3. PR-119 and PR-106 from Las Marías

4. PR-105 from Maricao

5. PR-102 from Cabo Rojo

6. PR-100 from Cabo Rojo

There are other roads linking Mayaguez to adjacent municipalities and wards. Figure 2-3 illustrates the roadway network of the western region of Puerto Rico.

The public transportation sector is served by 32 authorized publico-car routes with a total of approximately 703 authorized vehicles. Taxis also service the area but to a limited degree. No local bus service is provided. Table 2-1 presents an inventory of the publico-car routes serving Mayaguez. The inventory includes the Public Service Commission Code, route name, number of vehicles, terminal location and union number.

3. The Mayaguez Central Business District

The study area in which this study is focused upon is comprised of the central activity sector of the City of Mayaguez or Central Business District (see Figure 2-4). This CBD centers on the traditional church-plaza-commercial area for which the towns of Puerto Rico are traditionally known for.

The Mayaguez Study Area has a great diversity of activities which, together with the existing local transportation system, serves to attract a large number of visitors for shopping, visiting public and/or private services, schools, etc.

The main commercial activity in the CBD is concentrated primarily at Plaza Colón (Town Plaza), and Post (PR-2), McKinley, Méndez Vigo, Peral and Dr. Basora Streets. The Market Plaza is located in the southwestern sector of the CBD along Muñoz Rivera Street.

The CBD also contains a number of public and private institutions, schools, hopitals, urban residences and other activities. The University of Puerto Rico, Mayaguez Campus (College of Engineering and Mechanical Arts), located immediately to the north of the CBD, adds a significant aspect to the CBD.

4. Existing Street System

Traffic circulation within the Mayaguez CBD study is mainly north-south concentrated along Post and Dr. Basora Streets, and east-west along McKinley and Méndez Vigo Streets. The existing street pattern is basically a traditional grid pattern typical of Puerto Rico's central town areas. The pattern is dominated by one-way streets (Post street in one direction South to Muñoz Rivera

Street, McKinley and Méndez Vigo Streets) and centered on the Town Plaza (see Figure 4-5). One large problem that does exist is the main north movement from Muñoz Rivera Street along Dr. Basora Street. This street has a very low capacity affected by many stop signs, very low speed, a hospital, parking problems, etc.

Pavement widths vary significantly throughout the study area ranging from 28 feet to 42 feet total width with McKinley, Méndez Vigo, and Post Street being the widest.

5. Parking

Currently, there are at least four major public parking lots along the peripheral area of the CBD: the garages at the Palacio de Recreación, Luis Muñoz Rivera Street, and Plaza del Mercado and a parking lot at an area adjacent to the MPTC (see Figure 4-6). There are several smaller private lots spread out within the CBD.

The available spaces at the garages and lots are not enough to meet the parking demand and there is a strong dependence on curb side parking. The curb parking spaces that were freed by moving the públicos to the MPTC were rapidly taken over by private automobiles. Parking ordinances do exist to mainly restrict curb side parking to one side of the street, but are normally not enforced outside the Town Plaza sectors.

C. MAYAGUEZ' PUBLICO-CAR TERMINAL SYSTEM

The Mayaguez Public Transportation Center (MPTC) was inaugurated in September of 1983. The facility was constructed as a four level terminal structure with a total capacity for 400 vehicles. The first two levels were designed as passenger boarding areas; whereas, the remaining levels are for use as holding areas.

The terminal is located in the northeastern sector of the CBD approximately three blocks north of Plaza Colón. It is bounded on the West by Peral Street, plus a local circumference street, and residences; on the South by Palmita Street and the local street; and on the North and East by the Yaguez River.

Access to and from the terminal has to be via the internal street network, usually along narrow streets and an urban residential sector. The access streets are (1) Campos Street (outbound), (2) Pablo Maíz Street (inbound), (3) Palmita Street (outbound), (4) Peral Street (inbound), (5) Del Río Street (outbound), and (6) Iglesia Street (inbound).

Figure 4-7 presents a schematic layout of the terminal's ground floor passenger boarding area and accesses. The passenger boarding areas are configured as parallel service areas. This is in contrast with the angled berths found in both of Bayamón's terminals and the one in Caguas.

Passenger discharge is usually made outside of the terminal although some publico-car operators take their passengers inside the terminal, especially during inclement weather.

The terminal building includes space for an administration office, a cafeteria (not in operation), and maintenance. In addition, a large surface parking lot was constructed in the north sector adjacent to the terminal.

The terminal (MPTC) currently serves as the base for 17 of Mayaguez' 32 routes. These routes make up only 40 percent of the authorized vehicles. At the present time the terminal is used only by interurban routes and two of the taxi services (see Figure 6-3, page 6-22). The local routes (including urban and rural) maintain their curbside terminals as shown in Figure 4-8.

The Mayaguez municipal government is currently planning the establishment of an improved satellite terminal plan and the establishment of a shuttle bus system (see Figure 4-9). The satellite terminals would house those routes that currently are assigned curb terminals in the Balboa area (northeast sector) and the Market Plaza. The shuttle bus system would operate within the CBD providing service between the terminals and the main activity points.

C. PUBLIC TRANSIT PASSENGER AND VEHICLE VOLUMES

1. Current Service

In order to assess the impact of the terminal facilities upon the existing publico-car operations in Mayaguez, it was necessary to obtain information concerning current average vehicle and passenger volumes. For this purpose an extensive public transit vehicle and passenger count survey was conducted during April 1987.

The field survey included the establishment of selected cordon and interior count stations as shown in Figure 4-10. Tables 4-2 and 4-3 give the results of the vehicle and passenger counts at each of the cordon and interior stations, respectively. Appendix E contains a series of the detailed counts by 10-minute periods and hourly summaries for each station and direction of flow.

The results of the cordon counts indicate that the number of daily publico-car passenger and vehicles entering the Mayaguez CBD is approximately 5,138 and 3,230, respectively. Exiting the CBD, the numbers are 7,525 and 4,036, respectively. The total number of estimated weekday trips are 12,663 passengers and 7,266 vehicles, with an average occupancy of 1.74.

2. Comparison with Previous Volumes

A comparison of the existing publico-car vehicle and passenger volumes can be made with similar data obtained prior to the opening of the MPTC. Publico-car vehicle and passenger volumes were obtained from field surveys conducted during November 1982 as part of the study "Evaluation of the Impact of a Público Terminal Facility on Urban Transportation, Final Report", University of Puerto Rico and UMTA, March 1984.

The following summary presents a comparison of the 1982 counts with the present counts (1987). No number of público vehicles was obtained since the aforementioned study only presented passenger volumes. In addition, not all of the count stations covered during the 1987 counts were covered during the 1982 counts. Therefore the numbers presented herewith reflect all of the stations shown in Table 4-2 except for Stations 7-10 and 13.

Trips (In+Out)	1982 Counts (Before)	1987 Counts (After)	% Change (1981-1987)
Publico-cars	N/A	4,909	N/A
Passengers	7,964	10,381	+30.3%
Occupancy	N/A	1.9	N/A

The results of the comparisons indicate that there has been an apparent increase in passenger volumes in the Mayaguez CBD. This increase does not necessarily mean that there has ocurred a similar increase in the publico service use in the Municipality of Mayaguez. Other factors such as improved services, increased dependence on public transit, increased preference for public transit due to the problems of traffic congestion and lack of parking, increased student usage, or the difference in the periods of comparison. ~~It should be made clear that this is only for the terminal (MPTC).~~ could have influenced the results.

D. TERMINAL UTILIZATION

1. Introduction

The terminal utilization and accumulation were determined ~~using the same methodology as for Bayamón and Caguas. This was done~~ by recording each vehicle that enters and exits the terminal within a specified time period (30 minute intervals for this study). During the initial phases of this study, it was found that, ~~contrary to the Bayamón and Caguas terminals,~~ the number of private vehicles entering the MPTC or using it as a parking facility was almost

non-existent. However, a review of the terminal characteristics ~~and this report~~ during the final phases indicated an increased use of the terminal by private vehicles.

2. Utilization Evaluation

Utilizing the field survey, Table ~~4~~ 2-4 shows the publico-car accumulation pattern at the MPTC. The table presents the number of vehicles entering and exiting the terminal, the total accumulation by 30 minute interval, the capacity of the terminal, the percent accumulation or utilizaiton (by 30 minute interval), the maximum accumulation, and the percent utilization at maximum accumulation. Figure ~~4-11~~ 2-12 graphically illustrates the accumulation pattern.

From the table it can be seen that the maximum accumulation of 43 vehicles at the MPTC occured between 8:30 and 9 AM, representing 10.8 percent of the terminal's capacity. This indicates what can be considered as a significant underutilization of a terminal facility.

3. Private Vehicles in Terminal

As previously mentioned, the MPTC has recently become a center for private vehicle parking. At the beginning of this project, the private vehicle parking activity within the terminal was negligent. Even the adjacent surface level parking lot showed a significant underutilization. During the past year, however, the parking situation within the Mayaguez CBD has changed such that a greater degree of parking activity is concentrated in the MPTC area, particularly the surface lot.

A modified field survey was made which consisted of the recording of the number of private vehicles parked within the MPTC at one-hour intervals. Table ~~4~~ 2-5 presents the adjusted estimated hourly accumulation; whereas, Figure ~~4-12~~ 2-13 presents the corresponding graphic pattern.

From the survey and accumulation estimates, it was determined that the maximum accumulation of parked private cars was 33 vehicles at 10 AM. This represents 8.8 percent of the terminal's capacity. This value is almost the same as for the publico-car accumulation.

~~F.~~ E. SURVEY OF PUBLICO-CAR USERS

The survey of publico-car users in Mayaguez was conducted in order to obtain information on the users' opinion concerning the existing service and opinions on the terminal facilities. A total of 127 interviews were made during January 1988, concentrated primarily within the terminal.

Table 4-6 presents the Mayaguez publico-car users' opinions concerning the existing publico-car service. Approximately 80.3 percent of those interviewed indicated that the existing service is acceptable or better. Only 19.7 percent said that it was deficient or poor.

With respect to their opinions about the perceived impacts of the MPTC. Table 4-7 shows the survey results concerning location, passenger boarding area, passenger drop-off area, sanitary facilites, cafeteria facilities, and the administration and maintenance.

Less than two-thirds of those surveyed (62.2 percent) said that the terminal location was good; whereas, 10.2 percent said that it was poor.

The passenger boarding area was given a good rating by 76.4 percent; while 72.4 percent rated the drop-off area as good.

Possibly the worst complaints deal with the terminal's sanitary facilities. About 45.2 percent of the users said that these facilities were poor. Many indicated that the lack of maintenance was the principal problem.

The administration and maintenance sector of the terminal operations received a generally good approval (61.4 percent) with a little over one-fifth of the respondents (22.8 percent) saying that it was fair. The general comments concerning the overall condition indicated that the sanitary facilities needed more maintenance than any other sector of the terminal.

Since the principal objectives of this study is the evaluation of the impact of a publico-car terminal facility on the urban area, a question requesting the user's opinion on the most important effect of the terminal facility was included in all of the user's questionnaries. This question was also included in the publico-car operators', and businessmen's questionnaires.

The most frequent responses of the users concerning impacts of the terminals include (1) poor access due to location, and (2) did not facilitate transfers since only about half of the routes were actually stationed there.

F. SURVEY OF PUBLICO-CAR OPERATORS

A survey similar to that of the publico-car users was made of the publico-car operators. This survey was directed to obtain the operators' opinions concerning the terminals and perceived impacts that these terminals may have had upon their services.

The survey was conducted during April-May 1987. The survey questionnaire was directed to the official route representative (usually the president of the route union) whose opinions were assumed to reflect the general feelings concerning the type and extent of the impacts directly or indirectly related to the establishment of a terminal system. A total of 32 questionnaires were sent to each of the routes. A total of 26 (81.5 percent) route representatives filled out the form and returned it.

Table 4-8 presents a summary of the Mayaguez publico-car operators' opinions concerning several of the physical and operational aspects of the terminal.

Almost 40 percent of the operators indicated that the location was good, while 34.6 percent indicated that it was fair. Just over one-quarter of the operators said that the location was poor. The larger number of operators were previously assigned spaces around Plaza Colón. and other adjacent streets where chronic congestion was the norm.

The operators were queried about the terminals' internal circulation. Slightly over one-quarter (28.6 percent) said that it was good, while 52.4 percent indicated that it was fair and 19 percent that it was poor. Some of the problems that were cited included (1) private vehicles within the terminal and (2) a high degree of pedestrian/vehicle and vehicle/vehicle conflicts due to combined passenger boarding and discharge area.

The passenger boarding area was considered as good by 91.3 percent, fair by 4.3 percent and poor by 4.3 percent.

The passenger drop-off or discharge area was considered to be rated as good by 86.4 percent of the operators, fair by 9.1 percent and poor by 4.5 percent (1 route).

As with the users, the operators tended to rate the sanitary facilities as poor (71.4 percent). Only 4.8 percent rated them as good with 23.8 percent rating them as fair.

Although the terminal did not have a cafeteria within its structure at the time of the survey, the questions pertaining to cafeterias were directed to those in the immediate area. The cafeteria facilities received a good rating from only 16.7 percent one operator from six respondents with 50 operators (83.3 percent) rating them as poor.

The administration and maintenance of the terminal received a relatively favorable rating with 10.5 percent indicating the service as good, 73.7 percent as fair, and 15.8 percent as poor.

Table 4-9 presents the operators' opinions concerning the terminals' impact upon several aspect of their services. These included:

(1) Fare

(2) Gasoline Expenditures

(3) Number of Passengers

(4) Operator Comfort

(5) Transit User Comfort

(6) Operators' Income

Twenty-four of the route representives (92.3 percent of total) indicated that their fares have not changed because of the terminal. The changes that have occured between 1983 and 1987 were due primarily to increases in fuel prices, maintenance costs, and vehicle replacement costs.

With respect to gasoline cost expenditures, a large majority of the operators (84.6 percent) said that these had increased. Two routes (7.7 percent) indicated that no significant change was observed.

A significant number of the routes (18, 69.2 percent) claim that their ridership has decreased since the opening of the terminal. About 19.2 percent (5 routes) indicate that they have not perceived any significant change is their route passenger volumes, whereas, only three (11.5 percent) have indicated an increase in passengers.

A large majority of the operators (17, 77.3 percent) find that they have benefitted in terms of comfort. These benefits include less time looking for a parking space, easy access, and a better control of the route operations. One route (4.5 percent) claims a decrease in driver comfort, citing in some cases, the long distance from the Town Plaza where they formally had their terminals.

Another large majority of the operators (17, 77.3 percent) agree that the transit user benefits have increased. Only three (13.6 percent) have said that no change has occured.

In terms of income, only one of the operators said that their incomes had increased, 3 (11.5 percent) said that no change has occured, and 22 (84.6 percent) have indicated that they have experienced a decrease in income.

Asked about their opinion concerning the principal impact of the publico-car terminals, the operators' responses included the following:

(1) No reduction in traffic congestion especially along Post Street

(2) Increased passenger comforts

(3) Has made passenger tranfers more dificult

(4) Decreased incomes

(5) More competition, some of it illegal

The terminal size was considered too large by over three-quarters of the operators.

G. SURVEY OF LOCAL MERCHANTS

One of the most important impacts to be considered is that caused by the implementation of a terminal system upon the local CBD businesses. These impacts can be classifed into two categories:

(1) Direct impact upon sales of a business established at or near where the curb-side publico-car terminals used to be located, and

(2) The business development influence upon the CBD.

The survey conducted amongst the local merchants had the objective of receiving their opinions as input to this study. The businesses surveyed (a total of 92) included a wide range of establishments as shown in Table 4-10. The survey was conducted during January-February 1988.

Table 4-11 shows the distribution of responses related to the merchant's preferred publico-car terminal system. Of the 92 merchants interviewed, 41 (or 44.6 percent) indicated that they preferred cubside terminals. A total of 34 merchants (37 percent) said that they preferred a terminal building; whereas, 17 (18.5 percent) had no preference.

Table 4-12 presents the merchants' opinions (89 responses) regarding the location of the MPTC. Less than one-half of the merchants (39, 43.8 percent) indicated that they considered the location as good. Another 18 merchants (20.2 percent) said that it was fair; but, about over one-third (32, 36 percent) consider its location as poor.

Table 4-13 presents the distribution of the merchants' opinions concerning the perceived impacts of the terminals upon several aspects such as sales, number of local and other customers, and traffic congestion.

From the table it can be seen that just less than half of the merchants (47.8 percent of the respondents) said that their sales had not experienced any significant change. Less than 10 percent said that their sales have increased while 28 (43.3 percent) said that they have experienced a significant decrease.

Before making any valid conclusions concerning significant negative impacts upon the merchants' incomes, it is necessary to review the merchants' responses concerning the impacts upon the number of customers, both local and external. From Table 4-13 it can be observed that only 13.3 percent of the merchants have indicated that they have experienced an increase in both types of customers. Almost fifty percent have indicated a decrease in customers while between 38.9 and 41.1 percent have not perceived any significant changes.

A scrutiny of the surveyed merchants has indicated that the majority of the businesses which are said to have experienced a decrease in sales and customers are those located at or near Plaza Colón and Post Street. These are the same areas which had a number of important routes and curbside terminals.

With respect to traffic congestion, of the total 89 respondents to this question, only 34 (or 38.2 percent) of the merchants said that they perceived a significant reduction. Almost one-half (46.1 percent) perceived no significant change; whereas, 14 (or 15.7 percent) felt that the congestion had increased.

The merchants'general opinions concerning the impacts of the terminals included the following:

(1) Partially beneficial to operators and users,

(2) Distance from several CBD sectors too far, negatively affecting businesses in those areas since many passengers will not walk "up" to them;

(3) Has not helped to reduce the degree of congestion especially along Post Street.

CHAPTER 5

OBSERVATIONS, CONCLUSIONS, AND RECOMMENDATIONS

A. INTRODUCTION

This chapter presents a series of observations made for each terminal evaluated, several conclusions from the data gathered and analyzed, and recommendations concerning the terminals in general.

B. CONCLUSIONS AND OBSERVATIONS OF THE BAYAMON TERMINALS

+ Kuilan Terminal

1. This terminal exhibits various poor design features such as:

   (a) Insufficient clearance between levels. This impedes the use of the larger público-car vehicles on the market nowadays and even some of the regular vans have had height troubles resulting in the removal of topside luggage racks.

   (b) Turning radii of ramps very tight especially for long maxi-vans.

   (c) The proliferation of small businesses occupying just about every available open space under the ramps and stairwells results in the interference of pedestrians with the internal vehicle movements.

   (d) Insufficient cover for a large portion of passenger boarding and drop-off area. An AEE utility line runs through the eastern portion of the terminal. Although roofing has been provided in these areas, the design of the roofing does not allow sufficient coverage. Passengers boarding the vehicles are still subjected to rain in the boarding (or discharging) space between the concourse and the público-car. The design of the roofing should have included adequate side extension to cover at least one-half of the parked vehicle.

(e) The six/seven story terminal is not appropriate for público-car operations because of the long internal circulation for many of the routes. This has resulted in some of the vehicles parking along the side street (Rossy Street) near the terminal entrance.

(f) The internal pedestrian circulation is convoluted: too many ramps, tight walking spaces available due mainly to the numerous businesses, no designated crosswalk controls resulting in dangerous vehicle-pedestrian conflicts, and no adequate/posted directional information. No pedestrian crossing controls are available at the junction of the Terminal and the Río Hondo Pedestrian Mall.

2. The location of the terminal is very good since it is basically in the same area (Calle Parque, Market Place) where the majority of Bayamón's routes were located.

3. Congestion is still a factor in Bayamón, but it has been eased compared to when the públicos still had their curb-side terminals. Congestion along Parque Street is still prevalent during rush hours; however, if the público-cars had maintained their terminals along both sides of the street, traffic circulation would definitely be at a crisis point. Improvement in traffic conditions are more notable in the Town Plaza Sector and in the northeastern and eastern sectors.

4. The parking situation was improved since the relocation of the públicos to the terminals freed dozens of curb spaces and a large portion of the Market Plaza parking area. The CBD parking situation has been alleviated to a large degree by the parking area of El Canton Mall. Also, the municipal government is currently constructing a 500+ space, multi-level facility between the two terminals.

5. An access problem is prevalent at Calle Parque and the exit ramp from the terminal. Southbound and westbound routes have problems entering Parque Street. A recent improvement has been the establishment of an exclusive east-west público-car lane along Rossy Street. This was made necessary after the recent closure of the small side-street that connected Rossy Street and Highway PR-2 and provided direct access from the Kuilan Terminal.

6. There are some complaints from local businessmen concerning the long distance from the main shopping street and the terminal, mainly those in the northeastern sector of the CBD. The feeling is that the removal of the público-car stands has adversely affected client traffic.

+ Guardarrama Terminal

1. The terminal can be considered to be significantly overdesigned with respect to capacity. The público-cars utilize less than 30% of the available spaces.

2. The use of the upper levels as parking for city employees is a good alternative for the utilization of the unused space. However, the terminal's original objective was not the provision of private parking.

3. The antique car museum on the first level is an attractive addition to the terminal; although, it takes up half of the first floor passenger loading area and serves no direct public transit service. **[NOTE: This museum was recently relocated to the new Parque de las Ciencias, Bayamón's new recreational/educational Science Park. at the time of the preparation of this Final Report, the enclosed area formally housing the museum is being used as temporary offices for the Federal Emergency Management Administration {FEMA} following the recent hurricane.]**

C. CONCLUSIONS AND OBSERVATIONS OF THE CAGUAS TRANSPORTATION CENTER

1. Traffic congestion within the CBD is still prevalent, but it is generally perceived that the congestion would have been much more critical without the terminal. Present traffic circulation in the Plaza Palmer area can be considered to be good, since no público-car vehicles or related parking is allowed. The utilization of the parking spaces along both sides of the internal streets and the very high space turnover rates by the públicos, private buses, and taxis presented a chaotic situation. Traffic volumes along Gautier Benítez Street, although almost always congested, have decreased. The corresponding público-car and bus traffic has been redirected to Acosta Street, providing a much more direct access to the Terminal.

2. Of the four terminals evaluated in this study, this terminal is the more efficiently utilized terminal by both públicos and passengers.

3. No significant access problems are present. All routes are adequately served.

4. Private vehicles are permitted within certain areas of the terminal often creating an increase in vehicle-pedestrian conflicts.

5. Some new commercial areas have been established in adjacent areas.

6. The relocation of the públicos from the Town Plaza area has contributed to new development in that area.

D. CONCLUSIONS AND OBSERVATIONS OF MAYAGUEZ PUBLIC TRANSPORTATION CENTER

1. The physical limitations of the terminal's accesses (streets) is one of the contributing factors of congestion along those streets as well as other primary streets such Dr. Basora Street. Congestion in the CBD, particularly along Post Street and other major roadways, is generally about the same or worse than before the construction of the terminal. This is due in part to internal traffic congestion and other factors as follows. This information is based upon the aforementioned Mayaguez Terminal Impact Evaluation Study, 1984.

2. The majority of the local intraurban routes are not located in the MPTC. Almost, all of the local routes still utilize curbside terminals. The MPTC is utilized mainly by interurban routes. Thus, technically, the terminal does not fulfill its objective as a <u>urban</u> public transit facility.

3. The location of the MPTC has influenced many of the operators not to relocate to the MPTC. This is especially true of those operators of the Mayaguez Urbano Route, as well as those stationed at the Market Plaza and the Balboa Sector.

4. The area around the MPTC has been slowly converted from residential to a more commercial-related activity. This, in itself, is an expected, although in this case undesired, product of the MPTC.

5. The terminal can be considered to be overdesigned with respect to capacity. The publico-cars utilize less than 11% of the available space, even after six years of use.

E. IMPACT UPON PUBLICO-CAR USERS

The results of the survey of the public transit riders indicate that the users are generally satisfied with the terminals. The following is a comparative summary of the most important factors.

Opinion Concerning Location of Terminal(s): Percent (%) of Total Respondents

	Bayamón	Caguas	Mayaguez
1. Good	91.1	94.0	62.2
2. Fair	7.7	4.7	27.6
3. Bad	1.1 (Kuilan)	1.3	10.2

Opinion Passenger Boarding Areas: Percent (%) of Total Respondents

	Bayamón	Caguas	Mayaguez
1. Good	86.4	81.3	76.4
2. Fair	13.6	12.5	20.5
3. Bad	0.00	6.3	3.1

Opinion Concerning Sanitary Facilities: Percent (%) of Total Respondents

	Bayamón	Caguas	Mayaguez
1. Good	14.1	6.0	30.1
2. Fair	20.2	19.4	24.7
3. Bad	65.7	74.5	45.2

The major benefits cited by the users include, among others, ease of transfer, good accessibility (except in Mayaguez), and comfort. The major complaints or areas of improvements seem to be, again, the general maintenance and the lack of adequate and/or clean public sanitary facilities.

One other factor cited is that often their final trip destinations are, as they perceive, an uncomfortable distance from the terminal. One of the alternatives that could be used to address this problem is the use of shuttle buses within the CBD's. Only Caguas and Mayaguez are planning the establishment of shuttle bus systems.

F. IMPACT UPON PUBLICO-CAR OPERATORS

As presented in the preceding chapters, a series of surveys were directed at each city's público-car operators. These surveys were geared to obtaining relative perceived reactions to the terminals' influence upon their service. The following is a comparative summary of the most important factors.

Opinion Concerning Location of Terminal(s):
Percent (%) of Total Respondents

	Bayamón	Caguas	Mayaguez
1. Good	86.4	81.3	38.5
2. Fair	13.6	12.5	34.6
3. Bad	0.00	6.3	26.9

Impact on Gasoline Expenditures:
Percent (%) of Total Respondents

	Bayamón	Caguas	Mayaguez
1. Increased	54.5	17.6	84.6
2. Decreased	13.6	11.8	7.7
3. No change	31.8	70.6	7.7

Number of Passengers:
Percent (%) of Total Respondents

	Bayamón	Caguas	Mayaguez
1. Increased	9.1	0.0	11.5
2. Decreased	59.1	41.2	69.2
3. No change	31.8	58.8	19.2

Operators' Incomes:
Percent (%) of Total Respondents

	Bayamón	Caguas	Mayaguez
1. Increased	0.0	5.9	3.8
2. Decreased	45.5	41.2	84.6
3. No change	54.5	52.9	11.5

The general results of the survey is that many of the operators in the terminals have noted some change in operating economies (such as fuel and repairs) and more efficient and orderly público operations. Fuel expeditures were perceived to have increased in Bayamón and Mayaguez; whereas, in Caguas, the majority of the operators noted no significant difference. There seems to be a even split between those operators in Bayamón and Caguas, who indicated either a decrease in incomes or no significant difference.

There are some complaints concerning the problems of some transferring passengers coming from non-terminal based routes and other internal situations such as lack of an efficient terminal maintenance, security, and lack of adequate sanitary facilities.

The design of the Kuilan Terminal in Bayamón was critized because of inadequate headrooms between floors, very tight curves on the access ramps, and the large number of levels with limited space on each level. The Guardarrama Terminal is considered to be too large for the services stationed there.

In Caguas, the main complaints seem to do with the sanitary facilities, maintenance and the large number of private autos that are allowed within the terminal area.

In Mayaguez, the main complaint has been the terminal's location within the CBD. The inadequacies of the access streets, the long walking distances for their passengers and the confusing and congested internal CBD street system seem to be major complaints.

G. IMPACT UPON LOCAL BUSINESSES

One of the most important impacts to be considered is that caused by the implementation of a terminal system upon the local CBD businesses. These impacts can be classified into two categories: (1) direct impact upon sales of a business established at or near where the curb-side público-car terminals used to be located, and (2) the resulting influence in the development of new or enhanced businesses in and around the CBD.

In order to determine the magnitude of these impacts, a special survey was made of the business owners/managers in each of the three cities (limited to the CBD and the areas directly influenced by both, the curbside and transportation terminals). The following tables show a comparison of the responses per city.

Opinion Concerning Location of Terminal(s): Percent (%) of Total

	Bayamón Kuilan	Bayamón Guardarrama	Caguas	Mayaguez
1. Good	50.8	15.0	59.8	43.8
2. Fair	15.6	26.5	17.3	20.2
3. Bad	33.6	58.4	22.8	36.0

Preference for Type of CBD Público-Car Terminal Type:

	Bayamón	Caguas	Mayaguez
1. Curb-side terminals	52.6	39.6	44.5
2. Central terminals (s)	30.4	33.6	37.0
3. No preference	17.0	26.9	18.5

Impact of Terminals on Sales:

	Bayamón	Caguas	Mayaguez
1. Increased	19.4	19.8	8.9
2. Decreased	54.6	36.4	43.3
3. No change	25.9	43.8	47.8

Impact on Traffic Congestion:

	Bayamón	Caguas	Mayaguez
1. Increased	6.7	10.9	15.7
2. Decreased	44.8	48.7	38.2
3. No change	47.0	40.3	46.1

Generally, the acceptance or opinions of the local businessmen depend greatly upon the city and/or the terminal's location and the business location within the CBD. For example, the majority of the businessmen agree that the terminal locations are good or fair. However, in Bayamón's case almost one-half of them said that the Guardarrama Terminal was badly located. Upon further scrutiny of the data, it was noted that the large majority of those businessmen, who did not like the terminal's location, were mainly those farthest away or where access was impeded either by the street layout or the natural topographic feature (i.e., the steep slope dominating the Bayamón CBD.) The businesses where the most complaints originated were those near the upper areas of the Town Plaza, in the eastern sector, and along Barbosa Street. These areas correspond mainly to the sites where the público-cars now situated in the Guardarrama Terminal originally were located.

It is also noteworthy that the Bayamón and Mayaguez businessmen seem to prefer having the público-cars occupying curb-side terminals. In Caguas' case there is no clear preference although the slight tendancy is to the curb terminals. Again, the majority of those preferring curb-side terminals tend to be those farthest away from the terminal facilities.

There is a tendancy for the businessmen to indicate current lower sales compared to before the terminal. Again, the data showed that the establishments perceived to be the most affected were those farthest away from the terminal (i.e., Dr. Veve Street near the Bayamón Town Plaza) and/or had terminals in front of their stores prior to the opening of the terminal building.

From the local businessmen's viewpoint, there has been a notable positive impact upon the internal traffic conditions in the CBD's. Almost half have noted a decrease in congestion; whereas, from one-third to almost half have noted no significant change. Caguas realized the greatest perceivable change.

Many of the businessmen indicated that the factor influencing lower sales and other commercial activity was due mainly to the location of the terminal. An influencing factor is that many of the passengers make a transfer directly in the terminal. This contrasts with the original transfer operations where the passenger had to walk varying distances, past many stores, to the other routes located in front of stores. The situation cited in all of these cases creates the basis for the possible establishment of a CBD shuttle bus system in each city.

public transit operators, local businesses, society in general, etc.," found in many of the studies prepared during the past decade. It is necessary to quantify the justification for the terminal and present alternate actions with respect not only to terminal locations but also to terminal types and operations.

The requisite study should include, as a minimum, the following aspects. (Chapter 6 presents a recommended procedure).

a. the detailed identification and the quantification of the transportation problems within the study area. This includes traffic congestion and parking problems,

b. the determination of the absolute need for the terminal(s),

c. the selection of alternate actions and/or potential sites,

d. the designation of the routes to use each terminal facility including any necessary changes to their existing routes,

e. the determination of the needed capacity and type of each terminal,

f. the determination of any required changes to the existing traffic and parking patterns and regulations,

g. the preparation of conceptual terminal designs including accesses, passenger boarding and discharge areas, and internal and external vehicular and pedestrian circulation, among others,

h. the determination of the direct costs related to the terminal(s),

i. the potential direct impacts upon the local businesses, the traffic conditions, and the parking situation, and

j. the active participation of the general public, the corresponding governmental agencies and the public transit operators.

k. the preparation of an Environmental Assessment (EA) following the requirements established by UMTA and/or the local governmental entities.

2. It is recommended that the municipal governments re-evaluate the current terminal administrative procedures to assure proper maintenance of the terminal, especially the sanitary facilities.

3. The possibility of establishing an internal shuttle bus system in the study areas should be given serious consideration. The municipalities of Caguas and Mayaguez have already conducted feasibility studies. It should be noted that UMTA is not promoting the establishment of these types of systems with federal funds with respect to priority for other major systems. If the municipalities decide to apply for federal funding, including funds for operations, they will have to comply with all the UMTA regulations with respect to the establishment of public transit systems, whether it is for one bus or 500 bus operation.

4. It is necessary to maintain a monitoring program not only to provide a continuous evaluation of the terminals but also to assess the changes in the public transit systems in each urban with respect to service and operations. This program should also include periodic evaluations of the traffic and parking situations.

5. The provision of satellite terminals is necessary in Caguas and Mayaguez. In the latter case, although the MPTC is considered to be overdesigned, this does not preclude the need to provide adequate off-street facilities in the Balboa and Market Plaza Sectors. In Caguas, the south satellite terminal is currently under construction and the west terminal is being planned. Nevertheless, in orden to assure that the subsequent satellite terminals will not be overdesigned, it is necessary to undertake a detailed needs and location study including an accurate estimate of the terminal space needs.

6. The implementation of the Satellite Terminal Plan in Caguas should be accelerated. This plan should consider the inclusion the proposed Shuttle Bus System as an integral element of the Transportation Plan for the Caguas Metropolitan Area.

7. The existing traffic and parking regulations in each of the study areas should be strictly enforced or reassessed. Little is accomplished by relocating the public transit vehicles to off-street terminal facilities if blatant traffic and parking violations are permitted.

8. The establishment of terminals should be accompanied by a firm municipal public policy with regards to traffic, parking and the promotion of public transit use.