observations and Other Data**

ID	MD ID (a)	Location (b)	Turbo Dir	Turbo Lane Type (c)	Relevant Field Conditions (d)							Lanes/ROW (e)	
					Weaving	Other Signals	Minor St Dual LT2	Single Lane Main St	Median on Main St	Other	Major Street Speed Limit	Major St	Minor St
2	4624	NW 22 Ave at NW 139 St	SB	A	(2.1)	ok	ok	ok	(2.2)	NA	40	4LD+2P/90'	2L/60'
3	5989	NW 22 Ave at NW 127 St	SB	A	(3.1)	ok	ok	ok	(3.2)	(3.3)	40	4LD+2P/100'	2L/70'
4	4917	Douglas Rd at NW 159 St	NB	D	(4.1)	ok	(4.2)	ok	(4.3)	NA	40	5L/70'	2L/60'
6	4149	Ludlam Rd at W 74 St (+/-127 St)	SB	D	(6.1)	ok	ok	ok	(6.2)	NA	40	4L"D"/70'	2L/50'
8	3963	SW 72 Ave at SW 85 St	EB	B/D	(8.1)	ok	ok	ok	(8.2)	NA	40	3L47'-4LD70'	5L/75'
10	4390	Miami Lakes Dr at NW 60 Ave	NWB	D	(10.1)	ok	ok	ok	(10.2)	NA	35	5L/80'	2L/NA
11	5692	NW 25 St at 84 Ave	WB	D	ok	ok	ok	ok	(11.1)	NA	40	3/2+LT/75'	4LD/75'
12	5584	NW 84 Ave at NW 12 St	EB	C	ok	ok	ok	ok	ok	NA	40	4LD/NA	4LD/100'
13	4659	NW 78 Ave at NW 12 St	EB	C	(13.1)	ok	ok	ok	ok	NA	40	4LD/NA	2L/NA
14	5031	NW 7 St at NW 53 Ave	WB	D	(14.1)	ok	ok	ok	(14.2)	NA	40	5L/75'	2L/50'
16	5258	Fontainebleau Blvd at Park Blvd (+/-89 Av)	SEB	C	(16.1)	ok	(16.2)	ok	ok	NA	35	4LD/110'	4LD/110'
18	5034	SW 117 Ave at SW 128 St	SB	C	ok	ok	ok	ok	ok	NA	40	4LD/95'	2L/85'
19	5697	SW 117 Ave at SW 134 St	SB	C	(19.1)	ok	ok	ok	ok	NA	40	4LD/95'	2L/NA
20	6027	SW 137 Ave at SW 180 St	NB	C	ok	ok	(20.1)	ok	ok	NA	45	6LD/110'	2LD/70'
21	4607	Ives Dairy Rd at NE 800 Blk	SWB	C	(21.1)	ok	ok	ok	ok	NA	40	6LD/100'	4L/NA
22	4635	Ives Dairy Rd at NE 195 St Dr (+/-5 Av)	SWB	C	ok	ok	ok	ok	ok	(22.1)	40	6LD/100'	2L/NA
24	6737	SW 117 Ave at SW 136 St	SB	C	ok	ok	ok	ok	ok	NA	40	4LD/95'	2L/NA
25	5730	NW 22 Ave at NW 111 St	SB	A	ok	ok	ok	ok	ok	(25.1)	40	4LD+2P/95'	2L/70'
27	5222	SW 117 Ave at SW 47 Terr	SB	C	ok	ok	ok	ok	ok	NA	40	4LD/90'	2L/70'
28	5217	SW 137 Ave at SW 160 St	NB	C	(28.1)	ok	(28.2)	ok	ok	(28.3)	45	6LD/110'	2L/70'
29	2774	Pine Tree Dr at 47 St	NB	C	(29.1)	(29.2)	ok	ok	ok	NA	30	4LD+2P/90'	2L/60'
30	4832	Coral Way at SW 11900 Blk	EB	A	ok	ok	ok	ok	ok	NA	40	4LD/95'	4LD/NA
42	5703	SW 127 Ave at SW 43 Dr	NB	D	ok	ok	ok	ok	ok	NA	40	4LD/75'	2L+2P/70'
43	5416	SW 127 Ave at SW 62 St	NB	D	ok	ok	ok	ok	ok	(43.1)	40	4LD/90'	4LD/80'
47	5665	NW 87 Ave at NW 146 St	NB	C	ok	ok	ok	ok	ok	(47.1)	40	4LD/90'	5L/70'

Notes

- a - Miami-Dade signal number
- b - Determined by MD PWD as having suitable geometry for turbo lane operation
- c - As per MD PWD classifications:
  - A: "Ideal" - full turbo lanes, none of the main street through lanes need to stop, concrete separator
  - B: "Ideal" with ped feature and/or minor 4th leg
  - C: One Through Lane Stops - partial turbo lane with concrete separator
  - D: With Curb and/or Pylons - partial turbo lane without concrete separator
- d - Sources: Continuous Green T-Intersections (1997) and Tier 1 Analysis for Conversion of Three-Leg Intersections to Continuous Green T Intersections (2008)
- e - Source: Google Earth (ROW is approximate)



## Turbo Lanes

### Field Observations Review Notes

#### ID   MD ID   Location/Comments

2   4624   NW 22 Ave at NW 139 St

2.1: Minor RT d/w upstream, parking lanes NB & SB

2.2: Some trees

3   5989   NW 22 Ave at NW 127 St

3.1: SF RT d/w; parking lanes; T-street from west and full opening 300' north

3.2: Some palm trees

3.3: Elementary school on NE quadrant

4   4917   Douglas Rd at NW 159 St

4.1: SF d/w

4.2: One wide shared lane

4.3: Painted median

6   4149   Ludlam Rd at W 74 St (+/-127 St)

6.1: SF d/w

6.2: Narrow divider, painted median, back to back LT lanes

8   3963   SW 72 Ave at SW 85 St

8.1: Full openings 315' upstream and 255' downstream

8.2: Painted median

10   4390   Miami Lakes Dr at NW 60 Ave

10.1: Full opening 130' downstream

10.2: Painted median

11   5692   NW 25 St at 84 Ave

11.1: Painted median

12   5584   NW 84 Ave at NW 12 St

13   4659   NW 78 Ave at NW 12 St

13.1: Full openings 420' upstream and 150' downstream

14   5031   NW 7 St at NW 53 Ave

14.1: Multiple driveways upstream and downstream

14.2: Painted median, no separator

16   5258   Fontainebleau Blvd at Park Blvd (+/-89 Av)

16.1: Full openings 350' upstream and 400' downstream

16.2: Dual LT from major and minor streets

18   5034   SW 117 Ave at SW 128 St

19   5697   SW 117 Ave at SW 134 St

19.1: Full opening 300' upstream (private school)

20   6027   SW 137 Ave at SW 180 St

20.1: Dual LT on minor street

21   4607   Ives Dairy Rd at NE 800 Blk

21.1: Full opening 355' downstream

22   4635   Ives Dairy Rd at NE 195 St Dr (+/-5 Av)

22.1: Driveway makes it a four legged intersection

24   6737   SW 117 Ave at SW 136 St

25   5730   NW 22 Ave at NW 111 St

25.1: No parking s/o 111 St

27   5222   SW 117 Ave at SW 47 Ter

28   5217   SW 137 Ave at SW 160 St

28.1: full opening 465' downstream

28.2: Minor street dual LT

28.3: RR crossing 450' upstream

29   2774   Pine Tree Dr at 47 St

29.1: Full opening 350' downstream

29.2: Signal 370' upstream

30   4832   Coral Way at SW 11900 Blk

42   5703   SW 127 Ave at SW 43 Dr

43   5416   SW 127 Ave at SW 62 St

43.1: Large tree and controller on SE corner; Cross section narrows approaching bridge 600 ft to the north

47   5665   NW 87 Ave at NW 146 St

47.1: Downstream RT in/out, then LT lane

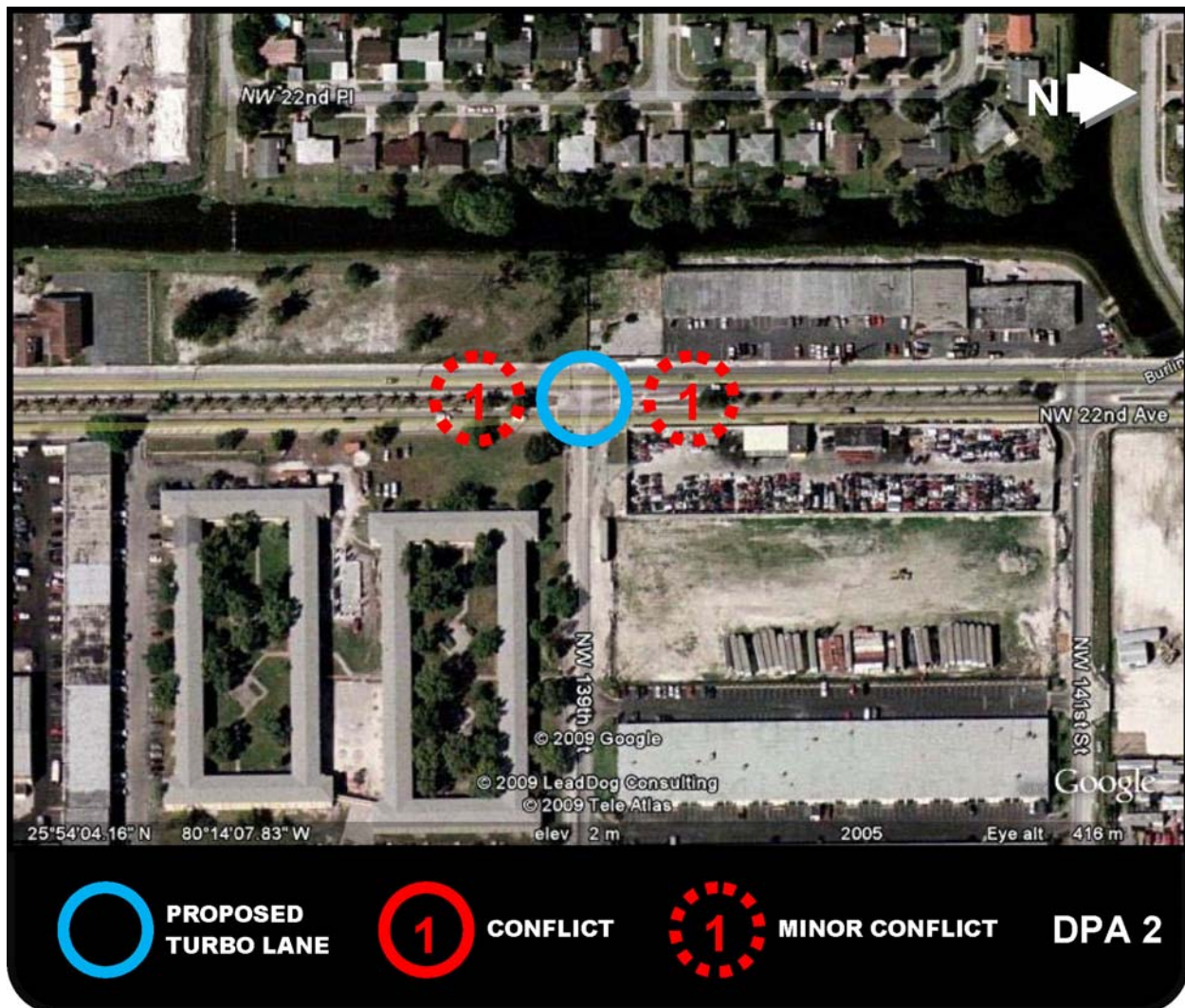
# **Appendix F**

## **Screening Results**



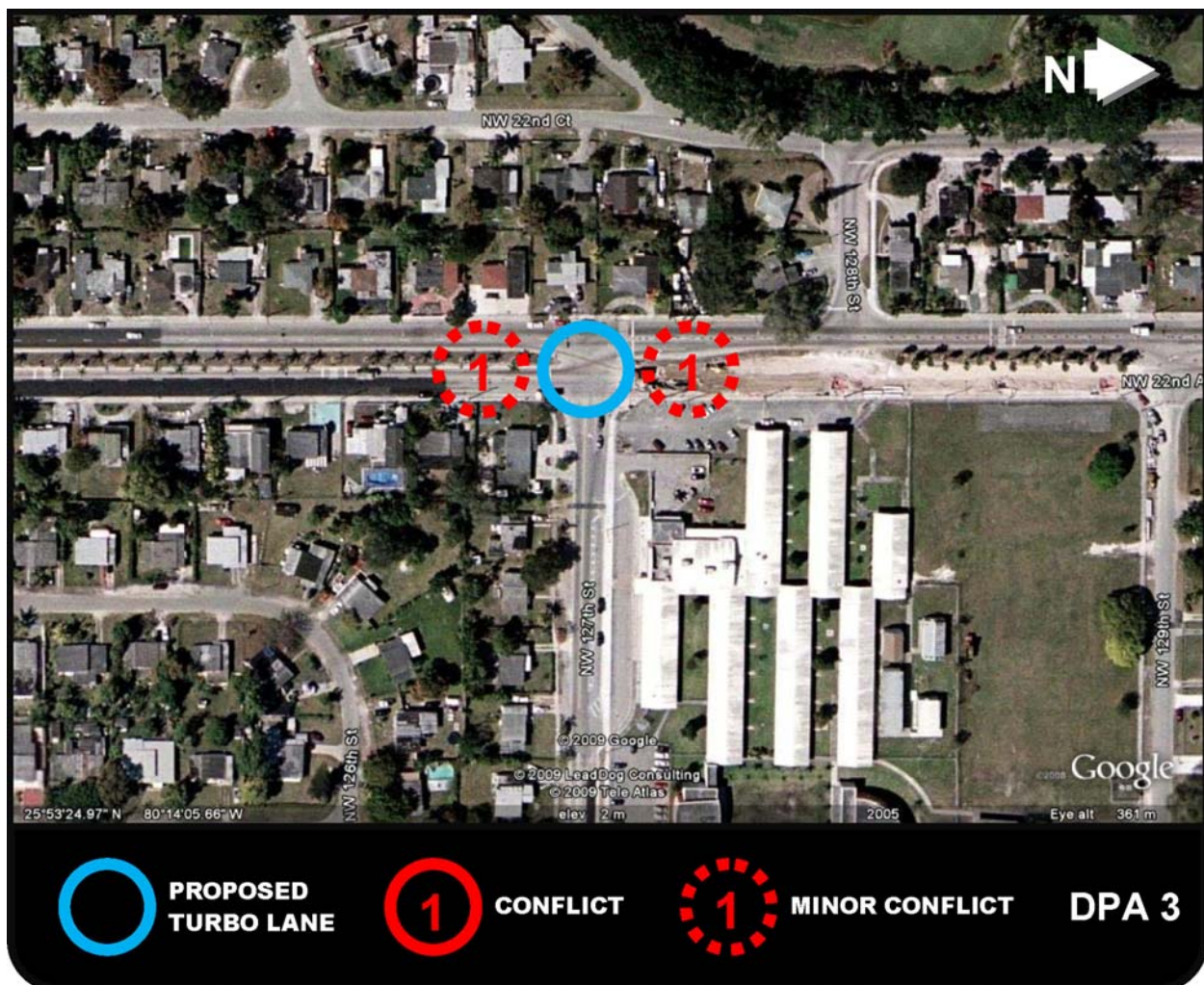


DPA ID:	2
MD ID:	4624
Location:	NW 22 Ave @ NW 139 St
Turbo Lane Direction:	SB
Recommendation:	MD turbo lane type A
Conflict:	NA
Minor Conflict:	1. Parking lanes
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	NA
Comments:	NA



DPA ID:	3
MD ID:	5989
Location:	NW 22 Ave @ NW 127 St
Turbo Lane Direction:	SB
Recommendation:	MD turbo lane type A
Conflict:	NA
Minor Conflict:	1. Parking lanes
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	NA

Note: Construction in photo is now complete





DPA ID:	4
MD ID:	4917
Location:	Douglas Rd @ NW 159 St
Turbo Lane Direction:	NB
Recommendation:	MD turbo lane type D instead of A
Conflict:	NA
Minor Conflict:	NA
Existing Ped. Crossing	No
Proposed Ped. Phase	No
Special Features:	NA
Comments:	Min. ROW width of 70' must be verified

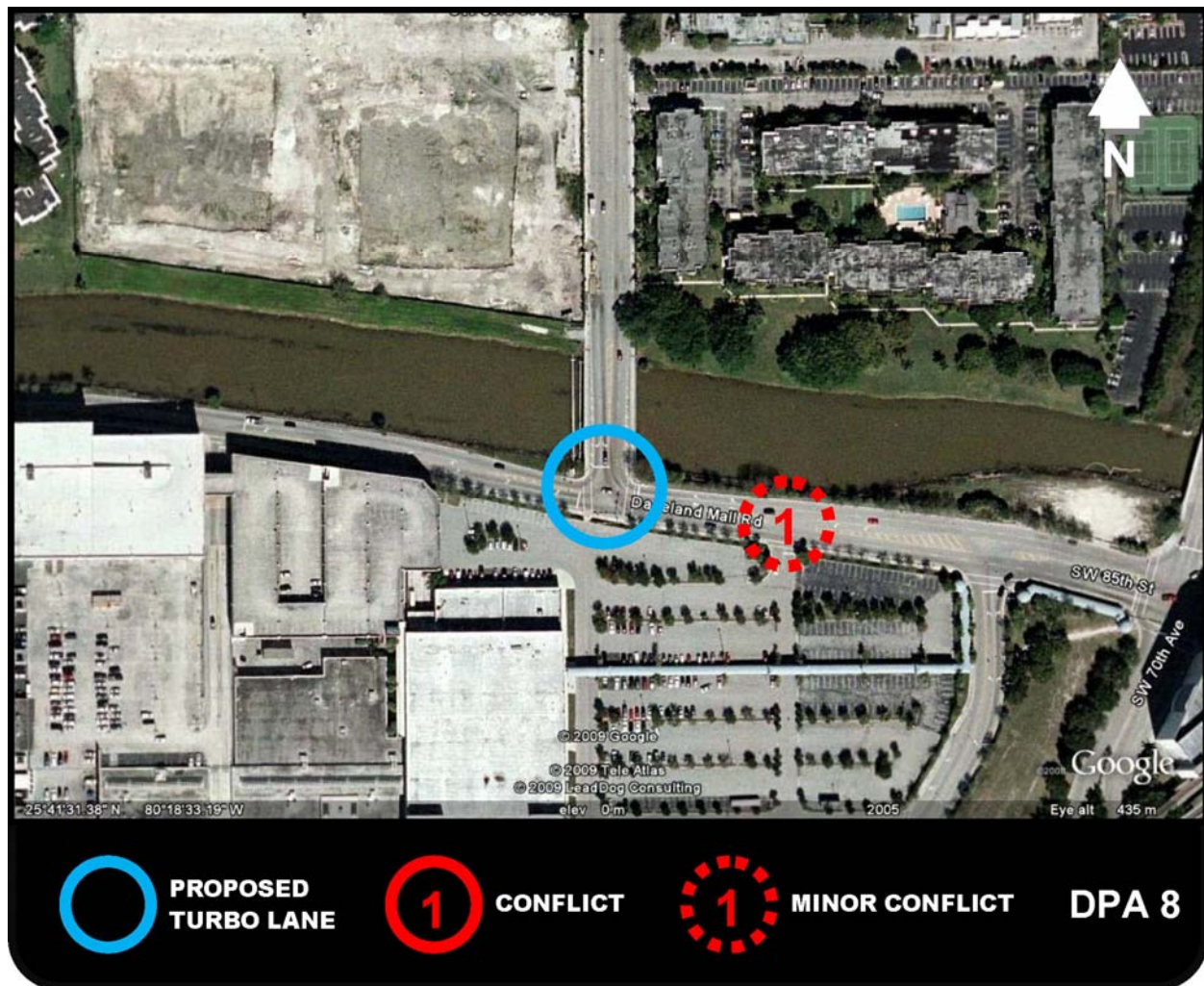


DPA ID:	6
MD ID:	4149
Location:	Ludlam Rd @ W 74 St
Turbo Lane Direction:	SB
Recommendation:	MD turbo lane type D
Conflict:	NA
Minor Conflict:	NA
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	NA
Comments:	NA

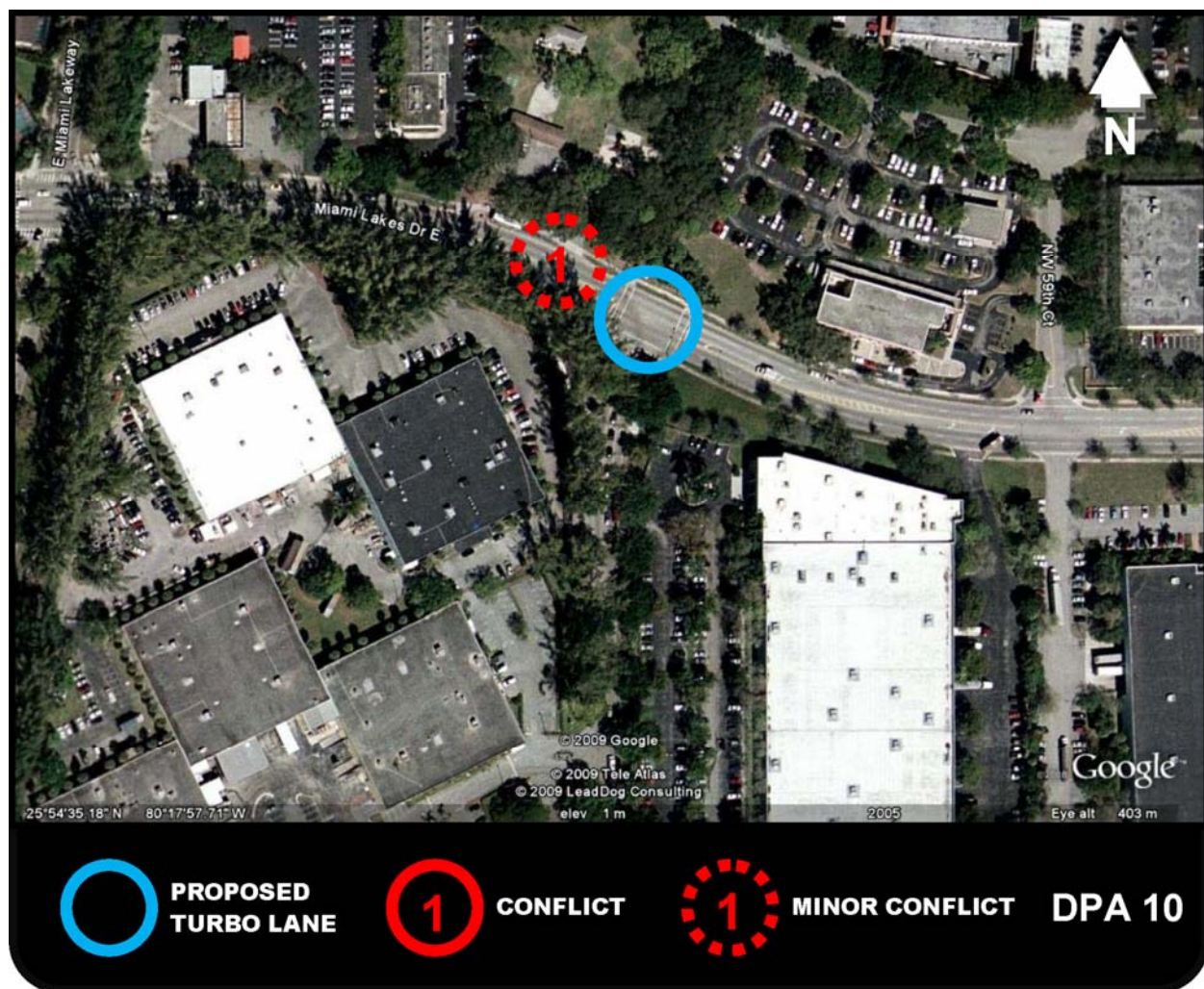




DPA ID:	8
MD ID:	3963
Location:	SW 85 St @ SW 72 Ave
Turbo Lane Direction:	EB
Recommendation:	MD turbo lane hybrid type B/C instead of A
Conflict:	NA
Minor Conflict:	1. Full median opening 255' downstream
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	Type B upstream, type C downstream due to change in cross section
Comments:	Close off median opening downstream

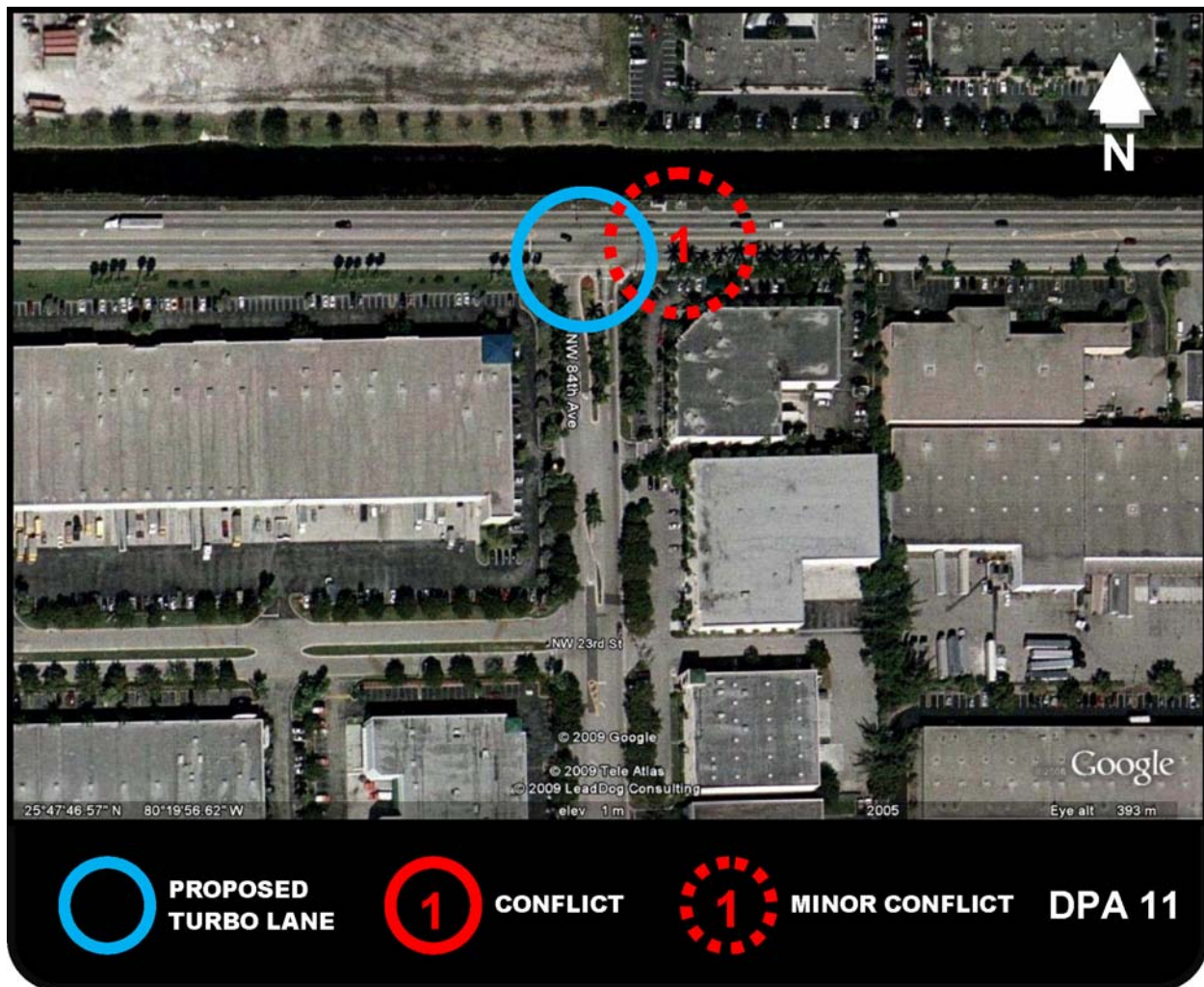


DPA ID:	10
MD ID:	4390
Location:	Miami Lakes Dr @ NW 60 Ave
Turbo Lane Direction:	NWB
Recommendation:	MD turbo lane type D
Conflict:	NA
Minor Conflict:	1. Full median opening 130' upstream
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	NA
Comments:	Close off downstream median opening



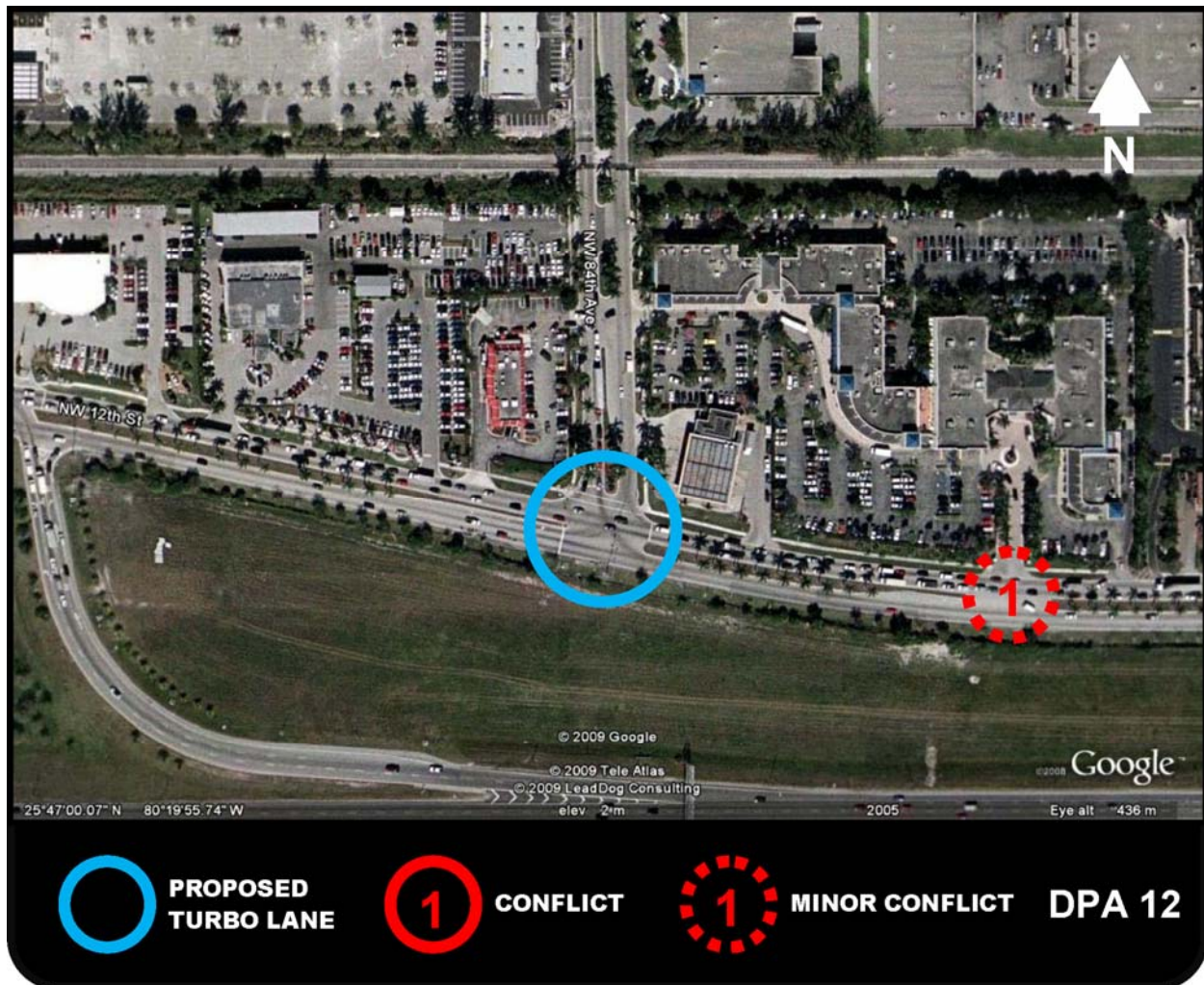


DPA ID:	11
MD ID:	5692
Location:	NW 25 St @ NW 84 Ave
Turbo Lane Direction:	WB
Recommendation:	MD turbo lane type D instead of A
Conflict:	NA
Minor Conflict:	1. Bus shelter
Existing Ped. Crossing	No
Proposed Ped. Phase	Yes
Special Features:	NA
Comments:	Verify bus shelter setback



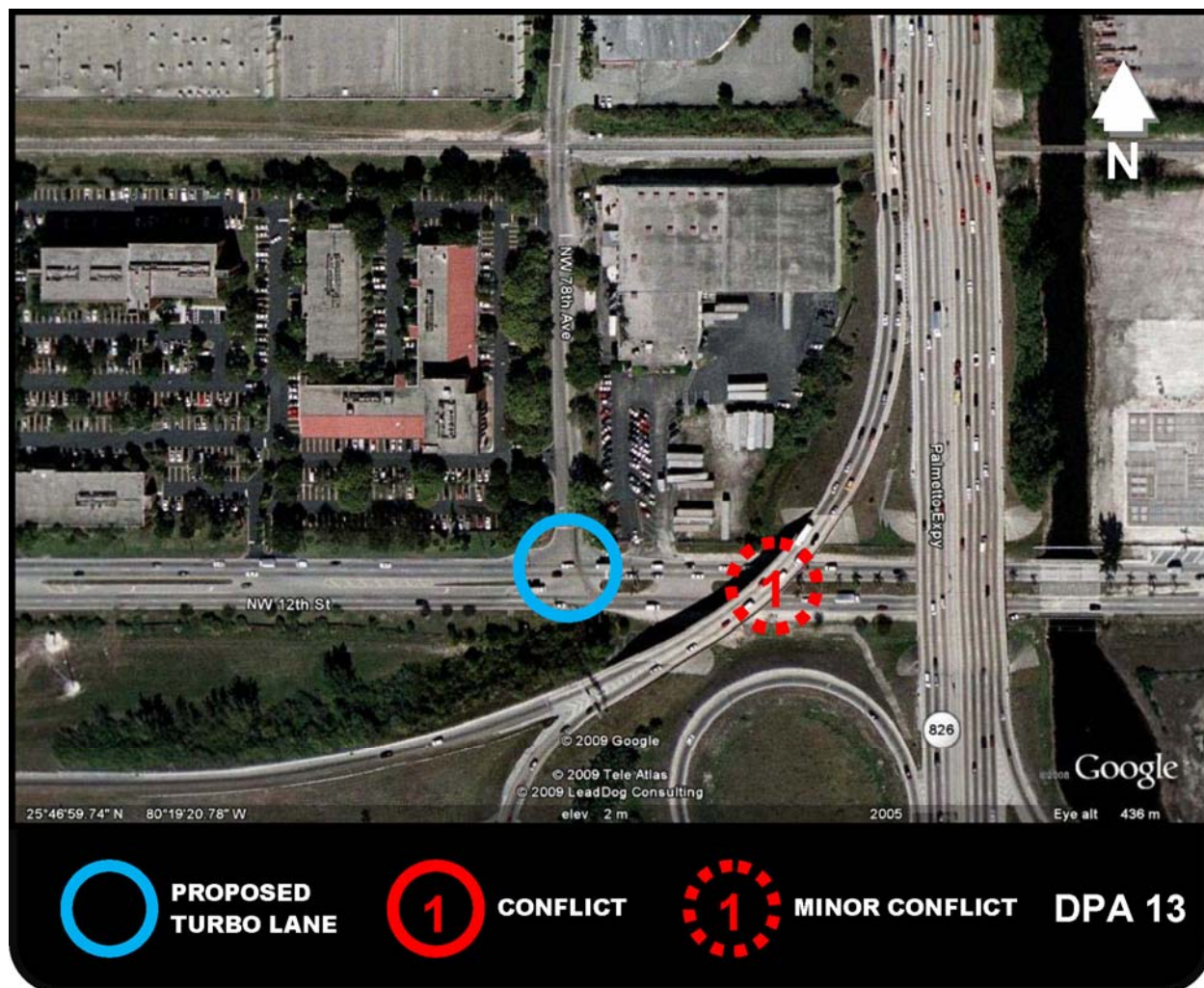


DPA ID:	12
MD ID:	5584
Location:	NW 12 St @ NW 84 Ave
Turbo Lane Direction:	EB
Recommendation:	MD turbo lane type C instead of A
Conflict:	NA
Minor Conflict:	1. Full median opening 570' downstream
Existing Ped. Crossing	No
Proposed Ped. Phase	No
Special Features:	Special signs (keep left for next driveway), extend solid white line across downstream opening
Comments:	NA



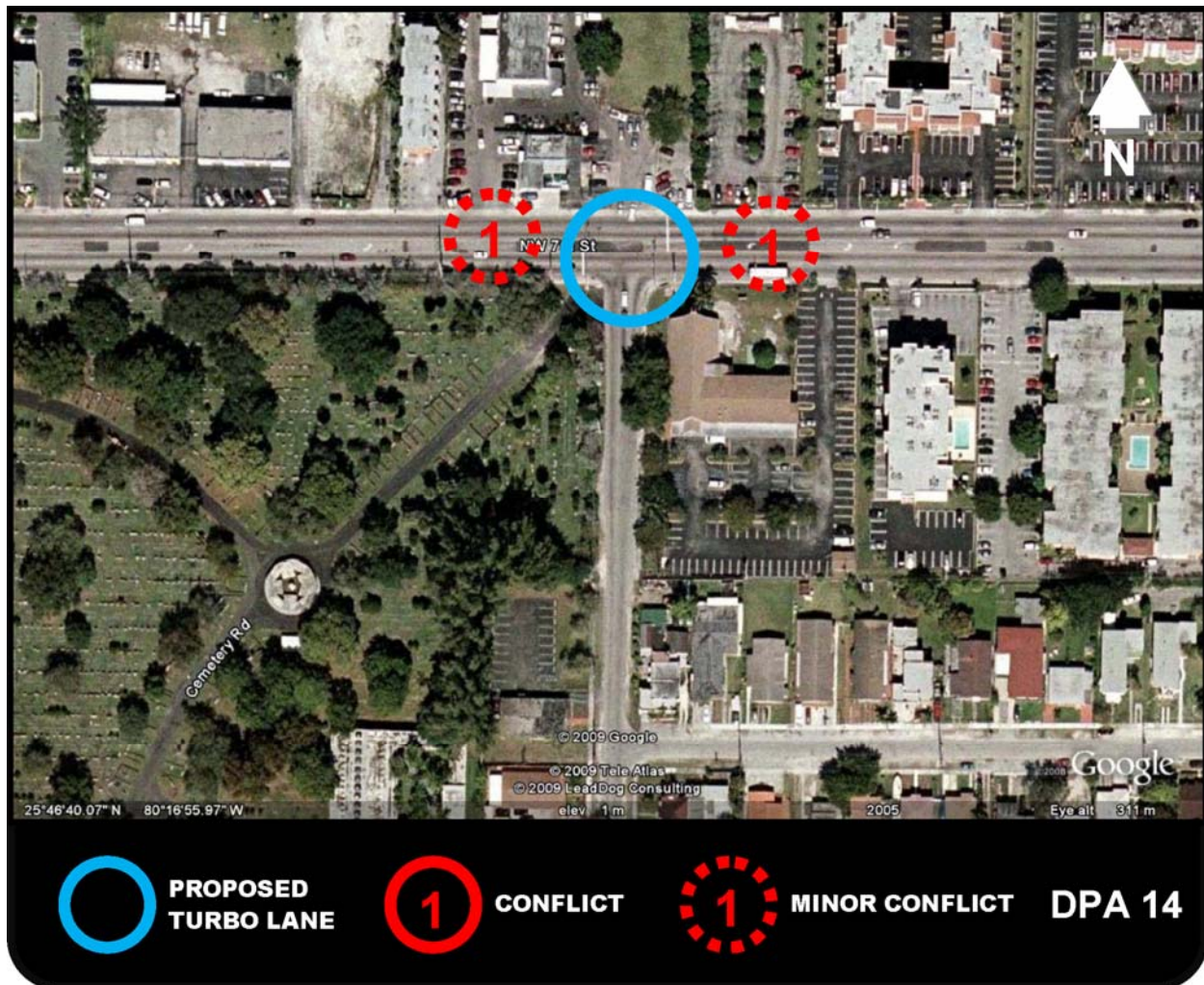
DPA ID:	13
MD ID:	4659
Location:	NW 12 St @ NW 78 Ave
Turbo Lane Direction:	EB
Recommendation:	MD turbo lane type D instead of A
Conflict:	NA
Minor Conflict:	1. Freeway ramp piers
Existing Ped. Crossing	No
Proposed Ped. Phase	No
Special Features:	NA
Comments:	NA

Note: Parcel in NE corner was acquired by FDOT, all facilities demolished

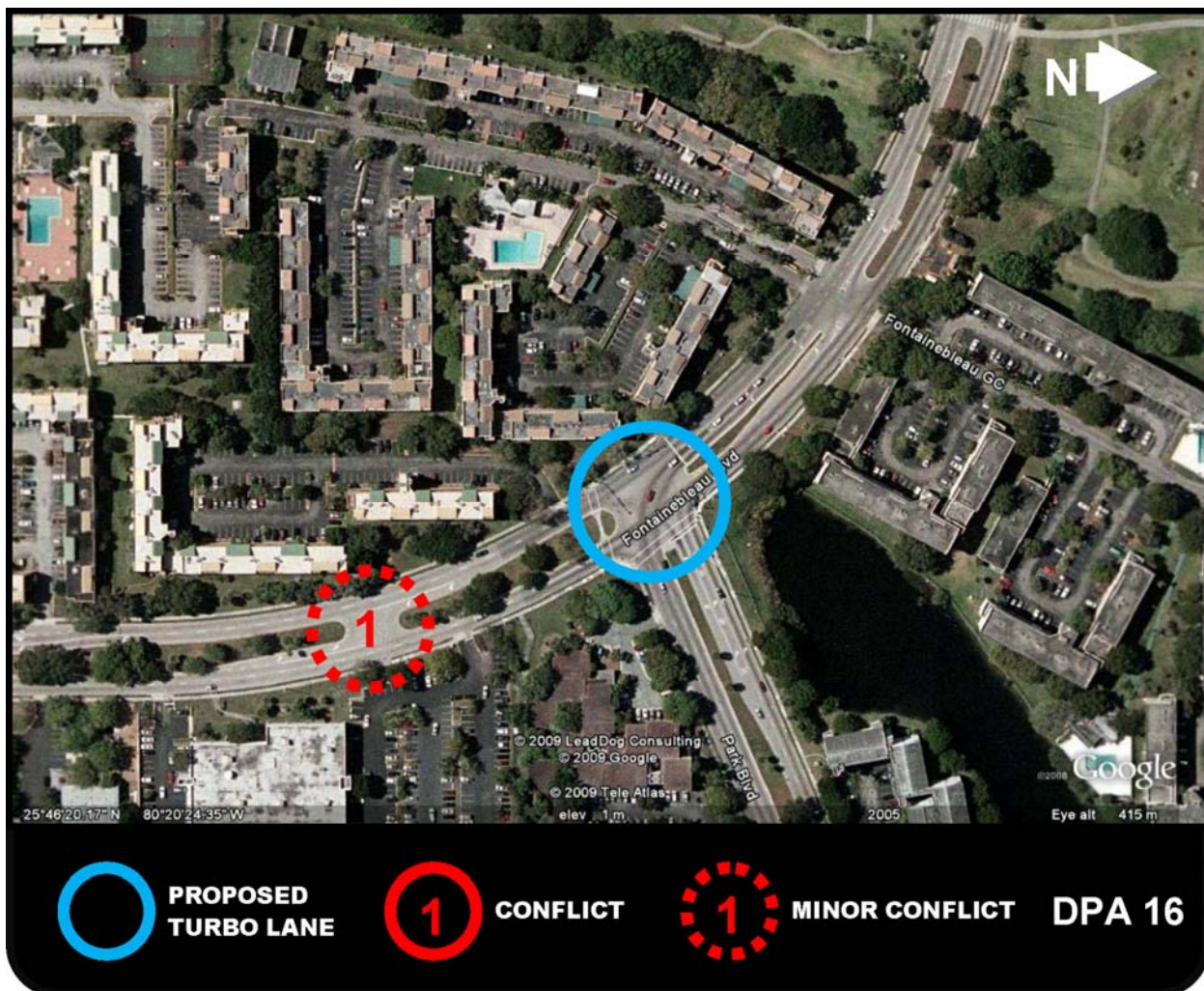




DPA ID:	14
MD ID:	5031
Location:	NW 7 St @ NW 53 Ave
Turbo Lane Direction:	WB
Recommendation:	MD turbo lane type D
Conflict:	NA
Minor Conflict:	1. Commercial driveways
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	NA
Comments:	Commercial driveways restrictions (right turns only)

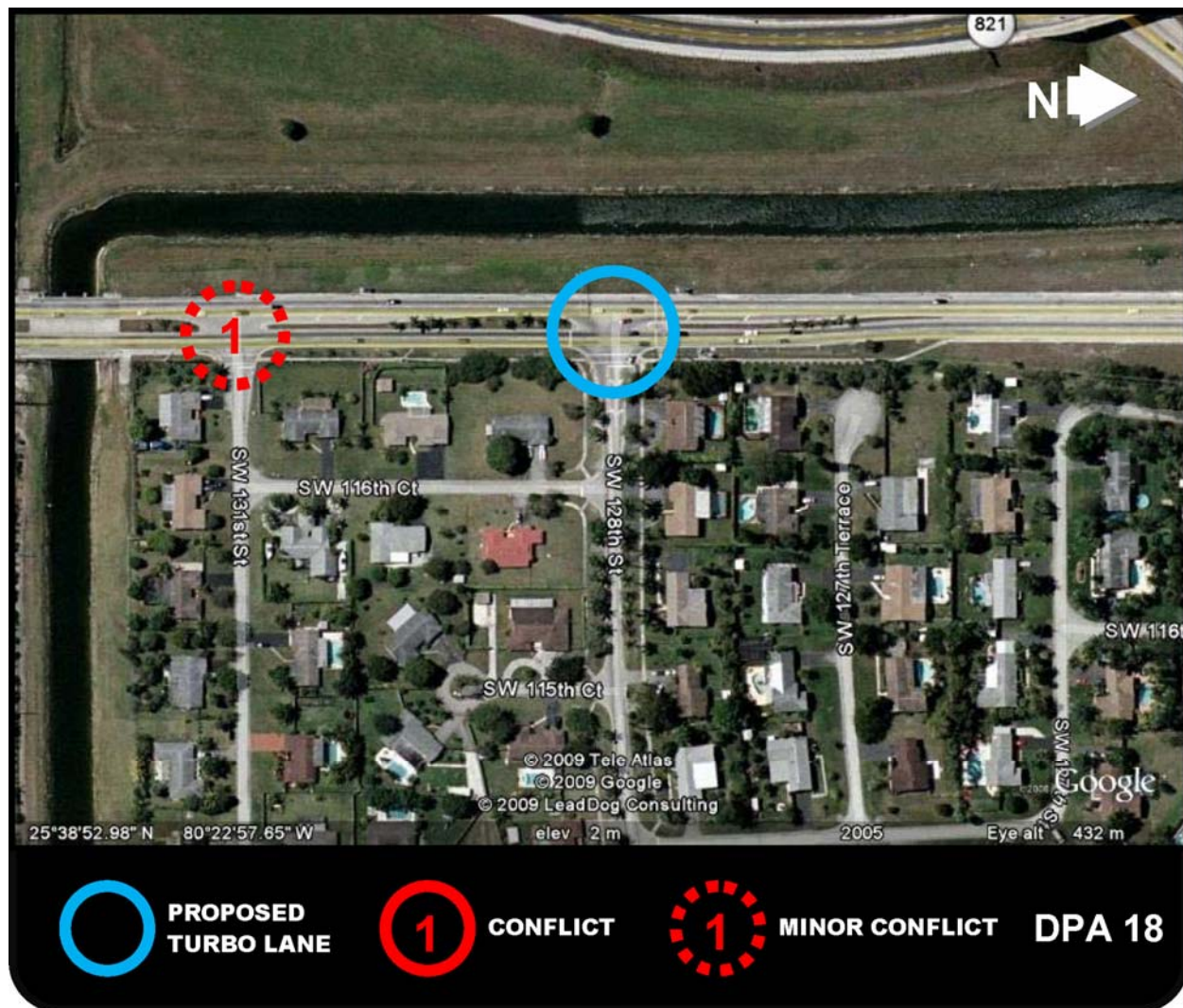


DPA ID:	16
MD ID:	5258
Location:	Fountainbleau Blvd @ Park Blvd
Turbo Lane Direction:	SEB
Recommendation:	MD turbo lane type C instead of A
Conflict:	NA
Minor Conflict:	1. Full median opening 400' downstream
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	Special signs (keep left for next driveway), extend solid white line across downstream opening
Comments:	Dual left turn lanes from main road

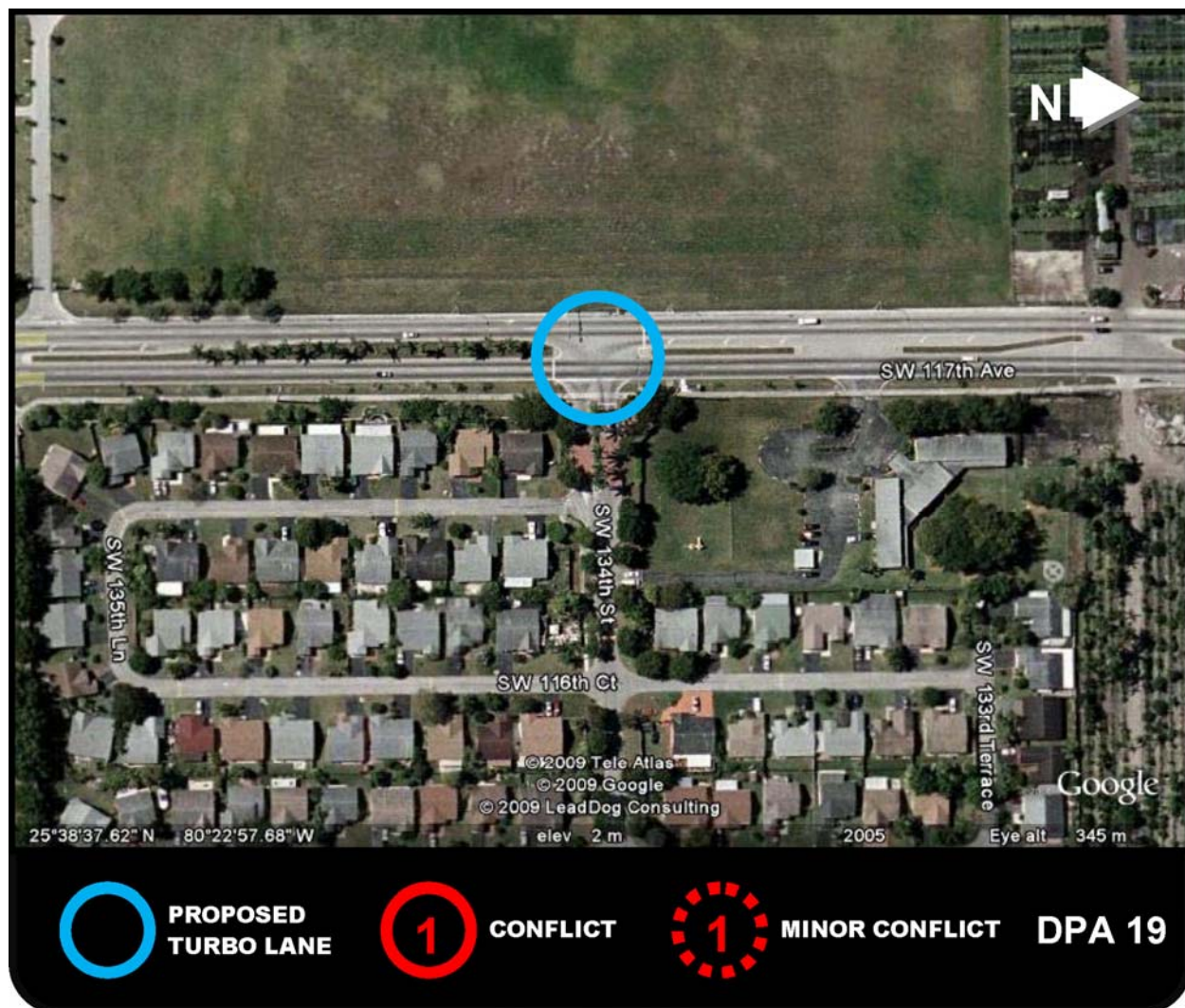




DPA ID:	18
MD ID:	5034
Location:	SW 117 Ave @ SW 128 St
Turbo Lane Direction:	SB
Recommendation:	MD turbo lane type C instead of A
Conflict:	NA
Minor Conflict:	1. Full median opening 525' downstream
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	Special signs (keep left for next street), extend solid white line across downstream opening
Comments:	NA

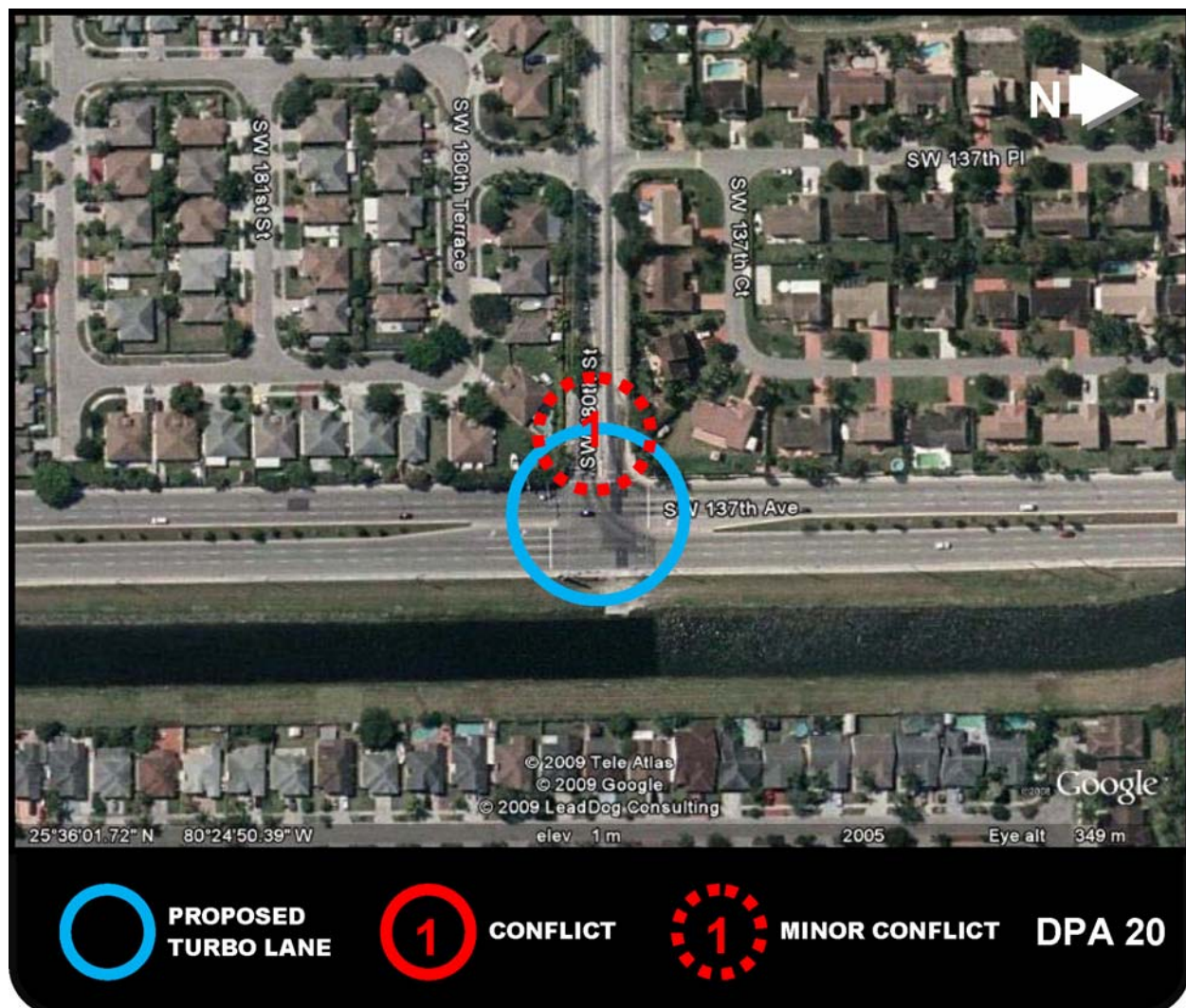


DPA ID:	19
MD ID:	5697
Location:	SW 117 Ave @ SW 134 St
Turbo Lane Direction:	SB
Recommendation:	MD turbo lane type D instead of A
Conflict:	NA
Minor Conflict:	NA
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	NA
Comments:	NA



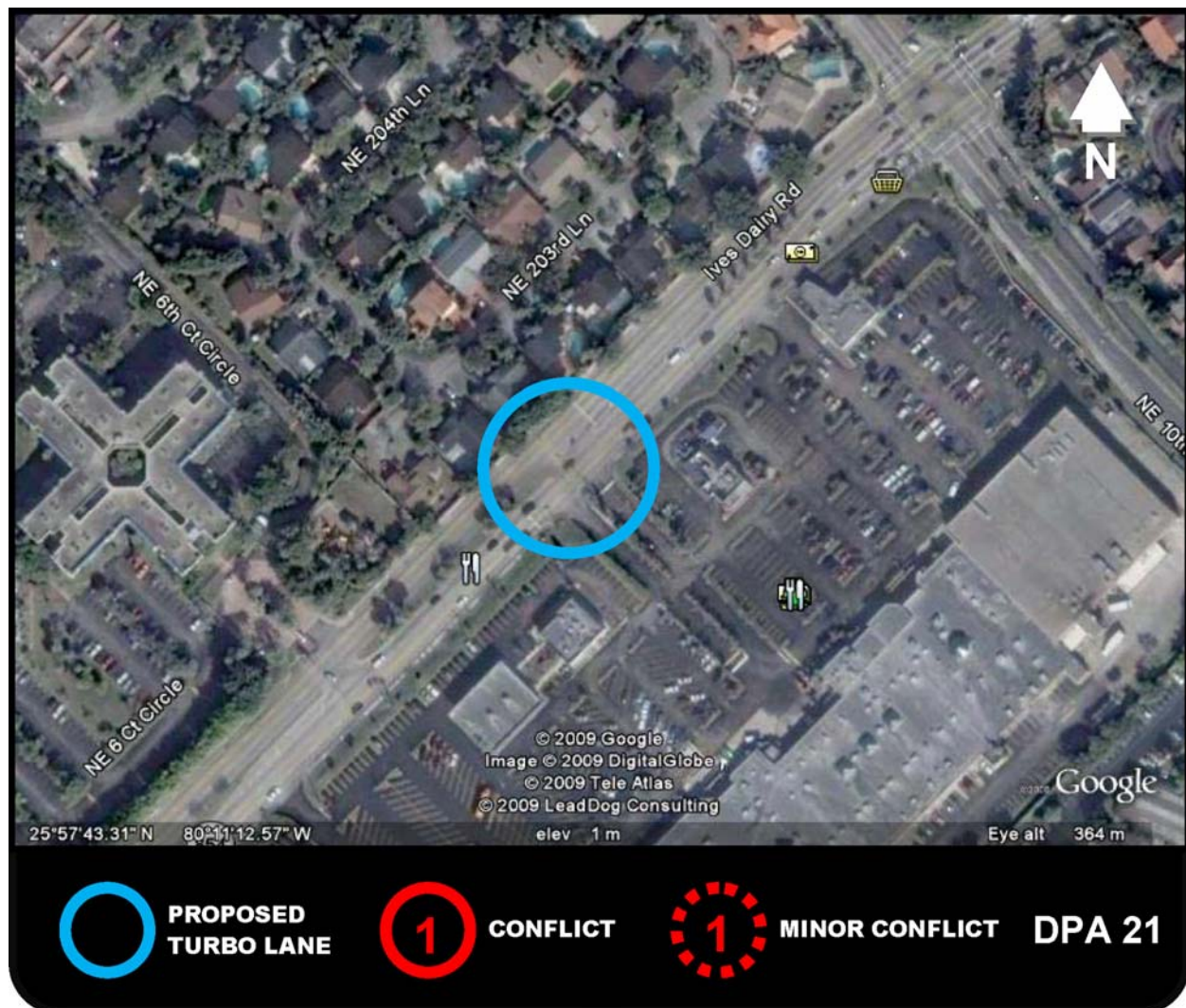


DPA ID:	20
MD ID:	6027
Location:	SW 137 Ave @ SW 180 St
Turbo Lane Direction:	NB
Recommendation:	No turbo lane
Conflict:	1. Dual left turn lane from minor street
Minor Conflict:	NA
Existing Ped. Crossing	NA
Proposed Ped. Phase	NA
Special Features:	NA
Comments:	NA





DPA ID:	21
MD ID:	4607
Location:	Ives Dairy Rd @ NE 800 Block
Turbo Lane Direction:	SWB
Recommendation:	MD turbo lane type D instead of A
Conflict:	NA
Minor Conflict:	NA
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	2' separator
Comments:	NA

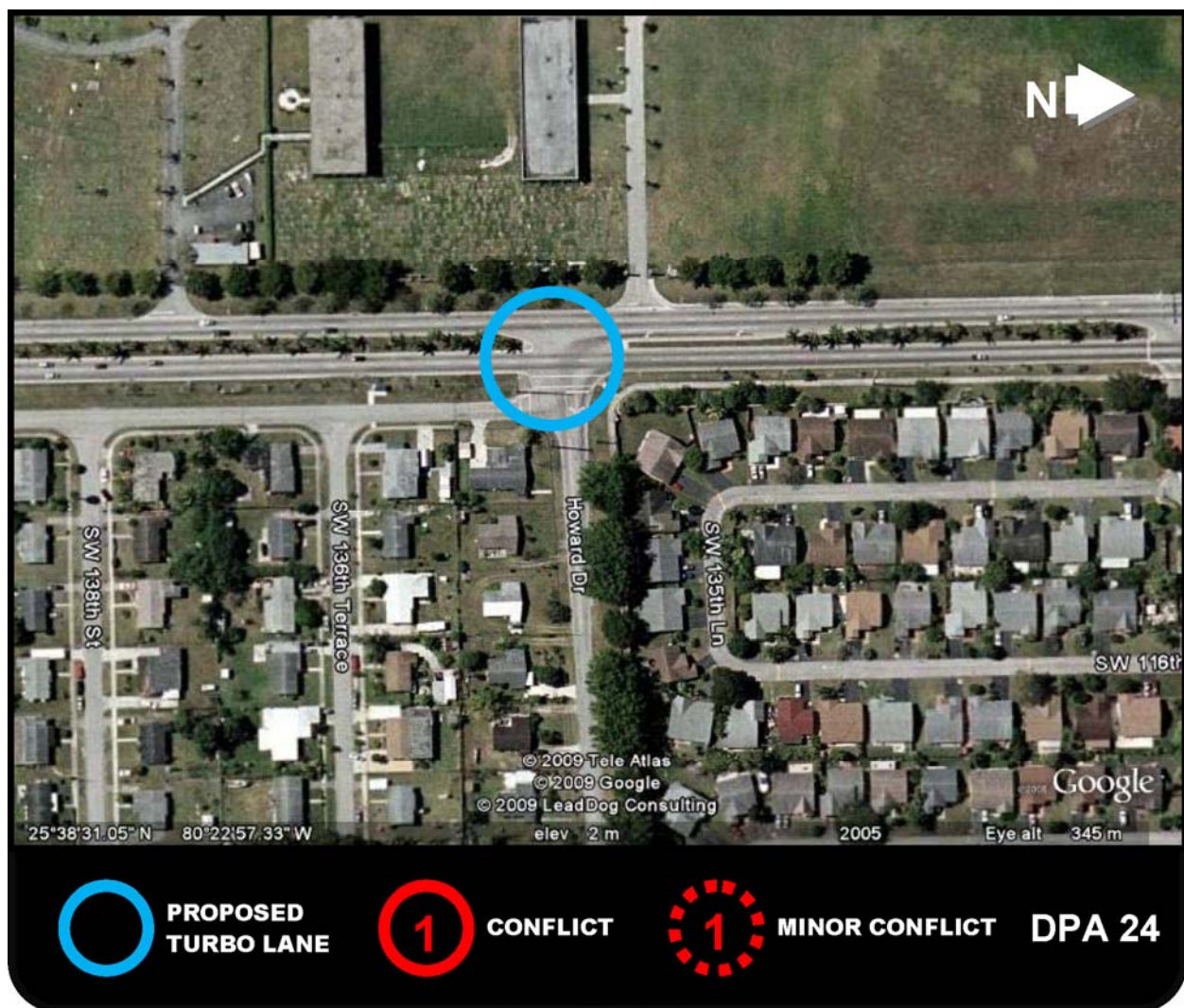


DPA ID:	22
MD ID:	4635
Location:	Ives Dairy Rd @ NE 195 St Dr
Turbo Lane Direction:	SWB
Recommendation:	MD turbo lane type C instead of B
Conflict:	NA
Minor Conflict:	1. Minor driveway is 4 <sup>th</sup> leg of intersection
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	Remove signal from 4 <sup>th</sup> leg of intersection
Comments:	Restrict driveway (4 <sup>th</sup> leg) to outbound right turns only

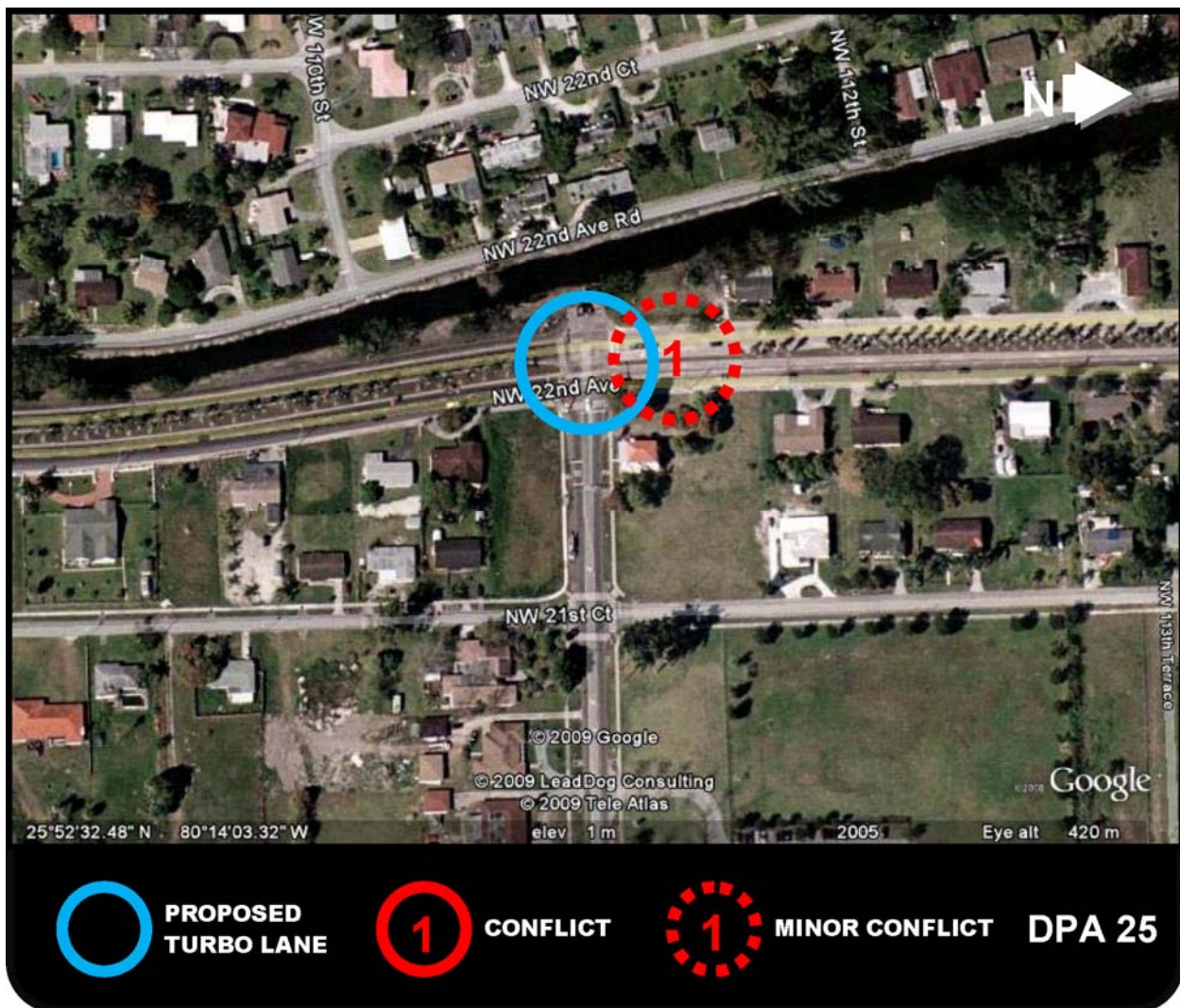




DPA ID:	24
MD ID:	6737
Location:	SW 117 Ave@ SW 136 St
Turbo Lane Direction:	SB
Recommendation:	MD turbo lane type A
Conflict:	NA
Minor Conflict:	NA
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	NA
Comments:	NA

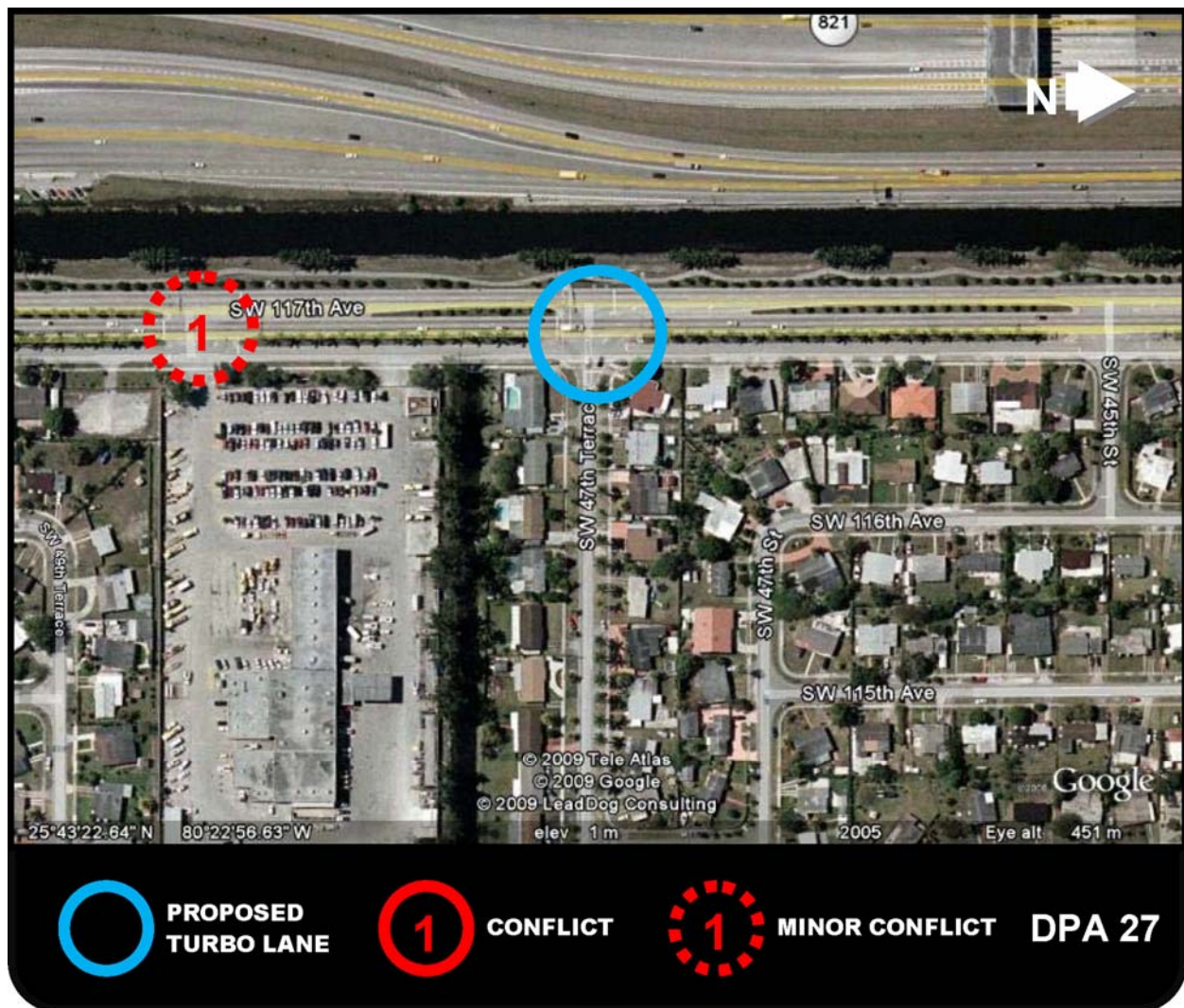


DPA ID:	25
MD ID:	5730
Location:	NW 22 Ave @ NW 111 St
Turbo Lane Direction:	SB
Recommendation:	MD turbo lane type A
Conflict:	NA
Minor Conflict:	1. Parking lanes
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	NA
Comments:	NA





DPA ID:	27
MD ID:	5222
Location:	SW 117 Ave @ SW 47 Ter
Turbo Lane Direction:	SB
Recommendation:	MD turbo lane type C instead of A
Conflict:	NA
Minor Conflict:	1. Signalized driveway 550' downstream
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	Special signs (keep left for next driveway), extend solid white line across downstream opening
Comments:	NA



DPA ID:	28
MD ID:	5217
Location:	SW 137 Ave @ SW 160 St
Turbo Lane Direction:	NB
Recommendation:	No turbo lane
Conflict:	1. Dual left turn lane from minor street
Minor Conflict:	NA
Existing Ped. Crossing	NA
Proposed Ped. Phase	NA
Special Features:	NA
Comments:	NA

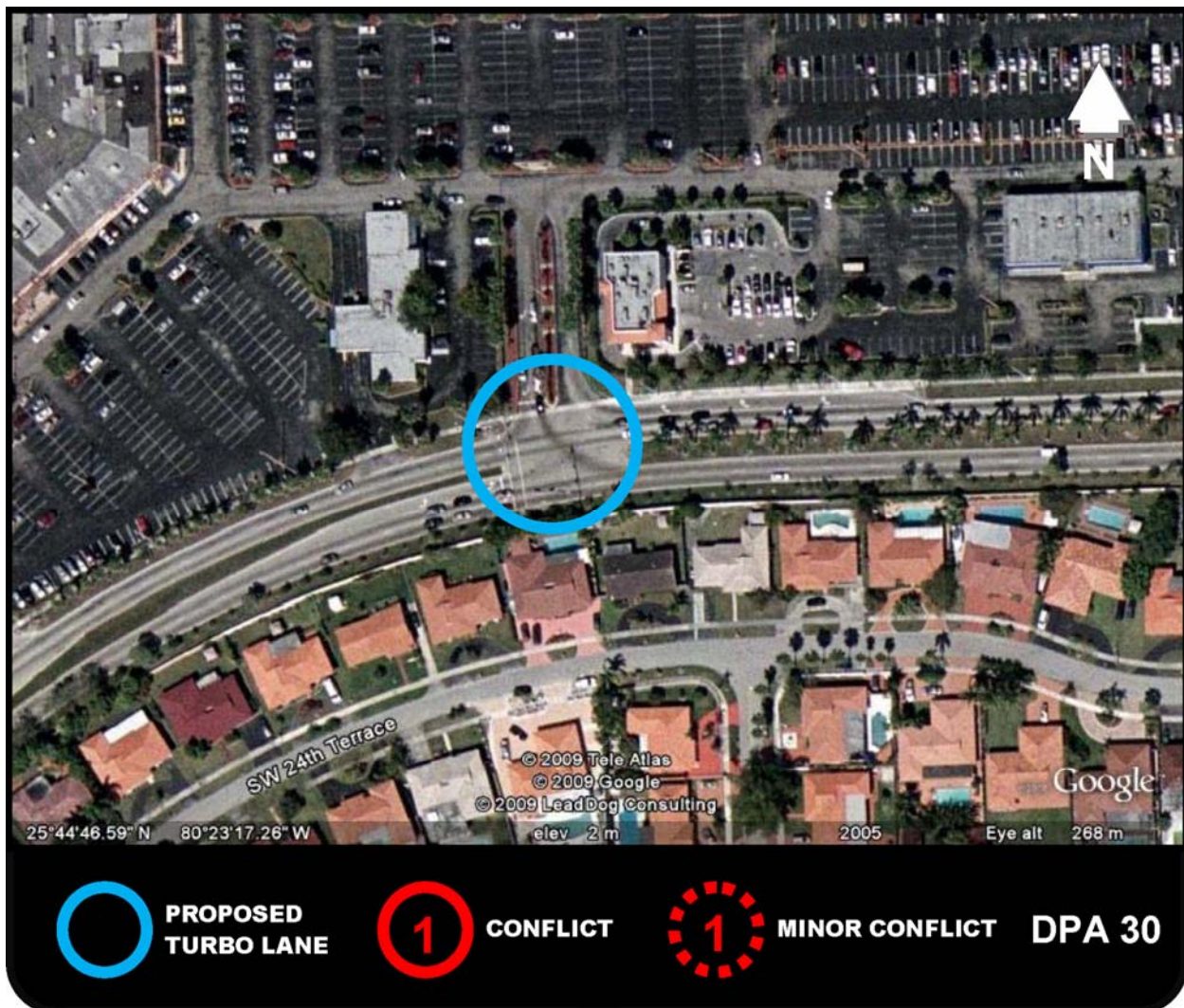




DPA ID:	29
MD ID:	2774
Location:	Pine Tree Dr @ 47 St
Turbo Lane Direction:	NB
Recommendation:	MD turbo lane type D
Conflict:	NA
Minor Conflict:	1. Parking lanes
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	NA
Comments:	NA



DPA ID:	30
MD ID:	4832
Location:	Coral Way @ SW 11900 Block
Turbo Lane Direction:	EB
Recommendation:	MD turbo lane type A
Conflict:	NA
Minor Conflict:	NA
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	NA
Comments:	NA



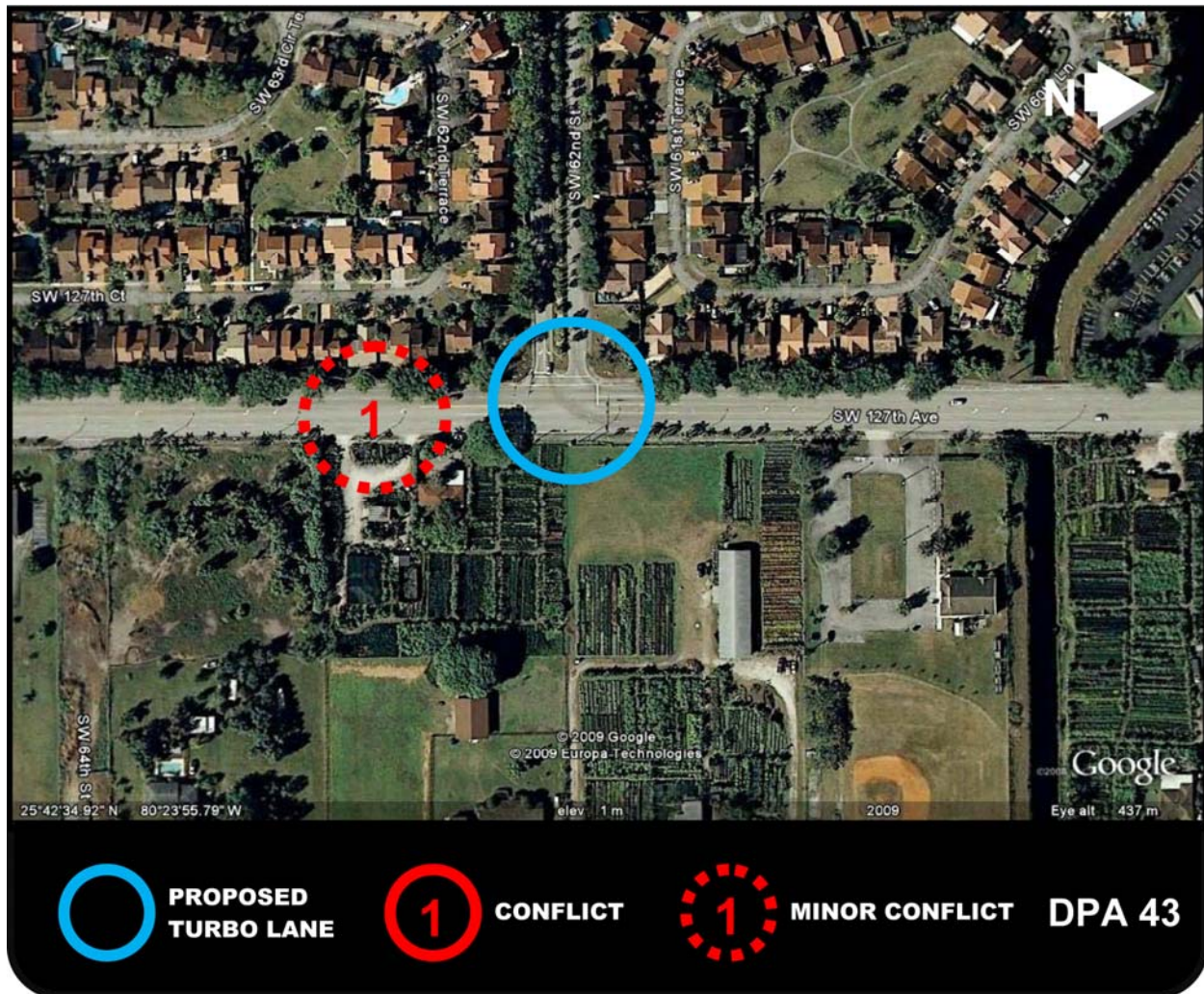


DPA ID:	42
MD ID:	5703
Location:	SW 127 Ave @ SW 43 Dr
Turbo Lane Direction:	NB
Recommendation:	MD turbo lane type D
Conflict:	NA
Minor Conflict:	1. Upstream driveway, 2. Downstream LT lane
Existing Ped. Crossing	No
Proposed Ped. Phase	No
Special Features:	Special advance signage for downstream LT lane
Comments:	Restrict upstream driveway to RT only





DPA ID:	43
MD ID:	5416
Location:	SW 127 Ave @ SW 62 St
Turbo Lane Direction:	NB
Recommendation:	MD turbo lane type D
Conflict:	NA
Minor Conflict:	1. Upstream driveway
Existing Ped. Crossing	No
Proposed Ped. Phase	No
Special Features:	NA
Comments:	Restrict upstream driveway to RT only



DPA ID:	47
MD ID:	5665
Location:	NW 87 Ave @ NW 146 St
Turbo Lane Direction:	NB
Recommendation:	MD turbo lane type C
Conflict:	NA
Minor Conflict:	1. Downstream LT lane
Existing Ped. Crossing	Yes
Proposed Ped. Phase	Yes
Special Features:	Special advance signage for downstream LT lane
Comments:	NA





# **Appendix G**

## **Approach Capacity Increase**





**Turbo Lanes Study**  
**Estimated Increase in Approach Capacity**

DPA ID	MD ID	Location	Turbo Dir	Rec. Turbo Lane Type	Turbo Lanes Dir Total Lanes	Number of Turbo Lanes	Cycle Length (sec)	Peak Hour Green Time (sec)	Turbo Approach Capacity Before (vph)	Turbo Approach Capacity After (vph)	% Change
2	4624	NW 22 Ave at NW 139 St	SB	A	2	2	120	95	2850	3600	26%
3	5989	NW 22 Ave at NW 127 St	SB	A	2	2	120	94	2820	3600	28%
4	4917	Douglas Rd at NW 159 St	NB	D	2	1	120	79	2370	2985	26%
6	4149	Ludlam Rd at W 74 St (+/-127 St)	SB	D	2	1	130	100	2769	3185	15%
8	3963	SW 85 St at SW 72 Ave	EB	B/D	1	1	90	33	660	1800	173%
10	4390	Miami Lakes Dr at NW 60 Ave	NWB	D	2	1	110	91	2978	3289	10%
11	5692	NW 25 St at 84 Ave	WB	D	2	1	130	115	3185	3392	7%
12	5584	NW 12 St at NW 84 Ave	EB	C	2	1	144	111	2775	3188	15%
13	4659	NW 12 St at NW 78 Ave	EB	C	2	1	140	99	2546	3073	21%
14	5031	NW 7 St at NW 53 Ave	WB	D	2	1	135	116	3093	3347	8%
16	5258	Fontainebleau Blvd at Park Blvd (+/-89 Av)	SEB	C	2	1	68	48	2541	3071	21%
18	5034	SW 117 Ave at SW 128 St	SB	C	2	1	122	94	2774	3187	15%
19	5697	SW 117 Ave at SW 134 St	SB	C	2	1	111	88	2854	3227	13%
20	6027	SW 137 Ave at SW 180 St	NB	C	3	2	100	70	3780	4860	29%
21	4607	Ives Dairy Rd at NE 800 Blk	SWB	C	3	2	105	87	4474	5091	14%
22	4635	Ives Dairy Rd at NE 195 St Dr (+/-5 Av)	SWB	C	3	2	105	74	3806	4869	28%
24	6737	SW 117 Ave at SW 136 St	SB	D	2	1	123	88	2576	3088	20%
25	5730	NW 22 Ave at NW 111 St	SB	A	2	2	140	108	2777	3600	30%
27	5222	SW 117 Ave at SW 47 Ter	SB	C	2	1	95	67	2539	3069	21%
28	5217	SW 137 Ave at SW 160 St	NB	C	3	2	100	70	3780	4860	29%
29	2774	Pine Tree Dr at 47 St	NB	C	2	1	120	88	2640	3120	18%
30	4832	Coral Way at SW 11900 Blk	EB	A	2	2	150	131	3144	3600	15%
42	5703	SW 127 Ave at SW 43 Dr	NB	D	2	1	100	75	2700	3150	17%
43	5416	SW 127 Ave at SW 62 St	NB	D	2	1	103	68	2377	2988	26%
47	5665	NW 87 Ave at NW 146 St	NB	C	2	1	93	73	2826	3213	14%

Base Capacity = 1800 vphgpl





# **Appendix H**

## **Estimated Costs**



**Turbo Lanes**  
**Cost Estimates Summary**

Turbo Lane Type	Mid-Point	Cost Range (x1000)					
		Low Cost Location		Medium Cost Location		High Cost Location	
		From	To	From	To	From	To
A	\$270	\$215	\$240	\$240	\$300	\$300	\$325
B	\$270	\$215	\$240	\$240	\$300	\$300	\$325
C	\$170	\$135	\$150	\$150	\$190	\$190	\$205
D	\$120	\$95	\$110	\$110	\$130	\$130	\$145

**ESTIMATE OF PROBABLE PROJECT COST**  
**TURBOLANE - TYPE A**  
**MIAMI-DADE, FLORIDA**  
**January 21, 2010**

Item No.	Item	Unit	Unit Cost
<b>ROADWAY</b>			
0110- 1- 1	CLEARING & GRUBBING	AC	\$ 15,761.61
0160- 4	STABILIZATION TYPE B	SY	\$ 4.69
0285-709	BASE OPTIONAL (BASE GROUP 09)	SY	\$ 20.00
0327- 70- 1	MILLING EXIST ASPH PAVT (1" AVG DEPTH)	SY	\$ 4.34
0334- 1- 14	SUPERPAVE ASPHALTIC CONC (TRAFFIC D)	TN	\$ 120.00
0337- 7- 32	ASPH CONC FC, TRAFFIC C, FC-9.5, RUBBER	TN	\$ 106.52
0520- 1- 10	CURB & GUTTER CONC (TYPE F)	LF	\$ 32.23
0520- 5- 21	TRAF SEP CONC (TYPE II) (4' WIDE)	LF	\$ 44.55
0520- 70	TRAFFIC SEPARATOR CONCRETE(SPECIAL)	SY	\$ 78.58
0570- 1- 2	PERFORMANCE TURF (SOD)	SY	\$ 2.21
<b>SIGNING AND PAVING MARKING</b>			
0700- 20- 11	SIGN SINGLE POST (F&I) (LESS THAN 12 SF)	AS	\$ 286.87
0700- 20- 12	SIGN SINGLE POST (F&I) (12 - 20 SF)	AS	\$ 870.57
0705- 11- 3	DELINEATOR, FLEXIBLE HIGH VISIBILITY MEDIAN	EA	\$ 120.00
0706- 3	RETRO-REFLECTIVE PAVEMENT MARKERS	EA	\$ 5.00
0710- 11-111	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 6")	NM	\$ 1,105.44
0710- 11-122	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 8")	LF	\$ 0.71
0710- 11-123	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 12")	LF	\$ 0.87
0710- 11-124	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 18")	LF	\$ 1.92
0710- 11-125	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 24")	LF	\$ 2.00
0710- 11-131	PAINTED PAVEMENT MARKINGS (STD, WHITE, SKIP, 6")	GM	\$ 466.90
0710- 11-160	PAINTED PAVEMENT MARKINGS (STD, WHITE, MESSAGE)	EA	\$ 41.40
0710- 11-170	PAINTED PAVEMENT MARKINGS (STD, WHITE, ARROWS)	EA	\$ 44.81
0710- 11-211	PAINTED PAVEMENT MARKINGS (STD, YELLOW, SOLID, 6")	NM	\$ 1,012.19
0710- 11-222	PAINTED PAVEMENT MARKINGS (STD, YELLOW, SOLID, 8")	LF	\$ 0.47
0710- 11-224	PAINTED PAVEMENT MARKINGS (STD, YELLOW, SOLID, 18")	LF	\$ 1.36
<b>SIGNALIZATION</b>			
0635- 1- 11	PULL & JUNCTION BOXES (F&I) (PULL BOX)	EA	\$ 628.12
0650- 51-311	SIGNAL TRAFFIC(F&I)(3 SECT 1 WAY)(STD)	AS	\$ 1,500.00
0650- 51-513	SIGNAL TRAF(F&I)(5 SECT 1 WAY)(SPL)	AS	\$ 3,000.00
0660- 2-101	LOOP ASSEMBLY (F&I) (TYPE A)	AS	\$ 1,086.22
0671- 2- 42	TRAFFIC CONTROLLER(MOD)(TYPE 170)	EA	\$ 2,000.00
0690- 10	SIGNAL HEAD TRAFFIC ASSEMBLY REMOVAL	EA	\$ 450.00

**MOBILIZATION 10%**  
**MAINTENANCE OF TRAFFIC (MISC.) 10%**

**CONTINGENCIES 20%**

**ESTIMATED CONSTRUCTION COST RANGE**

LOW = \$215,000 MIDDLE = \$270,000 HIGH = \$325,000

**Notes:**

1. The Cost Estimate does not include Landscape (tree relocation / removal), Drainage, Utilities Adjustments, ADA upgrades.
2. Most Unit Costs are based on Miami-Dade County Report "Cost Estimates for Conversion of Three-Leg Intersections to Turbolane Operations".
3. The Estimated Construction Cost Range does not include the Design and the C.E.I. costs.
4. The Cost Estimate only includes Pedestrian Improvements at the Turbolane approach.
5. Add \$12,000 to the Signalization Costs if intersection requires a Mast Arm relocation.

**ESTIMATE OF PROBABLE PROJECT COST**  
**TURBOLANE - TYPE C**  
**MIAMI-DADE, FLORIDA**  
**January 21, 2010**

Item No.	Item	Unit	Quantity	Unit Cost	Total Cost
<b>ROADWAY</b>					
0110- 1- 1	CLEARING & GRUBBING	AC	0.20	\$ 15,761.61	\$ 3,152
0160- 4	STABILIZATION TYPE B	SY	325	\$ 4.69	\$ 1,524
0285-709	BASE OPTIONAL (BASE GROUP 09)	SY	325	\$ 20.00	\$ 6,500
0327- 70- 1	MILLING EXIST ASPH PAVT (1" AVG DEPTH)	SY	3,065	\$ 4.34	\$ 13,302
0334- 1- 14	SUPERPAVE ASPHALTIC CONC (TRAFFIC D)	TN	36	\$ 120.00	\$ 4,320
0337- 7- 32	ASPH CONC FC, TRAFFIC C, FC-9.5, RUBBER	TN	171	\$ 106.52	\$ 18,215
0520- 1- 10	CURB & GUTTER CONC (TYPE F)	LF	592	\$ 32.23	\$ 19,080
0520- 5- 21	TRAF SEP CONC (TYPE II) (4' WIDE)	LF	293	\$ 44.55	\$ 13,053
0520- 70	TRAFFIC SEPARATOR CONCRETE(SPECIAL)	SY	68	\$ 78.58	\$ 5,343
0570- 1- 2	PERFORMANCE TURF (SOD)	SY	206	\$ 2.21	\$ 455
				<b>\$</b>	<b>84,944</b>
<b>SIGNING AND PAVING MARKING</b>					
0700- 20- 11	SIGN SINGLE POST (F&I) (LESS THAN 12 SF)	AS	2	\$ 286.87	\$ 574
0700- 20- 12	SIGN SINGLE POST (F&I) (12 - 20 SF)	AS	1	\$ 870.57	\$ 871
0705- 11- 3	DELINEATOR, FLEXIBLE HIGH VISIBILITY MEDIAN	EA	118	\$ 120.00	\$ 14,160
0706- 3	RETRO-REFLECTIVE PAVEMENT MARKERS	EA	104	\$ 5.00	\$ 520
0710- 11-111	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 6")	NM	0.298	\$ 1,105.44	\$ 329
0710- 11-122	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 8")	LF	361	\$ 0.71	\$ 256
0710- 11-123	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 12")	LF	416	\$ 0.87	\$ 362
0710- 11-124	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 18")	LF	0	\$ 1.92	\$ -
0710- 11-125	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 24")	LF	79	\$ 2.00	\$ 158
0710- 11-131	PAINTED PAVEMENT MARKINGS (STD, WHITE, SKIP, 6")	GM	0.125	\$ 466.90	\$ 58
0710- 11-170	PAINTED PAVEMENT MARKINGS (STD, WHITE, ARROWS)	EA	3	\$ 44.81	\$ 134
0710- 11-211	PAINTED PAVEMENT MARKINGS (STD, YELLOW, SOLID, 6")	NM	0.174	\$ 1,012.19	\$ 176
0710- 11-222	PAINTED PAVEMENT MARKINGS (STD, YELLOW, SOLID, 8")	LF	275	\$ 0.47	\$ 129
0710- 11-224	PAINTED PAVEMENT MARKINGS (STD, YELLOW, SOLID, 18")	LF	80	\$ 1.36	\$ 109
				<b>\$</b>	<b>17,836</b>
<b>SIGNALIZATION</b>					
0635- 1- 11	PULL & JUNCTION BOXES (F&I) (PULL BOX)	EA	1	\$ 628.12	\$ 628
0650- 51-311	SIGNAL TRAFFIC(F&I)(3 SECT 1 WAY)(STD)	AS	2	\$ 1,500.00	\$ 3,000
0650- 51-313	SIGNAL TRAF(F&I)(3 SECT 1 WY)(SPECIAL)	AS	1	\$ 2,000.00	\$ 2,000
0650- 51-513	SIGNAL TRAF(F&I)(5 SECT 1 WAY)(SPL)	AS	1	\$ 3,000.00	\$ 3,000
0660- 2-101	LOOP ASSEMBLY (F&I) (TYPE A)	AS	1	\$ 1,086.22	\$ 1,086
0671- 2- 42	TRAFFIC CONTROLLER(MOD)(TYPE 170)	EA	1	\$ 2,000.00	\$ 2,000
0690- 10	SIGNAL HEAD TRAFFIC ASSEMBLY REMOVAL	EA	2	\$ 450.00	\$ 900
				<b>\$</b>	<b>12,614</b>
				<b>\$</b>	<b>115,394</b>
<b>MOBILIZATION 10%</b>				\$	11,500
<b>MAINTENANCE OF TRAFFIC (MISC.) 10%</b>				\$	11,500
				\$	138,394
<b>CONTINGENCIES 20%</b>				\$	27,700
				<b>CONSTRUCTION TOTAL =</b>	<b>\$ 166,094</b>
<b>ESTIMATED CONSTRUCTION COST RANGE</b>					
<b>LOW = \$135,000 MIDDLE = \$170,000 HIGH = \$205,000</b>				<b>\$</b>	<b>170,000</b>

**Notes:**

1. The Cost Estimate does not include Landscape (tree relocation / removal), Drainage, Utilities Adjustments, ADA upgrades.
2. Most Unit Costs are based on Miami-Dade County Report "Cost Estimates for Conversion of Three-Leg Intersections to Turbolane Operations".
3. The Estimated Construction Cost Range does not include the Design and the C.E.I. costs.
4. The Cost Estimate only includes Pedestrian Improvements at the Turbolane approach.
5. Add \$12,000 to the Signalization Costs if intersection requires a Mast Arm relocation.



**ESTIMATE OF PROBABLE PROJECT COST  
TURBOLANE - TYPE D  
MIAMI-DADE, FLORIDA  
January 21, 2010**

Item No.	Item	Unit	Unit Cost
<b>ROADWAY</b>			
0110- 1- 1	CLEARING & GRUBBING	AC	\$ 15,761.61
0160- 4	STABILIZATION TYPE B	SY	\$ 4.69
0285-709	BASE OPTIONAL (BASE GROUP 09)	SY	\$ 20.00
0327- 70- 1	MILLING EXIST ASPH PAVT (1" AVG DEPTH)	SY	\$ 4.34
0334- 1- 14	SUPERPAVE ASPHALTIC CONC (TRAFFIC D)	TN	\$ 120.00
0337- 7- 32	ASPH CONC FC, TRAFFIC C, FC-9.5, RUBBER	TN	\$ 106.52
0520- 1- 10	CURB & GUTTER CONC (TYPE F)	LF	\$ 32.23
0520- 5- 21	TRAF SEP CONC (TYPE II) (4' WIDE)	LF	\$ 44.55
0520- 70	TRAFFIC SEPARATOR CONCRETE(SPECIAL)	SY	\$ 78.58
0570- 1- 2	PERFORMANCE TURF (SOD)	SY	\$ 2.21
<b>SIGNING AND PAVING MARKING</b>			
0700- 20- 11	SIGN SINGLE POST (F&I) (LESS THAN 12 SF)	AS	\$ 286.87
0700- 20- 12	SIGN SINGLE POST (F&I) (12 - 20 SF)	AS	\$ 870.57
0705- 11- 3	DELINEATOR, FLEXIBLE HIGH VISIBILITY MEDIAN	EA	\$ 120.00
0706- 3	RETRO-REFLECTIVE PAVEMENT MARKERS	EA	\$ 5.00
0710- 11-111	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 6")	NM	\$ 1,105.44
0710- 11-122	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 8")	LF	\$ 0.71
0710- 11-123	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 12")	LF	\$ 0.87
0710- 11-124	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 18")	LF	\$ 1.92
0710- 11-125	PAINTED PAVEMENT MARKINGS (STD, WHITE, SOLID, 24")	LF	\$ 2.00
0710- 11-131	PAINTED PAVEMENT MARKINGS (STD, WHITE, SKIP, 6")	GM	\$ 466.90
0710- 11-170	PAINTED PAVEMENT MARKINGS (STD, WHITE, ARROWS)	EA	\$ 44.81
0710- 11-211	PAINTED PAVEMENT MARKINGS (STD, YELLOW, SOLID, 6")	NM	\$ 1,012.19
0710- 11-222	PAINTED PAVEMENT MARKINGS (STD, YELLOW, SOLID, 8")	LF	\$ 0.47
0710- 11-224	PAINTED PAVEMENT MARKINGS (STD, YELLOW, SOLID, 18")	LF	\$ 1.36
<b>SIGNALIZATION</b>			
0635- 1- 11	PULL & JUNCTION BOXES (F&I) (PULL BOX)	EA	\$ 628.12
0650- 51-311	SIGNAL TRAFFIC(F&I)(3 SECT 1 WAY)(STD)	AS	\$ 1,500.00
0650- 51-313	SIGNAL TRAF(F&I)(3 SECT 1 WY)(SPECIAL)	AS	\$ 2,000.00
0650- 51-513	SIGNAL TRAF(F&I)(5 SECT 1 WAY)(SPL)	AS	\$ 3,000.00
0660- 2-101	LOOP ASSEMBLY (F&I) (TYPE A)	AS	\$ 1,086.22
0671- 2- 42	TRAFFIC CONTROLLER(MOD)(TYPE 170)	EA	\$ 2,000.00
0690- 10	SIGNAL HEAD TRAFFIC ASSEMBLY REMOVAL	EA	\$ 450.00

**MOBILIZATION 10%**  
**MAINTENANCE OF TRAFFIC (MISC.) 10%**

**CONTINGENCIES 20%**

**ESTIMATED CONSTRUCTION COST RANGE**

**LOW = \$95,000 MIDDLE = \$120,000 HIGH = \$145,000**

**Notes:**

1. The Cost Estimate does not include Landscape (tree relocation / removal), Drainage, Utilities Adjustments, ADA upgrades.
2. Most Unit Costs are based on Miami-Dade County Report "Cost Estimates for Conversion of Three-Leg Intersections to Turbolane Operations".
3. The Estimated Construction Cost Range does not include the Design and the C.E.I. costs.
4. The Cost Estimate only includes Pedestrian Improvements at the Turbolane approach.
5. Add \$12,000 to the Signalization Costs if intersection requires a Mast Arm relocation.

# **Appendix I**

## **Priorities**



**Turbo Lanes Study  
Priorities**

ID	MD ID	Location	MOE			Score				Priority
			Cap. Impr	Estim. Cost (x1000)	Implem. Issues	Cap. Impr	Estim. Cost	Implem. Issues	Total	
2	4624	NW 22 Ave at NW 139 St	26%	\$270	Few	2	1	2	5	L
3	5989	NW 22 Ave at NW 127 St	28%	\$227	No	3	2	3	8	H
4	4917	Douglas Rd at NW 159 St	26%	\$137	Few	2	3	2	7	H
6	4149	Ludlam Rd at W 74 St (+/-127 St)	15%	\$137	Few	1	3	2	6	M
8	3963	SW 85 St at SW 72 Ave	173%	\$170	Few	3	3	2	8	H
10	4390	Miami Lakes Dr at NW 60 Ave	10%	\$137	Few	1	3	2	6	M
11	5692	NW 25 St at 84 Ave	7%	\$137	Few	1	3	2	6	M
12	5584	NW 12 St at NW 84 Ave	15%	\$170	Few	1	3	2	6	M
13	4659	NW 12 St at NW 78 Ave	21%	\$197	Few	2	2	2	6	M
14	5031	NW 7 St at NW 53 Ave	8%	\$170	Few	1	3	2	6	M
16	5258	Fontainebleau Blvd at Park Blvd (+/-89 Av)	21%	\$197	Few	2	2	2	6	M
18	5034	SW 117 Ave at SW 128 St	15%	\$142	Few	1	3	2	6	M
19	5697	SW 117 Ave at SW 134 St	13%	\$142	Few	1	3	2	6	M
20	6027	SW 137 Ave at SW 180 St	29%	\$170	Some	3	3	1	7	H
21	4607	Ives Dairy Rd at NE 800 Blk	14%	\$197	No	1	2	3	6	M
22	4635	Ives Dairy Rd at NE 195 St Dr (+/-5 Av)	28%	\$197	Few	3	2	2	7	H
24	6737	SW 117 Ave at SW 136 St	20%	\$170	No	3	3	3	9	H
25	5730	NW 22 Ave at NW 111 St	30%	\$312	Few	3	1	2	6	M
27	5222	SW 117 Ave at SW 47 Ter	21%	\$142	Some	2	3	1	6	M
28	5217	SW 137 Ave at SW 160 St	29%	\$142	Some	3	3	1	7	H
29	2774	Pine Tree Dr at 47 St	18%	\$142	Few	2	3	2	7	H
30	4832	Coral Way at SW 11900 Blk	15%	\$270	No	1	1	3	5	L
42	5703	SW 127 Ave at SW 43 Dr	17%	\$102	Some	2	3	1	6	M
43	5416	SW 127 Ave at SW 62 St	26%	\$102	Few	2	3	2	7	H
47	5665	NW 87 Ave at NW 146 St	14%	\$170	Some	1	3	1	5	L

**Scoring Key**

Score	% Cap. Impr.		Est. Cost (x1000)		Issues	Priority	Score Range	
3	0	15	\$102	\$172	No	H	7	9
2	16	26	\$172	\$242	Few	M	6	6
1	27+		\$242	\$312	Some	L	5	5

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