VILLAGE OF KEY BISCAYNE

Office of the Village Manager

DT: January 24, 2011

TO: Honorable Mayor and Members of the Village Council

FR: John C. Gilbert, Village Manager

RE: Traffic Calming Master Plan

RECOMMENDATION

It is recommended that Village Council accept the Traffic Calming Master Plan and Policy Guidelines and schedule a date to further consider the recommendations.

BACKGROUND

In August 2011, the Village retained C3TS to review the remaining residential streets which have not had any traffic calming measures to determine which streets should be considered for future traffic calming. The Master Plan provides specific recommendations for the following streets (See pages 15-19):

1. Glenridge Road between Mashta Drive and W. Heather Drive.
2. Ridgewood Road between W. Mashta Drive and W. Heather Drive
3. W. Enid Drive between Harbor Drive and Ridgewood Road
4. Ocean Lane Drive east of Crandon Boulevard
5. Sunrise Drive east of Crandon Boulevard
6. Galen Drive east of Crandon Boulevard
7. McIntyre Street between Harbor Drive and Ridgewood Road
8. Seaview Drive east of Crandon Boulevard
9. Woodcrest Road between McIntyre Street and Harbor Drive

The preliminary cost estimate (See page 14) to complete all nine (9) projects is $1,010,000. The FY2012 Capital Improvements Plan (CIP) includes funding in the amount of $100,000. Should the Council approve a Master Plan, the Administration will request the Council to identify which streets are to receive traffic calming measures from the FY12 CIP funds. Based on the criteria, the chart on page 14 provides the recommended priority ranking.

The CIP for FY13-FY18 can identify which streets should receive traffic calming measures and funding levels. The Draft Master Plan provides criteria (See page 12) for the Council to use to prioritize these improvements.

In the past, the Council has received requests from residents asking for traffic calming measures on their streets. Presently, there are no established policies or guidelines on how to evaluate those requests. The Master Plan (Pages 21-29) provides a methodology on how to deal with those requests in addition to establishing baseline traffic levels (page 22) for a street to qualify for consideration for traffic calming measures.

VILLAGE OF KEY BISCAYNE

Traffic Calming Master Plan and Policy Guidelines

C3TS

January 2012

Village of Key Biscayne
88 West McIntyre Street
Key Biscayne, Florida 33149

Traffic Calming Master Plan and Policy Guidelines

Prepared by:

January 2012

PROFESSIONAL ENGINEER CERTIFICATE

I hereby certify that I am a registered professional engineer in the State of Florida practicing with C3TS, P.A., a corporation, authorized to operate as a an engineering business (EB 5022), FEID No. 65-0039493, by the State of Florida, Department of Professional Regulation, Board of Professional Engineers, and that I have reviewed or approved the evaluation, findings, opinions, conclusions, or technical advice hereby reported for:

Project: Village Of Key Biscayne
Traffic Calming Master Plan & Policy Guidelines

Project No: 01108-030

Location: Miami-Dade County, Florida

Client: Village of Key Biscayne

This Traffic Calming Master Plan Report and Policy Guidelines include a summary of data collection efforts, traffic calming analysis and recommendations to improve operations and safety within the project area. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering and planning as applied through professional judgment and experience.

Name: Godfrey Lamptey, P.E., PTOE

Signature: _____

P.E. Number: 68261

Date: _____

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1 | INTRODUCTION

1.1 Project Origin and Need

The Village of Key Biscayne, incorporated in 1991 is located on the island of Key Biscayne south of Miami Beach and east of Florida mainland. The village master plan adopted in September 1995 and amended through December 2008 identified the need for traffic calming/speed control on the roadway network within the village. To achieve this goal, the village has focused on streetscape and traffic calming improvements along its major arterials, collectors and residential streets such as Crandon Blvd., Harbor Drive, West Mashta Drive, Fernwood Road, Island Drive, East Enid Drive, Grapetree Drive and Heather Drive.

In August 2011, the Village of Key Biscayne retained Corzo Castella Carballo Thompson Salman, P.A. (C3TS) to review the remaining major residential streets within the village which have not had any sort of traffic calming measures installed on them and to determine which streets should be considered for future traffic calming. In addition, the village periodically receives public concerns regarding excessive vehicle speeding and cut-through traffic on residential streets. Currently, there is no established set of policy or guidelines regarding the approach to these public requests.

The purpose of this study was to perform a comprehensive analysis of the identified streets that do not have any traffic calming measures within the village and provides recommendations for various safety and traffic calming improvements without significant operational impacts to the roadway operations. The study will also prepare traffic calming policy guidelines that establishes a methodical approach to managing traffic calming requests from residents.

1.2 Study Location and Description

The study limits are located within the Village of Key Biscayne in Miami-Dade County. Nine residential streets were identified within the village roadway network for traffic calming considerations. These include:

1. Galen Drive (east of Crandon Boulevard)
2. Glenridge Road (between West Mashta Drive and West Heather Drive)
3. McIntyre Street (between Harbor Drive and Ridgewood Road)
4. Ocean Lane Drive (east of Crandon Boulevard)

5. Ridgewood Road (between West Mashta Drive and West Heather Drive)
6. Seaview Drive (east of Crandon Boulevard)
7. Sunrise Drive (east of Crandon Boulevard)
8. West Enid Drive (between Harbor Drive and Ridgewood Road)
9. Woodcrest Road (between McIntyre Street and Harbor Drive)

The locations of these residential streets included in this study are depicted in **Figure 1-1**

Figure 1-1 Project Location Map

1.3 Scope of Study

The scope of this study is to provide the Village of Key Biscayne with a traffic calming master plan for the identified roadway links. The tasks identified in the scope of services include, but are not limited to the following:

- Traffic data collection for the study links including volume, lane geometry and speed of vehicles
- Develop the existing Annual Daily Traffic (ADT) volumes and 85th percentile speed along the identified roadway segments
- Evaluate existing traffic operational conditions and perform level of service analysis for the roadway segments as per the Highway Capacity Manual
- Prioritize identified roadway links for traffic calming improvements
- Provide recommendations for traffic calming on the identified roadway links
- Develop traffic calming guidelines to handle requests from residents

2 | EXISTING CONDITIONS

A field review was done as part of the study to obtain information pertaining to roadway characteristics and features and also to observe the existing traffic conditions. The roadways in the study area generally follow a grid pattern on both the east and west sides of Crandon Boulevard. **Table 2-1** summarizes the existing roadway characteristics for the study roadway links.

Table 2-1
Existing Roadway Characteristics

#	Roadway	Limits	Approx. Length (mi)	Width (ft)	Divided/ Undivided	Posted Speed (mph)	Pedestrian Facility (Sidewalk)
1	Galen Drive	East of Crandon Boulevard	0.30	18	Undivided	20	Yes
2	Glenridge Road	Between West Mashta Drive and West Heather Drive	0.52	18	Undivided	20	No
3	McIntyre Street	Between Harbor Drive and Ridgewood Road	0.31	18	Undivided	20	Yes
4	Ocean Lane Drive	East of Crandon Boulevard	0.30	48	Divided (Raised)	20	Yes
5	Ridgewood Road	Between West Mashta Drive and West Heather Drive	0.52	Varies (18-24)	Undivided	None	No
6	Seaview Drive	East of Crandon Boulevard	0.35	24	Undivided	None	Yes
7	Sunrise Drive	East of Crandon Boulevard	0.32	18	Undivided	None	Yes
8	West Enid Drive	Between Harbor Drive and Ridgewood Road	0.31	18	Undivided	20	No
9	Woodcrest Road	Between McIntyre Street and West Heather Drive	0.20	18	Undivided	20	Yes

2.1 Posted Speed

Based on the field review, the majority of the roads have a posted speed of 20 mph, with the exception of Seaview Drive, Sunrise Drive and Ridgewood Road, which have no posted speed limit. Within the school zone surrounding the Key Biscayne Community School, the posted speed limit is 15 mph during the school days from 8:00 am to 9:00 am and from

1:30 pm to 3:30 pm, with the exception of Wednesday when it is from 1:30 pm to 2:30 pm only.

2.2 Typical Section

Most of the roadway links identified as part of this study are two-lane undivided residential streets (one lane in each direction) with an 18-ft pavement width. These include Galen Drive, McIntyre Street, Sunrise Drive, West Enid Drive and Woodcrest Drive.

Glenridge Road and Ridgewood Road are generally two-lane undivided residential streets, however, within the vicinity of the Key Biscayne Community School they operate as a single lane one-way road between West McIntyre Street and West Enid Drive in the northbound and southbound directions respectively. Parking is also allowed along these roadway links within this section.

Ocean Lane Drive is primarily a two-lane divided roadway (one lane in each direction) with raised median and exclusive lanes at the intersection with Crandon Blvd. The roadway width including the median varies from 48-ft to 52-ft.

Seaview Drive east of Crandon Boulevard is a two-lane undivided residential street (one lane in each direction) with a 24-ft pavement width.

2.3 Pedestrian Facilities

There are sidewalks present along some of the study roadway links. These links are Galen Drive, McIntyre Street, Ocean Lane Drive, Seaview Drive, Sunrise Drive and Woodcrest Drive. Glenridge Road, Ridgewood Road and West Enid Drive do not feature any sort of sidewalks along the sides of the roadways within the study limits. **Figure 2-1** shows the roadway links with pedestrian facilities within the Village of Key Biscayne.

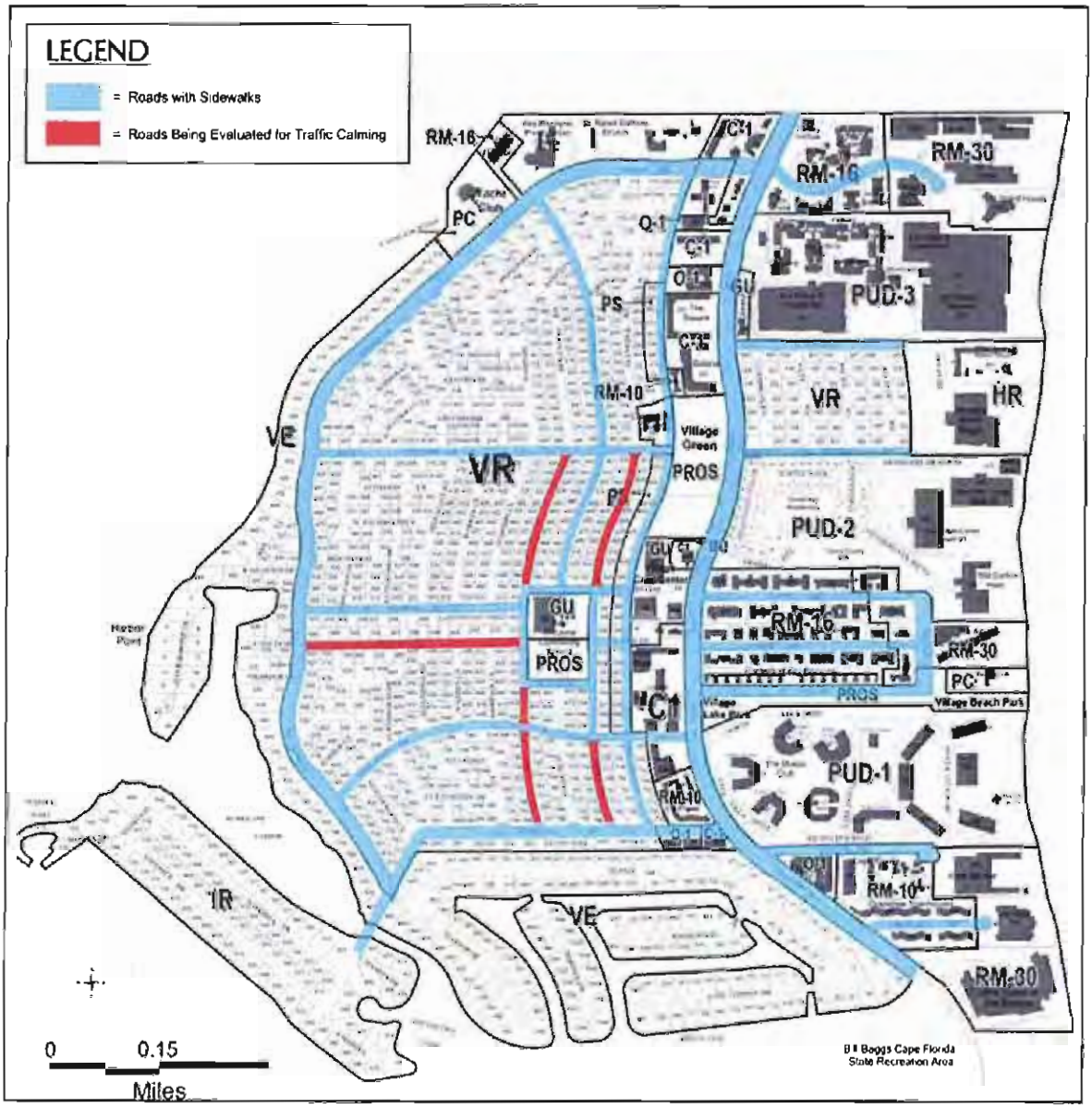


Figure 2-1 Existing Pedestrian Facilities

2.4 Existing Traffic Calming

Several traffic calming measures were observed along the major arterials, collectors and residential streets such as Crandon Blvd., Harbor Drive, West Mashta Drive, Fernwood Road, Island Drive, East Enid Drive, Grapetree Road and Heather Drive. **Figure 2-2** shows the roadways which have already been traffic calmed and the type of traffic calming features installed.

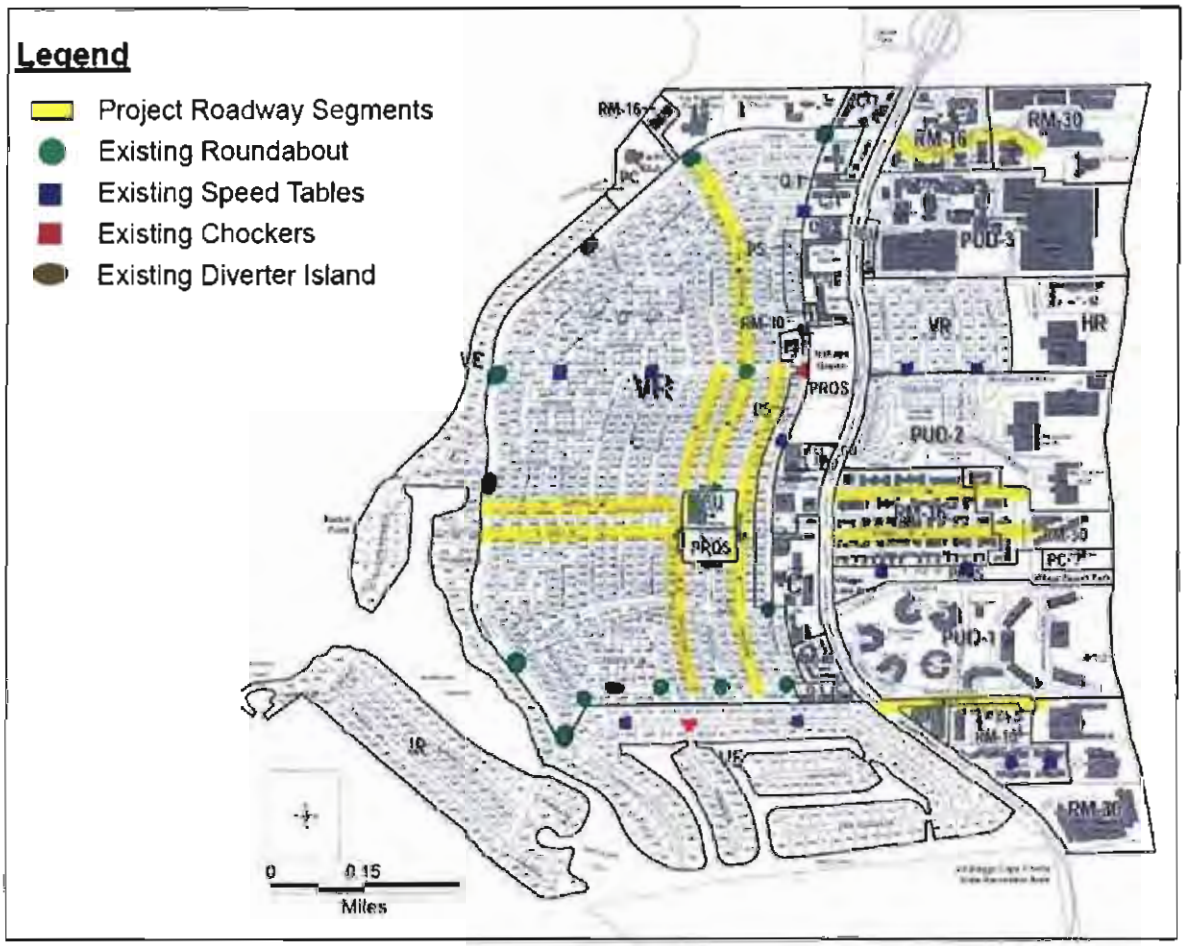


Figure 2-2 Existing Traffic Calming Locations and Types

3 | TRAFFIC CALMING ANALYSIS

The Institute of Transportation Engineers defines traffic calming as changes in street alignment, installation of barriers, and other physical measures to reduce traffic speeds and/or cut-through volumes, in the interest of street safety, livability, and other public purposes. Some of the key goals and objectives of traffic calming include

- Achieving slow speeds for motor vehicles
- Reducing collision frequency and severity
- Increasing the safety and the perception of safety for non-motorized users of the streets
- Reducing cut-through motor vehicle traffic
- Increasing the quality of life
- Incorporating the preferences and requirements of the people using the area
- Promoting pedestrian, cycle and transit use

Several factors are generally considered to determine if the installation of traffic calming measures on a roadway will achieve the intended goals and objectives. These include: Extent by which vehicle operating speeds (85th percentile speeds) exceed the posted speed limit, the Average daily traffic volumes, proximity to schools and pedestrian generators such as parks, presence of pedestrian facilities such as sidewalks and safety. The approach and methodology utilized in this study are outlined in the following sections.

3.1 Traffic Data Collection

A comprehensive traffic data collection was performed as part of this study. Based on the preliminary field observations, the following traffic count data was obtained at the key locations and critical time periods indicated:

48-hour bi-directional volume count performed on two consecutive weekdays. In addition, two-way speed survey was also performed on two consecutive weekdays. These counts were done at the following nine (9) locations:

1. Galen Drive (east of Crandon Boulevard)
2. Glenridge Road (between West Mashta Drive and West Heather Drive)
3. McIntyre Street (between Harbor Drive and Ridgewood Road)
4. Ocean Lane Drive (east of Crandon Boulevard)

5. Ridgewood Road (between West Mashta Drive and West Heather Drive)
6. Seaview Drive (east of Crandon Boulevard)
7. Sunrise Drive (east of Crandon Boulevard)
8. West Enid Drive (between Harbor Drive and Ridgewood Road)
9. Woodcrest Road (between McIntyre Street and Harbor Drive)

The traffic data collection was conducted during the week of 09/12/2011 to 09/18/2011 and the detailed traffic counts information is provided in **Appendix A.** The roadway geometric information was also collected during the traffic count data collection phase and complemented when necessary with aerial photographs of the study area.

3.2 Traffic Data Summary

The data collected from the traffic counts and speed surveys were summarized for each identified roadway link. **Table 3-1** presents a summary of the Average Daily Traffic (ADT) Volumes, vehicle operating speeds (85th Percentile Speed) and percentage of vehicles exceeding the posted speed limits along the identified roadway links. For the roadway links with no posted speed limits, the posted speed limits of the adjacent roadway links were assumed. **Figure 3-1** presents a summary of the percentage of total vehicles that are going 5 mph or more over the speed limits. Speed profiles of the roadway links are presented in **Appendix B**.

Table 3-1 Summary of Analysis								
#	Roadway	ADT (vpd)	Speed Limit (mph)	Average Speed (mph)	85th Percentile Speed (mph)	% Vehicles 5-10 mph over the Speed Limit	% Vehicles >=10mph over the Speed Limit	Total % Volume Exceeding 5 mph Above Speed Limit
1	Galen Drive	1631	20	23.69	28.99	22.97%	9.23%	32.20%
2	Glenridge Road	797	20	22.14	28.01	19.70%	5.21%	24.91%
3	McIntyre Street	677	20	19.84	24.97	11.97%	2.81%	14.78%
4	Ocean Lane Drive	3498	20	25.64	29.72	41.19%	12.12%	53.31%
5	Ridgewood Road	615	20	20.10	25.37	10.50%	3.34%	13.83%
6	Seaview Drive	1378	30	27.93	34.03	7.80%	1.78%	9.58%
7	Sunrise Drive	1178	20	25.02	31.36	31.15%	16.21%	47.37%
8	West Enid Drive	568	20	18.28	23.68	5.99%	1.59%	7.58%
9	Woodcrest Road	578	20	18.56	23.90	7.27%	1.47%	8.74%

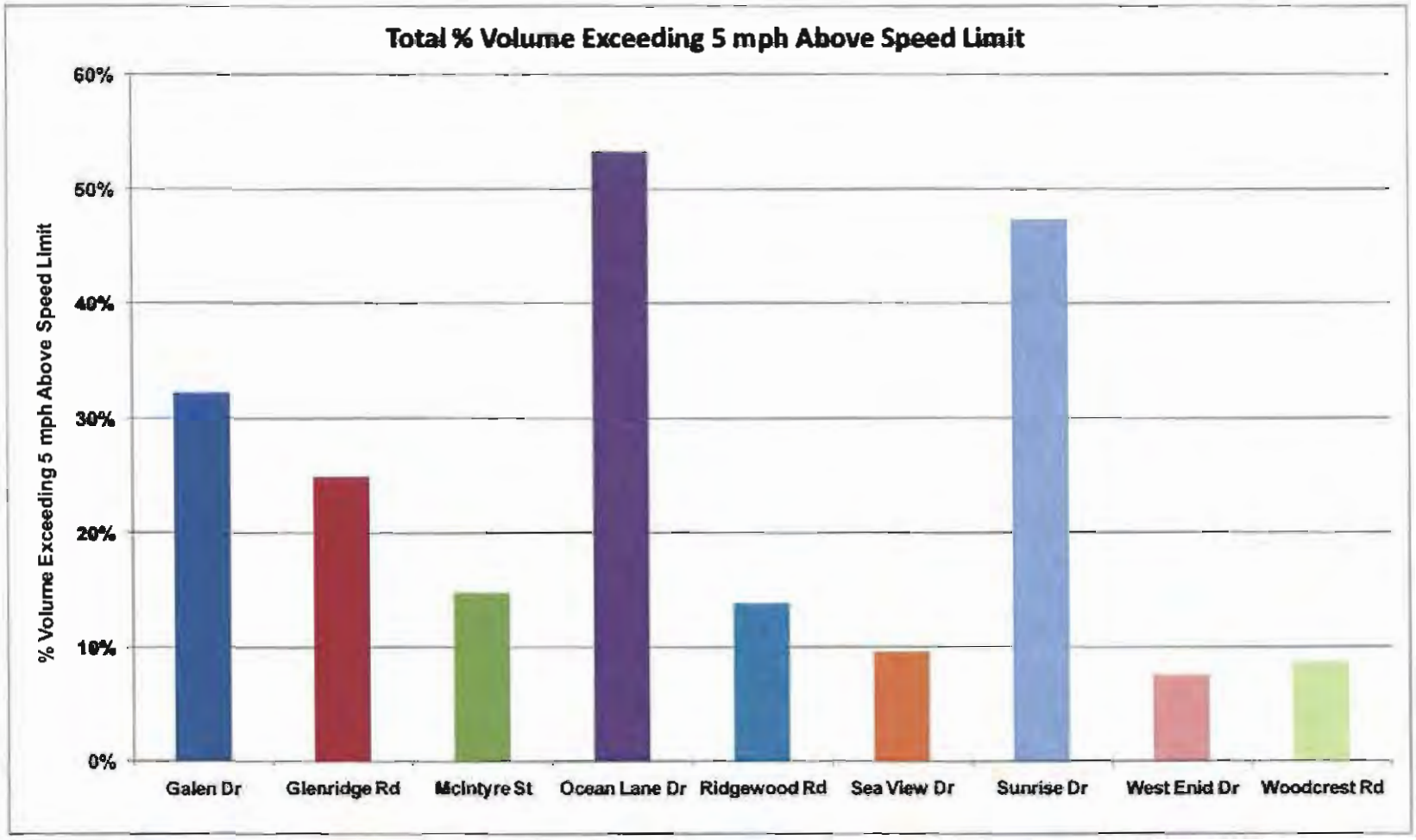


Figure 3-1 Speed Volume Summary of Different Roadway Links

From the above analysis it is observed that Ocean Lane Drive experiences the highest percentage of vehicles exceeding the speed limit by at least 5 mph or more, with over 53% of the vehicles exceeding the 20 mph posted speed limit. It is followed by Sunrise Drive (about 47% of the total vehicles) and Galen Drive (about 32%). The speed volume profile is not the key factor in determining the priority of the roadways for traffic calming. The following section discusses the prioritization process

3.3 Prioritization

The village typically has a constrained budget for funding of traffic calming projects, hence the need to prioritize these traffic calming projects to ensure efficient utilization of resources so that the streets with the greater problems are addressed first. The prioritization process also serves as a tool to provide an unbiased ranking of the identified roadways and to reduce political influences. For this study, the following four criteria were taken into consideration for each of the roadway links.

1. Percentage of vehicles going 5-10 mph over the Posted Limit
2. Percentage of vehicles going >=10 mph over the Posted Limit
3. Average Daily Traffic (ADT)
4. Presence of Pedestrian Facilities

The principal objective of traffic calming is to reduce speed on a given roadway section. Hence, the percentage of vehicles exceeding the speed limit is the primary criterion for traffic calming needs. For this study, this criterion was categorized as two separate criteria: percentage of vehicles travelling 5-10 mph or greater than 10 mph above the speed limit in order to independently account for moderate and excessive speeding. The average daily traffic volume criterion represents the exposure of other road users to vehicle traffic as well as the impact on mobility. The presence of pedestrian facilities such as sidewalks is a surrogate safety criterion that represents the likelihood of a potential conflict between vehicles and pedestrians. A value of 1 was assigned if a sidewalk is present and 0 otherwise.

The criteria described above usually have different dimensions (units). In order to combine the various criteria for the identified roadway links, each criterion has to be converted to a dimensionless unit. Several techniques have been proposed for decision making when multiple criteria with different dimensions are involved. For this study, the Impact Index Method (Transportation Decision Making – Principles of Project Evaluation and

Programming, Sinha & Labi, 2007) was used to estimate the combined effect of the various criteria for each identified roadway link. The Impact Index Method involves weighting and scaling or establishing a common unit of measurement so that all the criteria can be expressed in commensurable units to enable combination or comparison.

The first task in this approach is weighting of the different criteria to reflect the relative importance of the difference criteria. Based on a survey of traffic engineering professional, the following weights were assigned to the different criteria:

- Average Daily Traffic (ADT) 10%
- % of vehicles going 5-10 mph above speed limit 15%
- % of vehicles going >10 mph above speed limit 30%
- Pedestrian Facilities (Sidewalks) 45%

The next step is the scaling of the impacts. This involves converting each criterion from its original dimension to one that is uniform and commensurate across all the criteria. For each criterion, the scale factor is given by:

$$S_j = \frac{1}{Max(X_{1j}, X_{2j}, \ldots\ldots X_{Nj})}$$

Where

S_j = Scale factor for each criterion

X_{ij} = Measured impact of each criterion under each roadway link. For example, average daily traffic (in mph) for each roadway link

N = number of identified roadway links

The measured values for the various criteria were obtained from the traffic data and speed survey obtained from the traffic data collection effort.

After all the criteria have been weighted and scaled, the product of the weight (W_j), scale factor (S_j) and the measured impact (X_{ij}) for each criterion under each alternative is computed. This is a dimensionless value which is summed up for the various criteria to obtain the weighted score (T_i) for each identified roadway link and is expressed as:

$$T_i = \sum_{j=1}^{J} W_j \cdot S_j \cdot X_{ij}$$

The roadway link which had the highest weighted score has therefore the highest priority for traffic calming. **Table 3-2** summarizes the results of the prioritization analysis.

Table 3-2
Priority Ranking for Roadway Links

#	Roadway	Scaled Scores				Total Scaled Score	Weighted Score	Priority Ranking
		Volume	Speed (5-10 mph)	Speed (>10 mph)	Pedestrian Facility			
1	Galen Drive	0.47	0.56	0.57	-1.00	0.59	-0.15	6
2	**Glenridge Road**	0.23	0.48	0.32	0.00	1.03	0.19	**1**
3	McIntyre Street	0.19	0.29	0.17	-1.00	-0.34	-0.34	7
4	Ocean Lane Drive	1.00	1.00	0.75	-1.00	1.75	0.02	4
5	**Ridgewood Road**	0.18	0.25	0.21	0.00	0.64	0.12	**2**
6	Seaview Drive	0.39	0.19	0.11	-1.00	-0.31	-0.35	8
7	Sunrise Drive	0.34	0.76	1.00	-1.00	1.09	0.00	5
8	**West Enid Drive**	0.16	0.15	0.10	0.00	0.41	0.07	**3**
9	Woodcrest Road	0.17	0.18	0.09	-1.00	-0.57	-0.38	9

From the analysis results, the highest priority for traffic calming is Galen Drive (east of Crandon Boulevard), followed by Ridgewood Drive (between West Mashta Drive and West Heather Drive) and West Enid Drive (between Harbor Drive and Ridgewood Road).

4 | TRAFFIC CALMING RECOMMENDATIONS

The primary goal of this study is to identify traffic calming measures to reduce vehicular speeds and improve pedestrian safety. Various traffic calming measures were evaluated for each of the identified roadway links based on the following criteria

1. **Effect on speed reduction:** The different traffic calming measures have different effectiveness on their ability to reduce speed. For example, past studies indicate that speed tables would result in 18% reduction in the 85th percentile speed while traffic circles will result in 11% speed reduction (source: ITE Traffic Calming State-of-the-Practice). Hence, roadway links with higher operating speeds would benefit from traffic calming measures with higher speed control effectiveness.
2. **Effect on safety:** The Safety impacts of the various traffic calming measures differ from each other. For example, before-and-after studies performed at different sites indicates that speed tables would result in 45% reductions in collisions while traffic circles will result in 29% reduction in collisions (source: ITE Traffic Calming State-of-the-Practice). Consequently, traffic calming measures with higher safety effectiveness would benefit roadway links with no pedestrian facilities.
3. **Right of Way/Driveway Locations:** The availability of right of way is an important consideration for the type and location of traffic calming measures to be installed. In addition, the locations of access driveways were also considered in the selection of traffic calming measures for each identified roadway link.

Based on the above evaluations, the following recommendations are made for the study roadway links in order of their priority rankings.

4.1 Glenridge Road between West Mashta Drive and West Heather Drive

The 85th percentile speed on this roadway link is 28 mph which is approximately 40% higher than the 20 mph posted speed. Approximately 25% of the vehicles on this roadway travel at least 5 mph or more above the speed limit. In addition, a section of this roadway is adjacent to the Key Biscayne Community School and there are no sidewalks along the roadway. The combination of these factors ranks this roadway king as the number one priority for traffic calming. Recommended traffic calming measures include:

1. Construct an intersection bulb-out along the south leg of Glenridge Road at the intersection with McIntyre Street by utilizing the striped and excess pavement in the southeast and southwest corners of the intersection.
2. Construct two speed tables along Glenridge Road between West Mashta Drive and Woodcrest Road and between McIntyre Street and West Heather Drive to reduce vehicle speeds as they approach the school zone.

4.2 Ridgewood Road between West Mashta Drive and West Heather Drive

The 85th percentile speed on this roadway link is 25.4 mph which is approximately 27% higher than the 20 mph posted speed. Approximately 14% of the vehicles on this roadway travel at least 5 mph or more above the speed limit. Although speeding may not be a significant issue for this roadway, the complete absence of pedestrian facilities given its proximity to the Key Biscayne Community School ranks it as the number 2 priority for traffic calming measures due to the potential for conflicts with pedestrians and school children. Recommended traffic calming measures include:

1. Construct an intersection bulb-out along the south leg of Ridgewood Road at the intersection with McIntyre Street by utilizing the striped pavement in the southeast and southwest corners of the intersection.
2. Construct two speed tables along Ridgewood Road between West Mashta Drive and Woodcrest Road and between McIntyre Street and West Heather Drive to reduce vehicle speeds as they approach the school zone.

4.3 West Enid Drive between Harbor Drive and Ridgewood Road

The 85th percentile speed on this roadway link is 23.7 mph which is approximately 18% higher than the 20 mph posted speed. Approximately 8% of the vehicles on this roadway travel at least 5 mph or more above the speed limit. Similar to Ridgewood Road, speeding may not be a significant issue for this roadway. However, the complete absence of pedestrian facilities given its proximity to the Key Biscayne Community School ranks it as a number 3 priority for traffic calming measures due to the potential for conflicts with pedestrians and school children.

The recommended traffic calming measure is to construct two speed tables along West Enid Drive between Hampton Lane and Warren Lane and between Satinwood Drive and Curtiswood Drive to reduce vehicle speeds as they approach the school zone

4.4 Ocean Lane Drive east of Crandon Boulevard

The 85th percentile speed on this roadway link is 29.7 mph which is approximately 49% higher than the 20 mph posted speed. Approximately 53% of the vehicles on this roadway travel at least 5 mph or more above the speed limit. Although pedestrian sidewalks are provided along both sides of the road, the excessive speed, curved roadway geometry, flush shoulders and high traffic volume increases pedestrian exposure to traffic conflicts. In addition, the roadway is only marked as a four-lane roadway within the first 100-ft east of Crandon Blvd. This leaves the remainder of the roadway as a divided two-lane road with wide 16-18-ft pavement making it conducive for high speeds and ranks as number 4 on the priority list.

The recommended traffic calming measure is to reduce the existing lane widths to provide a two-lane divided roadway with 12-ft lanes and exclusive turn lane at intersections and major access driveways along the entire roadway. This involves lane narrowing with striping, parallel parking and landscaping and should be incorporated as part of an overall street enhancement project for this roadway link. The improvement will also increase the separation between the sidewalk and travel lanes, thereby enhancing livability.

4.5 Sunrise Drive east of Crandon Boulevard

This roadway link has a priority ranking of 5 among the nine (9) roadways. The 85th percentile speed on this roadway link is 31.4 mph which is approximately 57% higher than the 20 mph posted speed. Approximately 47% of the vehicles on this roadway travel at least 5 mph or more above the speed limit. Although pedestrian sidewalks are provided along both sides of the road, the straight alignment encourages speeding along the roadway link.

The recommended traffic calming measure is to construct two speed tables similar to those installed at Grapetree Drive and East Enid Drive. Additional advance signage for the stop condition at the Ocean Drive intersection should also be provided.

4.6 Galen Drive east of Crandon Boulevard

The 85th percentile speed on this roadway link is 29 mph which is approximately 45% higher than the 20 mph posted speed. Approximately 32% of the vehicles on this roadway travel at least 5 mph or more above the speed limit. The roadway provides access to several residential condos with pedestrian sidewalks along both sides of the road. The straight alignment with a 90 degree turn along Ocean Drive encourages speeding along the roadway link with potential safety concern at the 90 degree turn.

The recommended traffic calming measure is to construct two speed tables similar to those installed at Grapetree Drive and East Enid Drive. The advance signage for the 90 degree turn at Ocean Drive should also be upgraded to improve visibility.

4.7 McIntyre Street between Harbor Drive and Ridgewood Road

The 85th percentile speed on this roadway link is 25 mph which is approximately 25% higher than the 20 mph posted speed. Approximately 15% of the vehicles on this roadway travel at least 5 mph or more above the speed limit. This roadway provides access to the Key Biscayne Community School with pedestrian sidewalk on the north side only. Similar to West Enid Drive, speeding may not be a significant issue for this roadway. However, the presence of a school zone would require traffic calming measures.

The recommended traffic calming measure along McIntyre Street is to construct two speed tables between Hampton Lane and Warren Lane and between Satinwood Drive and Sabal Palm Drive to reduce vehicle speeds as they approach the school zone.

4.8 Seaview Drive east of Crandon Boulevard

The 85th percentile speed on this roadway link is 34 mph which is approximately 13% higher than the 30 mph posted speed. Approximately 10% of the vehicles on this roadway travel at least 5 mph or more above the speed limit. The roadway primarily provides access to residential condos at the end of the road. There are relatively few driveway access points along this corridor with pedestrian sidewalks on both sides of the road. Although excessive speeding was not observed, the relatively wider travel lanes and straight alignment also make it conducive for speeding.

The recommended traffic calming measure along Seaview Drive is to construct two speed tables similar to those installed at Grapetree Drive and East Enid Drive. Advance signage for the traffic circle at the end of the roadway should also be provided.

4.9 Woodcrest Road between McIntyre Street and Harbor Drive

The 85th percentile speed on this roadway link is 24 mph which is approximately 19% higher than the 20 mph posted speed. Approximately 9% of the vehicles on this roadway travel at least 5 mph or more above the speed limit. This roadway provides access to the Key Biscayne Community School with pedestrian sidewalk on the west side only. Similar to McIntyre Street, speeding may not be a significant issue for this roadway. However, the presence of a school zone would require traffic calming measures.

The recommended traffic calming measure along Woodcrest Road is to construct two speed tables between McIntyre Street and Heather Drive and between Heather Drive Woodcrest Lane to reduce vehicle speeds as they approach the school zone.

5 | PRELIMINARY COST ESTIMATES

Preliminary cost estimates for the various traffic calming measures along the identified roadway links are shown in **Table 5-1.** These preliminary cost estimates are based on the construction cost for similar traffic calming measures installed within various municipalities in the South Florida region.

Table 5-1
Preliminary Construction Cost Estimate

#	Roadway	Traffic Calming Measure	Unit Cost	Quantity	Improvement Cost	Roadway Link Total Cost
1	Glenridge Road	Intersection bulb-outs	$50,000	1	$50,000	$120,000
		Speed Tables	$35,000	2	$70,000	
2	Ridgewood Road	Intersection bulb-outs	$50,000	1	$50,000	$120,000
		Speed Tables	$35,000	2	$70,000	
3	West Enid Drive	Speed Tables	$35,000	2	$70,000	$70,000
4	Ocean Lane Drive	Street Enhancement (inc. lane narrowing, striping, parallel parking, landscaping)	$350,000	1	$350,000	$350,000
5	Sunrise Drive	Speed Tables	$35,000	2	$70,000	$70,000
6	Galen Drive	Speed Tables	$35,000	2	$70,000	$70,000
7	McIntyre Street	Speed Tables	$35,000	2	$70,000	$70,000
8	Seaview Drive	Speed Tables	$35,000	2	$70,000	$70,000
9	Woodcrest Road	Speed Tables	$35,000	2	$70,000	$70,000
Total Preliminary Construction Cost Estimate						**$1,010,000.00**

Funding for the proposed improvements must be approved by the Village Council prior to the commencement of the design and construction phases.

6 | TRAFFIC CALMING POLICY AND GUIDELINES

The Village of Key Biscayne receives numerous requests, complaints and suggestions from residents about traffic speeding and safety along the residential streets. Although police enforcement can be used to deter speeding, the use of police resource is usually temporary and typically not efficient for low volume residential streets. Consequently, there is a need for more permanent measures to reduce the speed of vehicles and discourage cut-through traffic on low volume residential streets. The Traffic Calming Policy and Guidelines provides a process for identifying and addressing problems related to speeding, excessive volumes, and safety on neighborhood streets and provide a procedure to consider, evaluate, and implement requests for traffic calming measures within the residential streets in the Village of Key Biscayne.

6.1 Policy Guidelines

6.1.1 Objectives

The objective of the Traffic Calming Policy and Guidelines is to work with residents to implement measures that affect driver behavior in such a way that reduces vehicles speeds and cut-through traffic. The overall objectives include

- Maintain and/or improve neighborhood livability by mitigating the impact of vehicular traffic on residential neighborhoods.
- Promote safe and attractive streets that maintain and/or improve the quality of life for residents, pedestrians and bicyclists.
- Encourage citizen involvement in all phases of neighborhood traffic calming activities.
- Make efficient use of Village resources by prioritizing traffic calming requests based on fair and impartial methodologies.

The Traffic Calming Policy and Guidelines is not designed to address high crash locations, mitigate noise from major arterials, redesign the overall transportation/street classification system or effect a modal shift.

6.1.2 Eligibility

This set of guidelines only applies to two-lane neighborhood streets (one lane in each direction) directly under the Village of Key Biscayne's control and does not apply to roads

under the state or county jurisdiction. It is necessary to provide some minimum criteria that must be met in order for a residential street to qualify for traffic calming measures. The minimum criteria were established based on the character, functionality, speed and volume of the residential roadway network within the Village as follows:

- Must have traffic volumes ranging from 400 to 5,000 vehicles per day
- Must have a posted speed limit of 30 mph or less
- Must be at least 800 feet in length

These minimum criteria ensure that the Village's resources are used efficiently to provide the best bang for the buck.

6.1.3 Public Involvement

Involvement of the community is key to a successful residential traffic calming program. Public input is critical to develop a consensus of the issues that adversely affect the neighborhood, evaluate the pros and cons of the various traffic calming measures and ensure that the issues are adequately addressed. To keep the community involved in their requests and foster a sense of ownership of the outcome, the Village of Key Biscayne staff will work with residents and groups in defining the problem, data collection and in the decision-making process. Notices of Public meetings regarding location, time and agenda should be mailed to residents at least 21 days prior to the meeting. In addition, the meeting notice should be placed on the Village Website.

6.1.4 Emergency Response

The Village of Key Biscayne recognizes that the use of physical traffic calming devices may have a negative impact on response time for emergency services, especially if there are multiple devices along the primary fire response routes. In order to ensure that adequate emergency response is provided to the public, the design and construction of all traffic calming devices must be approved by the Village Fire Department. The potential delay on emergency response time resulting from the proposed traffic calming devices should be estimated based on vehicle-delay calculations from published research (see **Appendix E)** or actual field measurements. If the potential delays are found to be unacceptable, based on the performance measures established by the Fire Rescue Department, less restrictive traffic calming devices should be considered.

6.2 Traffic Calming Process

This section describes the traffic calming process, regulations, and requirements for the Village of Key Biscayne Traffic Calming Policy. **Figure 6-1** provides a brief overview of the 12-Step traffic calming process.

Figure 6-1 12-Step Traffic Calming Process

6.2.1 Step 1 – Traffic Calming Request and Eligibility

The traffic calming process starts with an initial request from a resident to the Village Public Works Department concerning traffic problems in their neighborhood. This concern can be made through a phone call, letter/e-mail or personal contact. Each request will be documented in a Traffic Calming Request Form (See **Appendix D**) together with the details of the concerns such as specific problem locations, time of day that the problem occurs most frequently, possible causes or contributing factors.

The Public Works department will then determine if the street of concern is applicable for consideration by the Traffic Calming Guidelines. To be eligible for the program, the street must meet the eligibility criteria outlined in Section 6.1.2.

If the street of concern does not meet these basic eligibility requirements, the Village will work with the residents to identify other solutions such as educational brochures and flyers alerting drivers of their neighborhood speeding concerns.

6.2.2 Step 2 – Consensus from Neighborhood Residents

After the Village receives a traffic concern and determines it is eligible for traffic calming, the Village staff will request a petition from a representative number of residents in the neighborhood to verify that there is a widespread concern for the speeding or traffic issue (See **Appendix D**). The petition must include signatures from at least 50% of the households on the street segment where the traffic concerns have been identified to ensure that there is a consensus among the residents regarding the need for traffic calming.

6.2.3 Step 3 – Traffic Data collection

When it is determined that a majority of the residents perceive the traffic problem, the Village will collect traffic data to confirm the existence and magnitude of the traffic concern. The traffic data may include vehicle speeds, volumes, crash history, and pedestrian and bicycle activity. The results of the traffic data collection and initial investigation will be compared against the minimum thresholds required for a residential street to be considered for traffic calming as shown in **Table 6-1.** At least one or more of the four thresholds should be met to proceed with traffic calming measures.

Table 6-1 Traffic Calming Thresholds			
#	Traffic Criteria	Minimum Threshold	
		Outside School Zone	Within School Zone
1	85th Percentile Speed	Greater than 5 mph over the posted speed limit	Greater than 3 mph over the posted speed limit
2	Significant Speeding	10% of traffic at or greater than 10 mph over the posted speed	6% of traffic at or greater than 10 mph over the posted speed
3	Average Daily Traffic	Exceeds 400 vpd on residential streets or 1,000 vpd residential collectors	
4	Crashes	Street averages more than 2 crashes per year over a three year time period	

6.2.4 Step 4 – Public Workshop #1

The results of the traffic data collection, initial investigation and analysis will be presented to the residents at a Public Workshop to be organized by the Village. During the workshop, the Village Staff will discuss the traffic calming process, eligibility and minimum threshold requirements.

If the results of the data collection and initial analysis indicate that the street of concern should be considered for traffic calming, the residents together with the Village Staff will initially identify possible solutions that do not involve the use of physical controls or impediments on the roadway system discussed in Step 5.

If the results of the data collection and initial analysis conclude that the criteria for traffic calming have not been met, the concern cannot be brought back to the Village for three years unless something significantly changes existing conditions along the street of concern.

6.2.5 Step 5 – Low Cost Traffic Management Solutions

It is desirable to address traffic problems with the least restrictive measures possible and move to more costly geometric solutions only after other measures have proven ineffective. Therefore, the Village will implement fairly low cost, undisruptive initial traffic management solutions before proceeding into more formative calming measures. These solutions emphasize education and enforcement based measures and treatments such as:

- **Radar Speed Trailer Deployment** — This is a temporary device that is primarily used to educate motorists regarding the fact that they may be significantly exceeding the posted speed limit.
- **Traffic Enforcement Actions** — The Village may request Traffic Enforcement Police Officers to increase patrol on a random basis during the hours when the majority of the speeding violations occur. The intent is to modify behavior to result in a safer situation for all drivers and neighbors.
- **Traffic Signage and Pavement Markers** — An inventory and review of all traffic signage and pavement markings in the area. If necessary, the Village will install additional signage and/or pavement striping to increase driver awareness of speed limits.

6.2.6 Step 6 – Effectiveness of Low Cost Traffic Management Solutions

The Village will evaluate the effectiveness of the initial traffic management solutions three to six months after implementation to determine if the solutions were successful. Traffic data such as speed and/or volume will be collected at this point and analyzed to determine if the perceived problem has been successfully mitigated.

If the measure was successful, and the minimum thresholds identified **Table 6-1** have not been exceeded then the traffic calming process will end at this point. However, if the location continues to exceed the minimum thresholds for speed and/or volume, then a formal traffic calming study will be conducted.

6.2.7 Step 7 - Traffic Calming Study

The Village will conduct a formal Traffic Calming Study when the low cost traffic management solutions do not achieve the desired results. Additional traffic data collection may be required for the detailed analysis in order to identify possible solutions to the traffic problem. These solutions typically involve physical modifications of the street intended to control traffic speeds and/or volumes.

The Traffic Calming Study will also include a brief description and location of the different types of traffic calming measures to be used accompanied by photographs or drawings. Estimates of the construction costs for the traffic calming devices will also be provided. Potential traffic calming solutions including their advantages and disadvantages are included

in **Appendix E**. Diverted traffic must also be considered when evaluating traffic calming measures to ensure that the problem is not merely shifted from one location to another.

In addition, coordination with the Village of Key Biscayne Fire Rescue Department is required during the study. The potential delay on emergency response time resulting from the proposed traffic calming devices should be estimated based on vehicle-delay calculations from published research or actual field measurements to ensure that emergency response times or access are not significantly impacted.

6.2.8 Step 8 – Public Workshop #2

The Village will hold a Public Workshop after completion of the study to present the recommendations of the traffic calming study and to obtain input from the residents on the traffic calming recommendations. The workshop will be held in an open house format. There will be a short presentation followed by a question and answer session. Conceptual sketches of the type and location of traffic calming devices recommended will be on display for review.

It is important that the majority (at least 60%) of the fronting residences within 500' of each proposed device indicate their support for the device in order to receive approval for funding from the City Council. A petition showing support for the recommended traffic calming devices should be obtained prior to Council Approval.

6.2.9 Step 9 – Village Council Approval

Any comments, suggestions or recommendations received from the residents at Workshop #2 will be taken into consideration together with all the engineering analysis. A final decision will then be made on the appropriate Traffic Calming solution for the street of concern. The recommendation will be brought to the Village Council for final approval and funding allocation for the next phases.

6.2.10 Step 10 - Prepare Final Design Plans

When the funding for the traffic calming measure has been approved by the Village, final construction documents will be prepared, reviewed and approved for future construction by the Fire Rescue Department and the Public Works Department.

6.2.11 Step 11 - Project Construction

A contractor will typically be selected through a competitive bidding process to construct the project. The Village will coordinate with the contractor to establish a construction schedule and maintenance of traffic plan for the proposed improvement. The construction schedule and maintenance of traffic plan will be provided to the residents to notify them of upcoming construction at least one month prior to the beginning of construction activities. This is to ensure that Residents are aware of the construction impacts such as noise, dust, potential traffic rerouting to minimize frustrations.

6.2.12 Step 10 – Post-Construction Monitoring and Evaluation

Post construction monitoring and evaluation will be performed by the village Staff typically 90 to 120 days after construction is completed. This is essential to evaluate the measures of effectiveness and to learn more about how individual traffic calming devices affected driver behavior. This information obtained will be used to determine whether the desired outcomes have been achieved, and to what degree, and also to define the appropriate use of specific devices in future traffic calming programs.

7 | REFERENCES

1. US traffic Calming manual - American Planning Association, 2009
2. Transportation Decision Making Principles of Project Evaluation and Programming – Labi S., Sinha K.C., 2007
3. Traffic Calming: State of the Practice – Institute of Transportation Engineers/Federal Highway Administration, 1999
4. State of the Art: Residential Traffic Management, Federal Highway Administration, 1980
5. Canadian Guide to Neighborhood Traffic Calming, Canadian Institute of Transportation Engineers, 1998
6. The Influence of Traffic Calming on Emergency Response Times, Institute of Transportation Engineers ITE Journal, August 1997

APPENDIX A

(Traffic Counts and Speed Survey Counts)

Florida Department of Transportation

September 20, 2011

County	Station
87	0122

Site Description: GALEN DRV EAST OF CRANDON BLVD

Start Date	Start Time
September 13, 2011	00:00

Roadway ID: 87000000

	Direction: E					Direction:W					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	7	1	3	1	12	4	2	1	0	7	19
01:00	2	1	1	1	5	0	1	1	1	3	8
02:00	2	0	1	0	3	0	0	0	0	0	3
03:00	0	1	1	0	2	0	0	0	0	0	2
04:00	0	0	3	0	3	0	2	1	0	3	6
05:00	0	0	0	0	0	0	2	1	1	4	4
06:00	2	1	4	4	11	0	4	3	6	13	24
07:00	8	5	3	6	22	19	12	11	18	60	82
08:00	7	6	13	9	35	25	19	23	12	79	114
09:00	14	8	11	2	35	21	8	12	10	51	86
10:00	10	8	12	11	41	9	6	7	13	35	76
11:00	7	10	11	11	39	7	12	12	5	36	75
12:00	10	10	9	15	44	4	14	7	10	35	79
13:00	16	13	3	17	49	10	11	9	15	45	94
14:00	20	10	13	15	58	11	13	8	10	42	100
15:00	11	22	25	22	80	15	13	8	7	43	123
16:00	12	12	12	12	48	21	9	15	13	58	106
17:00	25	25	20	23	93	7	9	8	20	44	137
18:00	24	29	20	17	90	9	8	13	13	43	133
19:00	21	12	22	16	71	13	7	7	10	37	108
20:00	21	20	14	8	63	5	4	5	5	19	82
21:00	15	9	12	10	46	4	6	6	1	17	63
22:00	12	20	9	5	46	4	6	1	2	13	59
23:00	7	3	6	3	19	3	1	1	0	5	24
			24 Hour Total		915			24 Hour Total		692	1607

Peak Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	08:30	44	07:45	85	07:45	117
P.M.	17:30	96	16:00	58	17:45	146
Daily	17:30	96	07:45	85	17:45	146

Florida Department of Transportation

September 20, 2011

County	Station
87	0122

Site Description: GALEN DRV EAST OF CRANDON BLVD

Start Date	Start Time
September 14, 2011	00:00

Roadway ID: 87000000

	Direction: E					Direction: W					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	4	4	2	2	12	0	1	0	2	3	15
01:00	0	3	2	0	5	0	1	0	0	1	6
02:00	1	0	0	2	3	0	0	2	0	2	5
03:00	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	1	1	0	0	0	0	0	1
05:00	0	0	2	3	5	1	0	3	8	12	17
06:00	3	0	5	1	9	1	3	9	11	24	33
07:00	11	4	1	6	22	12	12	10	20	54	76
08:00	12	9	12	6	39	20	20	23	12	75	114
09:00	5	5	11	5	26	18	6	13	17	54	80
10:00	9	9	9	14	41	8	11	12	10	41	82
11:00	11	7	9	9	36	12	9	7	13	41	77
12:00	14	13	16	13	56	8	3	17	11	39	95
13:00	13	7	12	13	45	7	14	14	12	47	92
14:00	15	14	17	17	63	13	12	7	12	44	107
15:00	22	15	18	19	74	10	13	9	19	51	125
16:00	15	18	19	16	68	16	17	13	14	60	128
17:00	21	20	12	23	76	4	12	9	12	37	113
18:00	14	21	22	15	72	10	7	8	16	41	113
19:00	23	21	15	15	74	15	17	8	9	49	123
20:00	18	9	26	16	69	8	5	4	9	26	95
21:00	18	8	11	16	53	8	6	5	4	23	76
22:00	3	9	12	9	33	4	6	4	3	17	50
23:00	9	8	3	3	23	3	3	2	0	8	31
			24 Hour Total		905			24 Hour Total		749	1654

Peak Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	11:45	52	07:45	83	07:45	122
P.M.	18:15	81	15:45	65	18:30	137
Daily	18:15	81	07:45	83	18:30	137

Florida Department of Transportation

September 20, 2011

County	Station
87	0128

Start Date	Start Time
September 13, 2011	00:00

Site Description: GLENRIDGE RD BTWN WEST MASHTA DRV & WEST HEATHER V

Roadway ID: 87000000

Time	Direction: N					Direction:S					Combined Total
	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	
00:00	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0
02:00	0	1	0	0	1	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	1	1	1
04:00	0	0	0	0	0	0	0	0	3	3	3
05:00	1	1	3	1	6	0	1	1	5	7	13
06:00	5	2	3	5	15	5	0	1	4	10	25
07:00	9	19	14	3	45	12	20	10	4	46	91
08:00	6	5	10	9	30	2	6	2	2	12	42
09:00	5	6	9	6	26	6	10	6	3	25	51
10:00	5	7	9	7	28	3	3	4	0	10	38
11:00	6	8	4	9	27	4	4	4	3	15	42
12:00	7	6	5	13	31	0	3	4	6	13	44
13:00	7	6	7	8	28	5	7	13	11	36	64
14:00	11	20	8	11	50	14	7	2	1	24	74
15:00	10	13	25	5	53	3	5	3	8	19	72
16:00	9	5	9	12	35	4	4	3	6	17	52
17:00	12	4	2	7	25	8	5	5	6	24	49
18:00	15	6	8	4	33	7	2	5	5	19	52
19:00	8	5	2	4	19	3	2	2	0	7	26
20:00	2	1	2	0	5	2	1	4	1	8	13
21:00	4	1	1	1	7	0	1	0	1	2	9
22:00	0	1	2	1	4	0	0	0	0	0	4
23:00	1	0	0	0	1	0	0	0	0	0	1
			24 Hour Total		469			24 Hour Total		298	767

Peak Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	06:45	47	06:45	46	06:45	93
P.M.	14:45	59	13:15	45	13:30	91
Daily	14:45	59	06:45	46	06:45	93

Florida Department of Transportation

September 20, 2011

County	Station
87	0128

Site Description: GLENRIDGE RD BTWN WEST MASHTA DRV & WEST HEATHER V

Start Date	Start Time
September 14, 2011	00:00

Roadway ID: 87000000

	Direction: N					Direction: S					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	2	2	2
05:00	0	2	1	3	6	1	1	1	2	5	11
06:00	2	2	8	5	17	9	0	1	5	15	32
07:00	6	29	15	2	52	7	17	17	3	44	96
08:00	4	4	3	7	18	1	1	6	5	13	31
09:00	7	5	8	8	28	3	2	3	3	11	39
10:00	9	4	1	9	23	4	6	2	4	16	39
11:00	13	5	5	7	30	1	2	2	2	7	37
12:00	8	6	5	8	27	3	3	9	8	23	50
13:00	28	4	8	8	48	11	8	9	2	30	78
14:00	19	10	12	10	51	1	5	2	4	12	63
15:00	14	9	9	14	46	9	4	13	9	35	81
16:00	12	7	11	11	41	7	8	8	8	31	72
17:00	15	12	11	5	43	4	8	6	7	25	68
18:00	13	9	6	6	34	3	5	6	8	22	56
19:00	8	5	4	7	24	3	4	4	0	11	35
20:00	2	5	3	2	12	1	2	1	1	5	17
21:00	0	3	0	2	5	1	1	3	2	7	12
22:00	2	2	1	1	6	0	0	0	0	0	6
23:00	0	2	0	0	2	0	0	0	0	0	2
			24 Hour Total		513			24 Hour Total		314	827

Peak Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	06:45	55	06:45	46	06:45	101
P.M.	14:00	51	15:30	37	12:45	84
Daily	06:45	55	06:45	46	06:45	101

Florida Department of Transportation

September 20, 2011

County	Station
87	0125

Site Description: MCINTYRE ST BTWN HARBOR DRV & RIDGEWOOD RD

Start Date	Start Time
September 13, 2011	00:00

Roadway ID: 87000000

	Direction: E					Direction:W					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	0	0	0	0	0	0	1	0	0	1	1
01:00	0	0	0	0	0	1	0	0	0	1	1
02:00	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	1	2	3	1	1	1	0	3	6
06:00	0	0	4	4	8	0	1	0	5	6	14
07:00	3	3	7	4	17	4	1	0	1	6	23
08:00	6	13	5	5	29	11	24	7	4	46	75
09:00	2	6	3	2	13	3	2	5	4	14	27
10:00	4	5	5	8	22	7	4	8	4	23	45
11:00	6	5	4	6	21	2	1	4	6	13	34
12:00	6	2	4	7	19	3	4	4	3	14	33
13:00	8	5	2	9	24	3	3	9	3	18	42
14:00	1	8	2	10	21	5	2	7	9	23	44
15:00	7	7	4	9	27	24	10	4	4	42	69
16:00	8	3	6	8	25	2	7	3	8	20	45
17:00	8	3	13	9	33	2	9	9	7	27	60
18:00	3	6	5	2	16	8	11	8	10	37	53
19:00	7	3	4	2	16	6	6	4	7	23	39
20:00	5	2	1	1	9	4	5	2	0	11	20
21:00	1	0	2	1	4	4	5	5	1	15	19
22:00	0	2	0	1	3	2	2	0	1	5	8
23:00	0	1	0	1	2	0	0	0	0	0	2
			24 Hour Total		312			24 Hour Total		348	660

Peak Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	07:30	30	08:00	46	08:00	75
P.M.	17:00	33	14:30	50	14:30	76
Daily	17:00	33	14:30	50	14:30	76

Florida Department of Transportation

September 20, 2011

County	Station
87	0125

Site Description: MCINTYRE ST BTWN HARBOR DRV & RIDGEWOOD RD

Start Date	Start Time
September 14, 2011	00:00

Roadway ID: 87000000

	Direction: E					Direction:W					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	0	0	0	0	0	0	0	0	1	1	1
01:00	0	0	1	0	1	0	0	0	0	0	1
02:00	0	0	0	0	0	0	0	0	1	1	1
03:00	0	0	0	1	1	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0
06:00	1	0	4	4	9	1	0	0	6	7	16
07:00	6	2	2	7	17	4	1	1	3	9	26
08:00	11	18	3	2	34	9	15	9	5	38	72
09:00	8	6	3	3	20	7	9	0	1	17	37
10:00	3	3	2	7	15	8	2	0	5	15	30
11:00	5	1	9	4	19	4	4	2	6	16	35
12:00	2	6	1	5	14	7	6	4	6	23	37
13:00	3	8	11	12	34	4	6	6	20	36	70
14:00	9	3	6	2	20	14	4	3	5	26	46
15:00	4	6	7	7	24	9	5	7	10	31	55
16:00	8	7	3	7	25	7	7	8	6	28	53
17:00	3	7	4	6	20	10	3	4	5	22	42
18:00	7	3	5	5	20	10	6	7	11	34	54
19:00	3	4	9	4	20	8	4	8	11	31	51
20:00	4	4	3	3	14	7	5	2	5	19	33
21:00	2	3	1	0	6	2	4	3	1	10	16
22:00	1	0	0	1	2	2	1	1	3	7	9
23:00	0	0	0	0	0	2	3	1	1	7	7
			24 Hour Total		315			24 Hour Total		378	693

Peak Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	07:45	39	08:00	38	07:45	75
P.M.	13:15	40	13:15	46	13:15	86
Daily	13:15	40	13:15	46	13:15	86

Florida Department of Transportation

September 20, 2011

County	Station
87	0121

Site Description: OCEAN LANE BLVD EAST OF CRANDON BLVD

Start Date	Start Time
September 14, 2011	00:00

Roadway ID: 87000000

	Direction: E					Direction:W					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	2	3	4	4	13	2	2	0	1	5	18
01:00	1	0	2	0	3	0	0	0	0	0	3
02:00	3	0	0	0	3	3	0	0	2	5	8
03:00	0	0	0	0	0	0	1	0	1	2	2
04:00	0	0	1	0	1	0	1	0	3	4	5
05:00	2	1	4	3	10	0	1	3	3	7	17
06:00	3	1	9	10	23	6	8	19	16	49	72
07:00	14	12	20	21	67	30	26	35	42	133	200
08:00	20	31	27	24	102	53	57	47	36	193	295
09:00	22	22	17	17	78	38	31	35	27	131	209
10:00	24	14	23	25	86	35	34	33	28	130	216
11:00	18	25	29	17	89	20	26	25	29	100	189
12:00	27	18	20	19	84	30	26	23	28	107	191
13:00	25	19	30	39	113	27	26	29	31	113	226
14:00	38	31	25	34	128	29	28	27	34	118	246
15:00	32	34	26	26	118	32	34	33	41	140	258
16:00	31	17	34	28	110	32	33	25	33	123	233
17:00	38	25	31	30	124	25	28	20	27	100	224
18:00	42	51	40	42	175	16	32	24	24	96	271
19:00	30	33	42	24	129	16	25	17	16	74	203
20:00	27	19	21	25	92	12	21	8	7	48	140
21:00	16	16	17	12	61	7	3	5	5	20	81
22:00	15	21	16	16	68	15	6	8	8	37	105
23:00	10	9	3	6	28	9	2	5	3	19	47
			24 Hour Total		1705			24 Hour Total		1754	3459

Peak Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	08:15	104	07:45	199	07:45	298
P.M.	18:00	175	15:00	140	18:00	271
Daily	18:00	175	07:45	199	07:45	298

Florida Department of Transportation

September 20, 2011

County	Station
87	0121

Site Description: OCEAN LANE BLVD EAST OF CRANDON BLVD

Start Date	Start Time
September 15, 2011	00:00

Roadway ID: 87000000

	Direction: E					Direction: W					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	9	4	3	4	20	6	5	2	1	14	34
01:00	3	3	4	1	11	1	1	1	0	3	14
02:00	2	0	0	1	3	1	0	0	0	1	4
03:00	1	2	0	0	3	2	1	1	0	4	7
04:00	0	1	0	1	2	0	0	1	2	3	5
05:00	0	1	1	3	5	2	0	1	5	8	13
06:00	1	3	9	12	25	5	3	10	24	42	67
07:00	10	11	15	16	52	25	30	30	43	128	180
08:00	20	32	30	25	107	62	53	60	41	216	323
09:00	22	26	15	23	86	36	28	29	28	121	207
10:00	26	29	19	19	93	35	24	25	24	108	201
11:00	14	28	22	34	98	18	36	32	27	113	211
12:00	29	19	35	22	105	27	30	29	18	104	209
13:00	24	24	21	31	100	31	29	37	40	137	237
14:00	40	21	22	34	117	30	22	33	35	120	237
15:00	34	53	31	24	142	32	32	44	27	135	277
16:00	31	33	30	31	125	32	21	26	30	109	234
17:00	33	35	23	32	123	20	29	25	22	96	219
18:00	40	35	38	41	154	28	24	18	24	94	248
19:00	45	36	27	31	139	26	27	12	18	83	222
20:00	31	20	23	19	93	15	9	13	15	52	145
21:00	20	13	17	27	77	7	10	7	15	39	116
22:00	13	16	11	14	54	9	6	3	6	24	78
23:00	9	6	7	7	29	6	8	3	2	19	48
			24 Hour Total		1763			24 Hour Total		1773	3536

Peak Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	11:45	117	07:45	216	08:00	323
P.M.	18:30	160	14:45	143	14:45	295
Daily	18:30	160	07:45	218	08:00	323

Florida Department of Transportation

September 20, 2011

County	Station
87	0127

Site Description: RIDGEWOOD RD BTWN WEST MASHTA DRV & WEST HEATHER V

Start Date	Start Time
September 13, 2011	00:00

Roadway ID: 87000000

	Direction: N					Direction: S					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	0	0	0	0	0	1	0	0	0	1	1
01:00	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	1	0	1	1
06:00	0	0	1	4	5	0	0	1	2	3	8
07:00	4	5	2	6	17	4	2	1	9	16	33
08:00	21	46	13	7	87	39	16	4	1	60	147
09:00	2	4	5	5	16	3	2	2	5	12	28
10:00	7	5	2	2	16	1	0	2	0	3	19
11:00	2	3	7	4	16	2	1	4	3	10	26
12:00	7	2	8	4	19	3	3	2	6	14	33
13:00	4	7	5	13	29	3	2	5	6	16	45
14:00	8	6	2	8	24	2	4	7	8	21	45
15:00	24	9	1	5	39	5	4	2	7	18	57
16:00	3	5	5	3	16	5	0	4	3	12	28
17:00	9	7	3	4	23	5	2	4	4	15	38
18:00	5	4	1	6	16	2	2	2	4	10	26
19:00	5	4	3	4	16	2	1	1	2	6	22
20:00	3	4	1	1	9	1	1	0	0	2	11
21:00	0	2	1	0	3	2	0	1	1	4	7
22:00	1	1	1	0	3	5	1	0	0	6	9
23:00	0	0	0	0	0	1	0	0	0	1	1
			24 Hour Total		354			24 Hour Total		231	585

Peak Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	08:00	87	07:45	68	07:45	154
P.M.	14:30	43	14:15	24	14:30	67
Daily	08:00	87	07:45	68	07:45	154

Florida Department of Transportation

September 20, 2011

County	Station
87	0127

Site Description: RIDGEWOOD RD BTWN WEST MASHTA DRV & WEST HEATHER V

Start Date	Start Time
September 14, 2011	00:00

Roadway ID: 87000000

	Direction: N					Direction:S					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	1	0	1	0	0	0	0	0	1
02:00	0	0	0	0	0	1	0	0	0	1	1
03:00	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0
06:00	0	0	1	3	4	1	0	1	2	4	8
07:00	4	4	7	6	21	1	0	5	5	11	32
08:00	21	42	20	6	89	27	20	3	10	60	149
09:00	5	5	4	6	20	4	2	1	4	11	31
10:00	4	6	7	4	21	3	1	0	5	9	30
11:00	3	6	7	4	20	2	2	2	2	8	28
12:00	4	3	7	7	21	4	2	0	1	7	28
13:00	4	5	3	21	33	5	5	3	9	22	55
14:00	28	4	9	7	48	4	1	4	6	15	63
15:00	5	3	3	7	18	4	2	1	3	10	28
16:00	6	5	5	6	22	5	2	3	6	16	38
17:00	7	4	4	7	22	4	2	4	9	19	41
18:00	4	6	9	6	25	1	4	3	3	11	36
19:00	10	5	5	5	25	4	3	5	0	12	37
20:00	2	2	3	0	7	3	1	1	2	7	14
21:00	4	3	2	1	10	0	1	0	4	5	15
22:00	0	0	2	0	2	0	0	2	0	2	4
23:00	0	1	1	1	3	0	2	0	0	2	5
			24 Hour Total		412			24 Hour Total		232	644

Peak Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	07:45	89	08:00	60	08:00	149
P.M.	13:45	62	13:00	22	13:45	80
Daily	07:45	89	08:00	60	08:00	149

Florida Department of Transportation

September 20, 2011

County	Station
87	0124

Site Description: SEA VIEW DRV EAST OF CRANDON BLVD

Start Date	Start Time
September 13, 2011	00:00

Roadway ID: 87000000

	Direction: E					Direction:W					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	1	0	2	0	3	0	0	1	0	1	4
01:00	0	1	1	0	2	0	0	1	0	1	3
02:00	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	1	1	0	0	0	1	1	2
04:00	0	1	0	0	1	0	0	0	0	0	1
05:00	0	0	0	2	2	0	0	1	2	3	5
06:00	0	2	1	8	11	2	4	4	3	13	24
07:00	7	3	7	10	27	12	12	13	14	51	78
08:00	6	15	8	12	41	20	15	19	20	74	115
09:00	11	7	4	7	29	14	11	14	6	45	74
10:00	9	11	6	10	36	9	8	15	12	44	80
11:00	12	7	9	10	38	11	9	10	11	41	79
12:00	8	11	12	11	42	14	10	7	9	40	82
13:00	12	19	8	9	48	11	8	14	11	44	92
14:00	8	14	6	14	42	10	16	9	12	47	89
15:00	17	18	13	13	61	15	16	10	20	61	122
16:00	12	16	7	11	46	23	12	10	15	60	106
17:00	11	18	11	14	54	8	13	13	8	42	96
18:00	21	17	12	11	61	13	7	9	8	37	98
19:00	17	10	20	8	55	8	7	14	3	32	87
20:00	8	8	14	3	33	3	3	5	2	13	46
21:00	10	9	4	7	30	7	3	5	6	21	51
22:00	3	8	5	5	21	1	0	0	1	2	23
23:00	3	4	3	2	12	7	2	2	0	11	23
			24 Hour Total		696			24 Hour Total		684	1380

Peak Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	08:15	46	08:00	74	08:00	115
P.M.	17:15	64	15:15	69	15:15	125
Daily	17:15	64	08:00	74	15:15	125

Florida Department of Transportation

September 20, 2011

County	Station
87	0124

Site Description: SEA VIEW DRV EAST OF CRANDON BLVD

Start Date	Start Time
September 14, 2011	00:00

Roadway ID: 87000000

	Direction: E					Direction:W					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	2	0	0	0	2	0	0	0	0	0	2
01:00	2	0	1	0	3	1	2	0	0	3	6
02:00	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0
04:00	0	1	0	0	1	0	1	0	1	2	3
05:00	0	1	0	2	3	1	0	0	0	1	4
06:00	0	3	4	7	14	3	6	7	8	24	38
07:00	6	3	7	6	22	14	11	11	18	54	76
08:00	4	9	12	14	39	15	15	14	16	60	99
09:00	11	12	7	7	37	19	9	13	10	51	88
10:00	9	8	7	14	38	14	15	4	9	42	80
11:00	14	9	9	9	41	12	23	14	12	61	102
12:00	6	8	9	14	37	6	11	9	10	36	73
13:00	9	2	11	13	35	9	13	11	18	51	86
14:00	17	16	15	8	56	14	17	10	12	53	109
15:00	13	12	14	10	49	20	10	17	10	57	106
16:00	13	6	6	11	36	10	13	3	14	40	76
17:00	17	16	13	12	58	7	6	14	13	40	98
18:00	23	24	13	14	74	10	10	10	10	40	114
19:00	8	13	10	14	45	6	4	10	6	26	71
20:00	9	11	11	12	43	5	10	4	7	26	69
21:00	10	10	5	2	27	6	7	4	1	18	45
22:00	3	2	4	4	13	0	0	0	0	0	13
23:00	4	2	4	3	13	1	0	3	1	5	18
			24 Hour Total		686			24 Hour Total		690	1376

Peak Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	08:30	49	08:15	64	08:15	110
P.M.	18:00	74	13:30	60	13:45	120
Daily	18:00	74	08:15	64	13:45	120

Florida Department of Transportation

September 20, 2011

County	Station
87	0123

Site Description: SUNRISE DRV EAST OF CRANDON BLVD

Start Date	Start Time
September 13, 2011	00:00

Roadway ID: 87000000

Time	Direction: E					Direction:W					Combined Total
	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	
00:00	2	0	2	1	5	0	2	0	1	3	8
01:00	0	0	1	0	1	0	0	1	0	1	2
02:00	0	0	0	0	0	1	0	0	0	1	1
03:00	0	0	0	0	0	0	0	0	0	0	0
04:00	0	1	1	0	2	0	0	2	1	3	5
05:00	1	1	0	0	2	0	2	1	1	4	6
06:00	0	1	1	5	7	2	3	10	9	24	31
07:00	1	5	4	14	24	8	10	12	19	49	73
08:00	6	12	12	7	37	31	23	13	14	81	118
09:00	6	8	5	6	25	12	12	13	8	45	70
10:00	6	3	4	7	20	11	10	10	13	44	64
11:00	6	6	6	11	29	12	3	11	11	37	66
12:00	15	6	8	8	37	6	10	11	10	37	74
13:00	4	9	4	14	31	6	6	11	10	33	64
14:00	9	10	4	15	38	7	12	5	9	33	71
15:00	8	16	8	13	45	7	12	7	10	36	81
16:00	13	13	8	17	51	14	8	11	8	41	92
17:00	16	10	9	11	46	12	4	12	7	35	81
18:00	13	7	10	8	38	6	6	7	6	25	63
19:00	15	13	7	14	49	5	5	8	9	27	76
20:00	5	4	5	2	16	7	6	2	3	18	34
21:00	7	7	4	9	27	2	2	3	0	7	34
22:00	5	5	5	2	17	1	3	2	3	9	26
23:00	1	0	3	1	5	1	0	2	1	4	9
			24 Hour Total		552			24 Hour Total		597	1149

Peak Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	07:45	44	07:45	86	07:45	130
P.M.	16:15	54	15:15	43	15:15	93
Daily	16:15	54	07:45	86	07:45	130

Florida Department of Transportation

September 20, 2011

County	Station
87	0123

Site Description: SUNRISE DRV EAST OF CRANDON BLVD

Start Date	Start Time
September 14, 2011	00:00

Roadway ID: 87000000

	Direction: E					Direction: W					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	2	1	0	0	3	1	0	0	1	2	5
01:00	0	1	1	0	2	0	1	1	0	2	4
02:00	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	2	2	0	1	2	1	4	6
06:00	1	2	4	2	9	3	3	5	9	20	29
07:00	3	4	8	12	27	8	8	13	23	52	79
08:00	11	10	12	5	38	23	35	17	10	85	123
09:00	13	4	6	7	30	14	13	10	10	47	77
10:00	8	9	7	5	29	16	5	8	12	41	70
11:00	5	8	5	6	24	7	11	11	5	34	58
12:00	4	8	2	8	22	9	6	9	7	31	53
13:00	10	9	8	13	40	4	10	9	8	31	71
14:00	9	3	7	10	29	10	12	8	6	36	65
15:00	3	10	7	13	33	8	10	7	7	32	65
16:00	14	11	9	11	45	13	10	4	11	38	83
17:00	9	12	6	17	44	14	5	2	9	30	74
18:00	17	20	17	18	72	14	5	8	3	30	102
19:00	15	13	11	7	46	8	9	8	9	34	80
20:00	12	7	9	9	37	8	6	3	7	24	61
21:00	4	13	11	6	34	4	8	4	11	27	61
22:00	5	5	5	6	21	3	0	1	3	7	28
23:00	3	1	1	5	10	1	0	1	1	3	13
			24 Hour Total		597			24 Hour Total		610	1207

Peak Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	07:45	45	07:45	98	07:45	143
P.M.	18:00	72	13:30	39	17:45	107
Daily	18:00	72	07:45	98	07:45	143

Florida Department of Transportation

September 20, 2011

County	Station
87	0126

Site Description: WEST ENID DRV BTWN HARBOR DRV & RIDGEWOOD RD

Start Date	Start Time
September 13, 2011	00:00

Roadway ID: 87000000

	Direction: E					Direction:W					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	1	0	0	0	1	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0
02:00	1	0	0	0	1	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	1	0	0	1	2	2
06:00	0	2	1	5	8	0	0	2	3	5	13
07:00	2	3	2	4	11	4	3	1	4	12	23
08:00	10	15	15	4	44	6	8	4	3	21	65
09:00	3	5	3	4	15	5	4	6	2	17	32
10:00	3	3	3	4	13	4	4	5	5	18	31
11:00	6	2	4	2	14	2	2	7	3	14	28
12:00	4	4	6	11	25	3	4	4	10	21	46
13:00	2	5	4	8	19	4	2	1	3	10	29
14:00	2	2	5	8	17	4	1	7	7	19	36
15:00	14	6	3	2	25	14	11	6	8	39	64
16:00	7	5	4	5	21	5	3	6	4	18	39
17:00	2	7	5	6	20	7	3	4	4	18	38
18:00	5	4	4	5	18	7	7	3	5	22	40
19:00	1	2	4	3	10	3	2	1	5	11	21
20:00	3	5	2	0	10	4	0	0	2	6	16
21:00	1	1	1	0	3	0	0	1	0	1	4
22:00	0	1	0	2	3	0	0	0	0	0	3
23:00	0	1	0	0	1	0	0	0	0	0	1
			24 Hour Total		279			24 Hour Total		254	533

Peak Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	07:45	44	07:45	22	07:45	66
P.M.	14:30	33	14:30	39	14:30	72
Daily	07:45	44	14:30	39	14:30	72

Florida Department of Transportation

September 20, 2011

County	Station
87	0126

Site Description: WEST ENID DRV BTWN HARBOR DRV & RIDGEWOOD RD

Start Date	Start Time
September 14, 2011	00:00

Roadway ID: 87000000

	Direction: E					Direction: W					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	0	1	0	1	2	0	0	0	0	0	2
01:00	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	1	0	0	1	1
03:00	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	1	1	0	1	0	0	1	2
06:00	1	0	1	4	6	1	1	1	2	5	11
07:00	1	3	1	3	8	5	3	0	2	10	18
08:00	11	22	6	8	47	3	13	8	7	31	78
09:00	6	1	2	4	13	4	4	6	4	18	31
10:00	0	3	3	8	14	2	1	4	1	8	22
11:00	1	6	10	5	22	2	8	2	0	12	34
12:00	4	2	2	3	11	6	4	0	3	13	24
13:00	5	4	5	13	27	3	3	6	11	23	50
14:00	9	2	4	7	22	13	5	6	6	30	52
15:00	7	9	7	5	28	9	9	5	5	28	56
16:00	5	4	5	4	18	3	14	8	3	28	46
17:00	4	3	8	4	19	4	4	4	4	16	35
18:00	6	8	14	4	32	6	4	5	2	17	49
19:00	7	7	5	2	21	6	5	6	3	20	41
20:00	3	3	5	3	14	4	3	3	2	12	26
21:00	1	1	1	1	4	2	1	1	0	4	8
22:00	3	3	0	1	7	0	1	2	0	3	10
23:00	4	0	0	0	4	1	0	1	0	2	6
			24 Hour Total		320			24 Hour Total		282	602

Peak Information

	Direction: E		Direction: W		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	08:00	47	08:15	32	08:00	78
P.M.	18:15	33	13:30	35	13:15	64
Daily	08:00	47	13:30	35	08:00	78

Florida Department of Transportation

September 20, 2011

County	Station
87	0129

Site Description: WOODCREST RD BTWN MCINTYRE ST & HARBOR DRV

Start Date	Start Time
September 13, 2011	00:00

Roadway ID: 87000000

	Direction: N					Direction: S					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	0	0	0	1	1	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	1	1	0	0	0	2	2	3
06:00	0	0	3	4	7	0	0	0	2	2	9
07:00	4	5	9	19	37	2	6	6	6	20	57
08:00	35	14	8	7	64	26	32	5	2	65	129
09:00	5	6	2	4	17	1	2	5	1	9	26
10:00	5	4	1	7	17	3	1	1	1	6	23
11:00	4	6	1	4	15	3	3	3	1	10	25
12:00	3	5	5	1	14	2	5	3	4	14	28
13:00	0	3	12	11	26	1	1	3	11	16	42
14:00	9	3	5	10	27	5	5	4	2	16	43
15:00	10	3	3	7	23	17	8	2	4	31	54
16:00	4	4	2	1	11	5	3	3	1	12	23
17:00	7	4	1	6	18	3	3	4	4	14	32
18:00	5	8	3	4	20	1	2	1	2	6	26
19:00	2	2	2	3	9	0	2	4	0	6	15
20:00	5	3	2	2	12	2	4	1	1	8	20
21:00	3	2	1	0	6	1	0	0	0	1	7
22:00	2	0	0	0	2	0	0	0	2	2	4
23:00	0	0	1	2	3	0	0	0	1	1	4
			24 Hour Total		330			24 Hour Total		241	571

Peak Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	07:30	77	07:30	70	07:30	147
P.M.	13:15	35	14:30	31	13:30	59
Daily	07:30	77	07:30	70	07:30	147

Florida Department of Transportation

September 20, 2011

County	Station
87	0129

Site Description: WOODCREST RD BTWN MCINTYRE ST & HARBOR DRV

Start Date	Start Time
September 14, 2011	00:00

Roadway ID: 87000000

	Direction: N					Direction:S					Combined
Time	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	1st ¼	2nd ¼	3rd ¼	4th ¼	Total	Total
00:00	0	0	1	0	1	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0
06:00	1	3	0	4	8	1	1	1	2	5	13
07:00	2	9	9	23	43	2	0	7	4	13	56
08:00	34	15	18	3	70	23	34	8	3	68	138
09:00	4	2	8	7	21	0	2	4	5	11	32
10:00	3	4	2	8	17	1	1	4	0	6	23
11:00	1	7	3	2	13	4	2	0	1	7	20
12:00	2	3	5	5	15	0	1	0	3	4	19
13:00	3	6	4	16	29	2	1	3	12	18	47
14:00	5	5	4	6	20	17	8	4	7	36	56
15:00	3	5	4	5	17	3	3	1	6	13	30
16:00	0	1	7	5	13	9	2	1	4	16	29
17:00	7	9	8	6	30	1	4	2	5	12	42
18:00	4	6	5	7	22	2	2	1	0	5	27
19:00	3	6	3	2	14	1	2	1	2	6	20
20:00	2	1	3	0	6	0	0	0	0	0	6
21:00	2	2	4	1	9	1	0	0	1	2	11
22:00	2	1	1	1	5	1	1	2	1	5	10
23:00	0	3	1	1	5	0	0	0	0	0	5
				24 Hour Total	358				24 Hour Total	227	585

Peak Information

	Direction: N		Direction: S		Combined Directions	
	Hour	Volume	Hour	Volume	Hour	Volume
A.M.	07:45	90	07:45	69	07:45	159
P.M.	13:15	31	13:45	41	13:45	71
Daily	07:45	90	07:45	69	07:45	159

Sta: 870122321100 Id: 000057000147 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Tue - Sep 13, 2011 at 00:00 End: Tue - Sep 13, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: GALEN DRV EAST OF CRANDON BLVD File: D0913011.PRN
Ln1-East Ln2-West

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	4	19	78	274	670	388	139	31	1	0	0	0	1	1	1	1607
Percentages	0.25	1.18	4.85	17.05	41.69	24.14	8.65	1.93	0.06	0.00	0.00	0.00	0.06	0.06	0.06	

Lane	1	2	Total
Grand Totals	915	692	1607
Percentages	56.94	43.06	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
1607	23.92	18.04	23.56	29.31	3	0.2	3	0.2	2	0.1

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	1	0	7	10	75	11	9	1	0	0	0	0	0	0	0	114
Percentages	25.00	0.00	8.97	3.65	11.19	2.84	6.47	3.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.09
Pm Hour 17-18	0	2	4	32	73	16	9	1	0	0	0	0	0	0	0	137
Percentages	0.00	10.53	5.13	11.68	10.90	4.12	6.47	3.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.53

F.R. ALEMAN & ASSOC.

09-19-2011 Volume by Speed by Lane Report - D0914011.PRN 15:30 Pg 11

Sta: 870122321100 Id: 000057000147 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Wed - Sep 14, 2011 at 00:00 End: Wed - Sep 14, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: GALEN DRV EAST OF CRANDON BLVD File: D0914011.PRN
Ln1-East Ln2-West

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	1	11	74	325	755	361	102	19	3	2	0	0	0	0	1	1654
Percentages	0.06	0.67	4.47	19.65	45.65	21.83	6.17	1.15	0.18	0.12	0.00	0.00	0.00	0.00	0.06	

Lane	1	2	Total
Grand Totals	905	749	1654
Percentages	54.72	45.28	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
1654	23.46	18.00	23.20	28.66	1	0.1	1	0.1	1	0.1

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	0	1	6	21	56	21	5	3	1	0	0	0	0	0	0	114
Percentages	0.00	9.09	8.11	6.46	7.42	5.82	4.90	15.79	33.33	0.00	0.00	0.00	0.00	0.00	0.00	6.89
Pm Hour 16-17	0	0	5	21	84	13	3	2	0	0	0	0	0	0	0	128
Percentages	0.00	0.00	6.76	6.46	11.13	3.60	2.94	10.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.74

GLANE DR EAST OF CRANDON BLVD
09-20-2011 Graph of Speed for East Bound 09:14 Pg 1

Tue - Sep 13, 2011

Speed	Volume	0 100 200 300 400 500
		1
1-5	2	1
6-10	12	1*
11-15	57	1*****
16-20	174	1******************
21-25	317	1********************************
26-30	231	1************************
31-35	102	1**********
36-40	19	1*
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	1	1
66-70	0	1
71-147	0	1
		1
Total	915	1
		0 100 200 300 400 500

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
915	23.9	17.9	24.4	30.7	1	0.1	1	0.1	0	0.0

Tue - Sep 13, 2011

Speed	Volume	0 100 200 300 400 500
		1
1-5	2	1
6-10	7	1
11-15	21	1**
16-20	100	1**********
21-25	353	1**********************************
26-30	157	1***************
31-35	37	1***
36-40	12	1*
41-45	1	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	1	1
71-147	1	1
		1
Total	692	1
		0 100 200 300 400 500

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
692	23.9	19.7	24.1	29.4	2	0.3	2	0.3	2	0.3

GLANE DR EAST OF CRANDON BLVD
09-20-2011 Graph of Speed for East Bound 09:20 Pg 1

Wed - Sep 14, 2011

Speed	Volume	0 100 200 300 400 500
		1
1-5	0	1
6-10	8	1
11-15	51	1*****
16-20	206	1********************
21-25	329	1*********************************
26-30	229	1**********************
31-35	71	1*******
36-40	9	1
41-45	0	1
46-50	2	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	905	1
		0 100 200 300 400 500

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
905	23.4	17.9	23.8	29.8	0	0.0	0	0.0	0	0.0

GLANE DR EAST OF CRANDON BLVD
09-20-2011 Graph of Speed for West Bound 09:20 Pg 2

Wed - Sep 14, 2011

Speed	Volume	0 100 200 300 400 500
		1
1-5	1	1
6-10	3	1
11-15	23	1**
16-20	119	1**********
21-25	426	1**
26-30	132	1************
31-35	31	1***
36-40	10	1*
41-45	3	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	1	1
		1
Total	749	1
		0 100 200 300 400 500

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
749	23.5	19.6	23.7	28.4	1	0.1	1	0.1	1	0.1

Sta: 870128121100 Id: 000001711100 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Tue - Sep 13, 2011 at 00:00 End: Tue - Sep 13, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: GLENRIDGE RD BTWN WEST MASHTA & HEATHER File: D0913009.PRN
Ln1-North Ln2-South

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	0	14	51	178	322	159	34	8	0	0	1	0	0	0	0	767
Percentages	0.00	1.83	6.65	23.21	41.98	20.73	4.43	1.04	0.00	0.00	0.13	0.00	0.00	0.00	0.00	

Lane	1	2	Total
Grand Totals	469	298	767
Percentages	61.15	38.85	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
767	22.58	17.12	22.75	28.19	0	0.0	0	0.0	0	0.0

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 7-8	0	3	7	37	31	12	1	0	0	0	0	0	0	0	0	91
Percentages	0.00	21.43	13.73	20.79	9.63	7.55	2.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.86
Pm Hour 14-15	0	0	6	14	40	9	4	1	0	0	0	0	0	0	0	74
Percentages	0.00	0.00	11.76	7.87	12.42	5.66	11.76	12.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.65

Sta: 870128121100 Id: 000001711100 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Wed - Sep 14, 2011 at 00:00 End: Wed - Sep 14, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: GLENRIDGE RD BTWN WEST MASHTA & HEATHER File: D0914009.PRN
Ln1-North Ln2-South

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	3	17	87	238	287	155	30	8	1	0	0	0	0	0	1	827
Percentages	0.36	2.06	10.52	28.78	34.70	18.74	3.63	0.97	0.12	0.00	0.00	0.00	0.00	0.00	0.12	

Lane	1	2	Total
Grand Totals	513	314	827
Percentages	62.03	37.97	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
827	21.70	16.29	21.95	27.83	1	0.1	1	0.1	1	0.1

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 7-8	1	1	19	48	22	5	0	0	0	0	0	0	0	0	0	96
Percentages	33.33	5.88	21.84	20.17	7.67	3.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.61
Pm Hour 15-16	0	2	8	25	29	14	3	0	0	0	0	0	0	0	0	81
Percentages	0.00	11.76	9.20	10.50	10.10	9.03	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.79

GLENRIDGE RD BTWN WEST MASHTA DR & WEST HEATHER DR
09-19-2011 Graph of Speed for North Bound 16:51 Pg 1

Tue - Sep 13, 2011

Speed	Volume	0 100 200 300 400 500
		1
1-5	0	1
6-10	7	1
11-15	20	1**
16-20	87	1********
21-25	208	1********************
26-30	116	1**********
31-35	25	1**
36-40	6	1
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	469	1
		0 100 200 300 400 500

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
469	23.4	18.5	23.9	29.3	0	0.0	0	0.0	0	0.0

Tue - Sep 13, 2011

Speed	Volume	0 40 80 120 160 200
		1
1-5	0	1
6-10	7	1*
11-15	31	1*******
16-20	91	1**********************
21-25	114	1***************************
26-30	43	1**********
31-35	9	1**
36-40	2	1
41-45	0	1
46-50	0	1
51-55	1	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	298	1
		0 40 80 120 160 200

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
298	21.3	16.4	21.9	27.2	0	0.0	0	0.0	0	0.0

GLENRIDGE RD BTWN WEST MASHTA DR & WEST HEATHER DR

09-20-2011 Graph of Speed for North Bound 09:19 Pg 1

Wed - Sep 14, 2011

Speed	Volume	0 40 80 120 160 200
		1
1-5	1	1
6-10	10	1**
11-15	46	1**********
16-20	131	1********************************
21-25	189	1**
26-30	110	1***************************
31-35	18	1****
36-40	6	1*
41-45	1	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	1	1
		1
Total	513	1
		0 40 80 120 160 200

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
513	22.3	16.8	22.8	28.7	1	0.2	1	0.2	1	0.2

Wed - Sep 14, 2011

Speed	Volume	0 40 80 120 160 200
		1
1-5	2	1
6-10	7	1*
11-15	41	1**********
16-20	107	1**************************
21-25	98	1************************
26-30	45	1***********
31-35	12	1***
36-40	2	1
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	314	1
		0 40 80 120 160 200

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
314	20.7	15.6	21.0	27.3	0	0.0	0	0.0	0	0.0

F.R. ALEMAN & ASSOC.

09-19-2011 Volume by Speed by Lane Report - D0913003.PRN 15:03 Pg 11

Sta: 870125321100 Id: 000001016908 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Tue - Sep 13, 2011 at 00:00 End: Tue - Sep 13, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: MCINTYRE ST BTWN HARBOR DRV & RIDGEWOOD File: D0913003.PRN
Ln1-East Ln2-West

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	2	22	125	236	177	76	17	2	0	0	1	0	0	0	2	660
Percentages	0.30	3.33	18.94	35.76	26.82	11.52	2.58	0.30	0.00	0.00	0.15	0.00	0.00	0.00	0.30	

Lane	1	2	Total
Grand Totals	312	348	660
Percentages	47.27	52.73	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
660	19.94	13.40	19.07	24.98	2	0.3	2	0.3	2	0.3

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	0	1	20	29	22	2	0	0	0	0	1	0	0	0	0	75
Percentages	0.00	4.55	16.00	12.29	12.43	2.63	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	11.36
Pm Hour 15-16	0	6	15	27	16	5	0	0	0	0	0	0	0	0	0	69
Percentages	0.00	27.27	12.00	11.44	9.04	6.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.45

Sta: 870125321100 Id: 000001016908 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Wed - Sep 14, 2011 at 00:00 End: Wed - Sep 14, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: MCINTYRE ST BTWN HARBOR DRV & RIDGEWOOD File: D0914003.PRN
Ln1-East Ln2-West

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	5	21	136	267	162	86	11	1	0	0	1	0	0	0	3	693
Percentages	0.72	3.03	19.62	38.53	23.38	12.41	1.59	0.14	0.00	0.00	0.14	0.00	0.00	0.00	0.43	

Lane	1	2	Total
Grand Totals	315	378	693
Percentages	45.45	54.55	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
693	19.73	13.29	18.76	24.95	3	0.4	3	0.4	3	0.4

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	1	3	14	34	12	7	0	0	0	0	1	0	0	0	0	72
Percentages	20.00	14.29	10.29	12.73	7.41	8.14	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	10.39
Pm Hour 13-14	0	1	22	28	16	3	0	0	0	0	0	0	0	0	0	70
Percentages	0.00	4.76	16.18	10.49	9.88	3.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.10

MCINTYRE ST BTWN HARBOR DR & RIDGEWOOD RD
09-19-2011 Graph of Speed for East Bound 16:49 Pg 1

Tue - Sep 13, 2011

Speed	Volume	0 20 40 60 80 100
		1
1-5	1	1
6-10	10	1*****
11-15	65	1*********************************
16-20	97	1**
21-25	80	1**
26-30	48	1*************************
31-35	10	1*****
36-40	0	1
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	1	1
		1
Total	312	1
		0 20 40 60 80 100

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
312	20.2	13.8	20.1	27.3	1	0.3	1	0.3	1	0.3

MCINTYRE ST BTWN HARBOR DR & RIDGEWOOD RD
09-19-2011 Graph of Speed for Lane West Bound 16:49
Pg 2

Tue - Sep 13, 2011

Speed	Volume	0 40 80 120 160 200
		1
1-5	1	1
6-10	12	1***
11-15	60	1**********
16-20	139	1**********
21-25	97	1**********
26-30	28	1*******
31-35	7	1*
36-40	2	1
41-45	0	1
46-50	0	1
51-55	1	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	1	1
		1
Total	348	1
		0 40 80 120 160 200

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
348	19.7	14.3	19.6	25.3	1	0.3	1	0.3	1	0.3

MCINTYRE ST BTWN HARBOR DR & RIDGEWOOD RD
09-20-2011 Graph of Speed for East Bound 09:18 Pg 1

Wed - Sep 14, 2011

Speed	Volume	0 40 80 120 160 200
		1
1-5	5	1*
6-10	10	1**
11-15	75	1******************
16-20	113	1****************************
21-25	69	1*****************
26-30	35	1********
31-35	4	1*
36-40	1	1
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	3	1
		1
Total	315	1
		0 40 80 120 160 200

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
315	19.6	13.1	19.0	25.7	3	1.0	3	1.0	3	1.0

MCINTYRE ST BTWN HARBOR DR & RIDGEWOOD RD
09-20-2011 Graph of Speed for West Bound 09:18 Pg 2

Wed - Sep 14, 2011

Speed	Volume	0 40 80 120 160 200
1-5	0	
6-10	11	**
11-15	61	**********
16-20	154	**********
21-25	93	**********
26-30	51	**********
31-35	7	*
36-40	0	
41-45	0	
46-50	0	
51-55	1	
56-60	0	
61-65	0	
66-70	0	
71-147	0	
Total	378	

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
378	19.9	14.7	19.8	26.2	0	0.0	0	0.0	0	0.0

Sta: 870121321100 Id: 000000403715 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Wed - Sep 14, 2011 at 00:00 End: Wed - Sep 14, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: OCEAN LANE DRV EAST OF CRANDON BLVD File: D0914017.PRN
Ln1-East Ln2-West

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	0	10	72	299	1199	1467	368	42	2	0	0	0	0	0	0	3459
Percentages	0.00	0.29	2.08	8.64	34.66	42.41	10.64	1.21	0.06	0.00	0.00	0.00	0.00	0.00	0.00	

Lane	1	2	Total
Grand Totals	1705	1754	3459
Percentages	49.29	50.71	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
3459	25.69	21.46	26.41	29.71	0	0.0	0	0.0	0	0.0

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	0	3	12	25	117	118	18	2	0	0	0	0	0	0	0	295
Percentages	0.00	30.00	16.67	8.36	9.76	8.04	4.89	4.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.53
Pm Hour 18-19	0	1	6	30	103	113	15	3	0	0	0	0	0	0	0	271
Percentages	0.00	10.00	8.33	10.03	8.59	7.70	4.08	7.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.83

Sta: 870121321100 Id: 000000403715 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Thu - Sep 15, 2011 at 00:00 End: Thu - Sep 15, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: OCEAN LANE DRV EAST OF CRANDON BLVD File: D0915017.PRN
Ln1-East Ln2-West

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	1	10	63	344	1268	1414	397	35	3	0	1	0	0	0	0	3536
Percentages	0.03	0.28	1.78	9.73	35.86	39.99	11.23	0.99	0.08	0.00	0.03	0.00	0.00	0.00	0.00	

Lane	1	2	Total
Grand Totals	1763	1773	3536
Percentages	49.86	50.14	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
3536	25.58	21.35	26.23	29.73	0	0.0	0	0.0	0	0.0

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	0	0	4	30	124	125	37	3	0	0	0	0	0	0	0	323
Percentages	0.00	0.00	6.35	8.72	9.78	8.84	9.32	8.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.13
Pm Hour 15-16	0	0	6	27	98	109	33	3	1	0	0	0	0	0	0	277
Percentages	0.00	0.00	9.52	7.85	7.73	7.71	8.31	8.57	33.33	0.00	0.00	0.00	0.00	0.00	0.00	7.83

OCEAN LANE BLVD EAST OF CRANDON BLVD
09-20-2011 Graph of Speed for East Bound 11:54 Pg 1

Wed - Sep 14, 2011

Speed	Volume	0 200 400 600 800 1000
		1
1-5	0	1
6-10	7	1
11-15	34	1*
16-20	150	1*******
21-25	599	1****************************
26-30	695	1**********************************
31-35	203	1**********
36-40	17	1
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	1705	1
		0 200 400 600 800 1000

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
1705	25.7	21.5	26.4	30.7	0	0.0	0	0.0	0	0.0

Wed - Sep 14, 2011

Speed	Volume	0 200 400 600 800 1000
		1
1-5	0	1
6-10	3	1
11-15	38	1*
16-20	149	1*******
21-25	600	1******************************
26-30	772	1**************************************
31-35	165	1********
36-40	25	1*
41-45	2	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	1754	1
		0 200 400 600 800 1000

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
1754	25.7	21.6	26.6	30.5	0	0.0	0	0.0	0	0.0

OCEAN LANE DR EAST OF CRANDON BLVD
09-20-2011 Graph of Speed for East Bound 09:34 Pg 1

Thu - Sep 15, 2011

Speed	Volume	0 200 400 600 800 1000
		1
1-5	0	1
6-10	5	1
11-15	34	1*
16-20	171	1********
21-25	624	1******************************
26-30	701	1**********************************
31-35	209	1**********
36-40	18	1
41-45	1	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	1763	1
		0 200 400 600 800 1000

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
1763	25.6	21.4	26.3	30.7	0	0.0	0	0.0	0	0.0

Thu - Sep 15, 2011

Speed	Volume	0 200 400 600 800 1000
		1
1-5	1	1
6-10	5	1
11-15	29	1*
16-20	173	1********
21-25	644	1*********************************
26-30	713	1**********************************
31-35	188	1*********
36-40	17	1
41-45	2	1
46-50	0	1
51-55	1	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	1773	1
		0 200 400 600 800 1000

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
1773	25.5	21.4	26.2	30.6	0	0.0	0	0.0	0	0.0

Sta: 870127121100 Id: 000008310051 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Tue - Sep 13, 2011 at 00:00 End: Tue - Sep 13, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: RIDGEWOOD RD BTWN WEST MASHTA & HEATHER File: D0913005.PRN
Ln1-North Ln2-South

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	1	22	95	234	163	49	18	1	0	0	0	0	1	0	1	585
Percentages	0.17	3.76	16.24	40.00	27.86	8.38	3.08	0.17	0.00	0.00	0.00	0.00	0.17	0.00	0.17	

Lane	1	2	Total
Grand Totals	354	231	585
Percentages	60.51	39.49	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
585	19.75	13.73	18.98	24.56	2	0.3	2	0.3	1	0.2

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	0	3	38	67	32	4	1	0	0	0	0	0	1	0	1	147
Percentages	0.00	13.64	40.00	28.63	19.63	8.16	5.56	0.00	0.00	0.00	0.00	0.00	100.00	0.00	100.00	25.13
Pm Hour 15-16	0	5	18	21	12	0	1	0	0	0	0	0	0	0	0	57
Percentages	0.00	22.73	18.95	8.97	7.36	0.00	5.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.74

Sta: 870127121100 Id: 000008310051 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Wed - Sep 14, 2011 at 00:00 End: Wed - Sep 14, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: RIDGEWOOD RD BTWN WEST MASHTA & HEATHER File: D0914005.PRN
Ln1-North Ln2-South

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	3	15	87	258	181	80	13	2	2	1	0	0	0	0	2	644
Percentages	0.47	2.33	13.51	40.06	28.11	12.42	2.02	0.31	0.31	0.16	0.00	0.00	0.00	0.00	0.31	

Lane	1	2	Total
Grand Totals	412	232	644
Percentages	63.98	36.02	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
644	20.44	14.61	19.36	26.17	2	0.3	2	0.3	2	0.3

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	2	2	42	85	10	7	0	0	0	0	0	0	0	0	1	149
Percentages	66.67	13.33	48.28	32.95	5.52	8.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.00	23.14
Pm Hour 14-15	0	1	4	18	25	13	2	0	0	0	0	0	0	0	0	63
Percentages	0.00	6.67	4.60	6.98	13.81	16.25	15.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.78

RIDGEWOOD RD BTWN WEST MASHTA DR & WEST HEATHER DR
09-19-2011 Graph of Speed for North Bound 16:50 Pg 1

Tue - Sep 13, 2011

Speed	Volume	0 40 80 120 160 200
1-5	0	
6-10	5	*
11-15	45	**********
16-20	152	************************************
21-25	105	*************************
26-30	31	*******
31-35	15	***
36-40	0	
41-45	0	
46-50	0	
51-55	0	
56-60	0	
61-65	1	
66-70	0	
71-147	0	
Total	354	

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
354	20.3	16.1	20.2	25.7	1	0.3	1	0.3	0	0.0

RIDGEWOOD RD BTWN WEST MASHTA DR & WEST HEATHER DR
09-19-2011 Graph of Speed for South Bound 16:50 Pg 2

Tue - Sep 13, 2011

Speed	Volume	0 20 40 60 80 100
1-5	1	*
6-10	17	********
11-15	50	*************************
16-20	82	**
21-25	58	*****************************
26-30	18	*********
31-35	3	*
36-40	1	*
41-45	0	
46-50	0	
51-55	0	
56-60	0	
61-65	0	
66-70	0	
71-147	1	*
Total	231	

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
231	18.8	12.7	18.9	25.0	1	0.4	1	0.4	1	0.4

RIDGEWOOD RD BTWN WEST MASHTA DR & WEST HEATHER DR
09-20-2011 Graph of Speed for North Bound 09:18 Pg 1

Wed - Sep 14, 2011

Speed	Volume	0 40 80 120 160 200
		1
1-5	1	1
6-10	11	1**
11-15	50	1**********
16-20	153	1**********
21-25	128	1**********
26-30	56	1**********
31-35	10	1**
36-40	1	1
41-45	2	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	412	1
		0 40 80 120 160 200

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
412	20.5	16.0	20.7	26.6	0	0.0	0	0.0	0	0.0

RIDGEWOOD RD BTWN WEST MASHTA DR & WEST HEATHER DR
09-20-2011 Graph of Speed for South Bound 09:18 Pg 2

Wed - Sep 14, 2011

Speed	Volume	0 40 80 120 160 200
		1
1-5	2	1
6-10	4	1*
11-15	37	1*********
16-20	105	1**************************
21-25	53	1*************
26-30	24	1******
31-35	3	1
36-40	1	1
41-45	0	1
46-50	1	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	2	1
		1
Total	232	1
		0 40 80 120 160 200

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
232	20.3	14.9	19.5	25.6	2	0.9	2	0.9	2	0.9

Sta: 870124321110 Id: 000050080054 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Tue - Sep 13, 2011 at 00:00 End: Tue - Sep 13, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: SEA VIEW DRV EAST OF CRANDON BLVD File: D0913015.PRN
Ln1-East Ln2-West

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	0	6	36	107	291	511	297	108	18	2	2	0	1	1	0	1380
Percentages	0.00	0.43	2.61	7.75	21.09	37.03	21.52	7.83	1.30	0.14	0.14	0.00	0.07	0.07	0.00	

Lane	1	2	Total
Grand Totals	696	684	1380
Percentages	50.43	49.57	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
1380	27.87	21.80	27.96	33.99	2	0.1	2	0.1	1	0.1

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	0	0	2	9	20	44	30	9	1	0	0	0	0	0	0	115
Percentages	0.00	0.00	5.56	8.41	6.87	8.61	10.10	8.33	5.56	0.00	0.00	0.00	0.00	0.00	0.00	8.33
Pm Hour 15-16	0	0	6	8	25	58	18	6	1	0	0	0	0	0	0	122
Percentages	0.00	0.00	16.67	7.48	8.59	11.35	6.06	5.56	5.56	0.00	0.00	0.00	0.00	0.00	0.00	8.84

Sta: 870124321110 Id: 000050080054 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Wed - Sep 14, 2011 at 00:00 End: Wed - Sep 14, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: SEA VIEW DRV EAST OF CRANDON BLVD File: D0914015.PRN
Ln1-East Ln2-West

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	0	5	24	108	324	463	320	107	21	1	1	1	0	0	1	1376
Percentages	0.00	0.36	1.74	7.85	23.55	33.65	23.26	7.78	1.53	0.07	0.07	0.07	0.00	0.00	0.07	

Lane	1	2	Total
Grand Totals	686	690	1376
Percentages	49.85	50.15	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
1376	27.99	21.86	27.96	34.07	2	0.1	1	0.1	1	0.1

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 11-12	0	1	2	7	18	36	25	10	3	0	0	0	0	0	0	102
Percentages	0.00	20.00	8.33	6.48	5.56	7.78	7.81	9.35	14.29	0.00	0.00	0.00	0.00	0.00	0.00	7.41
Pm Hour 18-19	0	2	5	16	24	38	19	10	0	0	0	0	0	0	0	114
Percentages	0.00	40.00	20.83	14.81	7.41	8.21	5.94	9.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.28

SEA VIEW DR EAST OF CRANDON BLVD
09-20-2011 Graph of Speed for East Bound 09:15 Pg 1

Tue - Sep 13, 2011

Speed	Volume	0 100 200 300 400 500
		1
1-5	0	1
6-10	2	1
11-15	17	1*
16-20	46	1****
21-25	166	1**********
26-30	259	1************************
31-35	146	1**********
36-40	51	1*****
41-45	7	1
46-50	0	1
51-55	1	1
56-60	0	1
61-65	1	1
66-70	0	1
71-147	0	1
		1
Total	696	1
		0 100 200 300 400 500

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
696	27.7	22.2	28.3	34.5	1	0.1	1	0.1	0	0.0

Sta: 870124321110 Id: 000050080054 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Tue - Sep 13, 2011 at 00:00 End: Tue - Sep 13, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: SEA VIEW DRV EAST OF CRANDON BLVD File: D0913015.PRN
Ln1-East Ln2-West

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	0	6	36	107	291	511	297	108	18	2	2	0	1	1	0	1380
Percentages	0.00	0.43	2.61	7.75	21.09	37.03	21.52	7.83	1.30	0.14	0.14	0.00	0.07	0.07	0.00	

Lane	1	2	Total
Grand Totals	696	684	1380
Percentages	50.43	49.57	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
1380	27.87	21.80	27.96	33.99	2	0.1	2	0.1	1	0.1

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	0	0	2	9	20	44	30	9	1	0	0	0	0	0	0	115
Percentages	0.00	0.00	5.56	8.41	6.87	8.61	10.10	8.33	5.56	0.00	0.00	0.00	0.00	0.00	0.00	8.33
Pm Hour 15-16	0	0	6	8	25	58	18	6	1	0	0	0	0	0	0	122
Percentages	0.00	0.00	16.67	7.48	8.59	11.35	6.06	5.56	5.56	0.00	0.00	0.00	0.00	0.00	0.00	8.84

SEA VIEW DR EAST OF CRANDON BLVD
09-20-2011 Graph of Speed for East Bound 09:15 Pg 1

Tue - Sep 13, 2011

Speed	Volume	0 100 200 300 400 500
		1
1-5	0	1
6-10	2	1
11-15	17	1*
16-20	46	1****
21-25	166	1**********
26-30	259	1**************
31-35	146	1**********
36-40	51	1*****
41-45	7	1
46-50	0	1
51-55	1	1
56-60	0	1
61-65	1	1
66-70	0	1
71-147	0	1
		1
Total	696	1
		0 100 200 300 400 500

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
696	27.7	22.2	28.3	34.5	1	0.1	1	0.1	0	0.0

SEA VIEW EAST OF CRANDON BLVD
09-20-2011 Graph of Speed for East Bound 09:20 Pg 1

Wed - Sep 14, 2011

Speed	Volume	0 100 200 300 400 500
		1
1-5	0	1
6-10	1	1
11-15	13	1*
16-20	51	1*****
21-25	166	1****************
26-30	240	1************************
31-35	157	1***************
36-40	51	1*****
41-45	4	1
46-50	1	1
51-55	1	1
56-60	1	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	686	1
		0 100 200 300 400 500

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
686	27.8	22.1	28.3	34.6	1	0.1	0	0.0	0	0.0

Sta: 870123321100 Id: 000000403674 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Tue - Sep 13, 2011 at 00:00 End: Tue - Sep 13, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: SUNRISE DRV EAST OF CRANDON BLVD File: D0913013.PRN
Ln1-East Ln2-West

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	1	12	52	162	379	364	142	30	5	1	0	0	0	1	0	1149
Percentages	0.09	1.04	4.53	14.10	32.99	31.68	12.36	2.61	0.44	0.09	0.00	0.00	0.00	0.09	0.00	

Lane	1	2	Total
Grand Totals	552	597	1149
Percentages	48.04	51.96	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
1149	25.03	18.65	24.67	31.19	1	0.1	1	0.1	1	0.1

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	0	0	6	16	37	40	15	3	0	1	0	0	0	0	0	118
Percentages	0.00	0.00	11.54	9.88	9.76	10.99	10.56	10.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	10.27
Pm Hour 16-17	0	1	2	17	20	34	17	0	1	0	0	0	0	0	0	92
Percentages	0.00	8.33	3.85	10.49	5.28	9.34	11.97	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	8.01

Sta: 870123321100 Id: 000000403674 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Wed - Sep 14, 2011 at 00:00 End: Wed - Sep 14, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: SUNRISE DRV EAST OF CRANDON BLVD File: D0914013.PRN
Ln1-East Ln2-West

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	1	14	60	182	377	370	165	34	2	0	1	0	0	0	1	1207
Percentages	0.08	1.16	4.97	15.08	31.23	30.65	13.67	2.82	0.17	0.00	0.08	0.00	0.00	0.00	0.08	

Lane	1	2	Total
Grand Totals	597	610	1207
Percentages	49.46	50.54	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
1207	25.01	18.33	24.68	31.53	1	0.1	1	0.1	1	0.1

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	0	2	2	24	43	38	11	2	1	0	0	0	0	0	0	123
Percentages	0.00	14.29	3.33	13.19	11.41	10.27	6.67	5.88	50.00	0.00	0.00	0.00	0.00	0.00	0.00	10.19
Pm Hour 18-19	0	1	5	21	39	26	8	1	0	0	1	0	0	0	0	102
Percentages	0.00	7.14	8.33	11.54	10.34	7.03	4.85	2.94	0.00	0.00	100.00	0.00	0.00	0.00	0.00	8.45

SUNRISE DR EAST OF CRANDON BLVD
09-20-2011 Graph of Speed for East Bound 09:15 Pg 1

Tue - Sep 13, 2011

Speed	Volume	0 100 200 300 400 500
		1
1-5	1	1
6-10	5	1
11-15	24	1**
16-20	98	1*********
21-25	204	1********************
26-30	153	1***************
31-35	53	1*****
36-40	10	1*
41-45	3	1
46-50	1	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	552	1
		0 100 200 300 400 500

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
552	24.3	18.7	24.6	30.5	0	0.0	0	0.0	0	0.0

Tue - Sep 13, 2011

Speed	Volume	0 100 200 300 400 500
		1
1-5	0	1
6-10	7	1
11-15	28	1**
16-20	64	1******
21-25	175	1*****************
26-30	211	1*********************
31-35	89	1********
36-40	20	1**
41-45	2	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	1	1
71-147	0	1
		1
Total	597	1
		0 100 200 300 400 500

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
597	25.7	20.3	26.6	32.3	1	0.2	1	0.2	1	0.2

SUNRISE DR EAST OF CRANDON BLVD
09-20-2011 Graph of Speed for East Bound 09:20 Pg 1

Wed - Sep 14, 2011

Speed	Volume	0 100 200 300 400 500
		1
1-5	1	1
6-10	9	1
11-15	33	1***
16-20	112	1**********
21-25	202	1********************
26-30	155	1***************
31-35	67	1******
36-40	18	1*
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	597	1
		0 100 200 300 400 500

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
597	24.1	18.1	24.6	30.9	0	0.0	0	0.0	0	0.0

Wed - Sep 14, 2011

Speed	Volume	0 100 200 300 400 500
		1
1-5	0	1
6-10	5	1
11-15	27	1**
16-20	70	1*******
21-25	175	1*****************
26-30	215	1*********************
31-35	98	1*********
36-40	16	1*
41-45	2	1
46-50	0	1
51-55	1	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	1	1
		1
Total	610	1
		0 100 200 300 400 500

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
610	25.9	20.3	26.7	32.4	1	0.2	1	0.2	1	0.2

F.R. ALEMAN & ASSOC.

09-19-2011 Volume by Speed by Lane Report - D0913001.PRN 15:01 Pg 11

Sta: 870126321100 Id: 000000000046 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Tue - Sep 13, 2011 at 00:00 End: Tue - Sep 13, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: WEST ENID DRV BTWN HARBOR DRV &RIDGEWOOD File: D0913001.PRN
Ln1-East Ln2-West

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	5	28	116	223	118	35	7	0	0	0	0	0	1	0	0	533
Percentages	0.94	5.25	21.76	41.84	22.14	6.57	1.31	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	

Lane	1	2	Total
Grand Totals	279	254	533
Percentages	52.35	47.65	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
533	18.29	12.62	18.11	23.75	1	0.2	1	0.2	0	0.0

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	0	4	13	23	23	2	0	0	0	0	0	0	0	0	0	65
Percentages	0.00	14.29	11.21	10.31	19.49	5.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.20
Pm Hour 15-16	1	5	29	18	8	2	1	0	0	0	0	0	0	0	0	64
Percentages	20.00	17.86	25.00	8.07	6.78	5.71	14.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.01

Sta: 870126321100 Id: 000000000046 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Wed - Sep 14, 2011 at 00:00 End: Wed - Sep 14, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: WEST ENID DRV BTWN HARBOR DRV &RIDGEWOOD File: D0914001.PRN
Ln1-East Ln2-West

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	8	33	111	271	136	33	9	1	0	0	0	0	0	0	0	602
Percentages	1.33	5.48	18.44	45.02	22.59	5.48	1.50	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Lane	1	2	Total
Grand Totals	320	282	602
Percentages	53.16	46.84	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
602	18.27	12.78	18.20	23.61	0	0.0	0	0.0	0	0.0

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	1	3	13	47	14	0	0	0	0	0	0	0	0	0	0	78
Percentages	12.50	9.09	11.71	17.34	10.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.96
Pm Hour 15-16	0	4	8	26	8	7	3	0	0	0	0	0	0	0	0	56
Percentages	0.00	12.12	7.21	9.59	5.88	21.21	33.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.30

WEST ENID DR BTWN HARBOR DR & RIDGEWOOD RD
09-19-2011 Graph of Speed for East Bound 16:48 Pg 1

Tue - Sep 13, 2011

Speed	Volume	0 40 80 120 160 200
		1
1-5	3	1
6-10	15	1***
11-15	63	1**********
16-20	123	1********************************
21-25	55	1**********
26-30	18	1****
31-35	2	1
36-40	0	1
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	279	1
		0 40 80 120 160 200

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
279	17.9	12.9	18.4	24.0	0	0.0	0	0.0	0	0.0

WEST ENID DR BTWN HARBOR DR & RIDGEWOOD RD
09-19-2011 Graph of Speed for West Bound 16:48 Pg 2

Tue - Sep 13, 2011

Speed	Volume	0 20 40 60 80 100
		1
1-5	2	1*
6-10	13	1******
11-15	53	1**************************
16-20	100	1**
21-25	63	1*******************************
26-30	17	1********
31-35	5	1**
36-40	0	1
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	1	1
66-70	0	1
71-147	0	1
		1
Total	254	1
		0 20 40 60 80 100

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
254	18.7	13.2	19.0	24.8	1	0.4	1	0.4	0	0.0

WEST ENID DR BTWN HARBOR DR & RIDGEWOOD RD
09-20-2011 Graph of Speed for East Bound 09:16 Pg 1

Wed - Sep 14, 2011

Speed	Volume	0 40 80 120 160 200
		1
1-5	3	1
6-10	14	1***
11-15	66	1**********
16-20	138	1**********
21-25	73	1**********
26-30	21	1*****
31-35	4	1*
36-40	1	1
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	320	1
		0 40 80 120 160 200

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
320	18.4	13.3	18.8	24.5	0	0.0	0	0.0	0	0.0

WEST ENID DR BTWN HARBOR DR & RIDGEWOOD RD
09-20-2011 Graph of Speed for West Bound 09:16 Pg 2

Wed - Sep 14, 2011

Speed	Volume	0 40 80 120 160 200
1-5	5	1*
6-10	19	1****
11-15	45	1**********
16-20	133	1*********************************
21-25	63	1***************
26-30	12	1***
31-35	5	1*
36-40	0	1
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
Total	282	1

0 40 80 120 160 200

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
282	18.1	13.0	18.7	24.0	0	0.0	0	0.0	0	0.0

Sta: 870129121100 Id: 000007585101 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Tue - Sep 13, 2011 at 00:00 End: Tue - Sep 13, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: WOODCREST RD BTWN MCINTYRE ST & HARBOR File:
D0913007.PRN
Ln1-North Ln2-South

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	2	32	99	246	140	44	7	1	0	0	0	0	0	0	0	571
Percentages	0.35	5.60	17.34	43.08	24.52	7.71	1.23	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Lane	1	2	Total
Grand Totals	330	241	571
Percentages	57.79	42.21	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
571	18.74	13.09	18.48	24.04	0	0.0	0	0.0	0	0.0

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	1	7	25	68	24	4	0	0	0	0	0	0	0	0	0	129
Percentages	50.00	21.88	25.25	27.64	17.14	9.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.59
Pm Hour 15-16	0	3	15	33	2	0	1	0	0	0	0	0	0	0	0	54
Percentages	0.00	9.38	15.15	13.41	1.43	0.00	14.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.46

Sta: 870129121100 Id: 000007585101 CId: 01 Fmt: 300 - Imperial Int: 15 Min.
Start: Wed - Sep 14, 2011 at 00:00 End: Wed - Sep 14, 2011 at 24:00
City/Town: KEY BISCAYNE County: MIAMI DADE
Location: WOODCREST RD BTWN MCINTYRE ST & HARBOR File: D0914007.PRN
Ln1-North Ln2-South

Station Data Summary

Speed(mph)	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-147	Total
Grand Totals	9	26	125	252	124	40	6	2	0	0	0	0	0	0	1	585
Percentages	1.54	4.44	21.37	43.08	21.20	6.84	1.03	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.17	

Lane	1	2	Total
Grand Totals	358	227	585
Percentages	61.20	38.80	

Speed Summary

Total	AvgSpd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
585	18.38	12.69	18.10	23.75	1	0.2	1	0.2	1	0.2

Am/Pm Peak Hour Totals

Speed(mph)	->5	->10	->15	->20	->25	->30	->35	->40	->45	->50	->55	->60	->65	->70	>70	Total
Am Hour 8-9	2	7	33	86	7	2	0	0	0	0	0	0	0	0	1	138
Percentages	22.22	26.92	26.40	34.13	5.65	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	23.59
Pm Hour 14-15	0	2	18	25	8	3	0	0	0	0	0	0	0	0	0	56
Percentages	0.00	7.69	14.40	9.92	6.45	7.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.57

WOODCREST RD BTWN MCINTYRE RD & HARBOR DR
09-19-2011 Graph of Speed for Lane North Bound 16:50 Pg 1

Tue - Sep 13, 2011

Speed	Volume	0 40 80 120 160 200
		1
1-5	1	1
6-10	15	1***
11-15	47	1**********
16-20	142	1**********
21-25	87	1**********
26-30	33	1********
31-35	4	1*
36-40	1	1
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	330	1
		0 40 80 120 160 200

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
330	19.3	14.6	19.6	25.3	0	0.0	0	0.0	0	0.0

WOODCREST RD BTWN MCINTYRE RD & HARBOR DR
09-19-2011 Graph of Speed for South Bound 16:50 Pg 2

Tue - Sep 13, 2011

Speed	Volume	0 40 80 120 160 200
		1
1-5	1	1
6-10	17	1****
11-15	52	1*************
16-20	104	1**************************
21-25	53	1*************
26-30	11	1**
31-35	3	1
36-40	0	1
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	241	1
		0 40 80 120 160 200

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
241	17.9	12.7	18.4	23.9	0	0.0	0	0.0	0	0.0

WOODCREST RD BTWN MCINTYRE RD & HARBOR DR
09-20-2011 Graph of Speed for North Bound 09:19 Pg 1

Wed - Sep 14, 2011

Speed	Volume	0 40 80 120 160 200
		1
1-5	7	1*
6-10	14	1***
11-15	69	1******************
16-20	148	1************************************
21-25	83	1*********************
26-30	30	1*******
31-35	4	1*
36-40	2	1
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	1	1
		1
Total	358	1
		0 40 80 120 160 200

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
358	18.9	13.4	19.0	25.0	1	0.3	1	0.3	1	0.3

Wed - Sep 14, 2011

Speed	Volume	0 40 80 120 160 200
		1
1-5	2	1
6-10	12	1***
11-15	56	1**********
16-20	104	1**************************
21-25	41	1**********
26-30	10	1**
31-35	2	1
36-40	0	1
41-45	0	1
46-50	0	1
51-55	0	1
56-60	0	1
61-65	0	1
66-70	0	1
71-147	0	1
		1
Total	227	1
		0 40 80 120 160 200

Station Speed Summary

Total	Avg Spd	15%ile	50%ile	85%ile	>55	%>55	>60	%>60	>65	%>65
227	17.6	12.8	18.1	23.3	0	0.0	0	0.0	0	0.0

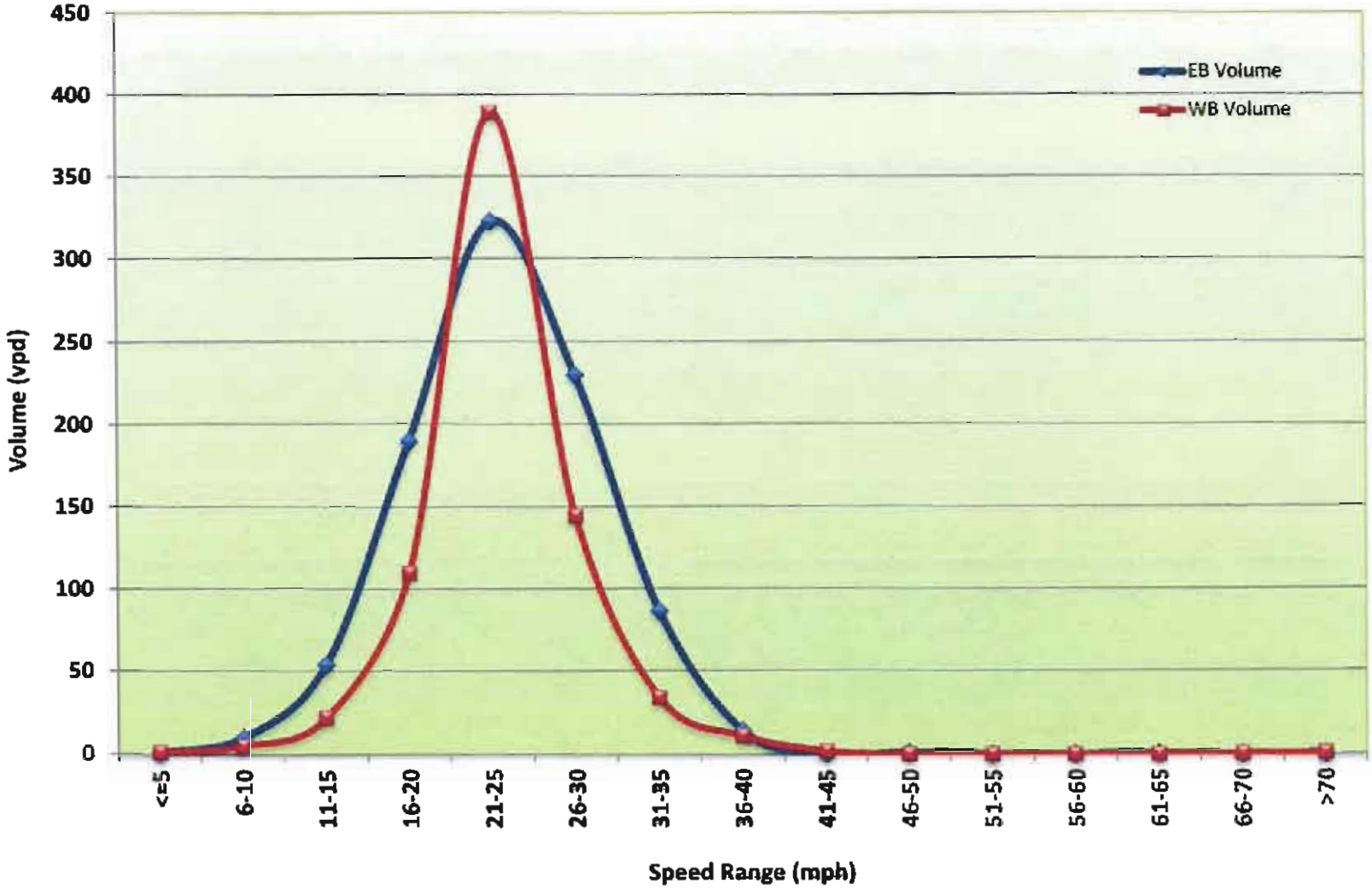
APPENDIX B

(Summary of Speed Analysis)

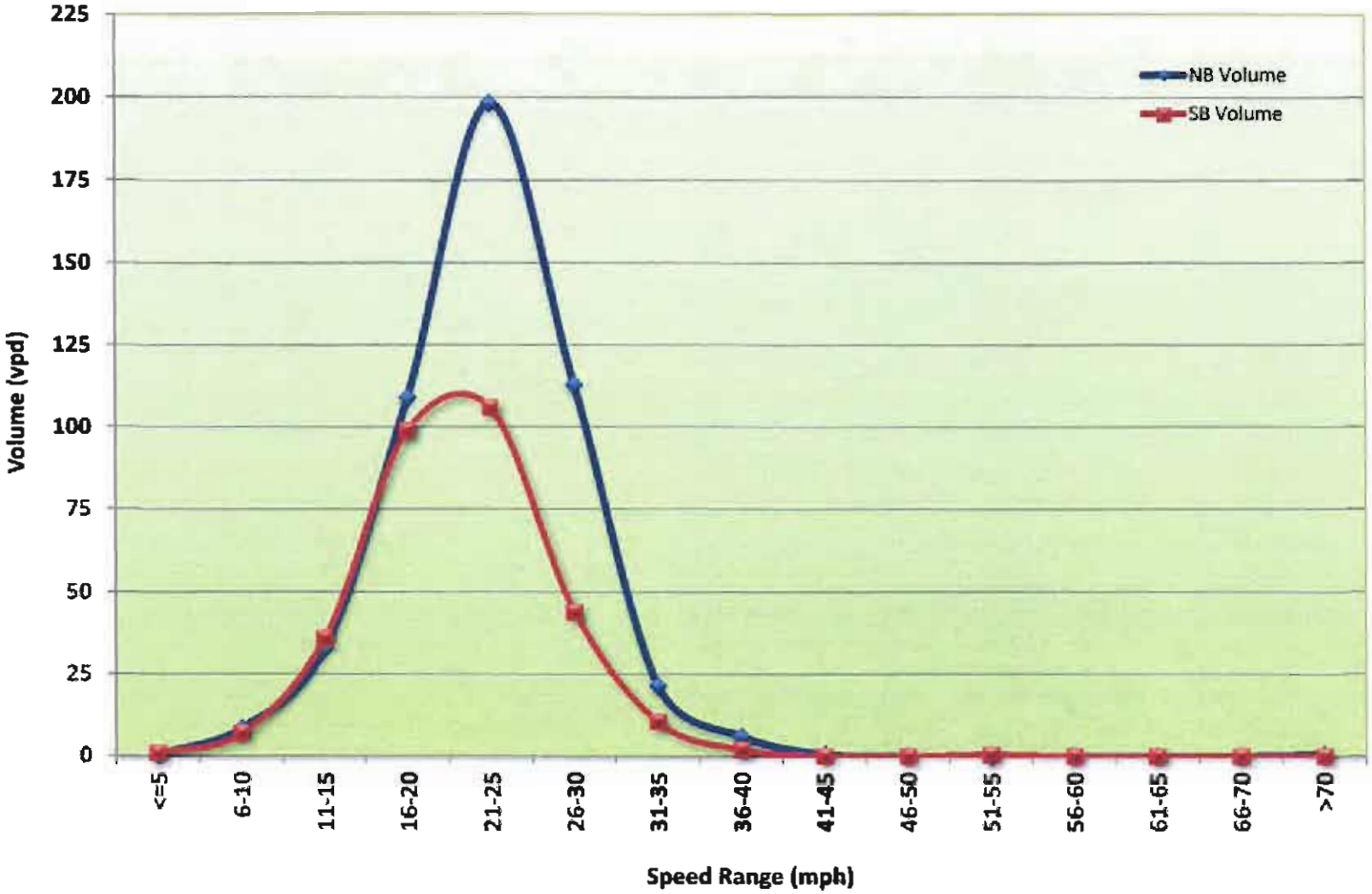
	Speed range (mph)	<=5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	>70	Total Vol	Roadway Link
Volume	13-Sep	2	12	57	174	317	231	102	19	0	0	0	0	1	0	0	915	Galen Dr E of Crandon Blvd
	14-Sep	0	8	51	206	329	229	71	9	0	2	0	0	0	0	0	905	
	EB Volume	1	10	54	190	323	230	87	14	0	1	0	0	1	0	0	910	
	13-Sep	2	7	21	100	353	157	37	12	1	0	0	0	0	1	1	692	
	14-Sep	1	3	23	119	426	132	31	10	3	0	0	0	0	0	1	749	
	WB Volume	2	5	22	110	390	145	34	11	2	0	0	0	0	1	1	721	
	13-Sep	0	7	20	87	208	116	25	6	0	0	0	0	0	0	0	469	GLENRIDGE RD BTWN WEST MASHTA DR & WEST HEATHER DR
	14-Sep	1	10	46	131	189	110	18	6	1	0	0	0	0	0	1	513	
	NB Volume	1	9	33	109	199	113	22	6	1	0	0	0	0	0	1	491	
	13-Sep	0	7	31	91	114	43	9	2	0	0	1	0	0	0	0	298	
	14-Sep	2	7	41	107	98	45	12	2	0	0	0	0	0	0	0	314	
	SB Volume	1	7	36	99	106	44	11	2	0	0	1	0	0	0	0	306	
	13-Sep	1	10	65	97	80	48	10	0	0	0	0	0	0	0	1	312	MCINTYRE ST BTWN HARBOR DR & RIDGEWOOD RD
	14-Sep	5	10	75	113	69	35	4	1	0	0	0	0	0	0	3	315	
	EB Volume	3	10	70	105	75	42	7	1	0	0	0	0	0	0	2	314	
	13-Sep	1	12	60	139	97	28	7	2	0	0	1	0	0	0	1	348	
	14-Sep	0	11	61	154	93	51	7	0	0	0	1	0	0	0	0	378	
	WB Volume	1	12	61	147	95	40	7	1	0	0	1	0	0	0	1	363	
	13-Sep	0	7	34	150	599	695	203	17	0	0	0	0	0	0	0	1705	OCEAN LANE DR EAST OF CRANDON BLVD
	14-Sep	0	5	34	171	624	701	209	18	1	0	0	0	0	0	0	1763	
	EB Volume	0	6	34	161	612	698	206	18	1	0	0	0	0	0	0	1734	
	13-Sep	0	3	38	149	600	772	165	25	2	0	0	0	0	0	0	1754	
	14-Sep	1	5	29	173	644	713	188	17	2	0	1	0	0	0	0	1773	
	WB Volume	1	4	34	161	622	743	177	21	2	0	1	0	0	0	0	1764	
	13-Sep	0	5	45	152	105	31	15	0	0	0	0	0	1	0	0	354	RIDGEWOOD RD BTWN WEST MASHTA DR & WEST HEATHER DR
	14-Sep	1	11	50	153	128	56	10	1	2	0	0	0	0	0	0	412	
	NB Volume	1	8	48	153	117	44	13	1	1	0	0	0	1	0	0	383	
	13-Sep	1	17	50	82	58	18	3	1	0	0	0	0	0	0	1	231	
	14-Sep	2	4	37	105	53	24	3	1	0	1	0	0	0	0	2	232	
	SB Volume	2	11	44	94	56	21	3	1	0	1	0	0	0	0	2	232	
	13-Sep	0	2	17	46	166	259	146	51	7	0	1	0	1	0	0	696	SEA VIEW DR EAST OF CRANDON BLVD
	14-Sep	0	1	13	51	166	240	157	51	4	1	1	1	0	0	0	686	
	EB Volume	0	2	15	49	166	250	152	51	6	1	1	1	1	0	0	691	
	13-Sep	0	4	19	61	125	252	151	57	11	2	1	0	0	1	0	684	
	14-Sep	0	4	11	57	158	223	163	56	17	0	0	0	0	0	1	690	
	WB Volume	0	4	15	59	142	238	157	57	14	1	1	0	0	1	1	687	

	Speed range (mph)	<=5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	>70	Total Vol	Roadway Link
Volume	13-Sep	1	5	24	98	204	153	53	10	3	1	0	0	0	0	0	552	SUNRISE DR EAST OF CRANDON BLVD
	14-Sep	1	9	33	112	202	155	67	18	0	0	0	0	0	0	0	597	
	EB Volume	1	7	29	105	203	154	60	14	2	1	0	0	0	0	0	575	
	13-Sep	0	7	28	64	175	211	89	20	2	0	0	0	0	1	0	597	
	14-Sep	0	5	27	70	175	215	98	16	2	0	1	0	0	0	1	610	
	WB Volume	0	6	28	67	175	213	94	18	2	0	1	0	0	1	1	604	
	13-Sep	3	15	63	123	55	18	2	0	0	0	0	0	0	0	0	279	WEST ENID DR BTWN HARBOR DR & RIDGEWOOD RD
	14-Sep	3	14	66	138	73	21	4	1	0	0	0	0	0	0	0	320	
	EB Volume	3	15	65	131	64	20	3	1	0	0	0	0	0	0	0	300	
	13-Sep	2	13	53	100	63	17	5	0	0	0	0	0	1	0	0	254	
	14-Sep	5	19	45	133	63	12	5	0	0	0	0	0	0	0	0	282	
	WB Volume	4	16	49	117	63	15	5	0	0	0	0	0	1	0	0	268	
	13-Sep	1	15	47	142	87	33	4	1	0	0	0	0	0	0	0	330	WOODCREST RD BTWN MCINTYRE RD & HARBOR DR
	14-Sep	7	14	69	148	83	30	4	2	0	0	0	0	0	0	1	358	
	NB Volume	4	15	58	145	85	32	4	2	0	0	0	0	0	0	1	344	
	13-Sep	1	17	52	104	53	11	3	0	0	0	0	0	0	0	0	241	
	14-Sep	2	12	56	104	41	10	2	0	0	0	0	0	0	0	0	227	
	SB Volume	2	15	54	104	47	11	3	0	0	0	0	0	0	0	0	234	

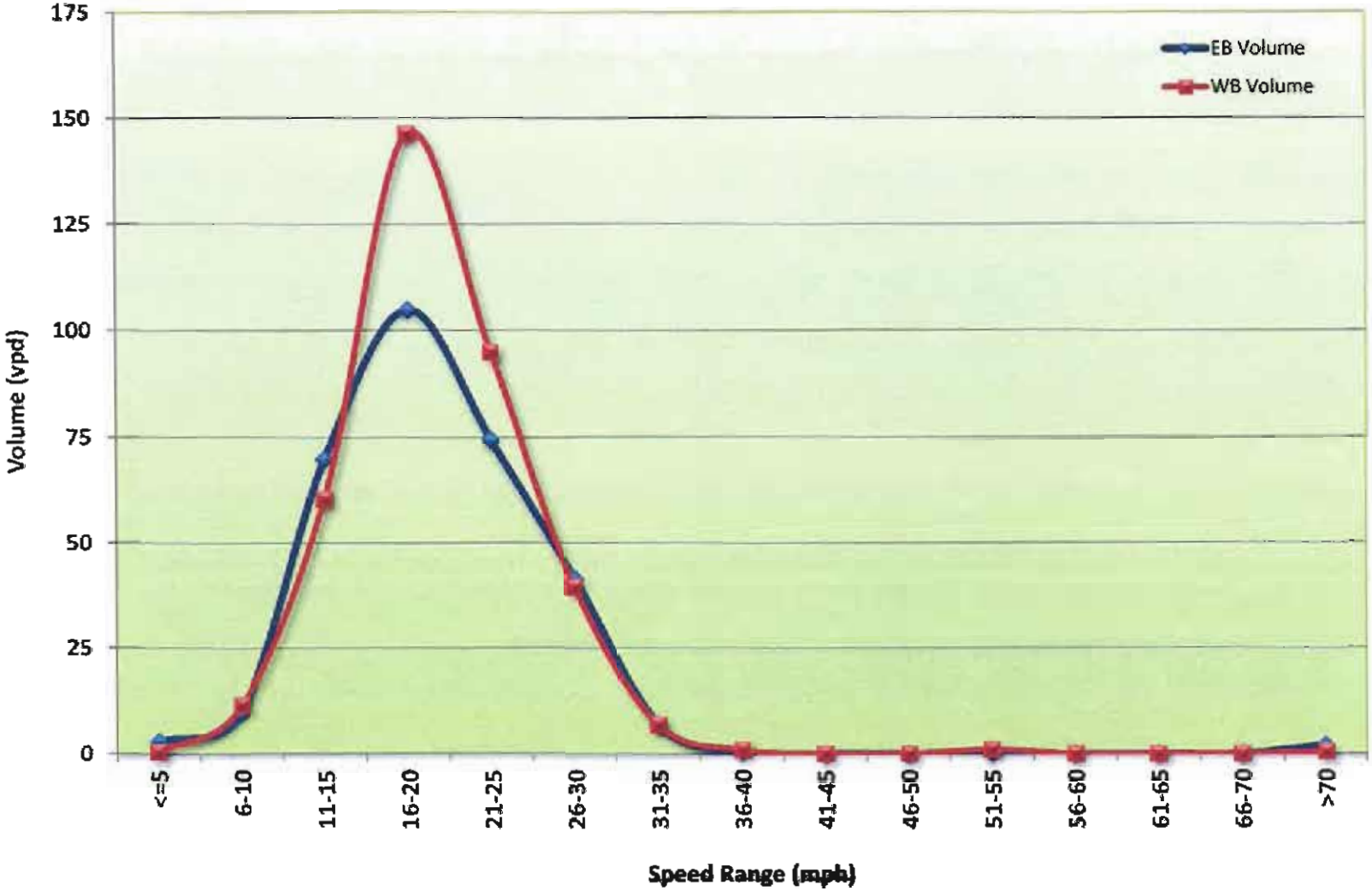
GALEN DRIVE VOLUME AND SPEED SURVEY



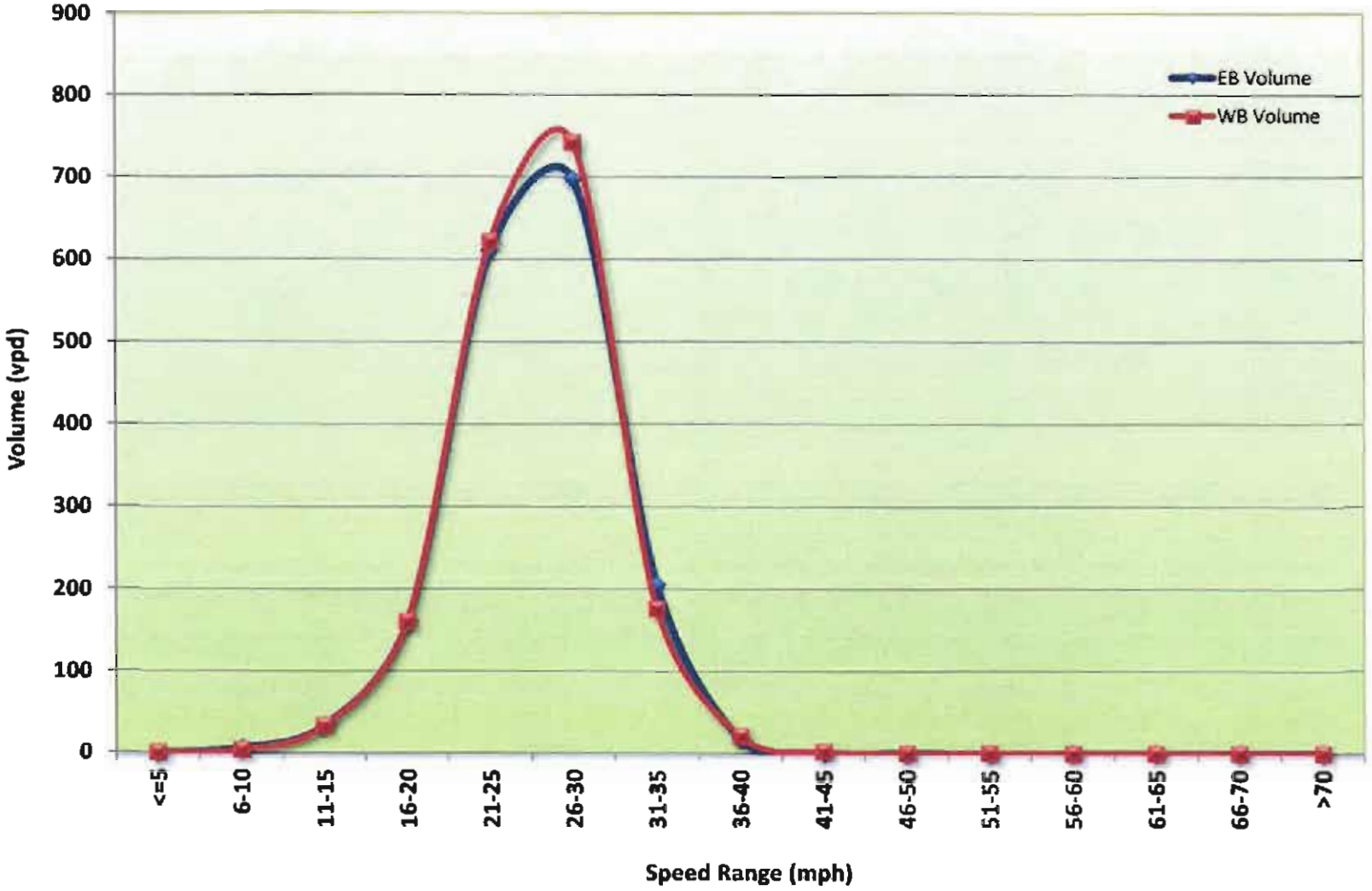
GLENRIDGE DRIVE VOLUME AND SPEED SURVEY



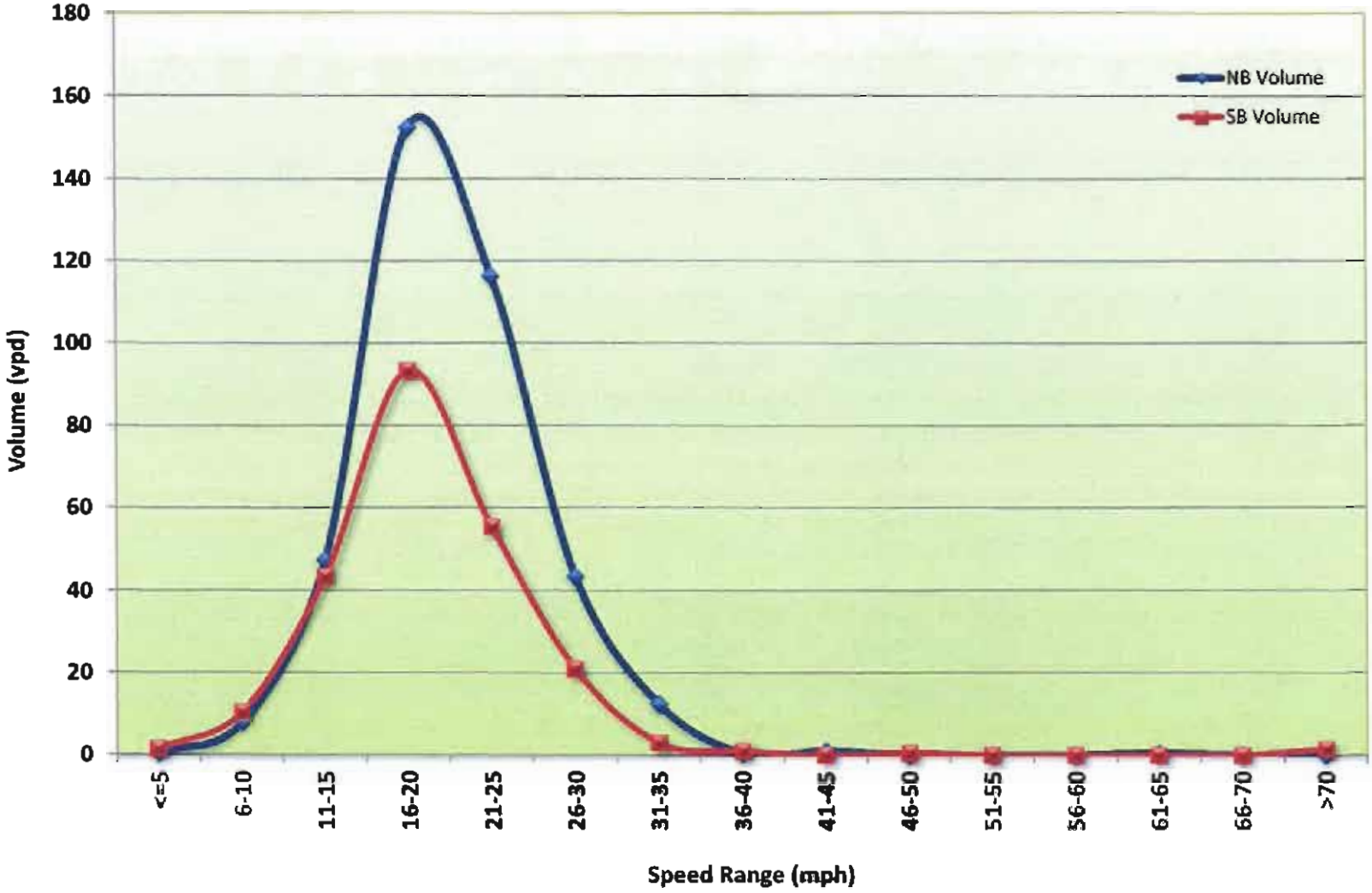
MCINTYRE STREET VOLUME AND SPEED SURVEY



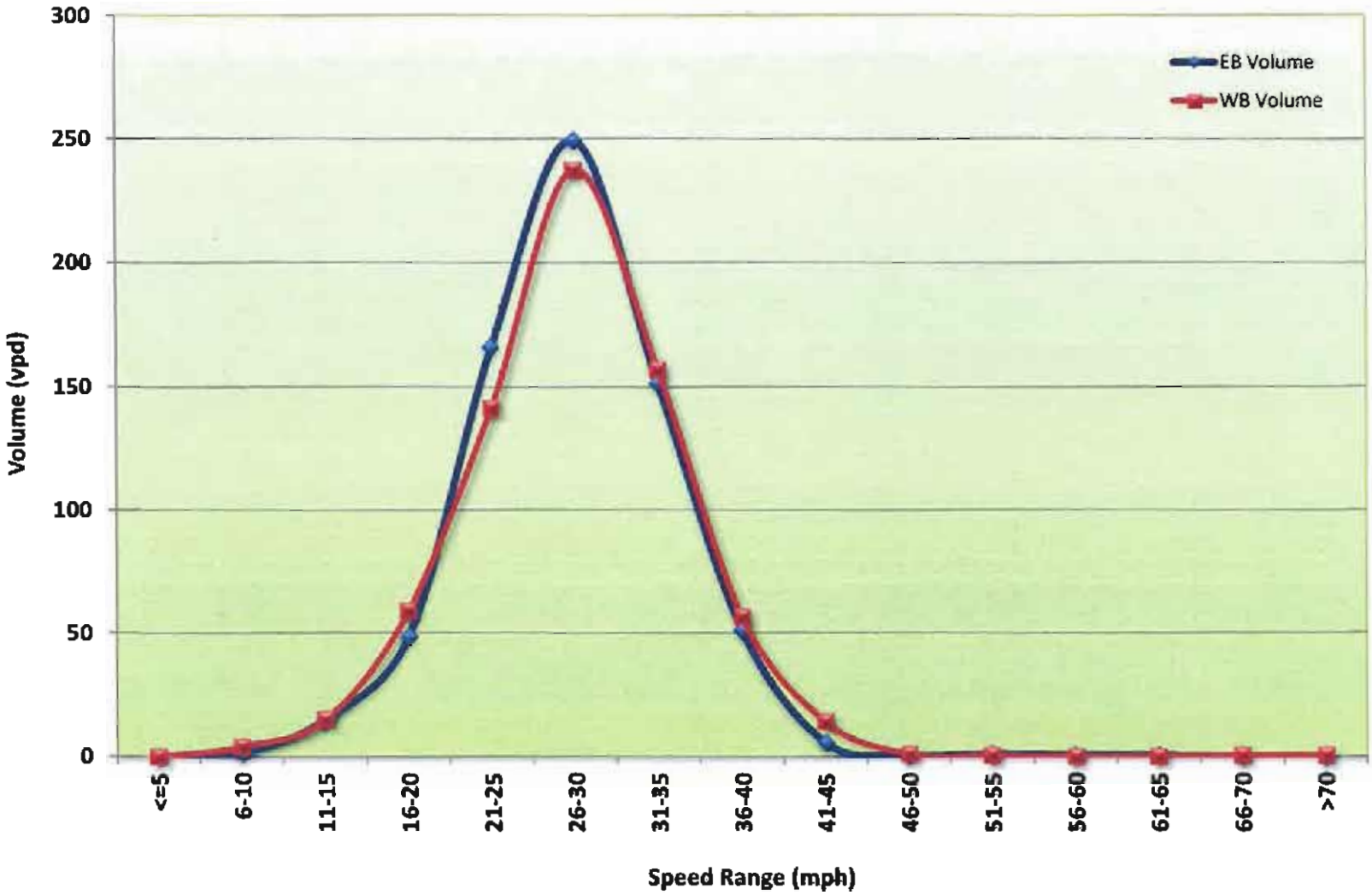
OCEAN LANE DRIVE VOLUME AND SPEED SURVEY



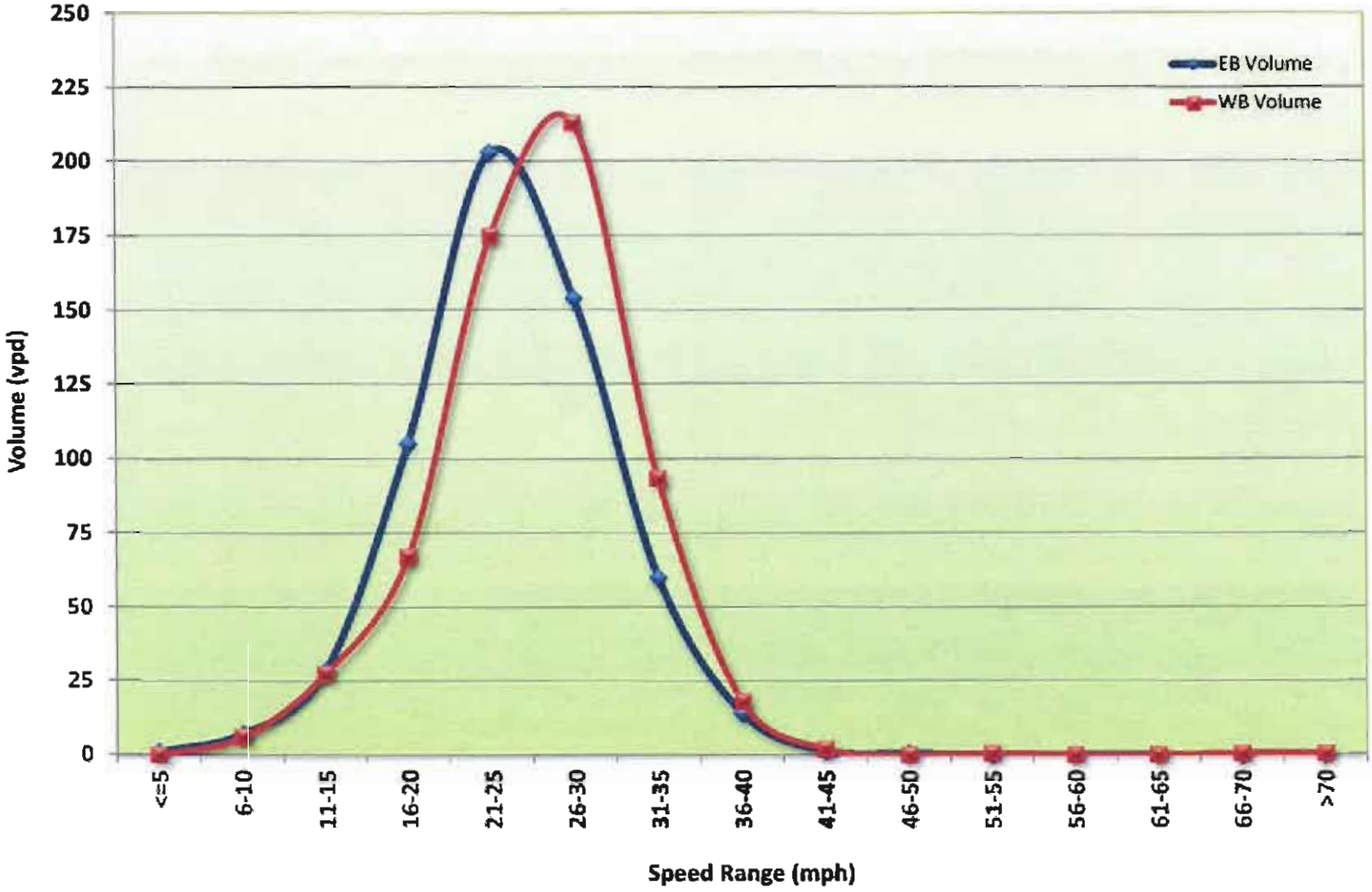
RIDGEWOOD ROAD VOLUME AND SPEED SURVEY



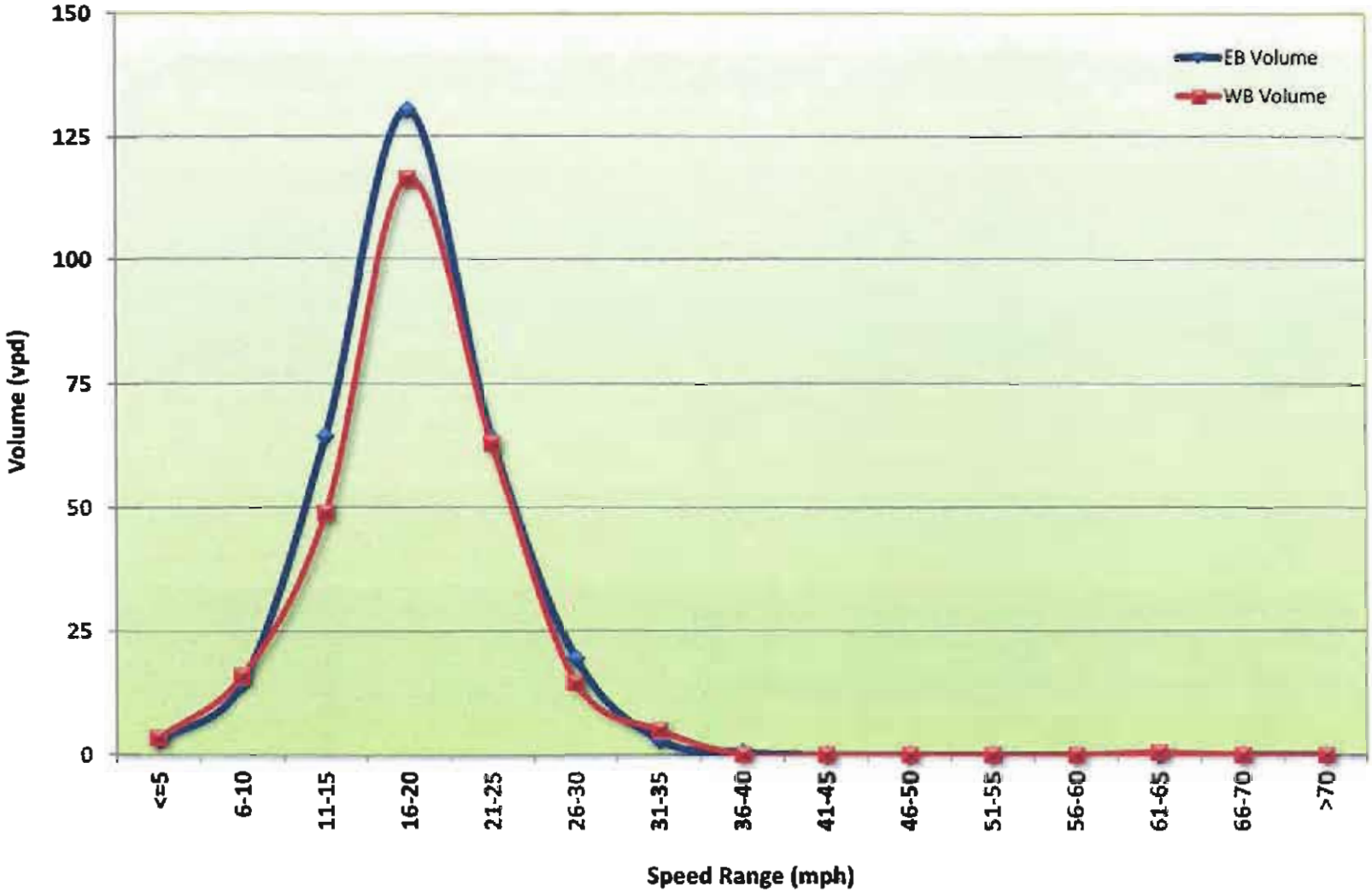
SEAVIEW DRIVE VOLUME AND SPEED SURVEY



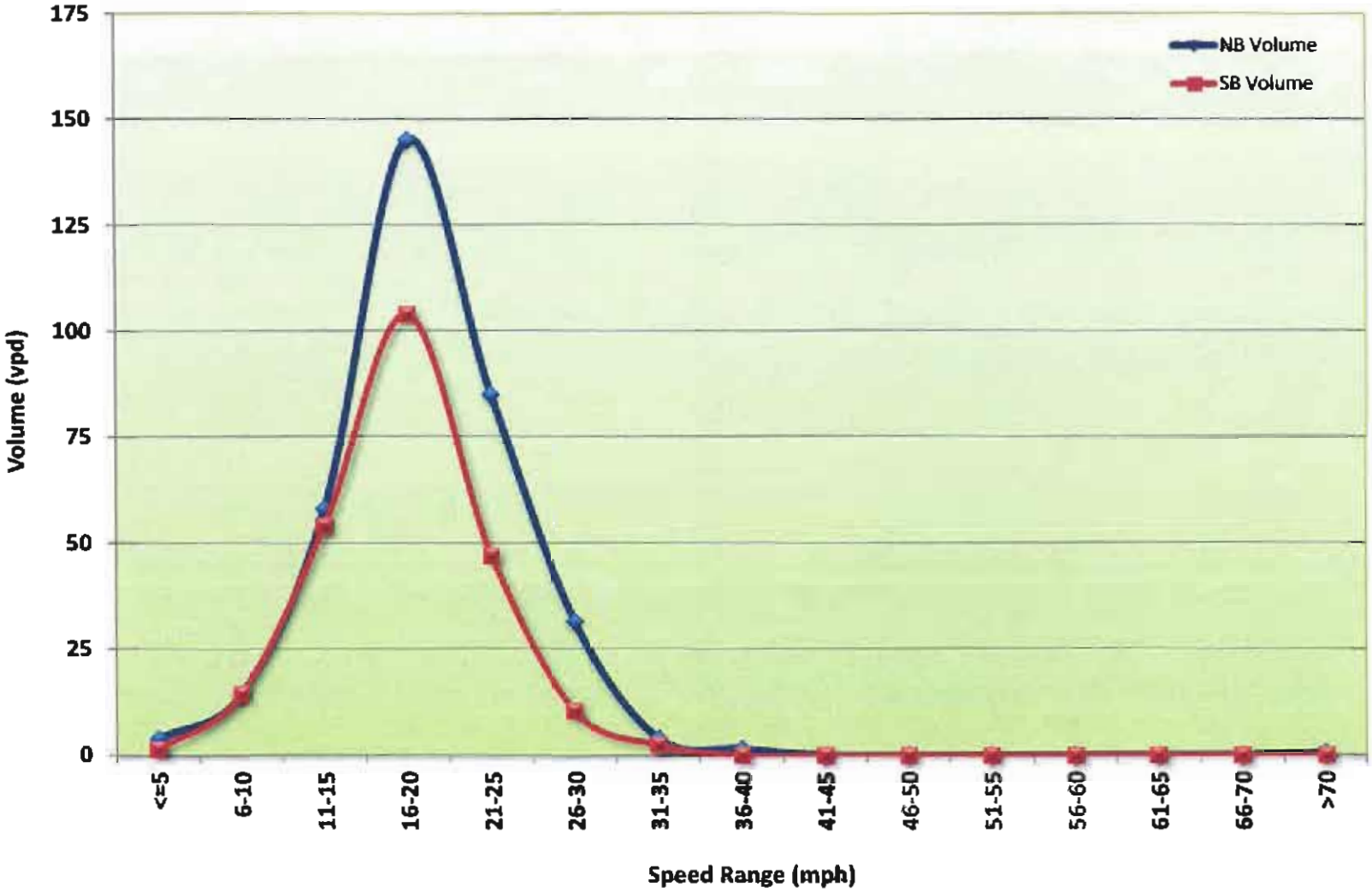
SUNRISE DRIVE VOLUME AND SPEED SURVEY



WEST ENID DRIVE VOLUME AND SPEED SURVEY



WOODCREST ROAD VOLUME AND SPEED SURVEY



APPENDIX C

(Traffic Calming Devices)

Speed Table

Traffic Circle

Center Islands

Chokers

APPENDIX D

(Traffic Calming Request and Petition Forms)

Village of Key Biscayne

Traffic Calming Request Form

1. Contact Information

Name: _____

Address: _____

Phone Number: _____

Email: _____

2. Location of Traffic Problem:

_____

_____

3. Potential solutions to be considered.

_____

_____

_____

_____

Village of Key Biscayne

Petition for Traffic Calming

THE UNDERSIGNED AGREE TO THE FOLLOWING:

1. **All persons signing this petition do hereby certify that they reside within the impacted area, which is hereby defined as the street segment of :**

_____

_____

_____

2. **All persons signing this petition do hereby agree of the following problem in the defined impacted area:**

_____

_____

_____

3. **All persons signing this petition do hereby agree that the following contact person(s) represent the neighborhood as facilitator(s) between the neighborhood residents and the Village of Key Biscayne:**

_____

Name Address Phone #

_____

Name Address Phone #

_____

Name Address Phone #

APPENDIX E

(Residential Traffic Calming Options)

Bulb-outs

Description
Curb extensions to physically reduce the road's width at intersections. Similar to lane narrowing but used at intersection(s). Used to provide both physical and visual narrowing of the roadway to force drivers to slow down and to shorten the crossing distance for pedestrians and hence spend less time in the intersection. Also called bump-outs.

Issues Addressed
- Speeding
- Pedestrian safety

Applications
- Local streets and local collectors at intersections.
- Works well with mini-traffic circles and at crosswalks.

Advantages
- Reduces pedestrian crossing distance.
- Pedestrians more visible to drivers.
- Interrupts straight curb lines and slows traffic, especially when used in series.
- Reduces turning speeds.
- Can visually enhance the street through landscaping.

Disadvantages
- Can require some parking removal.
- May impede bicycle traffic by restricting travel lanes.
- Large vehicles may need to cross into adjacent travel lanes to negotiate turns.

Evaluation Considerations
- Only possible on streets with curbs.

Design/Installation Considerations
- Landscaping can be installed to improve aesthetics by reducing cement footprint of bulb-out.
- Special design attention for buses making right-turns and for bike lanes.


Main St. @ Third St


Berry Ave


Santa Clara, CA

Chicanes

Description
A series of bulb-outs or curb extensions that narrow the street and inserts curvature in an otherwise straight stretch of roadway.

Issues Addressed
- Speeding (primary)
- Cut-through traffic (secondary)

Applications
- Collectors and local collectors.
- Straight streets with long blocks.

Advantages
- Discourages high speeds by forcing horizontal deflection.
- Reduces straight line of sight and enhances visual breaks in the street scape.
- Provides landscaping opportunity.
- Can accommodate emergency vehicles.

Disadvantages
- Removes some on-street parking.
- Inattentive drivers may not abide by the new center line, potentially impacting oncoming traffic and bicyclists.
- Drivers can choose to speed down the center line when no vehicle is traveling in the opposite direction.

Evaluation Considerations
- Speed reduction most effective when two vehicles are traveling in opposite directions.

Design/Installation Considerations
- Must be designed carefully to discourage drivers from deviating out of the appropriate lane.
- Adequate space should be provided for pedestrians and bicyclists so that they do not need to compete for space with vehicles.
- Landscaping must be designed so as not to obstruct sight lines.


N. Clark between Jardin and Almond Ave.


El Monte near S. Clark


Median island and bump outs (half a choker) as part of chicane


Median island used as part of chicane

Chokers

Description
Mid-block curb extensions that narrow a street by extending the sidewalk or widening the planting strip so that two cars must pass slowly when traveling in opposite directions.

Issues Addressed
- Speeding (primary)
- Traffic volume (secondary)

Applications
- Local streets, local collectors, collectors.
- Works well when combined with speed humps.

Advantages
- Reduces vehicle speed.
- May reduce traffic volume.
- Opportunity for landscaping and visual enhancements to the neighborhood.
- Can accommodate emergency vehicles.

Disadvantages
- Drivers can choose to speed down the center line when no vehicle is traveling in the opposite direction.
- Removes some on-street parking.

Evaluation Considerations
- Speed reduction most effective when two vehicles are traversing choker in opposite directions at the same time.
- Speed reduction more effective if combined with vertical deflection (Ex. speed humps, raised crosswalks)

Design/Installation Considerations
- Adequate space behind or in front of chokers may be provided to avoid having bicyclists compete for space with vehicles.
- Landscaping must be designed so as not to obstruct sight lines.

Juanita Way, Los Altos

Price Ave, Cupertino, CA
Choker/Speed Hump Combination

Two vehicles passing through choker simultaneously

Medians and Median Islands

Description
Medians and median islands located near the center portion of the street can be used to:

- Narrow lanes.
- Introduce horizontal deflection as part of a chicane configuration in conjunction with or bulb-outs.
- Provide a visual line-in sight interruption on a straight street by placing landscaping and trees in what was the middle of the street.
- Provide a pedestrian refuge.

A median does not have raised curbs except for a bull nose curb on the ends of the median as visual cue and delineation until landscaping matures. Can be later removed.

Median islands are similar to medians but are generally installed at intersections and have raised curbs all around. Median islands may be used to shorten pedestrian crossing at an intersection and provide an opportunity for landscaping and visual enhancements to a neighborhood. They can also be used as part of a gateway to a neighborhood.

Issues Addressed

- Speeding
- Pedestrian safety

Applications

- Collectors and local collectors.

Advantages

- Prevents cars from passing.
- Can reduce head-on collision potential.
- Opportunity for landscaping and visual enhancements to the neighborhood.

Description continued on next page

With bull nose curb - El Monte @ S. Clark

Center Islands without curbs

Fremont between Grant Rd and Sunnyvale

El Monte between Cuesta and Covington

Cuesta @ Springer

Illustrations continued on next page

Median Islands

Disadvantages

- Effect on vehicle speeds may be limited by the absence of any vertical deflection (Ex. speed table or raised crosswalk).
- May require on-street parking removal.
- May restrict access to driveways in one direction.
- May force vehicles closer to bicycle lanes.

Evaluation Considerations

- Median islands, when used to block side street access, may divert traffic and may impact emergency response time.

Design/Installation Considerations

- Maintain lane width adequate to accommodate bicycle travel.

S. Clark at El Monte

Higgins at El Monte

Springer at Berry

Mountain View

Landscaped Median Island and Pedestrian Refuge

Mini-Traffic Circles

Description
Raised, circular island placed within the middle of residential intersections, requiring vehicles to divert around them, potentially forcing drivers to slow down as they traverse around the circle. Drivers making left turns are directed to maneuver in a counter-clockwise direction, exiting the traffic circle by turning right onto the desired street. Unlike a roundabout, a traffic circle can involve stop signs and the driver is not required to yield to vehicles already engaged in the traffic circle.

Issues Addressed
- Speeding and accidents (primary)
- Cut-through traffic (secondary)

Applications
- Local streets and local collectors.

Advantages
- Reduces vehicle speeds.
- May effectively reduce collisions.
- May discourage cut-through traffic.
- Provides visual break in the street scape to reduce mid-block speeds.
- Opportunity for landscaping and visual enhancements.

Disadvantages
- Can impact emergency response.
- Can cause bicycle/auto conflicts if restricted travel lanes.
- Drivers may turn in front of circle.
- Can cause the removal of on-street parking, depending on design.

Evaluation Considerations
- For NTMP projects, street tree(s) in traffic circle are maintained by the city; any additional plants are maintained by residents.

Design/Installation Considerations
- May require bulb-outs to discourage vehicles from turning left in front of traffic circle.


N. Clark @ Jardin in Los Altos


N. Clark, Los Altos


Mountain View, CA

Roundabouts

Description
A roundabout is a circular, raised island with deflector islands that form a hub for the traffic that flows around it and the streets that shoot off it. Traffic circulates within roundabouts in a counter-clockwise direction and exits the roundabout by turning right onto the desired street. Unlike a signalized intersection or a mini-traffic circle, drivers select gaps in the traffic to enter the roundabout from each approaching street without having to stop but having to yield to vehicles already engaged in the roundabout.

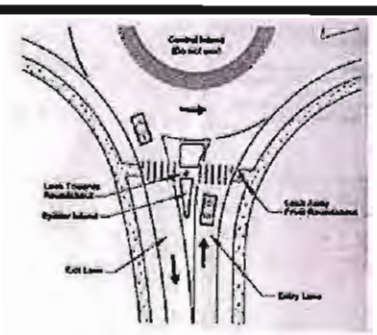
Issues Addressed
- Speeding
- Accidents

Applications
- Collectors, arterials @ intersections

Advantages
- Reduces vehicle speeds.
- Reduces intersection collisions as compared to signalized intersections and 4-way stops.
- Opportunity for landscaping and visual enhancements to the neighborhood.
- May increase intersection capacity depending on turning movements.

Disadvantages
- May require major reconstruction of an existing intersection
- Continuous flow of traffic limits opportunity for pedestrians to cross (compared to signal).
- May reduces response times for emergency vehicles.
- May require a learning curve when first installed.

Design/Installation Considerations
- Careful design needed to accommodate bicyclists and pedestrians.
- May require additional use of right-of-way to accommodate buses and large vehicles.



Proposed roundabout for Springer @ Berry (not implemented)

Cristo Rey Dr., Cupertino, CA

Alameda, CA

Radar Speed Signs

Description
Driver feedback signs that use radar to provide motorists with an instant message, displayed on a reader board, telling them how fast they are driving and to encourage drivers to slow down and drive the posted speed.

Issues Addressed
- Speeding

Applications
- Local collector, collector and arterial.

Advantages
- Highly visible and very effective educational tool at providing and communicating information to motorists.
- Effective for temporary speed reduction.
- Radar speed trailer is portable.

Disadvantages
- Not self-enforcing.
- Duration of effectiveness may be limited.
- Relatively expensive.
- Not aesthetically pleasing.

Evaluation Considerations
- May detract from the quaint appearance of a street.

Design/Installation Considerations
- Install at a location that minimizes visual impact of flashing message on adjacent residential properties.

Springer near Rosita

Miramonte near Stanley

Radar Speed Trailer

Raised Crosswalks/Speed Tables

Description
A speed table (i.e., trapezoidal shaped speed hump) designed as a pedestrian crossing. Typically implemented as a 3 inch elevated, 10 foot wide flat "table" in the center with 6 feet transition ramps on either side that are gently sloped. Has higher design speeds than those for speed humps and thus designed for streets with higher speeds and volume.

Issues Addressed
- Speeding
- Pedestrian safety

Applications
- Local collectors and collectors
- Mid-block placement
- Appropriate for school crossings.

Advantages
- Effectively reduces vehicle speeds.
- Increases crosswalk visibility & safety.
- Volumes typically decrease where cut-through traffic is a problem.
- Should not require parking removal.
- Smoother on large vehiclesvthan speed humps.

Disadvantages
- May cause increase in noise at raised crosswalk and on streets with a high volume of bus and truck traffic.
- May cause increase in emergency vehicle response but not as much as speed humps.
- Pedestrians may falsely assume that motorists see them and will yield.

Evaluation Considerations
- Same as those for speed humps

Design/Installation Considerations
- Street grade must be less than 8%


Berry Ave in front of Loyola School


El Monte at back of Almond School


Colored stamped asphalt speed table


Speed table constructed with pavers

Roadway Narrowings

Description
Roadway narrowings are used to control and constrict vehicle travel paths to encourage slower speeds. The lane width can be reduced, with excess asphalt then striped with a bicycle lane or paved shoulder; these treatments make the driving area appear to be narrow without adding curbing to physically narrow the roadway. The street can also be physically narrowed by extending sidewalks and providing landscaped areas.

Issues Addressed
- Speeding
- Pedestrian and bicycle safety

Applications
- Local collector, collector, arterial
- Streets adjacent to or near schools

Advantages
- Increases pedestrian and bicycle safety
- Self enforcing

Disadvantages
- May not result in significant speed reduction when not used in conjunction with other devices
- May leave excess asphalt to right of roadway, negating effect of visual narrowing

Evaluation Considerations
- Need to determine whether narrowing may significantly divert traffic to surrounding streets.

Design/Installation Considerations
- Minimum lane width, as determined by city, must be maintained.
- Colored slurry can be used designate bicycle path for added visibility and delineation.
- Excess asphalt to right of bike lane may negate effectiveness.

10' lane on Springer Ave

Pathway, landscaping on Berry Ave

Use of colored asphalt to designate bicycle lane and narrow vehicle lane.

Speed Humps

Description
A wave-shaped raised pavement that typically extends the full width of the street. The combination of different heights, lengths, and approach ramps will affect the speed a vehicle can comfortably go over the hump; therefore, a speed hump can be designed for a desired speed at which it may be navigated without causing discomfort to the driver or damage to the vehicle. Discomfort increases as speed over the hump increases. Typically placed in series and spaced as a function of the desired mid-point speed between devices.

Issues Addressed
- Speeding

Applications
- Residential, local streets.
- Not allowed on collector & arterial streets.
- Mid-block placement, not at an intersection.
- Works well with neckdowns and chokers.

Advantages
- Cost effective speed control.
- Self-enforcing.
- Deters cut-through traffic and reduces corresponding noise.
- Does not impact parking.
- Requires minimum maintenance.
- Bicycle friendly.

Disadvantages
- May shift traffic to parallel streets.
- May cause an increase in noise at speed hump, especially on streets with a high volume of bus and delivery truck traffic.
- May increase emergency vehicle response.
- Requires signage and markings that may be considered unsightly.

Description continued on next page

Asphalt speed hump with shark's tooth markings

Stamped asphalt in Cupertino, CA

Stamped gray colored asphalt

Speed Bump vs Speed Hump

Illustrations continued on next page

Speed Humps

Evaluation Considerations

- Impact on Emergency Response Vehicles: Response times must remain within allowable upper limit. Speed tables and speed cushions should also be considered.
- Impact on Noise: Depends on vehicle profile of street. Slightly lower when mostly cars. Slightly higher when a significant percentage of bus and trucks traffic.
- Impact on Aesthetics: Depends on type of markings, signage and materials used.
- Impact on Property Values: inconclusive.[1]

Design/Installation Considerations

- Hump heights range between slightly below 3 inches and up to 4 inches depending on target speed, with trend toward 3 - 3 1/2 inches maximum.
- Hump lengths range from 12 to 14 feet.
- Humps in a series must be properly spaced to encourage driving at constant target speed and to avoid noise from breaking and acceleration immediately before and after each device.
- Difficult to construct precisely; may need to specify a construction tolerance (e.g. ± 1/8 inch) on height.
- Must be sufficiently marked. Often have signage. At a minimum, an advance warning sign before first hump in series.
- Desired speed at speed hump should take into account that SUVs can typically navigate over a speed hump faster than a passenger car.
- Brick colored stamped asphalt can be used for aesthetic value.
- Street grade must be less than 8%.

Speed humps with embedded V-shaped markings

A wider speed hump

See more pictures on next page

[1] "The Economic Impact of Speed Humps on Housing Values," ITE Journal, January 2000, Gwinnett County Department of Transportation, Georgia, by W. Martin Bretherton, Vince Edwards, and Jun Miao. http://www.trafficlogix.com/images/press_releases/55.pdf

The Influence of Traffic Calming on Emergency Response Times

PORTLAND, OREGON PERFORMED A RESEARCH PROJECT TO MEASURE THE AFFECTS OF TRAFFIC CIRCLES AND SPEED BUMPS ON RESPONSE TIMES FOR VARIOUS TYPES OF FIRE APPARATUS.

BY CRYSTTAL ATKINS AND MICHAEL COLEMAN

THE CITY OF PORTLAND, OREgon USA is well known for its quality of neighborhoods and the efforts that have been made to maintain and enhance the livability of these neighborhoods. Part of this success is a result of the city's Traffic Calming Program which has been effective in minimizing the impacts of traffic on neighborhood streets. The program has been in existence for over 12 years with a primary goal of reducing overall traffic speeds on residential streets.

Traffic calming devices are used on Portland's neighborhood streets when traffic conditions are out of character with their adjacent residential, institutional and recreational land uses. Calming devices are used to slow vehicle speeds; to encourage the use of more appropriate streets for through trips; and to enhance pedestrian, bicycle and transit safety. To date, 70 traffic circles and approximately 310 speed bumps have been installed on numerous neighborhood collector and local service streets throughout the city. The devices have proven to be effective at slowing traffic without significantly impacting convenience, mobility and travel time for drivers.

Unfortunately, traffic calming devices that reduce overall vehicular speeds can also impact emergency response vehicles by increasing their response times. City staff from the Traffic Calming Program and the Fire Bureau historically have worked together to review and/or develop traffic calming project designs. But given the number of existing and planned traffic calming devices, the Fire Bureau has become more concerned in recent years about the cumulative impact of these devices on their ability to respond to emergencies in a timely manner. Neighborhoods also are struggling with how best to address the problem of speeding traffic on their streets while not impacting response times for emergency service providers.

RESEARCH METHOD

To better understand the impacts of traffic calming, the city performed a research project to measure the affects of both traffic circles and speed bumps on response times for various types of fire apparatus during the fall of 1995. The Bureau of Traffic Management and the Fire Bureau conducted a thorough data collection effort to help quantify the relationship between three types of traffic calming devices and fire vehicle travel times. Different types of fire vehicles were driven on streets calmed with traffic circles, 22-foot (ft) speed bumps and 14-ft speed bumps. Figures 1, 2 and 3 illustrate the three devices. Table 1 lists basic information about the types of fire vehicles used in this study.

The testing considered four variables that influence the speed at which a fire vehicle can be negotiated around traffic circles or across speed bumps. The variables tested are: the driver, the type of fire vehicle, the desirable vehicle speed and the types of calming devices. The data collection effort involved six fire vehicles of varying characteristics. Test runs were conducted on a total of six streets. Two streets had 22-ft speed bumps, two had 14-ft speed bumps and two had traffic circles. A total of 36 different drivers participated in the testing. The total number of test runs on each street was four per vehicle, or 24 runs per street.

Each test run was videotaped. The camera recorded the vehicle speeds that were detected and displayed by a radar gun. The time of day, to the nearest sec-

ond, was superimposed on the recording. The speed and time information for each test run was transcribed from the videotapes to a spreadsheet. The information for each run was used to calculate the distance traveled after each second, as well as the vehicle's distance from the starting line after each second of the run.

For various combinations of the four variables, the time needed to travel a length of street that had no calming device was compared to the time needed to travel the same length with a calming device. The time and impact distance required to decelerate from a desirable response speed, negotiate the calming device and accelerate back to the original speed was determined from the data. The time required to travel the same impact distance without a calming device to influence the desirable response speed was calculated. The difference between the two travel times equals the delay associated with the calming device. This delay-per-device was calculated for all six vehicles as they negotiated every calming device on the six test streets. Delays-per-device were calculated for desirable response speeds of 25, 30, 35 and 40 mph.

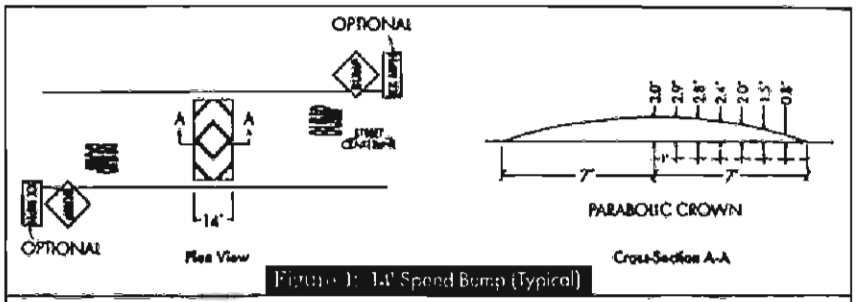


Figure 1: 14' Speed Bump (Typical)

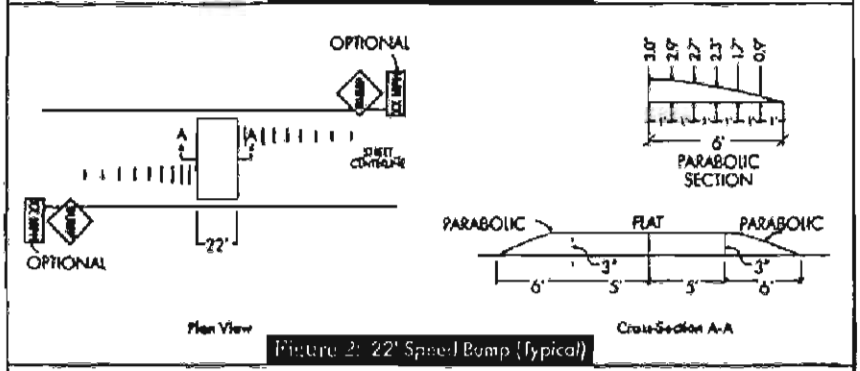


Figure 2: 22' Speed Bump (Typical)

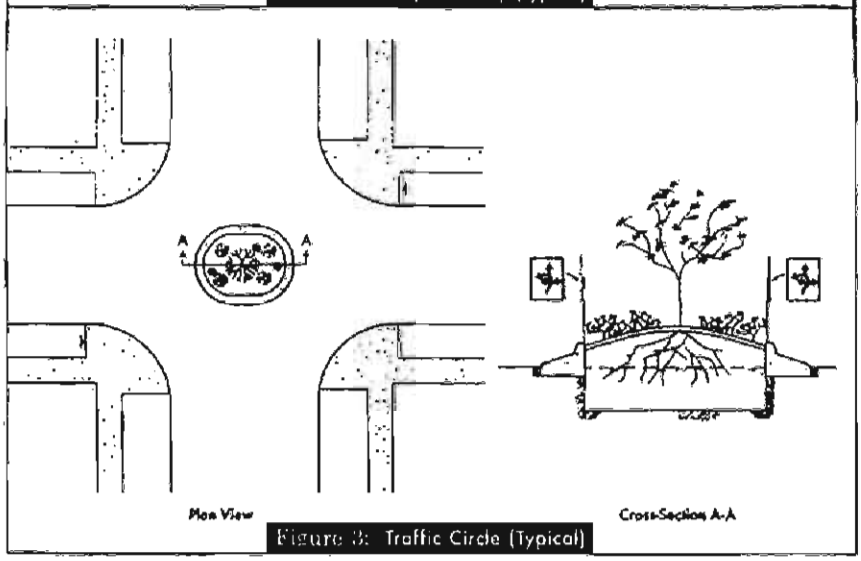


Figure 3: Traffic Circle (Typical)

FINDINGS

The results of the city's research are presented in Tables 2, 3 and 4. Depending on the type of fire vehicle and the desirable response speed, the three devices were found to create a range of delays for each device as follows:

Table 1. Fire Vehicle Specifications

VEHICLE	OVERALL LENGTH	WHEELBASE	WEIGHT (LBS)	HORSEPOWER (HP)	WT./HP RATIO (LBS/HP)	0-40 MPH ACCEL. TIME (SECONDS)
ENGINE 18	29'10"	15'5"	34,860	185	188	19
RESCUE 41	21'	11'6"	na	185	na	12
SQUAD 1	27'	14'6"	23,170	275	84	17
TRUCK 1	48'	21'0"	53,000	450	118	20
TRUCK 4	57'	13'0"	53,960	450	120	22
TRUCK 41	37'6"	16'9"	42,100	350	120	27

BMI is currently conducting a safety study for NCHRP. The focus of this study is to develop an improved accident warrant for traffic signal installation. The study requires a national sample of intersections that have had signal control installed or removed between 1993 and 1995. The researchers would like to invite all state and local agencies to participate in this study by submitting a list of potential study sites. Preliminary information should include the following:

How many intersections in your jurisdiction have had signal control installed or removed between 1993 and 1995?

Is accident data for these intersections available for the period between 1989 and 1996? Is the accident data available in electronic format (computer file)?

Of the above listed intersections, how many have had signal control installed based upon intersection safety?

Also, please provide the following identifying information when submitting responses:

Name

Position

City or State agency name

District/Department

Telephone

Fax

E-mail address

Submittals can be sent to:
Michael Obermeyer
BMI
Suite 700
8330 Boone Boulevard
Vienna, VA 22182
703/917-0710;
BMIVA1@AOL.COM

- *22-ft speed bumps: 0.0 to 9.2 seconds of delay per bump*
- *14-ft speed bumps: 1.0 to 9.4 seconds of delay per bump*
- *Traffic circles: 1.3 to 10.7 seconds of delay per circle*

The drivers' performances did not appear to significantly influence the results. Their choices of deceleration and acceleration rates as well as their choices of minimum speeds near the devices were very consistent.

CONCLUSIONS

The results provide quantitative data that can be used in the determination of the impacts of one or more traffic calming devices on fire response times along a given emergency response

Table 2. Typical Impacts of 22-foot Speed Bumps on Emergency Vehicles

VEHICLE	LOWEST SPEED (MPH)	DESIRABLE SPEED (MPH)	TRAVEL TIME DELAY (SECONDS)	IMPACT DISTANCE (FEET)
ENGINE 18	21	25	0.8	136
	21	30	1.7	323
	21	35	3.0	505
	21	40	5.0	752
RESCUE 41	34	25	0.0	0
	34	30	0.0	0
	34	35	0.3	118
	34	40	1.5	263
SQUAD 1	24	25	0.4	80
	24	30	1.0	214
	24	35	2.1	433
	24	40	3.4	708
TRUCK 1	22	25	0.6	137
	22	30	1.4	320
	22	35	3.0	600
	22	40	4.9	885
TRUCK 4	16	25	1.8	254
	16	30	3.4	449
	16	35	5.9	674
	16	40	7.7	1039
TRUCK 41	14	25	3.0	316
	14	30	4.8	622
	14	35	7.2	912
	14	40	9.2	1322

Lowest Speed: This is the lowest speed a vehicle travels when crossing a 22-foot speed bump.
Desirable Speed: This is the speed a driver might wish to travel if there were no speed bumps.
Travel Time Delay: This is the additional time required to travel to a destination due to a 22-foot speed bump's influence.
Impact Distance: This is the length of street where a given vehicle cannot be driven at a given desirable speed because of the speed bump's influence.

(POSITIONS, from page 65)

route. While this information is obviously useful for planning and designing individual traffic calming projects, additional information is necessary in order to make a complete assessment of these impacts. Specifically, this includes: 1) the types of fire vehicles responding to emergencies; 2) the desirable and appropriate speed of fire vehicles at each of the calming devices located along the response route; 3) the geographical area that will be affected by any increase in delay to response times; and 4) the use of this route by fire vehicles given the likely demand for emergency services and the availability of good alternative routes. Further, a full assessment of the impacts on response times for a given set of traffic calming devices needs to be balanced

Table 3. Typical Impacts of 14-foot Speed Bumps on Emergency Vehicles

VEHICLE	LOWEST SPEED (MPH)	DESIRABLE SPEED (MPH)	TRAVEL TIME DELAY (SECONDS)	IMPACT DISTANCE (FEET)
ENGINE 18	13	25	2.3	286
	13	30	3.7	399
	13	35	5.2	581
	13	40	7.7	814
RESCUE 41	17	25	1.0	147
	17	30	1.7	269
	17	35	2.9	483
	17	40	4.9	628
SQUAD 1	12	25	2.7	244
	12	30	4.1	436
	12	35	5.9	611
	12	40	8.3	852
TRUCK 1	11	25	3.4	269
	11	30	4.9	455
	11	35	6.6	646
	11	40	9.4	931
TRUCK 4	12	25	3.4	315
	12	30	4.9	485
	12	35	6.8	732
	12	40	9.1	1053
TRUCK 41	12	25	3.5	327
	12	30	4.7	472
	12	35	6.6	762
	12	40	8.6	1152

Lowest Speed: This is the lowest speed a vehicle travels when crossing a 14-foot speed bump.
Desirable Speed: This is the speed a driver might wish to travel if there were no speed bumps.
Travel Time Delay: This is the additional time required to travel to a destination due to a 14-foot speed bump's influence.
Impact Distance: This is the length of street where a given vehicle cannot be driven at the desired speed because of the speed bump's influence.

with the benefits of traffic calming on reducing speeding problems and enhancing public safety and livability along neighborhood streets.

This research project provides the initial quantitative data that is necessary to begin to weigh the pros and cons of traffic calming. More importantly, though, it will be useful as part of the community-wide discussions on the broader public safety policy issue; this being the tradeoff associated with slowing vehicular traffic on neighborhood streets while increasing emergency vehicle response times.

The city is currently addressing this policy issue by initiating an 18-month planning process that will basically take this question out to the community for an open public discussion and review of the safety issues and tradeoffs. A task force made up of seven citizen representatives and one representative each from the Transportation, Police and Fire Bureaus will be appointed by the City Council to address this issue. The task force's work will consist of: development of criteria to be used to designate emergency response routes throughout the city; development of classification definitions and descriptions, including a range of traffic calming solutions available for different streets; development of classification policies; and development of recommendations.

The final work product will be an adopted set of emergency response routes that will be incorporated into the city's transportation master plan. This planning effort is believed to be the first of its kind in resolving the increasing conflict between traffic calming and emergency service responses. ■

Table 4. Typical Impacts of Traffic Circles on Emergency Vehicles

VEHICLE	LOWEST SPEED (MPH)	DESIRABLE SPEED (MPH)	TRAVEL TIME DELAY (SECONDS)	IMPACT DISTANCE (FEET)
ENGINE 18	14	25	2.8	261
	14	30	4.3	489
	14	35	6.1	671
	14	40	8.5	814
RESCUE 41	16	25	1.3	170
	16	30	2.3	301
	16	35	3.1	467
	16	40	5.1	612
SQUAD 1	17	25	1.2	172
	17	30	2.3	326
	17	35	3.7	501
	17	40	5.3	776
TRUCK 1	10	25	4.8	319
	10	30	6.4	524
	10	35	8.4	749
	10	40	10.7	1034
TRUCK 4	11	25	4.3	322
	11	30	6.2	549
	11	35	8.1	799
	11	40	10.3	1139
TRUCK 41	11	25	3.9	338
	11	30	5.2	555
	11	35	7.3	845
	11	40	9.2	1255

Lowest Speed: This is the lowest speed a vehicle travels when navigating around a traffic circle.
Desirable Speed: This is the speed a driver might wish to travel if there were no traffic circles.
Travel Time Delay: This is the additional time required to travel to a destination due to a traffic circle's influence.
Impact Distance: This is the length of street where a given vehicle cannot be driven at the desired speed because of the traffic circle's influence.

CRYSTTAL ATKINS

has more than 17 years of experience in program and project planning, management and public involvement. She has been instrumental in developing two traffic calming programs and has implemented over 20 traffic calming projects.

MICHAEL COLEMAN, *P.E.,*

has more than 15 years of experience in transportation planning, design and traffic engineering. He has extensive experience in providing management and design services for traffic calming projects. In addition, Mr. Coleman has conducted extensive research into traffic calming device design and effectiveness.