TRANSPORTATION ELEMENT
DATA INVENTORY AND ANALYSIS

This section addresses the data inventory requirements of 9J-5.019(1) and (2), F.A.C., supportive of the development of goals, objectives, policies, and implementation programs for the Transportation Element.

Purpose of Transportation Element

Pursuant to Rule 9J-5.019, F.A.C., local governments not located within the urban area of a Metropolitan planning Organization (MPO) shall adopt a Transportation Element. Furthermore, the Rule provides that those local governments with a population of 50,000 or less shall not be required to prepare a mass transit or ports, aviation and related facilities elements. Since the City is not located within a MPO and contains a population less than 50,000, the City is required to prepare a Transportation Element.

In an effort to clarify the requirements of those local governments required to submit a Transportation Element, the Department of Community Affairs, in September 1999, released a guide that addresses the transportation planning requirements of local governments based upon Rule 9J-5.019, F.A.C. This guide has been used in the generation of this element.

However, due to the presence and vision of a multi-modal transportation system within the City, this element has been entitled the Transportation Element. It has been created to meet the Traffic Circulation requirements of Rule 9J-5, F.A.C., and further address multi-modal issues related to the existing and future transportation system of the City. Multimodalism addresses both motorized and non-motorized transportation, including vehicles using the roadway network, bicycles, pedestrians, airplanes, and sea travel via personal and commercial watercraft.

The purpose of the Transportation Element Data Inventory and Analysis is to describe and analyze transportation resources within the City, project the future conditions, and prepare a foundation for the formulation of goals, objectives and policies. Data has been collected, analyzed and portrayed in textual, tabular and graphic form, including a series of transportation maps. An additional focus of this element is to further multi-modal opportunities within the City. The Transportation Element and Data Inventory and Analysis presents:

1. An analysis of the existing transportation system, including the ability of transportation facilities and services to serve existing land uses, and the adequacy of the existing and projected transportation system to provide emergency evacuations;
2. Growth trends and travel patterns, including relationships between land uses and the transportation system;
3. Projected transportation system levels of service;
4. An analysis of local and state programs;
5. Maintenance of adopted levels of service standards; and

6. Land use policy implications of transportation management programs necessary to promote public transportation.

Existing Transportation Data Requirements
(§9J-5.019(2), F.A.C.)

Definition of Terms and Concepts

Classification of Major Thoroughfares. Major thoroughfares are categorized into functional classification groups according to the character of service they provide. The four functional classification groups for urban areas are principal arterials, minor arterials, collectors and local streets. The extent and degree of access control is a significant factor in defining the functional classification of a roadway. Regulated limitation of access is necessary on arterials to enhance their primary function of mobility, while the primary function of local streets is to provide access. The functional classifications of major thoroughfares are defined in *A Policy on Geometric Design of Highways and Streets* (American Association of State Highway and Transportation Officials, 1990)

1. **Principal Arterials.** The principal arterial system serves the major centers of activity and the highest volume traffic corridors of urbanized areas. Principal arterials typically serve longer distance trips. Although principal arterials constitute a small percentage of the total roadway network, they carry a high portion of the total urban area traffic. The principal arterial system also carries most of the trips entering and leaving the urban area. Service on principal arterials is normally continuous with relatively high traffic volumes, long average trip lengths, and high operating speed. Service to abutting lands is typically subordinate to the provision of travel service and major traffic movements.

2. **Rural Principal Arterials.** The rural principal arterial system consists of a network of routes that provide for movements between urban areas. The system provides for corridor movement with trip density suitable for substantial statewide travel. In more densely populated states, this class of highway includes most of the heavily traveled routes that might warrant multilane improvements. The rural principal arterial system includes most existing rural freeways, and is stratified into two design groups consisting of freeways and other principal arterials.

3. **Minor Arterials.** The minor arterial system interconnects and supports the principal arterial system. It accommodates trips of moderate lengths at a lower level of mobility than provided by principal arterials. Minor arterials provide continuity among communities and, ideally, do not penetrate identifiable neighborhoods. Generally, the spacing of minor arterials is not greater than one mile in developed areas.

4. **Collectors.** The collector street system provides vehicular access to and mobility within residential neighborhoods, commercial and industrial areas. It differs from the arterial system by penetrating neighborhoods and distributing trips from arterials to their ultimate destinations. Collector streets also channelize vehicular traffic from local streets onto the

arterial system, and have moderate operating speeds and shorter travel distances than arterials.

5. **Local Streets.** The local street system comprises all roadways not in one of the higher systems. It provides direct access to abutting land uses and connections to the higher order systems. Local streets offer the lowest level of vehicular mobility and service and through traffic is often discouraged.

Level of Service. Level of Service (LOS) standards can be determined for various public facilities. Level of Service for roadways is defined by the *Highway Capacity Manual 2000* (Transportation Research Board, 2000) as:

> *"A qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience."*

The six different LOS classifications represent a range of operating conditions and the driver's perception of those conditions. They are described below:

1. **Level of Service A.** This LOS represents an ideal condition of primary free-flow traffic operations at average travel speeds. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream, and delays at intersections are minimal.

2. **Level of Service B.** This LOS represents reasonably stable, unimpeded traffic flow at average travel speeds. The ability to maneuver within the traffic stream is only slightly restricted and stopped delays are not significant.

3. **Level of Service C.** Traffic flow is stable but drivers' choice of speeds and ability to maneuver are increasingly restricted. Longer queues characterize this level of service.

4. **Level of Service D.** Traffic flow is generally unstable where minor increases in flow result in substantial delay. Driving speeds are tolerable for short periods, but are subject to sudden variance. The ability to maneuver and choose a speed is severely restricted.

5. **Level of Service E.** High volumes and significant delay typify this level of service. Traffic flow is unstable and generally maintained at a low speed. Driver comfort is low due to limited space between vehicles and rapidly changing speeds, and extensive delays are typically experienced at critical intersections.

6. **Level of Service F.** Traffic flow is characterized by extremely low speeds. Driving comfort is low and motorists incur significant delays. Substantial queuing also occurs at critical intersections.

Traffic performance calculations are generally based upon a methodology obtained from the latest edition of the Transportation Research Board's *Highway Capacity Manual.* For US 1, Monroe County adopted the methodology set forth by the US 1 LOS Task Force[1]. The

methodology is based on a comparison between adjusted-posted speed limits and median travel speeds, which are measured in the field. This methodology is discussed in detail in the *Analysis of Existing Transportation System* section. The City also utilizes this methodology for the calculation of existing traffic performance on US 1.

For other roadways within the City, the LOS shall be determined based upon standard Florida Department of Transportation (FDOT) methodology for determination of LOS. This methodology utilizes the maximum service volumes provided in the generalized tables contained in FDOT's *1998 Level of Service Handbook.*

Existing Transportation Map Series

The existing series of maps have been prepared to represent the transportation network, including collector and arterial roadways, bicycle and pedestrian paths, and the Marathon Airport. At present, the City does not have mass transit rail lines.

Map 12: Functional Classification identifies the functional classification of major thoroughfares in the City. The functional classification indicates the role of each thoroughfare in meeting current travel demands, assists in defining land use relationships, and reveals the jurisdiction responsible for maintenance. US 1 functions as an urban state principal arterial, but also as "Main Street" within the City. All other roadways in the City traverse a short distance and function as collector or local streets. The main function of these collector and local roadways is to provide access to abutting land uses and channelize traffic to US 1 at specific connections.

Map 13: Major Trip Generators and *Table 7-1: Major Trip Generators and Attractors* identify the sites of major trip generators and attractors and their location by Mile Marker (MM) within the City.

TABLE 7-1:
Major Trip Generators and Attractors

Site	Mile Marker
Best Western/Faro Blanco Resort	47.9
Government Center/Switlik Elementary School	48.7
Fisherman's Hospital	48.8
Community Park/City Marina	49.2
Home Depot	49.5
Marathon Liquor Shopping Center/Main Post Office	49.7
Marathon High School	50.0
Publix Shopping Center	50.0
Sombrero Beach	50.0
Winn-Dixie Shopping Center/K-Mart/McDonalds	50.1
Gulfside Village Shopping Center	50.2

TABLE 7-1:
Major Trip Generators and Attractors

Site	Mile Marker
Marathon Airport	52.2
Office Depot Shopping Center/Walgreens	52.8
Old Town Shopping Center/Post Office	53.0
The Dolphin Research Center	59.0
Grassy Key Flea Market	59.9

Source: City of Marathon

Map 14: Pedestrian and Bicycle Pathways delineates the existing pedestrian/bikeways within the City. Bicycle paths run parallel to US 1 throughout portions of the City.

Map 15: Hurricane Evacuation Routes delineates the County's designated regional transportation facilities critical to the evacuation of the population prior to an impending disaster. US 1 is designated as the primary hurricane evacuation route for the City and Monroe County.

Map 16: Roadway Level of Service illustrates Levels of Service for US 1 throughout the City.

Map 17: Aviation Facilities identifies the current Marathon Airport within the City, access connections to the surrounding roadway network, and the surrounding land uses. All airport facilities currently on-site are identified, as are clear zones and obstructions.

Transit, Port and Rail Facilities. The City has no scheduled fixed route transit, seaport, or rail facilities within its municipal boundaries; and therefore, no associated data, analysis or maps regarding these facilities are presented in the City's Plan.

Analysis of Existing Transportation System
(§9J-5.019(3), F.A.C.)

Existing Roadway System. The roadway network in the City and the Keys is unique with US 1 serving as the primary link for every island throughout the archipelago. However, it also operates as a collector for local traffic generated in the City. Roadway access entering and exiting the City is only provided via US 1, which serves the Keys as both an economic and public safety lifeline. It cannot be overstated the need to assess the operation of US 1 within a regional context to assure that the Keys' only roadway link will continue to function properly.

The functional classification for US 1 in the City is an urban principal arterial. All other streets in Marathon are collector streets and local streets, which, due to the linear geography of the Keys and importance of US 1, are geared towards providing access to abutting land uses and channelizing traffic towards US 1. Monroe County transferred jurisdiction and responsibility for local and collector to the City, which currently includes approximately 380 streets.

Much of US 1 through the City contains parallel frontage roads. Pursuant to *A Policy on Geometric Design of Highways and Streets* (American Association of State Highway and Transportation Officials, 1990), frontage roads serve numerous functions, depending on the type of arterial they serve and the character of the surrounding area. Such roads may be used to control access to an arterial roadway, to function as a street facility serving adjoining property, and to maintain circulation of traffic on each side of the arterial.

Within Marathon, the frontage roads segregate local traffic from the higher speed through traffic. The frontage roads within the City perform an important function. By serving local traffic, these roads assist in reducing traffic volumes on US 1. Bicycle and pedestrian facilities are located on or adjacent to frontage roads interspersed throughout the City. These frontage roads have the potential to provide additional roadway capacity within the City if needed during an evacuation event.

US 1 in the City is defined between MM 47.0 to MM 60.5, from the east end of the Seven Mile Bridge to Tom's Harbor Bridge. It is essentially a four-lane roadway through Marathon consisting of a center left-turn lane with curb and gutter from 37th Street (MM 49) to Aviation Boulevard (MM 50) and a median with left-turn storage and curb and gutter from Aviation Boulevard (MM 50) to Coco Plum Drive (MM 54). From Coco Plum Drive (MM 54) to Tom's Harbor Bridge (MM 60), US 1 narrows to a two-lane, undivided facility. Posted speeds are generally 45 miles per hour, with an approximate two-mile segment posted at 40 miles per hour (MM 48 to MM 50) and a six-mile segment posted at 55 miles per hour (MM 54 to MM 60).

Additionally, as traffic exits Marathon towards the Seven Mile Bridge, US 1 narrows from a four-lane facility to a two-lane facility. This creates a bottleneck as traffic attempts to merge, leading to substantial delay.

Seven signalized intersections are located on US 1 within the City. Two pedestrian signals are located at MM 48.5 and MM 53.0, while the remaining five signals regulate traffic. The locations of the traffic signals are listed below in Table 7-2:

TABLE 7-2:
Traffic Signals on US 1 in the City of Marathon

Mile Marker	Cross Street
48.5	Switlick School
50.0	SR-931/Sombrero Beach Road
52.4	107th Street
52.5	109th Street
53.0	121st Street
53.5	Key Colony Beach Causeway
54.0	Coco Plum Drive

Source: 2003 US 1 Arterial Travel Time and Delay Study

Methodology to Measure Levels of Service. Prior to the City's incorporation, authority for determining the adopted level of service performance for US 1 resided with Monroe County.

The US 1 Level of Service Task Force, a multi-agency group comprised from Monroe County, the Florida Department of Transportation and the Florida Department of Community Affairs, prepared the methodology used for monitoring. The Task Force formulated the methodology in 1991 and revised it in 1997. They are scheduled to meet again in 2000 to consider further changes pursuant to the 2000 Highway Capacity Manual. As a newly incorporated municipality with a stake in the outcome, the City should participate as a member of the Task Force.

Measurements of travel speeds for the entire 108-mile stretch of US 1 and 24 individual segments are established by conducting travel time runs from Key West to the mainland during peak tourist season, defined as the six-week window beginning the second week of February and ending the fourth week of March each year. Monroe County adopted the methodology set forth by the US 1 LOS Task Force for measurement of US 1 traffic performance, establishing the minimum acceptable level of service as LOS C. Further, 45 miles per hour has been adopted by the County as the LOS C standard, regardless of the posted speed limit of the segment.

US 1 in the City is considered to be an interrupted flow facility due to the urban setting and number of traffic signals in close proximity to each other. Table 7-3 shows the thresholds for the levels of service utilizing the US 1 LOS Task Force methodology, based on median travel speeds for locations with a 45 mph posted speed limit and interrupted flow:

TABLE 7-3:
Levels of Service

LOS	Speed
A	≥35.0 mph
B	≥28.0 mph
C	≥22.0 mph
D	≥17.0 mph
E	≥13.0 mph
F	<13.0 mph

Source: 2003 Arterial And Travel Time/Delay Study, URS Inc.

Monroe County adopted LOS C standard for US 1, calculated using the LOS Task Force methodology, which provides that the level of service shall be maintained within five percent (5%) of LOS C. The City shall also adopt LOS C utilizing the US 1 LOS Task Force methodology, thereby maintaining the regional consistency of analysis necessary for US 1. This methodology is not effective for estimating future levels of service because it determines levels of service based on speeds measured in field surveys, which vary from year to year. For other roadways within Marathon, the adopted LOS standard is D, utilizing FDOT methodology for determination of LOS, which measures peak hour traffic volumes.

Traffic Performance of US 1. Table 7-4, contains the 2002 Average Annual Daily Traffic (AADT) volumes on or near US 1 obtained from FDOT's five count stations, located within the City. The AADT figure is for two-way traffic.

TABLE 7-4:
2002 AADT on US 1 in Marathon

Count Station	Location	2002 AADT
90-0046	200 feet south of US 1, on Key Colony Beach Causeway	6,200
90-0045	200 feet north of Key Vaca Bridge	24,500
90-0110	200 feet north of 70th Street	30,500
90-0055	200 feet south of US 1, 20th Street	7,200
90-0642	100 feet north of Seven Mile Bridge	12,900

Source: Florida Department of Transportation, 2002

Monroe County assesses the performance of its public facilities annually. The most current is detailed in the *2003 Monroe County Public Facilities Capacity Assessment.* Table 7-5 illustrates travel performance information for US 1 segments in the City.

TABLE 7-5:
Existing (2003) Traffic Performance US 1 in Marathon

Segment (Key)	Beginning Mile Marker	Ending Mile Marker	Speed Limit (mph)	Median Speed (mph)	LOS
Marathon	47.0	54.0	45/40	38.2	A
Grassy	54.0	60.5	45/55	50.9	C

Source: 2003 Arterial and Travel Time/Delay Study, URS Inc.

Pursuant to the US 1 LOS Task Force methodology, the level of service on US 1 within the City is LOS A for the interrupted flow facility. This indicates that US 1 is currently operating above the acceptable level of service standard of LOS C.

Reserve Capacity. The difference between the segment travel speeds and the LOS C standard is known as the reserve speed. Reserve speed is converted into an estimated reserve capacity of additional traffic volumes and corresponding additional development. If the travel speed falls below the LOS C standard, additional trips equivalent to five percent (5%) of LOS C capacity are allowed to accommodate a limited amount of land development, until traffic speeds are measured again or until remedial actions are implemented. Available capacity for US 1 in the City is summarized in Table 7-6, as determined from the *1999 US 1 Arterial Travel Time and Delay Study.*

TABLE 7-6:
US 1 Level of Service and Reserve Capacity

Segment	1999 Level of Service	1998 Maximum Reserve Volume	1999 Maximum Reserve Volume	Reserve Speed (MPH)
Marathon MM 47.0 to 54.0	A	18,876	18,598	15.4
Grassy MM 54.0 to 60.5	C	2,527	841	0.8

Source: 1999 US 1 Arterial Travel Time and Delay Study

The City, defined between MM 47 and MM 60, currently operates at LOS A with 15.4 miles per hour of reserve speed available and LOS C with 0.8 miles per hour of reserve speed available before the respective segments will operate below the adopted LOS C. This translates into a reserve volume of 18,598 vehicles and 841 vehicles, respectively.

If the overall LOS for US 1 is below the adopted LOS C, all growth in the Florida Keys will be required to cease. Should the roadway segment operate below the adopted LOS, policy options exist for the City to re-allocate available trips from one roadway segment to another, change the LOS to D for certain segments or reduce speed limits on segments with deficiencies, according to Task force documentation. These actions require policy statements in the Plan and should be coordinated with FDOT via the US 1 Level of Service Task Force and an annual workshop. While presently US 1 through Marathon is operating at an acceptable LOS, future conditions may dictate the need for actions besides roadway widening. Transportation System Management (TSM) strategies and enhancing transportation alternatives will provide additional tools to ensure that US 1's level of service and consequently, the roadway reserve capacity, will be maintained to accommodate future proposed development.

Traffic Performance on Collector Roadways. According to the *Monroe County Public Facilities Capacity 1999 Assessment,* all collector and local roads in the City operated at or above the adopted standard of LOS D in 1999.

Accident Analysis. The Florida Department of Transportation (FDOT) collects and summarizes crash data for all facilities operated by the state, which involve at least one motorized vehicle. Pedestrian and cyclist data is provided only if a motorized vehicle is also involved. A query of FDOT's database for US 1 in Marathon for the years from 1995 to 1999 provided the most current data, and is summarized below in Tables 7-7 and 7-8.

TABLE 7-7:
Traffic Crash Frequency Summary US 1 in the City of Marathon

Location	1995		1996		1997		1998		1999	
	Freq	Rate	Freq	Rate	Freq	Rate	Freq	Rate	Freq	Rate
East of Seven Mile Bridge to Vaca Key	24	6.26	13	2.72	16	3.71	10	2.16	15	2.77
Vaca Key to Grassy Key	114	0.99	105	1.07	105	1.09	105	0.96	98	0.79
Grassy Key to Tom's Harbor Bridge	6	0.28	7	0.33	6	0.29	7	0.29	8	0.35

Note: Crash rates reported are per million vehicle-miles traveled
Source: Florida Department of Transportation, 1999

TABLE 7-8:
Traffic Fatality Frequency Summary US 1 in The City of Marathon

Location	1995		1996		1997		1998		1999	
	Freq	Rate	Freq	Rate	Freq	Rate	Freq	Rate	Freq	Rate
East of Seven Mile Bridge to Vaca Key	1	26.08	0	0.00	1	23.21	0	0.00	1	18.47
Vaca Key to Grassy Key	2	1.73	2	2.03	0	0.00	2	1.83	1	0.81
Grassy Key to Tom's Harbor Bridge	4	18.84	0	0.00	0	0.00	2	8.39	0	0.00

Note: Fatality rates reported are per 100 million vehicle-miles traveled
Source: Florida Department of Transportation, 1999

The City was divided into three roadway segments, based on roadway cross sections, for the purpose of analyzing crash statistics. The roadway segment from east of the Seven Mile Bridge to Vaca Key is approximately 1.1 miles in length where US 1 is a two-lane facility. US 1 from Vaca Key to Grassy Key is approximately 11.7 miles long and is generally a four-lane roadway. US 1 east on Grassy Key to Tom's Harbor Bridge transitions back to a two-lane roadway and is approximately 2 miles in length.

The 11-mile segment of US 1 from Vaca Key to Grassy Key includes the central business district of the City and several traffic signal-controlled intersections. Since this segment is substantially longer than the others, the exposure to be involved in a crash is also greater. Therefore, this segment should also exhibit a greater frequency of crashes, as shown in Table 7-7. However, when these frequencies are converted to rates based on the average daily traffic traversing the segment and the exposure for the segment (i.e. the length of the segment), it is shown in Table 7-7 that US 1 from the east end of the Seven Mile Bridge to Vaca Key has a significantly larger

crash rate than the other segments. While this rate has decreased over the past five years, it is still more than three times the rate associated with the Vaca Key-to-Grassy Key segment and nearly eight times the rate for the Grassy Key-to-Tom's Harbor Bridge segment.

Further investigation of the Seven Mile Bridge-to-Vaca Key segment indicates that approximately 62 percent of reported crashes over the past five years are rear end crashes. The transition from four lanes to two lanes in the southbound direction near the bridge typically results in queues, particularly if a motorist attempts to complete a left-turn maneuver from the travel lane in this transition area. Intuitively, when vehicles are stopped waiting to complete a turning maneuver from a through lane, rear-end crashes will occur with greater frequency.

The fatality statistics shown in Table 7-8 do not seem to indicate a reliable historic trend for any of the segments. While the fatality rates are high when traffic fatalities have been recorded, it should be noted that fatalities are a rare occurrence and do not usually happen. Further, when a traffic fatality is recorded in the shorter roadway segments, the rate is skewed upward due to the limited exposure of the short segments. Of the four fatalities recorded for 1995 on US 1 between Grassy Key and Tom's Harbor Bridge in Table 7-8, three occurred in one head-on crash. Only two fatal crashes were recorded in the four years since.

Existing Modal Split and Vehicle Occupancy Rates. The automobile is typically the most convenient mode for people to travel because of the ability to travel instantaneously when the individual desires. Alternative modes of transportation often incur delay from waiting for a bus, train, airplane, etc. as well as the time to travel to the destination. Thus, alternate modes have difficulty competing against the automobile. Transportation options currently available within the City include the automobile, airplane, bicycling, walking, and boating.

Information regarding modal split and vehicle occupancy rates for Marathon are not available. However, the modal split is likely to favor the automobile due to the lack of transit, lack of population density, minimal destinations provided at the airport and the lack of connectivity of the bicycle/pedestrian paths. The City may become less dependent on the automobile in the future through the provision of connected network of safe bicycle and pedestrian paths or a transit system that connects the airport with local hotels and major trip generators/attractors.

Origin and Destination Characteristics. Origin and destination studies provide information about traffic movements such as trip length, trip purpose, and traveler information. The Monroe County Traffic Report Guidelines Manual (Appendix D) published in March 1996 contains information from an origin/destination survey conducted at six locations along US 1 within the Keys in 1992.

One of the surveys was located at MM 52 in the City. The results indicate that 39.2 percent of trips were permanent residents, 45.9 percent of the trips were by tourist, and 11.6 percent were by seasonal residents. The fact that many trips were made by tourists is validated by the data, which indicates that 43.9 percent of all trips are non-home based trips. While the data in the survey indicates that permanent and seasonal residents comprise the majority of survey trips, it is unclear how many of the respondents actually reside within the City or were traveling through the City.

Existing Public Transit Facilities and Routes. The City currently does not operate a transit system. Monroe County does provide para-transit service for the transportation disadvantaged, which is discussed in the next section, and the Greyhound Bus Company provides regional bus service between Key West and Miami with three daily trips in each direction.

Transportation Disadvantaged. The transportation disadvantaged include individuals who, because of physical or mental disability, income status or age, are unable to transport themselves or purchase transportation. As a result, these individuals are dependent upon others to obtain access to health care, employment, education, shopping, social and other activities.

Within the State of Florida, the provision of services to the transportation disadvantaged is coordinated by the Florida Commission for the Transportation Disadvantaged under the Transportation Disadvantaged Program. This program has established local coordinated systems to serve the transportation disadvantaged with each county having a designated Community Transportation Coordinator. Within Monroe County, the Guidance Clinic of the Middle Keys is the designated Community Transportation Coordinator. In addition to serving as a transportation provider, the Guidance Clinic also subcontracts with Monroe County Social Services and Medicaid Transportation. These transportation providers supply transportation services to Monroe County's transportation disadvantaged population, including those that reside within the City.

Existing Pedestrian and Bicycle Facilities. The availability of pedestrian facilities and amenities plays an important role in encouraging the use of alternative modes of travel to the automobile. Benefits associated with walking and bicycling include the reduction of vehicular traffic, improved air quality due to reduced emissions, personal health/recreation and a reduced need for automobile parking facilities. To be considered a realistic transportation alternative, however, the infrastructure needs to be favorable for bicycle and pedestrian use.

The City contains a network of bicycle facilities that is shared by pedestrians, in-line skaters and other users. Sidewalks dedicated exclusively for pedestrians are virtually non-existent. *Map 14: Pedestrian and Bicycle Pathways* identifies the bicycle network in Marathon.

As shown on *Map 14*, the existing pedestrian and bicycle paths extend continuously along US 1 from the east end of the Seven Mile Bridge to approximately MM 54, north of the airport. The path is located on the Bay side of US 1 with crossings (either at-grade or separated) located at the Seven Mile Bridge, MM 49, and Sombrero Beach Road (MM 50), in addition to the two pedestrian traffic signals at MM 48.5 and MM 53.0. Two rest stop facilities are provided and are located south of MM 49, and between MM 49 and Sombrero Beach Road. Four accessible trail-heads, located near the east end of the Seven Mile Bridge, MM 49, just north of Sombrero Beach Road on the bay side, and MM 51.5 near the airport, are provided.

The development of bicycling and pedestrian facilities and the support of these travel modes within the City may provide an important service by reducing automobile trips on US 1. This is particularly true in light of the location of Marathon's existing pedestrian/bicycle facilities, and

the development of the County Wide Florida Keys Overseas Heritage Trail State Park which are adjacent to US 1 and provide a realistic alternative mode of transport to the automobile.

Existing Marine Travel and Port Facilities. Due to its geographic location, Marathon has the ability to support boating as an additional mode of transportation. Although figures related to the number of boats and boat trips taken within the City do not currently exist, the unique setting of the City lends itself towards this alternative transportation mode. According to the Florida Department of Highway Safety and Motor Vehicles, in 1998, Monroe County had 20,356 registered pleasure crafts. Therefore, marine travel has the potential to serve as a viable alternative to travel on US 1. However, information is not available concerning the frequency and patterns of marine travel.

Boot Key Harbor currently is an area utilized by approximately 350 live-aboard vessels during the peak season and approximately 150 vessels during the off-peak season. Therefore, it is not truly a port facility, as defined by Chapter 9J-5, F.A.C., because it is not predominantly utilized by commercial uses. There are numerous marinas throughout the City and commercial fishing operations near Boot Key Harbor, along Coco Plum Drive, 11th and 15th Streets and Fisherman's Point.

Existing Airport Facilities. Marathon Airport is located at MM 51.5. Until recently, there were several daily scheduled flights to/from Miami and Fort Lauderdale. The airport consists of a single, east-west runway that is 5,000 feet long with 400-foot long overruns at each end. It is 100 feet wide and lighted with medium intensity light. The runway will support a 47,000-pound aircraft with single-wheel gear, a 66,000-pound aircraft with dual-wheel gear, and an 110,000-pound aircraft with dual-tandem gear[2]. In 1983, the FAA, based upon a Convair 440 wingspan, approved reductions in the separations between the runway centerline and the taxiway centerline, aircraft parking area, and building restriction line.

Marathon Airport currently does not have an air traffic control tower, but does employ a non-precision instrument approach on Runway 7 with a circular or straight-in non-directional beacon approach, as shown on *Map 17: Aviation Facilities*.

The terminal building is 2,600 square feet, consisting of ticketing, baggage claim, car rental, waiting areas, advertising, manager's office, phone booth, vending machines, restrooms, and a partially paved parking lot accommodating 48 vehicles. Two fixed base operators (FBO) are located in hangars and provide jet and aviation fuel. The Marathon Flying Club is located in the clear zone at the east end of the runway. Monroe County Mosquito Control is also located at the east end of the runway, but is outside of the clear zone. The Marathon Volunteer Fire Department, which directly accesses the airport and US 1, provides crash, fire, and rescue services.

Land Use Compatibility with Airport Facilities. Much of the areas surrounding the Marathon Airport are developed and include many established residences. This is particularly true of the south and east, which includes some industrial development. The airport's overall impact is somewhat lessened by the hardwood hammock buffer along Aviation Boulevard to the north which reduces the impact to adjacent neighbors.

Intermodal Facilities. Currently, the Greyhound Bus Company offers regular service along the entire length of the Keys, and operates a ticket office in the City. Buses will pick up and/or drop off passengers at any authorized stop, but tickets can only be purchased at specific offices.

Because of the lack of limited access highways in the City, no HOV lanes exist. Further, no designated park-and-ride lots exist in the City.

Characteristics of Major Trip Generators and Attractors. The major traffic generators and attractors within the City are identified in *Table 7-1: Major Trip Generators and Attractors*. The existing major trip generators and attractors are depicted on *Map 13: Major Trip Generators*.

The characteristics of the trips generated by the schools include peak traffic demand in the mornings (when pupils and staff arrive) and afternoons (when pupils and staff depart). It may be noted that the morning peak traffic period associated with schools coincides with the typical morning home-to-work commute. However, the peak afternoon traffic period associated with schools occurs earlier than the typical work-to-home commute.

The trip generation characteristics of governmental facilities, such as City Hall and the US Post Office, are influenced by both the facilities' employees and customers. Most employees arrive in the morning and leave in the evening. Peak hours for retail customers and restaurants as well, may vary depending on hours of operation, and the clientele to which the service is oriented.

Availability of Transportation Facilities and Services to Serve Existing Land Uses. The City is comprised of approximately 5,122 acres of which 3,187 are developed. Approximately 52 percent of the area is zoned for residential uses, while commercial and mixed use land uses account for approximately 48 percent of existing land uses. Analysis provided in the Future Land Use Element of the Plan indicates that 956 of the 2,578 total vacant lots (37%) in the City are environmentally sensitive hardwood hammock or wetland habitat with development constraints, leaving 1,622 lots with few environmental development constraints.

As noted previously, US 1 is the only arterial roadway within the City and the Keys. Other roadways within the City, including the frontage road network, traverse shorter distances, and provide direct access to adjacent land uses, funneling traffic towards or parallel to US 1. These roadways adequately serve the existing land uses. Additionally, land uses close to City sidewalks and bicycle paths are also served by these alternative modes.

Emergency Management. The Monroe County Comprehensive Plan (Intergovernmental Coordination Element, Policy 216.1.3) designates US 1 and Card Sound Road (SR 905) as hurricane evacuation routes for the Florida Keys. US 1 is the only land-based connection to the mainland for the Keys, and within the City is primarily a four-lane roadway. US 1 transitions to a two-lane facility near MM 54 and continues to the north as a two-lane facility with intermittent center left-turn and right-turn lanes to Key Largo (MM 91). To the northeast of Key Largo, the US 1 corridor splits into two roadways. US 1 veers northwest and connects to Miami-Dade County, while SR 905 continues in the northeast direction. The cross section on US 1 between MM 106 and MM 126 varies between a two-lane undivided roadway and a four-lane undivided roadway. In Florida City, US 1 becomes a four-lane divided roadway.

The Monroe County Comprehensive Plan Hurricane Evacuation Analysis provides an analysis of hurricane evacuation via US 1 and Card Sound Road, including an estimate of the clearance times required to evacuate Monroe County using these roadways. This study establishes evacuation zones, identifies critical roadway segments, and estimates clearance times based on development patterns, functional population, and the behavioral analysis undertaken as part of the Lower Southeast Florida Hurricane Evacuation Study prepared by the US Army Corps of Engineers in 1989. This study was revised in 1995 and Policy 216.1 of Intergovernmental Coordination Element of the Monroe County Plan was amended to state that the County shall aim to reduce existing hurricane clearance times to 24 hours by 2010. This policy was based on the widening of the 18-mile Stretch, a project that was removed from the FDOT Five-Year Work Program in 1999.

The Florida Keys Hurricane Evacuation Study (Miller Consulting, Inc., November 2000) concludes that, with the existing roadway network, 26 hours and 46 minutes would be required to evacuate the Keys during a Category 3-5 hurricane. This means that the evacuation of the Florida Keys must be 2 hours and 46 minutes quicker to adhere to the 24-hour policy. Currently the study recommends only capital improvement projects to reduce evacuation time. Transportation system management (TSM) strategies, as proposed by the *Monroe County Sheriff Office's report*, were not considered in the draft report. Currently the Miller Consulting study and its recommendations have not been adopted by any local government. Continued coordination with Monroe County through existing Task Forces and Technical Groups, and with FDOT, will be essential to ensure that growth management and policy alternatives are fully examined to reduce evacuation times.

The City has currently undertaken the development of an Evacuation Plan focused upon the early evacuation of tourists, recreational vehicle (RVs) and mobile home residents, which supplements the County's plan. It recommends evacuating these populations early, in advance of the ordered evacuation for the general public, to reduce clearance times by as much as 30 minutes by minimizing the number of vehicles transporting evacuees to the mainland during the peak period. However, the transient evacuation plan also has not been finalized and adopted by City Council. Until such time, the City will continue to adhere and follow the Monroe County evacuation plan to maintain regional continuity in the event of a natural disaster for the safe and efficient evacuation of all the inhabitants of the Keys.

Future Transportation Map Series

As required by Chapter 9J-5.005(c)(5), F.A.C., the City has developed a series of maps depicting the future transportation network. Any future improvements or changes are shown on the relevant transportation maps. The proposed port area in Boot Key Harbor is also depicted. However, no limited access highways or high-speed rail lines are expected.

Map 12: Functional Classification. This map identifies the functional classification and the number of lanes of the major thoroughfares in the City. The functional classification indicates the role of each thoroughfare in meeting future travel demands, assists in defining land use relationships, and reveals the jurisdiction responsible for maintenance. US 1 functions as an urban state principal arterial, but also as "Main Street" within the City. All other roadways in the

City traverse a short distance and function as collectors or local streets. The main function of these collector and local roadways is to provide access to abutting land uses and channelize traffic to US 1 at specific, controlled connections.

Map 13: Major Trip Generators. Table 7-9: Future Major Trip Generators and Attractors identify the future major trip generators and attractors within the City and their location by Mile Marker (MM) as listed below.

TABLE 7-9:
Future Major Trip Generators And Attractors

Site	Mile Marker
Marathon Marina	47.5
Best Western	48.0
Government Center/Switlik Grade School	48.7
Fisherman's Hospital/Public Utilities	48.8
Community Park/City Marina	49.2
Marathon Liquor Shopping Center/Main Post Office	49.7
Marathon High School	50.0
Publix Shopping Center	50.0
Sombrero Beach	50.0
Winn-Dixie Shopping Center/K-Mart/McDonalds	50.1
Gulfside Village Shopping Center	50.2
Marathon Airport	52.2
Office Depot Shopping Center/Walgreens	52.8
Old Town Shopping Center/Post Office	53.0
Dolphin Research Center	59.0

Map 14: Pedestrian and Bicycle Pathways. This map delineates the future pedestrian paths and bikeways within the City, based in part on the Heritage Trail Master Plan. Bicycle paths run parallel to US 1 throughout portions of the City. Connectivity to all proposed modes of travel and centers of trip generation and attraction are critical to creating an integrated, multi-modal transportation system.

Map 15: Hurricane Evacuation Routes. The County's designated regional transportation facilities critical to the evacuation of the population prior to an impending disaster are depicted. US 1 continues to be designated as the primary hurricane evacuation route for the City and Monroe County, and is expected to remain as the only surface transportation evacuation route.

Map 16: Roadway Level of Service. Future levels of service for US 1, the only major thoroughfare in the City, are illustrated in Map 16.

Map 17: Aviation Facilities. This map illustrates the future Marathon Airport within the City, access connections to the surrounding roadway network, and the surrounding land uses. All future airport facilities to be on-site are identified, as are clear zones and obstructions.

Map 18: Future Transit Facilities. This map demonstrates that the City proposes a scheduled fixed route transit and seaport facility within its municipal boundaries. Transit routes, terminals, right-of-way, exclusive transit corridors, and significant trip generators and attractors are identified and depicted in Map 18, as well as intermodal terminals and access facilities.

High-speed rail facilities appear to be unfeasible due to right-of-way restrictions and the prohibitive cost of such a project. Therefore, no analysis, recommendation, or future map regarding high-speed rail is included in the City's Plan.

Analysis of Future Transportation System

Transportation System Level of Service and Growth Trends. Traffic projections for US 1 within the City were estimated based upon methodologies outlined in the Florida Department of Transportation's *Design Traffic Handbook.* For areas without a forecasting model, such as Marathon, traffic projections are normally based upon historic trends, with a linear growth pattern normally assumed. When historic Average Annual Daily Traffic (AADT) data is used, linear regression is calculated typically using the most recent 10 years of data to extrapolate the future year traffic projections.

To determine the future traffic volumes on US 1 within the City, historical AADT of US 1 was gathered. FDOT maintains three count stations within Marathon that provided a minimum of 10 years of data. The 2002 AADT at these stations, as well as their location, was previously provided in Table 7-4. Using linear regression analysis, growth rates were developed for US 1 from each of these count stations. The analysis indicated that traffic along US 1 in Marathon has been historically increasing at a 2.5 percent annual compound growth rate. It is believed that due to the Monroe County's Rate of Growth Ordinance (ROGO) limiting the number of new residential units which can be constructed annually which has been in effect since 1992, the present amount of development in the City, and the recent economic boom that fueled an increase in tourism, the future growth rate will slow from its present 10-year pace. Therefore, the trend analysis evaluated the past five years of historical traffic data (inclusive of ROGO), which indicated that the growth rate would be approximately 1.9 percent.

Future traffic predictions for the US 1 segments within the City are presented in Table 7-10. It should be noted that the projections forecast the future travel demand for the roadway. Growth management policies for the Keys that recognize the carrying capacity limitations of the Florida Keys, limitations on the construction of new transient accommodations, implementation of a toll on US 1, or decreased Tourist Development Council (TDC) spending could possibly limit the future travel demand.

TABLE 7-10:
Future Traffic Projections within Marathon

FDOT Count Station	Location	2002 AADT	2020 AADT
90-0110	200 feet east of 70th Street	30,500	49,100
90-0045	200 feet east of Key Vaca Bridge	24,500	40,400
90-0642	100 feet east of Seven Mile Bridge	12,900	29,100

Interaction between Future Land Use and Transportation. In the Future Land Use Element, the population projections for the City were developed through the planning horizon based upon the current State mandated rate of growth limitation, which allows a maximum of 24 housing units per year. Based upon this rate, Marathon is projected to add an additional 480 housing units between the years 2000 and 2020.

The City currently has a low-density land use pattern. The future allocation of land use, as represented on the *Future Land Use Map*, reaffirms this pattern and is consistent with the vision of Marathon's residents. This vision was defined at workshops early in the development of this Plan.

The land use categories shown on the *Future Land Use Map* impact transportation facilities differently. For example, the type of residential land uses impact trip generation characteristics, as well as the viability of alternative modes of transport. As published in the Institute of Transportation Engineers' *Trip Generation Manual,* 6th Edition, 1997, multi-family housing typically generates 40 percent fewer daily trips, or three daily trips per dwelling unit, than single-family housing. The increased housing and population densities make transit more attractive and promote walking and bicycling.

The City supports the principle of linking more intense residential land uses with commercial areas via some form of transit.

Bicycle and pedestrian circulation can also be enhanced by directly connecting residential areas to the principal commercial areas of Marathon. By providing direct routes for pedestrians and bicyclists, they become more attractive transportation modes, thereby decreasing the need to drive to each individual location.

Finally, the orientation of commercial structures along US 1 also helps promote bicycle/pedestrian usage. For example, structures built closer to the roadway and adjacent to bicycle and pedestrian facilities encourage their use. This may be accomplished by placing parking along the side or rear of the structures. Through site design guidelines incorporated into the Land Development Regulations, these types of improvements may be accomplished for both new construction and redevelopment.

Future Transportation System Needs. Traffic capacity analysis of US 1 is based upon the traveling speed through designated segments. The City is divided into two segments (Segments 13 and 14) defined as MM 47.0 to MM 54.0 and from MM 54.0 to MM 60.5, from the east end of the Seven Mile Bridge to Tom's Harbor Bridge. The calculated difference between current

travel speeds and Level of Service C speed criteria produces a maximum number of reserve trips that US 1 can theoretically accommodate before falling below the LOS C travel speed threshold. While Segment 13, corresponding to MM 47 to MM 54, has sufficient reserve capacity, Segment 14 has approximately 814 trips in reserve before exceeding the designated level of service on US 1.

Because of the speed-based methodology employed, roadway widening is not the only viable solution to operational problems along US 1. Additional alternatives can be effective in increasing travel speeds and, consequently, reserve capacity, such as:

- Traffic Management Activities: These include traffic operations, traffic control, and access management techniques.

- Transit Management Actions: These actions include transit operations, transit marketing, and intermodal coordination.

- Demand Reduction Activities: Carpools/vanpools, dial-a-ride, telecommuting, and flextime work hours are examples.

- Restraint Measures: These potential solutions include parking management, restricted areas, congestion pricing/tolls, and time restrictions on commercial vehicles.

The most effective technique listed above involves access management. Specifically, the goals include limiting the number of conflict points, separating the conflict areas, limiting deceleration areas, and removing turning vehicles from through travel lanes. If applied appropriately, these treatments can effectively increase the travel speed on US 1 and the corresponding level of service.

Traditional Transportation Demand Management (TDM) projects include spreading the peak hour traffic to other periods of the day and reducing the numbers of trips generated, through land use policy and change. Examples of TDM include staggered work hours (flex time), telecommuting or providing incentives to encourage carpooling or ride sharing. Telecommuting involves working from one's home instead of traveling to a traditional work environment. Given the recent technological boom and the prevalence of the Internet in virtually all homes, telecommuting as a demand management technique is a viable option.

TDM may prove difficult in the City because of the unique travel characteristics during the day. Traffic typically increases hourly until peaking around noon. It then decreases slightly until approximately 5:00 PM, where it peaks again before decreasing rapidly[3] *(1999 US 1 Travel Time Study).* Unfortunately, the travel characteristics of US 1 in Marathon do not provide the opportunity to realize the full potential of benefits from traditional TDM treatments. However, some benefit could be gained and should be explored.

Future Aviation Facilities. The Marathon Airport Master Plan, with a planning horizon of 2010, indicates that sufficient capacity for operations will exist given the present runway configuration. Further, the terminal will also meet demand until 2006. However, commercial

service terminal space and automobile parking will exceed capacity by the planning horizon. A thorough analysis concerning terminal space was performed for the Marathon Terminal Area Study and recommended expanding the terminal space, as well as automobile parking, to accommodate future demand.

While current runway lengths cannot accommodate commercial jets exceeding 110,000 pounds, no modifications are recommended in the Master Plan. However, airport drainage was noted as an area of concern where the ponding of water occurs between the runway and the taxiway, and a drainage system was recommended. Birds currently use the ponds and create a potential hazard to aircraft.

Although future demand is anticipated to be met by the current facilities, with the exception of commercial terminal space and automobile parking space, it is reasonable to expect growth due to the increasingly congested US 1. Thus, demand will continue to grow for additional air service.

Intermodal Facilities. Because of the limited right-of-way, general public sentiment against road-widening projects, and the regional uniqueness of US 1 as being the only roadway connecting the Keys to the mainland, the feasibility of an HOV lane is extremely low. It is not expected to be a viable alternative during the life of this document.

An important variable attracting transit users is population density. The City is unique because much of the population directly accesses US 1 or resides near the corridor. Successful implementation of transit services includes a substantially dense population, and since much of the population is located along the US 1 corridor, as identified in the Future Land Use Element, this favors the development of a transit service. Data specific to the City is needed to determine the feasibility of transit and their facilities, and should be coordinated with the Future Land Use Element to cluster transit-friendly land uses to facilitate transit service.

Connectivity of bicycle and pedestrian facilities to other modes of travel promotes interaction between modes and less reliance upon the automobile, and consequently congestion relief on US 1. In concert with future land development, bicycle and pedestrian paths should be linked with major commercial, employment, and recreational centers. These should augment and complement the proposed paths from the Florida Keys Overseas Heritage Trail Master Plan, which will extend from the eastern terminus of the existing path to approximately MM 59.5, along the Bay side of US 1, and transfer to the Atlantic side of US 1 where it will continue to the east beyond Tom's Harbor Bridge near MM 60.5.

Future Port Facilities. The City has indicated a desire to develop Boot Key Harbor as a managed marina facility between Miami and Key West. Access connections to surface transportation networks, as well as other modes of travel, should be conceived of conceptually, and potential environmental effects, such as dredging, vessel damage and spills, should be identified. The result of such a study should provide clear direction concerning the feasibility of developing a port in Marathon, and the potential implications of doing so.

The City would also like to develop this facility to position itself in the forefront if and when trade and travel restrictions to Cuba are lifted. The opening of Cuba could entail a new source of food for the City and an additional tourist destination. It could also indicate an increase of transient boats destined to/from Cuba, and a surge of refugees. These positive and negative implications should also be evaluated in the study.

Recommended Future Transportation Improvements

Planned/Programmed Highway Improvements. Currently, no capacity-related improvements are planned or programmed for US 1 within Marathon by the City, or are contained within the FDOT's Five-Year Work Program.

Bicycle and Pedestrian Improvements. Public support, together with a year-round pleasant climate, makes bicycling and walking viable alternative modes of transportation. Given the importance of these facilities towards achieving the multi-modal goals of the City, a comprehensive evaluation should be performed to identify improvements to the entire bicycle and pedestrian system.

Through development of a Bicycle and Pedestrian Master Plan, an assessment of the existing system and future network will be generated. Such a plan should identify on and off-road linkages between residential areas and commercial/recreational areas, and should be coordinated with the Heritage Trail Master Plan and a transit plan to offer a complete, integrated transportation system. Residents and non-residents could potentially be able to seamlessly move between various modes thereby relieving the burden from US 1 and the automobile.

The Florida Keys Overseas Heritage Trail Master Plan has identified segments within the City where pedestrian and bicycle trails are proposed to be constructed. These proposed paths complement the existing paths and trails, while extending the connectivity and continuity of the bicycle and pedestrian facilities. The path is proposed to begin at the eastern terminus of the existing path near MM 54.5 and extend to the east to MM 59.5 on the Bay side, at which point it crosses US 1 and continues to the east on the Atlantic side beyond Tom's Harbor Bridge. Additional at-grade and/or separated crossings are proposed at MM 56, MM 59.5, and MM 60. Trailheads are proposed near the proposed crossings at MM 56 and MM 59.5.

The potential for use of abandoned rights-of-way and acquisition of land to better facilitate a complete bicycle and pedestrian network should also be identified. Bridge crossings are critical to completing a regional, continuous system, and the City should coordinate with FDOT to schedule bridge improvements to accommodate pedestrian and bicycle traffic.

Potential enhancements to the roadway network include the installation of appropriate traffic control measures such as striping and signage to improve safety where bicycle and pedestrian paths intersect with US 1. These measures should also be provided along the sidewalks and pedestrian paths in the commercial areas of Marathon, and could encourage increased and safer pedestrian activity.

Marine Travel. Although information is not currently available, marine vessels in the City are an alternative mode of transportation that must be considered, due to the geography of the Florida Keys. A significant industry in Marathon is tourism, which is spurred by recreational fishing and eco-tourism. This mode of transportation should be further developed to serve future transportation needs of Marathon. Local and regional ferries, as well as water taxis, should be examined as a viable transportation option. In concert with the heavy tourist influx, the alternative mode of transportation could relieve congestion from US 1, and the novelty of such systems should not be discounted as a potential source of revenue. Through the completion of a travel survey, local travel patterns and frequency rates for all transportation modes (including marine), and destination and origin points should be established.

A harbor management program is proposed for Boot Key Harbor. The intent is to develop mooring fields and facilities and utilize the City Marina as the land based interface to this. As the midway point of the Keys, the marina facility could relieve congestion on US 1 if developed for tourist cruising vessels. If developed as a port of call, cruise lines could bring tourists to the City without traveling along US 1. Intermodal access to the entire transportation network would be vital to creating an integrated system. Additional study is necessary to ascertain the type of port that would best serve the City, as well as the access connections to other modes of travel, particularly the surface transportation system.

Access Management. Roadways serve two important, yet distinct functions. They must provide a means for safe and efficient travel, while providing access to private property. Given the competing interests of additional development, the preservation of travel speeds on US 1, the environment, the Plan requirements for adequate facilities, and access management rules, a balanced approach is necessary regarding access.

In 1988, the Florida Legislature enacted the *State Highway System Access Management Act*, which regulates and controls access to roadway facilities of the State Highway System. The Florida Department of Transportation adopted Rule 14-97, F.A.C., "State Highway System Classification System and Standards", in 1990 to implement the Act. The rule established standards and methods upon which to base the approvals of proposed driveway connections to the State Highway System. These standards are based on a roadway classification system that classifies roadways based upon their existing urban environment, design, and existing driveway connection density.

Because US 1 represents the only continuous, uninterrupted path from the Keys to the mainland, the minimum allowable driveway spacing for a roadway segment is the most critical issue. Permanent spacing standards have been adopted based on roadway classification standards and are as follows:

Access Class #1: Reserved for limited access highways.

Access Class #2: High access control with a restrictive median. Service roads currently exist or are planned and connections, median openings, and signals are limited.

Access Class #3: Controlled access with an existing or planned restrictive median. Characterized by long spacings between connections, median openings, and signals. Land use density is developing or undeveloped.

Access Class #4: Controlled access with an existing or planned non-restrictive median. Characterized by long spacing between connections, median openings, and signals. Land use density is developing or undeveloped.

Access Class #5: An existing or planned restrictive median. Land use density is developed.

Access Class #6: An existing or planned non-restrictive median. Land use density is developed.

Access Class #7: An existing restrictive or non-restrictive median. Land use density is developed. Travel speeds are typically low and the road has limited ability to be widened or improved. Driveway connections are frequent.

US 1 from MM 47.0 to MM 51.0 is generally classified as Class 6, which is typical of an urban, developed area without a restrictive median. From MM 51 to MM 54.5, US 1 is classified as Class 5, which is similar to Class 6 with the exception that a restrictive median is present. US 1 from MM 54.5 to MM 60.5 is classified as Class 4, which is indicative of the current two-lane configuration through undeveloped segments. Access to these roadways is tightly controlled to facilitate high speed, high volume, long distance travel.

Internal Consistency within the Plan. This element was developed in concert with the other elements of the City's Plan, particularly the Future Land Use Element. As noted throughout, the analysis of the future transportation system for Marathon was based upon the vision of the City as expressed within the goals, objectives and policies of the Plan and reflected on the *Future Land Use Map*.

Strategies within this element provide an emphasis on multi-modal options with the City and reflect the desired character of the City as expressed throughout the Plan. The future land use categories within Marathon and their support of differing transportation modes were considered in this element's development.

Projects contained within the Capital Improvements Program of the Capital Improvements element support the transportation improvements necessary to maintain future mobility within Marathon.

[1] De Arazoza, Rafael E., and Douglas S. McLeod, A Methodology to Assess Level-of-Service on US 1 in the Florida Keys, January 1993, for presentation at the Transportation Research Board annual Meeting.

[2] Airport information about maximum weight and type of aircraft.

[3] *Monroe County Year 2010 Comprehensive Plan, Technical Document*, Figure 4.7.