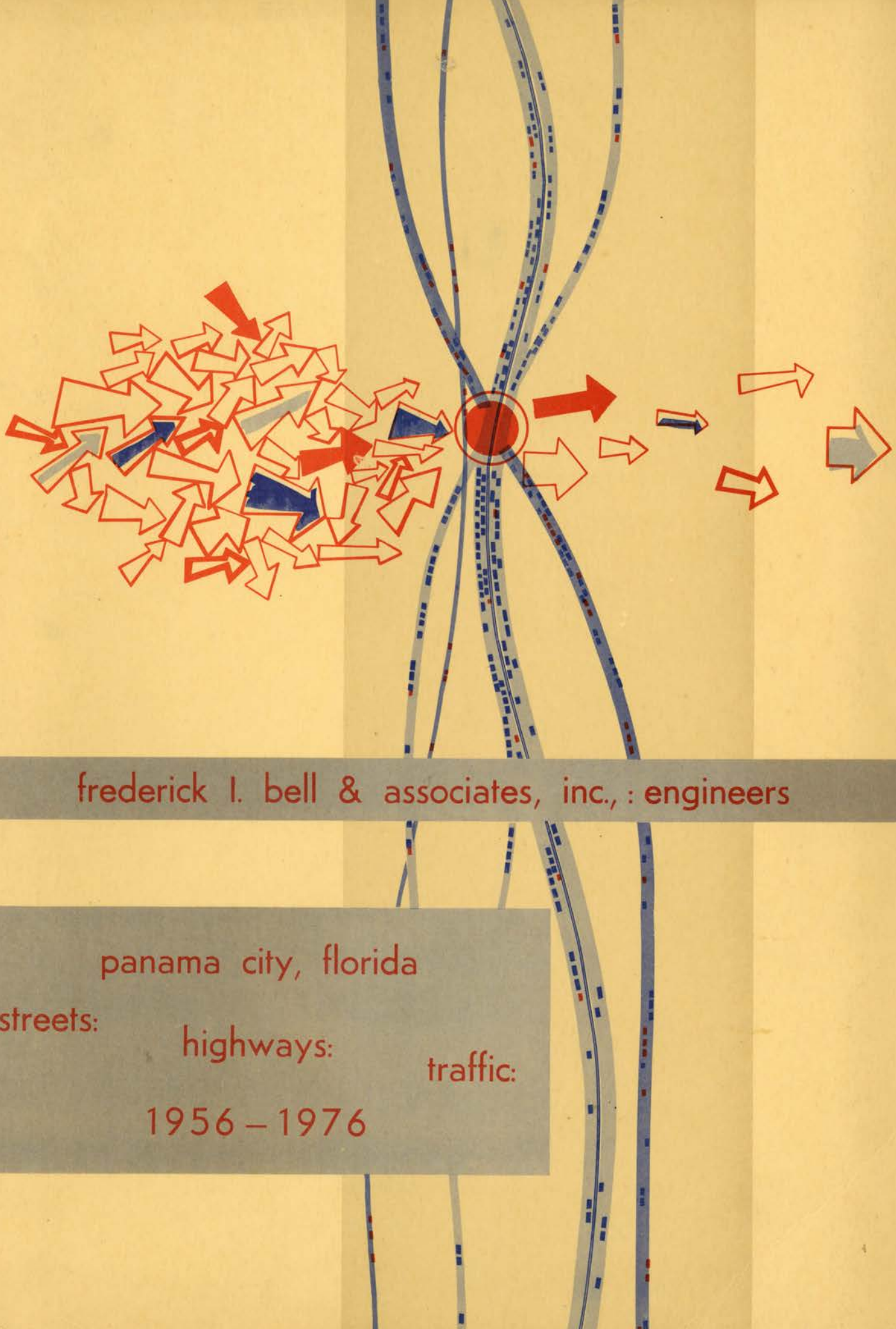
1956

Engineering Report on the Urban Area Traffic Survey of Panama City Bay County Florida for the State Road Department of Florida in the Cooperation with U.S. Bureau of Public Roads

Frederick L. Bell and Associates Inc.



frederick I. bell & associates, inc., : engineers

panama city, florida

streets: highways: traffic:

1956 – 1976

FREDERICK L. BELL & ASSOCIATES
CONSULTING ENGINEERS
ROOM 110 PETROLEUM BUILDING
TALLAHASSEE, FLORIDA

TELEPHONE 2-0359

November 13, 1956

The State Road Department of Florida
Tallahassee
Florida

Attention: Mr. Wilbur E. Jones, Chairman

Gentlemen:

We are pleased to present our report on the comprehensive traffic survey of the urban area of Panama City, Bay County, Florida.

We have endeavored to present our analysis of the survey data in a logical, narrative manner. The more important results have been portrayed on maps and graphs for your convenience.

We sincerely appreciate the opportunity of performing this important work for The State Road Department of Florida.

Respectfully,

FREDERICK L. BELL & ASSOCIATES, INC.

Signature Deleted

Frederick L. Bell, President

FLB:bs

1956

ENGINEERING REPORT

on the

URBAN AREA TRAFFIC SURVEY

of

PANAMA CITY, BAY COUNTY, FLORIDA

for

THE STATE ROAD DEPARTMENT OF FLORIDA

In cooperation with

U. S. BUREAU OF PUBLIC ROADS

by
Frederick L. Bell & Associates, Inc.
Consulting Engineers
Tallahassee, Florida

FREDERICK L. BELL & ASSOCIATES
CONSULTING ENGINEERS
ROOM 110 PETROLEUM BUILDING
TALLAHASSEE, FLORIDA

TELEPHONE 2 0359

ACKNOWLEDGEMENT

The successful completion of the Panama City Traffic Survey was realized through the co-operative efforts of the Mayor and City Commissioners of Panama City and the County Commissioners of Bay County.

We wish, also, to acknowledge the ready assistance offered by the City Manager's Office, the City Engineer's Office, the Panama City Police Department, and the Bay County Sheriff's Office.

Many civic and public service organizations liberally devoted time and effort in order that maximum public response might be obtained in the "post-card" phase of the survey, including:

Organized Churches of Panama City
Chamber of Commerce
Panama City News-Herald
Station WPCF
Station WDLP
Station WJDM-TV

THE ENGINEERS

SUMMARY OF RECOMMENDATIONS

INTERIM

No. 1. Install traffic signal control and channelization, Scheme 1, Florida State Road Department (Figure 19 in this report) at 15th Street and Harrison Avenue.

2. Remove traffic signals at those intersections enumerated in Table VIII.

3. Change angle parking to parallel parking along Beck Avenue between 11th and 12th Streets.

4. Change routing of U. S. 98 from Beck Avenue between 9th and 15th Streets to travel Frankford Avenue from Beach Drive to 15th Street.

5. Provide By-Pass for U. S. 98 "thru" traffic over East Avenue and 15th Street; sign existing U. S. 98, "Business District Route ".

6. Remove parking along 6th Street (U. S. 98) from Massalina Bayou Bridge to Beach Drive (Figure 25).

7. Remove parking on the approaches of 5th Street to Harrison Avenue (refer to Figure 25).

8. Remove parking on the approaches of Beach Drive to Harrison Avenue (refer to Figure 25).

9. Widen Magnolia Avenue to 40 feet (paved street width) from 6th Street to 7th Street, and from 3rd Court to 4th Street (Figure 25).

10. Change parking meter control about the U. S. Post Office as shown on Figure 25.

11. Remove stop sign controls from Grace Avenue at 9th Street, 12th Street, and 13th Street.

12. Establish progressive timing control of the traffic signals in the central business district as interconnected on Figure 25. Timing schedules are given in Table IX.

13. Acquire off-street parking facilities as described

in this report and shown on Figure 25.

14. File traffic accident reports by location and use these records to develop accident "spot" maps.

1965 NEEDS

15. Construct a bridge structure (28-foot roadway) spanning Massalina Bayou at 5th Street.

16. Acquire additional right-of-way along 5th Street, from Massalina Bayou to Cove Boulevard as sketched on Figure 26.

17. Re-design the intersection of U. S. 98 (6th Street) at Cove Boulevard as shown on Figure 26.

18. Establish one-way traffic flow on 6th Street, west-bound, between Cove Boulevard and Beach Drive, and one-way on 5th Street, east-bound, from Beach Drive to Cove Boulevard (Figure 27).

19. Regulate the directional flow of traffic on Mulberry Avenue and Beach Drive between 5th and 6th Streets as follows:

    a. Mulberry Avenue; one-way, north-bound.

    b. Beach Drive; one-way, south-bound.

LONG-RANGE PLAN

20. Proclaim the arterial street plan, Figure 27, by City Ordnance.

21. By City Ordnance, regulate building set-back through zoning control to protect the right-of-way requirements of given sections of design, refer to Table XIII and Figure 31.

22. Acquire the additional rights-of-way as given by the schedule in Table XIII.

23. Co-ordinate municipal construction activities with the fiscal programs of Bay County and the Florida State Road Department to obtain the maximum benefits of traffic facility continuity and financing.

PANAMA CITY, FLORIDA

REPORT CONTENT

report content (cont'd)

FIGURES

figures (cont'd)

TABLES

INTRODUCTION

The inadequacies of a municipalities' street and highway system are more readily apparent than those of any other public utility. They are most provoking because they reflect lost time and lost motion: their total effect upon the motorist is accumulative.

The street traffic system of Panama City has not yet reached that point where these cumulative defects are reflected in the community economy. However, the factual data of the traffic survey have indicated problems that exist and others that are developing.

The Panama City Urban Area Traffic Survey, analyzed and reported herein, has as its primary objective the alleviation of these inadequacies through objective, analytical study. This study and report, however, is ever mindful of the economics involved, as well as, the desire to preserve the integrity of the community to be served.

THE PEOPLE AND THE LAND

The People: The population of Panama City is most heterogenous. It is composed of a stable population base engaged in industry and commerce; a considerable segment consists of military personnel from the Tyndall Air Force Base and Navy Mines Countermeasure Station; and a seasonal population influx results from the many tourist attractions, the most outstanding being the fishing and beach facilities.

An effort has been made to determine the probable growth of this population as an aid to planning the future street and highway improvement program.

The Federal Census of 1950 reported the total population of Panama City at 25,814: the only urban area in Bay County. A straight-line expansion of the historical population data (by the algebraic method of least squares) was used to project its growth to the year 1980. This straight-line method was determined to be the most reliable because the life span of Panama City offers a meager thirty-year base for expansion.

To further supplement the population forecast, growth rates of other similar Florida cities were analyzed and compared with it. Straight-line curves for the actual population of Pensacola and Orlando were plotted thirty years

beyond the year that each of these two cities reached the 1950 population of Panama City. For example, Pensacola reached the 1950 population of Panama City in the year 1921. The portion of Pensacola's actual population growth curve from the year 1921 to 1951 was plotted and compared to what is estimated for Panama City (see Figure 1). The same procedure was followed for Orlando.

The estimated growth rate for Panama City falls between the actual growth rates for the two compared cities: slower than Orlando and faster than Pensacola.

Other interesting characteristics of the population point up similarities between these three cities and are indicative of the trend for similarity in population growth rate. A few of these characteristics are presented in Table I for examination and consideration.

The Land: The plans of a city, once the streets and other public facilities are resolved, are most constant. The enduring street pattern and land use of St. Augustine, Florida, the oldest city in the state, is proffered as an example to illustrate this proposition.

This consideration prompted the study of existing land use to supplement the data used to develop a satisfactory

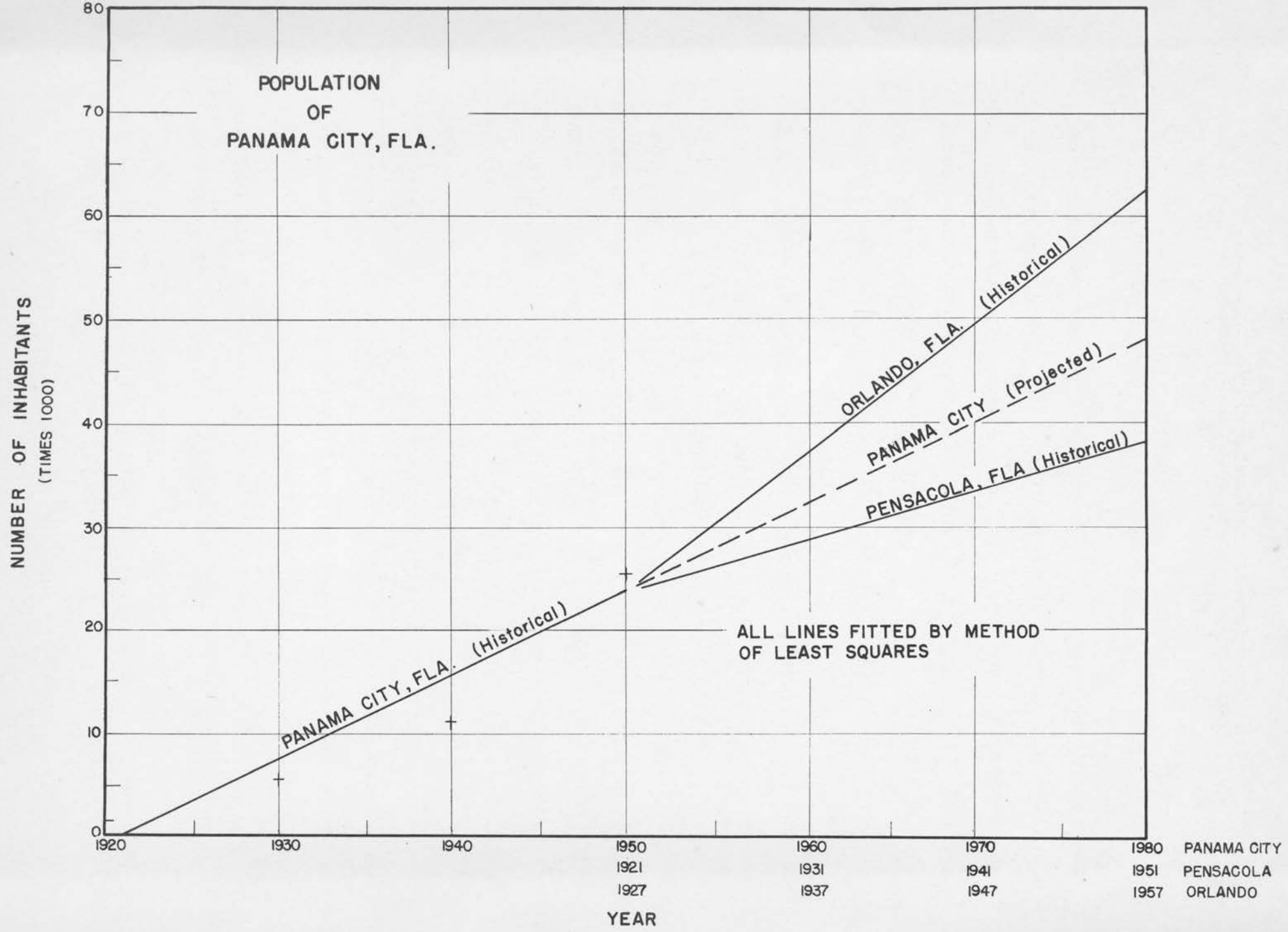

POPULATION
OF
PANAMA CITY, FLA.
NUMBER OF INHABITANTS
(TIMES 1000)
80
70
60
50
40
30
20
10
0
ORLANDO, FLA. (Historical)
PANAMA CITY (Projected)
PENSACOLA, FLA (Historical)
PANAMA CITY, FLA. (Historical)
ALL LINES FITTED BY METHOD
OF LEAST SQUARES
1920
1930
1940
1950
1960
1970
1980
1921
1931
1941
1951
1927
1937
1947
1957
PANAMA CITY
PENSACOLA
ORLANDO
YEAR

Figure 1

TABLE I

A COMPARISON OF POPULATION CHARACTERISTICS OF THREE FLORIDA CITIES *

	Panama City	Pensacola	Orlando
Percent of civilian labor force employed	96.0	93.0	95.3
Percent of civilian labor force employed in:			
(1) Manufacturing	14.3	8.5	7.1
(2) Construction	8.7	5.4	8.1
(3) Hotels	1.8	.6	2.1
(4) Public administration	10.2	13.9	3.9
(5) Government work	15.7	19.8	8.4
Percent of people over twenty-five having completed the following number of years of schooling			
8	67.0	61.5	75.1
12	41.7	31.0	46.7
16	6.3	6.0	9.1
Median School Years completed			
1. (Male)	9.6	8.7	11.3
2. (Female)	10.2	9.5	12.0
Median Income			
(1) Family and unrelated individuals	$2,390	$2,023	$2,168
(2) Families only	2,643	2,431	2,685
Transient Population			
(1) Percent new (1949 - 1950) residents (from outside Bay County) of total 1950 population	15.1	7.6	10.5
(2) Percent people moved (1949 - 1950) to different address inside county	15.9	14.2	16.0

* Data Source: 1950 Population Report P-B10

network of streets and highways.

Figure 2 presents the general characteristics of existing land use superimposed on the present arterial street and highway system. It is beyond the scope and intent of this report to develope a pattern of desirable land use or proffer a plan for zoning. It will be suggested, however, when considering design or improvement to traffic facilities, that zoning setback protection be made a fact to assure adequate rights-of-way for expansion purposes.

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CONSULTING ENGINEERS

1956

LAND USE MAP

PANAMA CITY
FLORIDA

Figure 2

PANAMA CITY - 1976

The severity of the present problem of traffic congestion developed, as in most American cities, several years before the street traffic facilities were structurally "worn-out". To circumvent the possibility of this occurring again, some determinations must be made relative to the future growth of the community and the development of motor vehicle usage in the Panama City area. This is preliminary to the development of a planned street improvement program.

There is one constant in this problem: the highway. Highway officials and engineers have generally agreed that design for a twenty-year period of adequacy is economically sound and representative of the normal life expectancy of the highway structure.

Starting with this basic concept, the need for street traffic facilities during the ensuing twenty years was estimated. The estimate or forecast of future traffic needs was made by studying the historical trends of things most closely related to traffic.

Traffic is basically the product of the number of motor vehicles and a value representing their use. Therefore, to reliably predict traffic movements for a twenty-year period, the historical trends of the number of

registered motor vehicles in Bay County and the gallons of gasoline sold were selected for study.

The results of projecting the trends of these two related things are presented on Figure 3. It will be noted that the factors thus derived for the year 1976 are; 2.0 for registered motor vehicles and 2.1 for gasoline sales. To supplement these trends, the historical records of traffic volume counts were tabulated and projected. These data were selected because they would reflect the local growth (as would registered motor vehicles) and the increase in tourism (as would gasoline sales). This index, then, would serve to stabilize the traffic forecast.

The files of the Traffic and Planning Division, Florida State Road Department, provided the twenty-four hour, annual average, daily traffic volumes for comparison. The station selected (SRD Station 122-C) was located on 15th Street in Panama City, three-quarters of a mile west of Harrison Avenue. The annual average data for this station were available for the period 1951 through 1956 and projection of the historical trend (by the method of least squares) produced a factor of 2.09 for the forecast year, 1976.

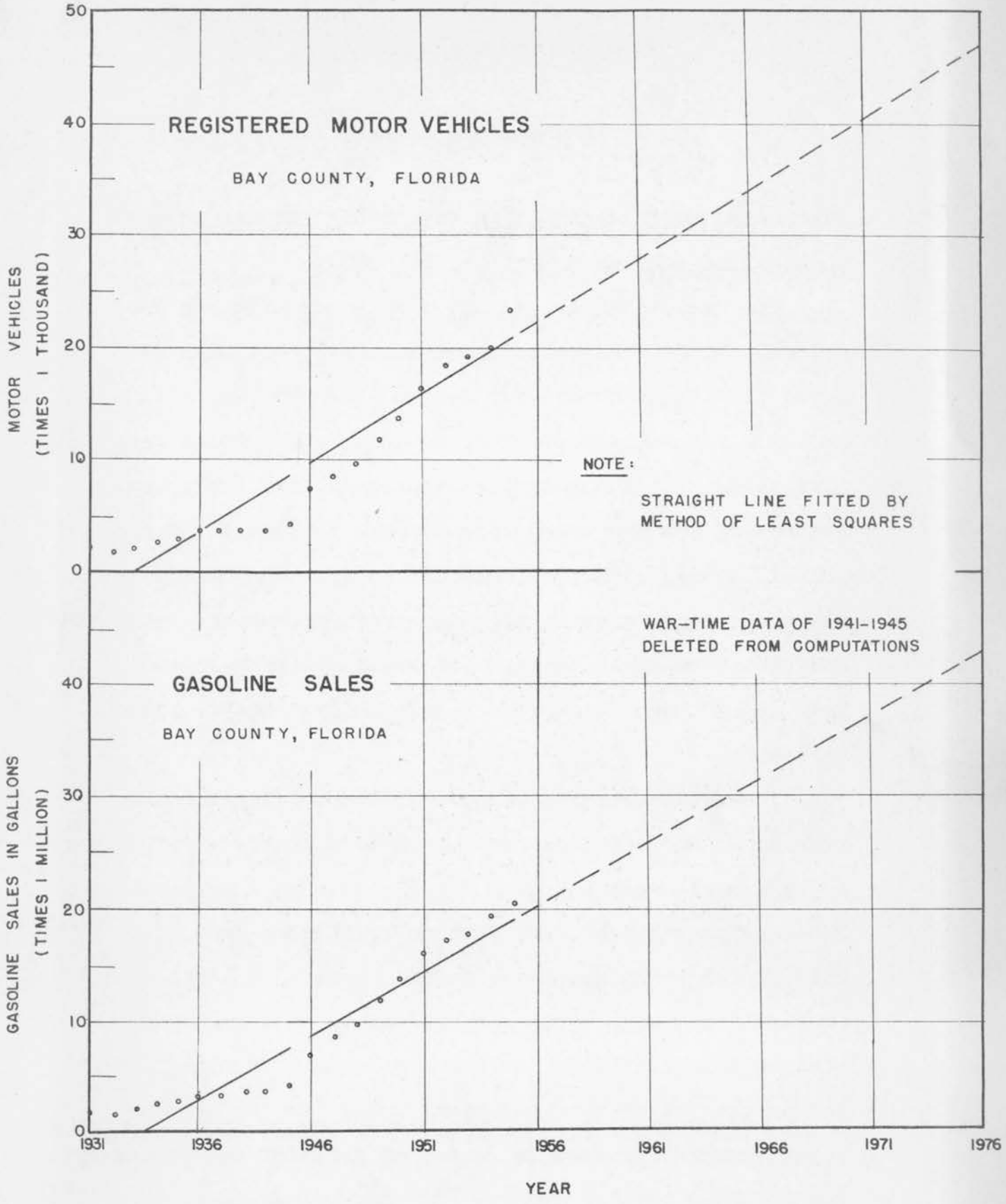
REGISTERED MOTOR VEHICLES
BAY COUNTY, FLORIDA
MOTOR VEHICLES (TIMES I THOUSAND)
NOTE:
STRAIGHT LINE FITTED BY METHOD OF LEAST SQUARES
WAR-TIME DATA OF 1941-1945 DELETED FROM COMPUTATIONS
GASOLINE SALES
BAY COUNTY, FLORIDA
GASOLINE SALES IN GALLONS (TIMES I MILLION)
0
10
20
30
40
50
1931
1936
1946
1951
1956
1961
1966
1971
1976
YEAR

Figure 3

These three projections were considered representative of the probable traffic growth and the expansion factor of 2.1 was selected to expand the survey data.

THE TRAFFIC SURVEY

The keystone to the building of a plan of trafficways to serve a population and the land it uses is the gathering of factual data. These data should include (1) an inventory of the existing facilities, (2) study of the land area served and its use, (3) summation of the usage of the existing facilities by origin and destination of the vehicle movements, (4) isolation and study of areas generating large volumes of traffic (shopping centers, resort areas, business districts, etc.), and (5) study of the storage facilities available in areas of vehicle concentration.

To facilitate gathering the data and simplify their ultimate analysis, a cordon line was delineated to encompass the developed, urban area of Panama City and its environs. The location of this line was modified to provide safety for personnel conducting roadside interviews of traffic on each of the roads crossing the cordon.

The land area contained by the cordon line was divided into tracts or zones. The primary objective of this division was to expedite the grouping of motor vehicle trip origins and destinations into small areas of singular land use, and to afford simplicity and accuracy in assigning traffic to specific streets or highways. These internal

zones purposely embraced small areas with the forethought that they could be grouped together in the event larger areas should prove satisfactory. As the analysis progressed, these areas were grouped and all presented pictorial and tabular data are based on the new zone areas, as grouped (see Figure 4).

The communities lying outside of the survey area cordon and within Bay County were also given a zone number in order that the interchange of traffic between these communities and Panama City might be analyzed and provided for in the highway plan.

To properly meet the function of serving the needs and desires of motorists, the development of a street and highway plan should conform, as closely as economics will permit, to the lines of major desires and movements of that population.

To calibrate these essentials, a comprehensive study was made of vehicle trip origins and destinations. This study was divided into two component parts; (1) External Phase, a study of vehicle trips made into and out of the survey area, as delineated on Figure 4, and (2) Internal Phase, a study of trip movements of which both the origin and destination were within the cordon of the study area.


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LEGEND
A INTERNAL ZONES (FINAL)
00 INTERNAL ZONES (ORIGINAL)
ZONE BOUNDRY
EXTERNAL INTERVIEW STATION
SCREENLINE STATION
ST. ANDREWS BAY
NORTH BAY ROAD
22 ND ST.
20 TH ST.
19 TH ST.
18 TH ST.
17 TH ST.
16 TH ST.
15 TH ST.
11 TH ST.
10 TH ST.
9 TH ST.
8 TH ST.
7 TH ST.
6 TH ST.
5 TH ST.
4 TH ST.
3 RD ST.
2 ND ST.
BALTIMORE STREET
LOMBARDY AVE.
HANNAH AVE.
DRUMMOND STREET
BAY AVENUE
WILMONT AVENUE
FRANKFORD AVENUE
LISENBY AVENUE
BALBOA STREET
DESOTA AVENUE
BEACH DRIVE
AIRPORT ROAD
SCREENLINE
HIGHWAY 231
HARRISON AVENUE
JENKS AVENUE
MAGNOLIA AVENUE
MASSALINA AVENUE
BONITA AVE.
COVE BOULEVARD
CHERRY STREET
EAST 1 ST. STREET
CENTER AVENUE
MARIE DR.
SOUTH AVE.
COURT
SURVEY AREA
ZONE MAP
PANAMA CITY
FLORIDA
Figure 4

the traffic survey

The data for the internal and external phases of the survey were obtained by different methods and are subsequently defined.

EXTERNAL PHASE: WHY and HOW

The movement of persons and goods into and out of the urban area of Panama City is an important function of that area's economy. The degree of ease and safety by which these movements may be executed reflects the future of Panama City and its ability to achieve new productivity.

The type and number of vehicle movements entering and leaving the study area were recorded by interviewing motorists as they crossed an imaginary boundary or cordon line circumscribing the urban area (see Figure 4). The roadside interviewing included only vehicles leaving the study area as a representative sample of the total external trips.

From this external origin-destination study were obtained information regarding; (1) trip origin and destination, (2) trip purpose, (3) number of persons in the vehicle, (4) route of entrance into the area (if applicable), (5) place of vehicle registration (state or county), and

(6) time of day the trip was made. Controls were established to obtain the total traffic volume count for an average weekday, by hours, and to obtain an hourly classification of vehicle type, by direction. These controls permitted expansion of the interview data to a value representing the twenty-four hour "peak season" traffic flow.

INTERNAL PHASE: WHY and HOW

Preliminary study of the Panama City urban area resulted in the decision to obtain a representative sample of the internal vehicle movements (trips with both origin and destination entirely within the study cordon) by means of the Controlled Post Card Method. This arrangement involved the mailing of post cards containing a questionnaire section to be completed by the addressee and returned to the sender.

While it is true that this type of "mail-out" usually results in a return of fifteen to twenty percent, accounting controls of the number of cards mailed to each small zone (Figure 4) were maintained to keep constant vigilance of the returns in order that selective publicity might stimulate a better response from a zone or zones as required.

the traffic survey: internal study

The post cards requested information of the vehicle movements made during a twenty-four hour period. Each trip was to be listed giving; (1) origin, (2) destination, and (3) the time of day at each trip ending. Clear instructions were printed on each post card and considerable radio, television, and newspaper publicity was given to further clarify the questionnaire and to expedite the post card return.

The post card "mail-out" list was compiled from the records of the Bay County Tax Collector which gives the name and address of the owner of every motor vehicle tag sold in that county. This list was complete for the current year (1956) through July 9th.

Since the records presented the total of vehicle tag sales for all types of vehicles in the entire county, considerable processing was required to eliminate motor scooters, motor cycles, house trailers, and utility trailers. Further, the list was screened to include only those addresses within the cordon boundary of the traffic survey. This preliminary editing resulted in a total mail-out of 14,845 trip report post cards. These cards specifically requested of the Post Office Department a notice, on their Form #3547, of change of address, improper or

incorrect address, or other reasons for non-delivery of the card to the addressee.

Of the original mail-out of 14,845 trip report post cards, 809 were returned by the Post Office Department on Form #3547 noting the new or forwarding address of the addressee. These cards were deducted from the total of the original mail-out if the new address was outside of the internal study cordon. If the new address was still inside the study area, the card was remailed and adjustments made accordingly in the control records.

Upon receipt back of completed trip report post cards, additional adjustments to control records were necessary.

Origin - Destination Address: The completed trip report cards were screened to check the first and last trips reported against the zone of original mail-out. This check permitted more specific geographic assignment of the vehicle garage location for those cards delivered to Post Office Box addresses. Further, it permitted a check upon those cards that were forwarded by the Post Office Department (or other persons) without return or notice to the sender on Form #3547.

In the event the address of the first trip origin and the last trip destination did not coincide with the zone

of mail-out, the control records were changed accordingly. If the address was outside of the survey area, the card was deducted from the original mail-out and was not used. This correction was made on the assumption that the first trip of the day originated from the home garage and the destination of the last trip of the day was to the home garage of the vehicle.

Faulty Address: The original mail-out of the traffic survey trip report cards was further adjusted to reflect the loss of trip reports as a result of faulty addresses.

This catagory accumulates those cards not deliverable by the Post Office Department because of incorrect street or number or other improper address that the Department was unable to correct from their directory. These cards were again checked against the registered motor vehicle list, the city directory, and the telephone book in an effort to obtain the proper address. Those cards that could not be corrected were a total loss and subsequently deducted from the original mail-out total.

This processing of the post cards resulted in a final "adjusted" mail-out of 10,503 cards. This total represents 70.5% of the total registered motor vehicles reported garaged in the area by the records of the Bay County Tax

Collector. Of this total, 3,185 were completed by the addressees, representing an overall good return of 31%.

Taxicabs: Study of the normal internal movement of the population included commercial trucks and passenger vehicles. The internal study of motor vehicle trips made by taxicabs was obtained by personal contact with the management of the operating companies. The initial consideration was to obtain permission to reproduce the daily trip log for each taxicab. However, only one company maintained such records and they were reproduced.

In as much as the other taxicab operators did not have such records available, they were asked to permit their drivers to carry a trip report card in the taxi to record trips as they were accumulated. However, the operators were unable to co-operate and it was not deemed advisable to insist upon their co-operation. In view of these obstacles, the records of the one company (which was also the largest) represented a twenty percent sample of the taxicab population.

Tourism: The vehicle trips made by this element of the traffic stream principally involve the highway connecting links serving Panama City. The trip movements were covered by the external phase of the survey.

However, acknowledging that these motorists were not concerned with the community problems of Panama City, an effort was made to determine their contribution to the "internal" traffic movements.

The hotels, motels, and rooming houses listed by the Florida Hotel Commission were each given a number of trip report cards equal to the number of rental units in each establishment. This personal contact permitted detailed explanation of the survey and accruing benefits in order that full co-operation of the management might be obtained.

The owner or manager was asked to issue a trip report post-card to each guest and ask that it be completed according to the instructions printed on the card. Identification control of these cards permitted a tabulation upon receipt of the postal returns.

Of the 1,012 cards thus distributed, thirty-five were returned to the survey office completed. This extremely poor return was not considered unusual and the returns were discarded.

Publicity: The extensive publicity campaign conducted for the post card phase of the Panama City traffic survey was extended over a period of forty-seven days; and an acceptable overall return of 31% was obtained. By August

27th, the daily postal receipts of complete and incomplete trip report cards had dropped to less than twenty per day; therefore, on September 1st, the acceptance of trip post cards was discontinued.

Daily accounting control of the receipted trip report cards, by zones of mail-out, permitted the use of intensified, "selective" publicity in an effort to stimulate returns from the lagging areas. A complete publicity brochure has been prepared and previously submitted to the Florida State Road Department.

Screenline: Since the pattern and magnitude of the external and internal vehicle trips were obtained by sampling methods, a screenline was established that would be crossed by most of the trip movements within and through the survey area. This imaginary line is delineated on Figure 4. The locations where streets crossed the screenline were given a station number and traffic census were taken to obtain vehicle classification and direction for an average weekday.

For all intents and purposes, this screenline was established as a practical, comparative check against the trip movements reported by the origin-destination study. The total number of screenline crossings taken from the trip movements reported by the origin-destination study

accounted for 83% of the ground count of vehicles at screenline stations. No attempt was made to adjust the study data to equal the ground count at the screenline, since there is not conclusive evidence of the validity of the screenline as an accurate check upon the completeness of origin to destination trip movement studies.

DESIRE LINES

The ultimate value of the trip movements from the origin-destination study is to enable determination of the level of design required for the arterial streets and highways serving Panama City.

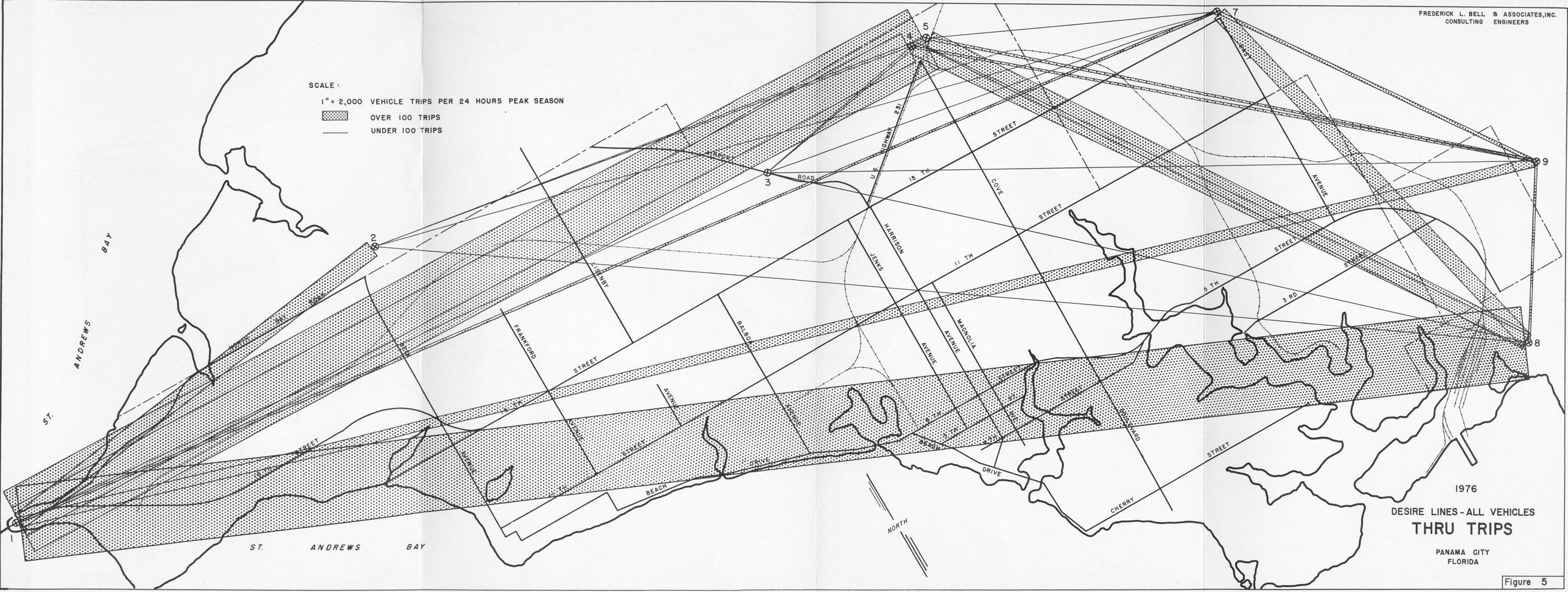
The vehicle trips have been classified in three major catagories:

1. Thru trips: both origin and destination outside of the urban area.
2. External-Internal trips: origin (destination) inside the urban area and destination (origin) outside the area.
3. Internal trips: both origin and destination inside the urban area.

These basic trip types merit consideration separately, as well as, collectively because of their differing purposes and needs.

To simplify analysis and interpretation of the trip data, visual aids have been constructed and will be hereafter referred to as "Desire Lines". These lines, representing the origin to destination movements, have been presented, to scale, on a map of the Panama City street and highway system. The lines represent the path the motorist would prefer or desire to travel, if it were possible for him to do so; hence, the name desire lines.

Thru Trip Desire Lines: Figure 5 presents the 24-hour


FREDERICK L. BELL & ASSOCIATES, INC.
CONSULTING ENGINEERS
SCALE :
1" = 2,000 VEHICLE TRIPS PER 24 HOURS PEAK SEASON
OVER 100 TRIPS
UNDER 100 TRIPS
1
2
3
4
5
7
8
9
ST. ANDREWS BAY
ST. ANDREWS BAY
NORTH
BEACH
DRIVE
CHERRY
STREET
AVENUE
BOULEVARD
ROAD
HARRISON
JENKS
MAGNOLIA
FRANKFORD
BALBOA
U.S. HIGHWAY 231
15 TH
11 TH
9 TH
5 TH
3 RD
1976
DESIRE LINES - ALL VEHICLES
THRU TRIPS
PANAMA CITY
FLORIDA
Figure 5

peak season, 1976 values for vehicle trips passing through this urban area, as taken from Table II. They have no need of the arterial street grid as such, but would receive greater benefit from a highway facility that would skirt the more heavily congested streets and areas.

The heaviest "thru" movement (4,108 trips) is along 15th Street (SR 30A) between stations 1, 4, and 5. The second heaviest travel (3,430 trips) follows the marked route of U. S. 98 between stations 1, 8, and 9. The traffic flow between stations 4, 5, and 8 ranks third in this class with 1,297 trips.

External-Internal Trip Desire Lines: These lines present the pattern and magnitude of vehicle trips entering and leaving the Panama City urban area during the peak season of the forecast year 1976. They have been prepared on four separate figures for clarity; Figures 6, 7, 8, and 9.

These trips make major use of those arterial streets that provide direct access to the state and county highways. Few of these movements can be expected to travel the secondary street system because many of the drivers are not familiar with the area.

Figure 6 (sheet 1 of 3) presents those movements that will exceed 500 per day, maximum season, in 1976. Figure 7

desire lines: external-internal

(sheet 2 of 3; trips entering and leaving from the west half of the area) and Figure 8 (sheet 3 of 3; trips entering and leaving from the east half of the area) portray those external-internal trips of less than 500 per day, maximum season 1976. This separation of trips was made to simplify visual comparison of desire line volume and direction.

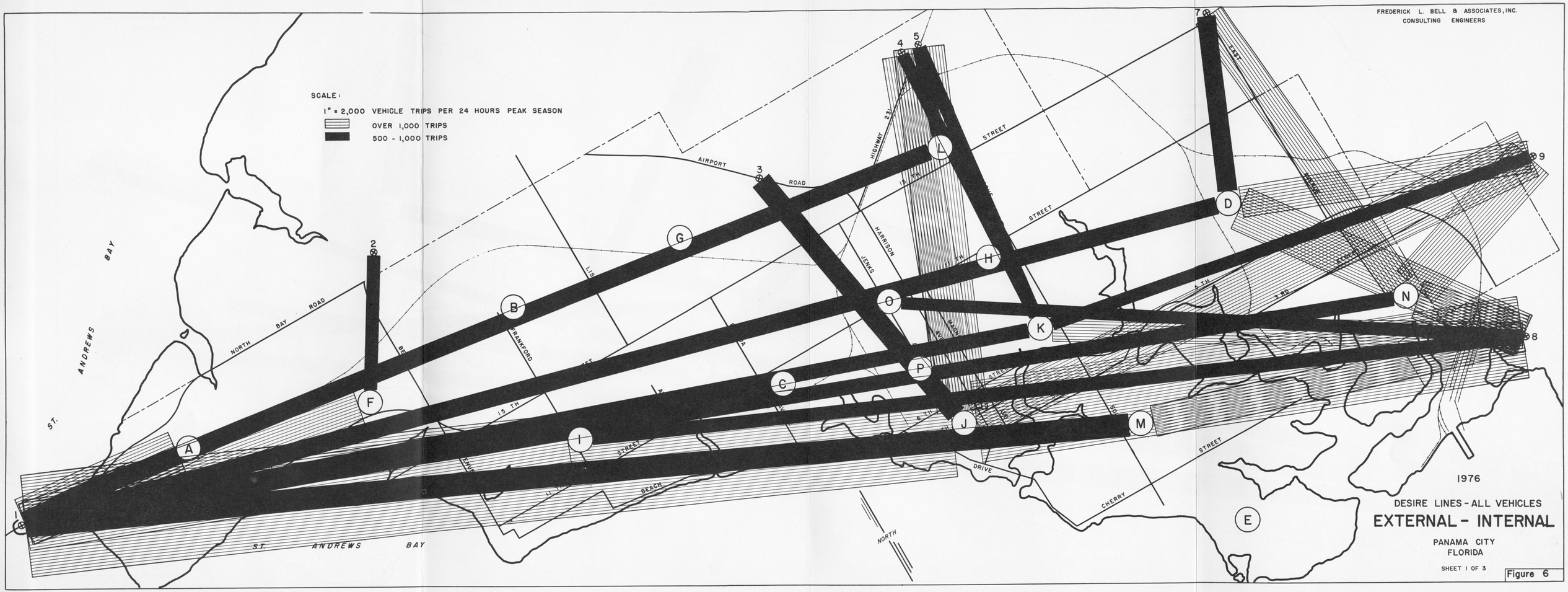
Figure 9 records, graphically, the interchange of vehicular traffic between the urban area of Panama City and the other principal communities in Bay County.

From Figures 6, 7, and 8, it is noted that the interchange of traffic (24-hour peak season, 1976) between external stations and internal zones closely parallels the present arterial street grid.

The total east-west movement, in terms of vehicle trips, is approximately 40,600 per day (1976). These trips, using the present street system, would use 15th Street, 11th Street, Beach Drive, and 6th Avenue and 5th Avenue (U. S. 98).

The total north-south movement approximates 14,800 vehicle trips per day (1976). With the present street grid they would use Frankford Avenue, Jenks Avenue, Harrison Avenue, Magnolia Avenue, Cove Boulevard, and East Avenue.

The heaviest concentration of trip origins and desti-


FREDERICK L. BELL & ASSOCIATES, INC.
CONSULTING ENGINEERS
SCALE:
1" = 2,000 VEHICLE TRIPS PER 24 HOURS PEAK SEASON
OVER 1,000 TRIPS
500 - 1,000 TRIPS
1976
DESIRE LINES - ALL VEHICLES
EXTERNAL - INTERNAL
PANAMA CITY
FLORIDA
SHEET 1 OF 3
Figure 6

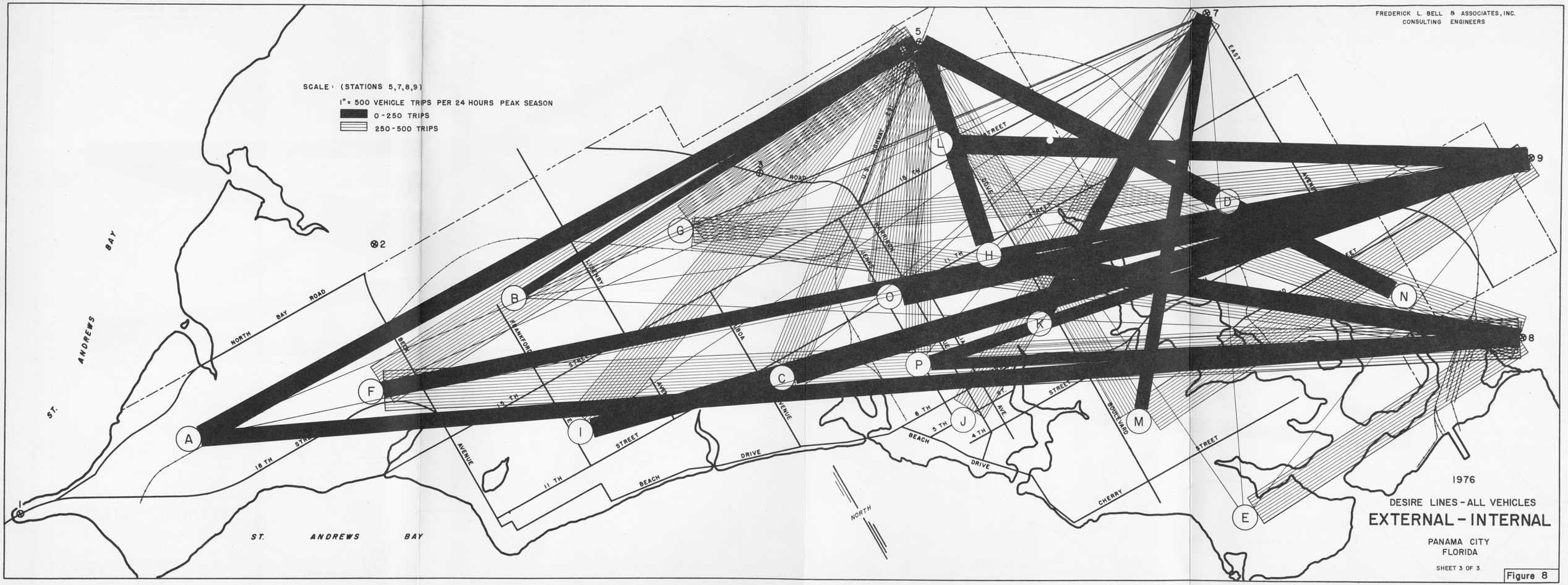
DESIRE LINES - ALL VEHICLES

EXTERNAL - INTERNAL

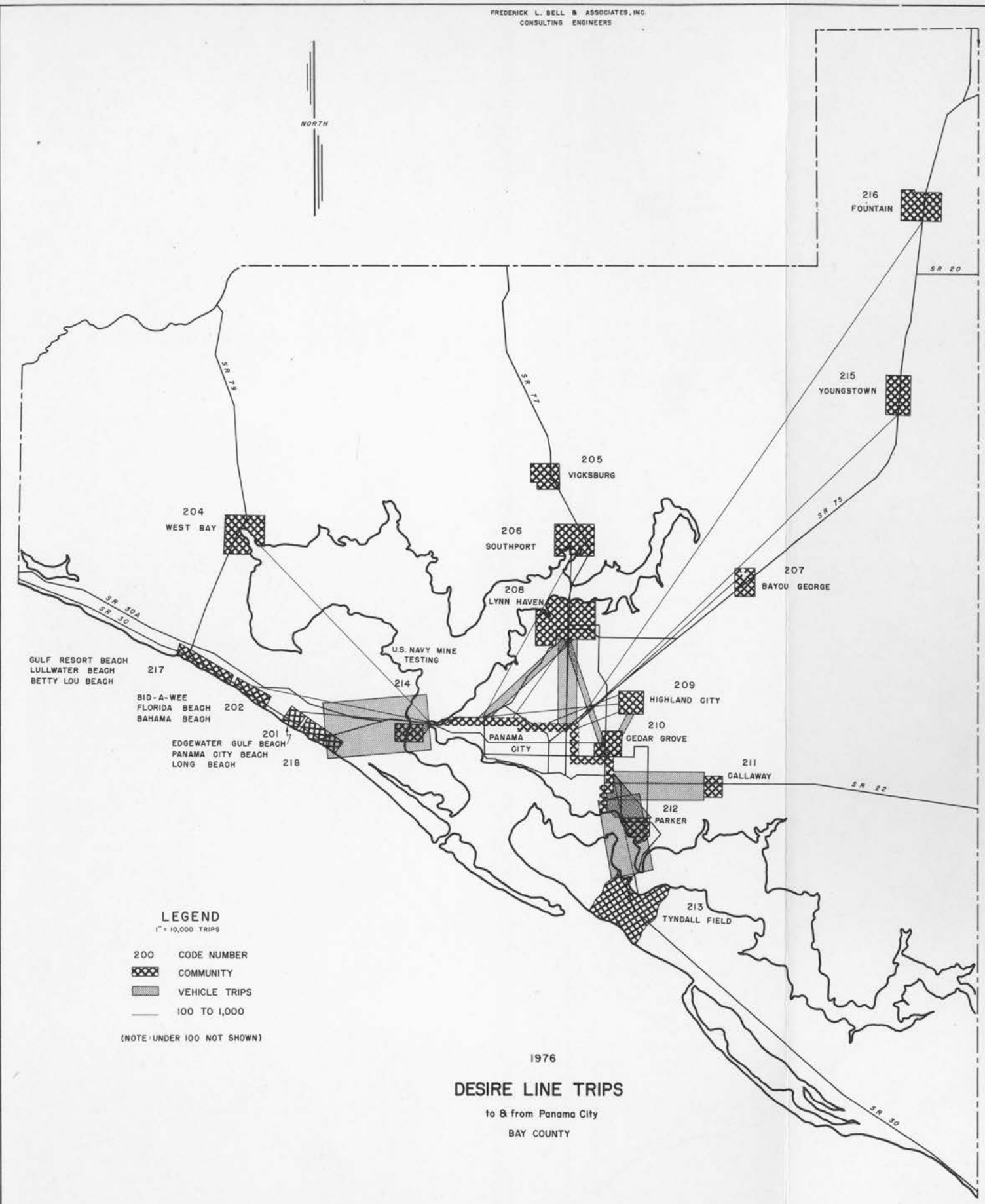
PANAMA CITY
FLORIDA

SHEET 2 OF 3

Figure 7


FREDERICK L. BELL & ASSOCIATES, INC.
CONSULTING ENGINEERS
SCALE: (STATIONS 5,7,8,9)
1" = 500 VEHICLE TRIPS PER 24 HOURS PEAK SEASON
0 - 250 TRIPS
250 - 500 TRIPS
1976
DESIRE LINES - ALL VEHICLES
EXTERNAL - INTERNAL
PANAMA CITY
FLORIDA
SHEET 3 OF 3
Figure 8

FREDERICK L. BELL & ASSOCIATES, INC.
CONSULTING ENGINEERS



LEGEND
1" = 10,000 TRIPS

200 CODE NUMBER
COMMUNITY
VEHICLE TRIPS
100 TO 1,000

(NOTE: UNDER 100 NOT SHOWN)

1976

DESIRE LINE TRIPS

to & from Panama City

BAY COUNTY

Figure 9

nations is well distributed in the area: Zone J (business district), 14,642; Zone N, 6,192; Zone D, 5,299; and Zone I, 4,096.

These trip summaries were taken from Table III. More specific traffic assignments of these trips, plus the external and internal trips, were made to determine the adequacy of the present streets to the forecast year, 1976. All of the trips were assigned to specific sections of the arterial street grid after comparing travel times over alternative routes at design or legal speed.

The interchange of traffic (Table IV) between Panama City and the other communities in Bay County, as shown on Figure 9, is essentially a problem of providing improved access to and from the beach areas on the west and Tyndall Field on the east. The major restrictions to these major movements are; (1) the bridge crossing St. Andrews Bay to the beach area, and (2) the routing of U. S. 98 traffic through the central business district.

Internal Trip Desire Lines: This classification of vehicle movement groups those trips that are generally shorter in length of travel. Further, the vehicle operator is usually more familiar with the city's traffic arteries and will, most often, select a less traveled route to avoid

congested streets or areas. However, these trips are extremely important to the economic and social welfare of the community and must be considered in the development and design of the street and highway network.

The desire lines for the zone to zone interchange of traffic (1976 peak season) have been resolved (from Tables V and VI) into three major directional plans for passenger cars: Figure 10, major north-south movements; Figure 11, major east-west interchange; and Figure 12, diagonal trips. The anticipated daily volumes of commercial vehicle zone to zone movements, peak season 1976, have been presented on one map, Figure 13.

To maintain simplicity, the desire lines on Figures 10, 11, 12, and 13 have been drawn to a band-width scale representing varying increments of trip volume. This permits easier visual "black ink" interpretation of the major flows by the reader.

It will be noted that the major movements of passenger cars and trucks generally conform to the pattern established by the external-internal trips. There is considerable movement between the "downtown" area of Panama City and the Millville and Springfield areas. This movement, in addition to the external and external-internal trips, places a tre-

mendous load upon the single highway bridge (Route U. S. 98) crossing Watson Bayou.

These zone to zone movements build to an ever greater volume in the vicinity of Massalina Bayou. However, two bridges provide crossing at this point; 4th Street, and 6th Street (U. S. 98).

The desire lines to and from zones "M" and "E" have the alternative of crossing Massalina Bayou via Beach Drive or 4th Street. These trips total approximately 12,600 per day (1976).

Truck movements, as interpreted for Figure 13, include all delivery and service vehicles, including; pick-up, panel, and sedan delivery trucks.

A summary of all the desire line concentration in excess of 1,000 vehicle trips per day (1976 peak season) have been prepared for Figure 14.

Panama City External Study

TABLE II

VEHICLE TRIPS BETWEEN EXTERNAL STATIONS
ALL VEHICLES
1976

	EXTERNAL STATION							
Station	01	02	03	04	05	07	08	09
01	--	732	23	1378	2730	105	2990	440
02		--	--	15	6	3	12	--
03			--	41	55	36	51	6
04				--	309	--	558	135
05					--	27	739	130
07						--	613	184
08							--	100
09								--

Panama City External Study

TABLE III

VEHICLE TRIPS BETWEEN EXTERNAL STATIONS
AND INTERNAL ZONES
1976

EXTERNAL STATION

ZONE	01	02	03	04	05	07	08	09	Totals
A	2012	314	--	32	198	14	161	52	2783
B	253	23	24	28	101	9	97	34	569
C	528	57	89	497	378	42	405	178	2174
D	709	23	101	271	216	810	1847	1322	5299
E	284	--	24	57	66	28	327	84	870
F	1770	530	60	87	453	55	419	172	3546
G	443	51	272	353	435	46	327	265	2192
H	261	--	83	135	207	14	211	116	1027
I	2162	417	54	246	418	54	544	201	4096
J	4338	115	862	1664	2198	377	3395	1693	14642
K	627	17	143	500	555	185	1094	529	3650
L	689	23	36	431	510	74	450	209	2422
M	942	18	143	366	304	138	1283	392	3586
N	572	23	172	209	189	1352	1620	2055	6192
O	491	17	165	303	493	97	515	237	2318
P	392	6	106	205	251	28	212	138	1338

TABLE IV

TRIPS TO IMMEDIATE AREAS

OUTSIDE

PANAMA CITY

External Station

ZONE	01	02	03	04	05	07	08	09
201	221	--	--	8	26	23	--	--
202	189	--	--	4	--	--	--	--
204	162	11	12	57	9	9	--	--
205	--	--	--	28	4	--	--	6
206	--	171	18	558	26	166	--	--
207	--	6	6	--	378	152	--	6
208	--	1656	325	3501	216	1058	--	6
209	--	103	--	49	2979	1325	--	--
210	--	17	--	4	57	37	--	--
211	--	23	--	--	4	--	46	5577
212	--	11	--	--	4	5	5345	1249
213	--	17	--	--	18	--	8114	836
214	1881	--	12	--	--	--	--	--
215	--	11	--	--	207	46	--	--
216	--	11	--	4	101	28	--	--
217	90	--	--	--	--	--	--	--
218	10850	--	112	--	4	--	--	--

TABLE V

TWO-WAY
ORIGIN-DESTINATION TABLE

TRIPS BETWEEN ZONES

1976
Passenger Cars Only

Panama City, Florida

ZONE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
A	182	136	55	120	46	553	185	34	581	715	102	52	136	137	114	88
B		43	87	59	31	379	135	163	664	746	213	92	73	142	97	47
C			99	203	134	197	192	129	774	1596	432	186	465	181	296	279
D				2121	91	233	369	277	332	2809	1070	188	766	2857	417	172
E					292	73	66	95	175	1986	743	130	1254	352	192	71
F						1012	304	29	2094	1640	478	202	421	442	247	182
G							189	93	521	1241	447	119	492	292	337	223
H								325	175	974	699	311	274	334	155	136
I									2654	2158	630	292	574	505	542	272
J										4555	4025	962	5579	2414	2435	1562
K											1049	300	2408	1251	839	480
L												67	443	398	174	177
M													2347	835	512	445
N														2295	280	182
O															397	356
P																109

TABLE VI

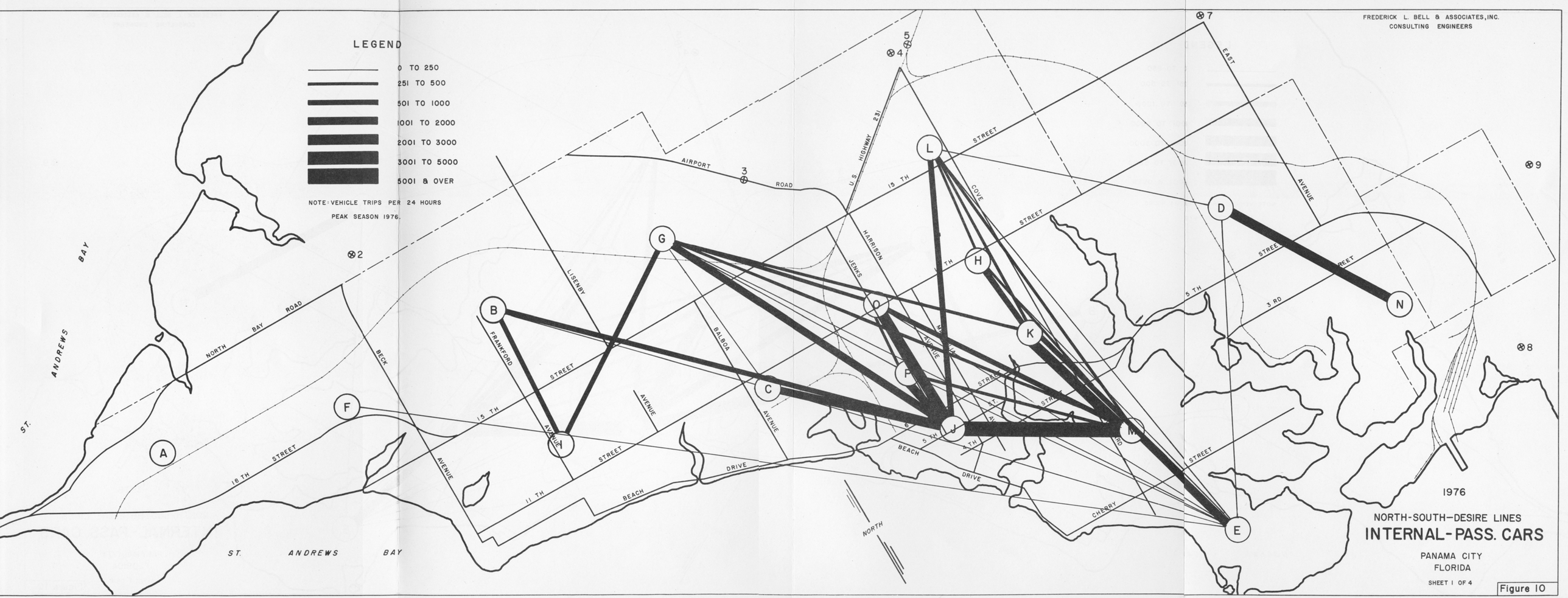
TWO-WAY
ORIGIN-DESTINATION TABLE

TRIPS BETWEEN ZONES

1976
Trucks

Panama City, Florida

ZONE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
A	21	17	16	--	--	30	4	4	42	63	52	17	32	11	6	--
B		13	14	5	7	23	16	--	64	24	--	10	8	8	--	42
C			46	134	21	53	100	21	111	390	84	64	21	63	39	63
D				268	29	4	6	25	105	356	265	87	110	313	31	50
E					32	--	2	45	34	175	122	9	103	21	37	10
F						111	56	9	177	221	37	38	9	11	11	34
G							20	--	97	299	111	85	85	69	13	34
H								81	49	93	89	148	14	154	26	107
I									156	235	101	89	43	64	71	51
J										897	421	328	533	257	333	293
K											265	84	173	89	199	44
L												334	83	145	66	45
M													175	81	38	52
N														502	47	21
O															39	37
P																15


LEGEND
0 TO 250
251 TO 500
501 TO 1000
1001 TO 2000
2001 TO 3000
3001 TO 5000
5001 & OVER
NOTE: VEHICLE TRIPS PER 24 HOURS
PEAK SEASON 1976.
FREDERICK L. BELL & ASSOCIATES, INC.
CONSULTING ENGINEERS
1976
NORTH-SOUTH-DESIRE LINES
INTERNAL-PASS. CARS
PANAMA CITY
FLORIDA
SHEET 1 OF 4
Figure 10
ST. ANDREWS BAY
NORTH BAY ROAD
18 TH STREET
BECK AVENUE
FRANKFORD AVENUE
11 TH STREET
BEACH DRIVE
LISENBY AVENUE
BALBOA AVENUE
AIRPORT ROAD
U.S. HIGHWAY 231
HARRISON AVENUE
JENKS AVENUE
15 TH STREET
COVE BOULEVARD
EAST AVENUE
3 RD STREET
5 TH STREET
4 TH STREET
CHERRY STREET
NORTH
A
B
C
D
E
F
G
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K
L
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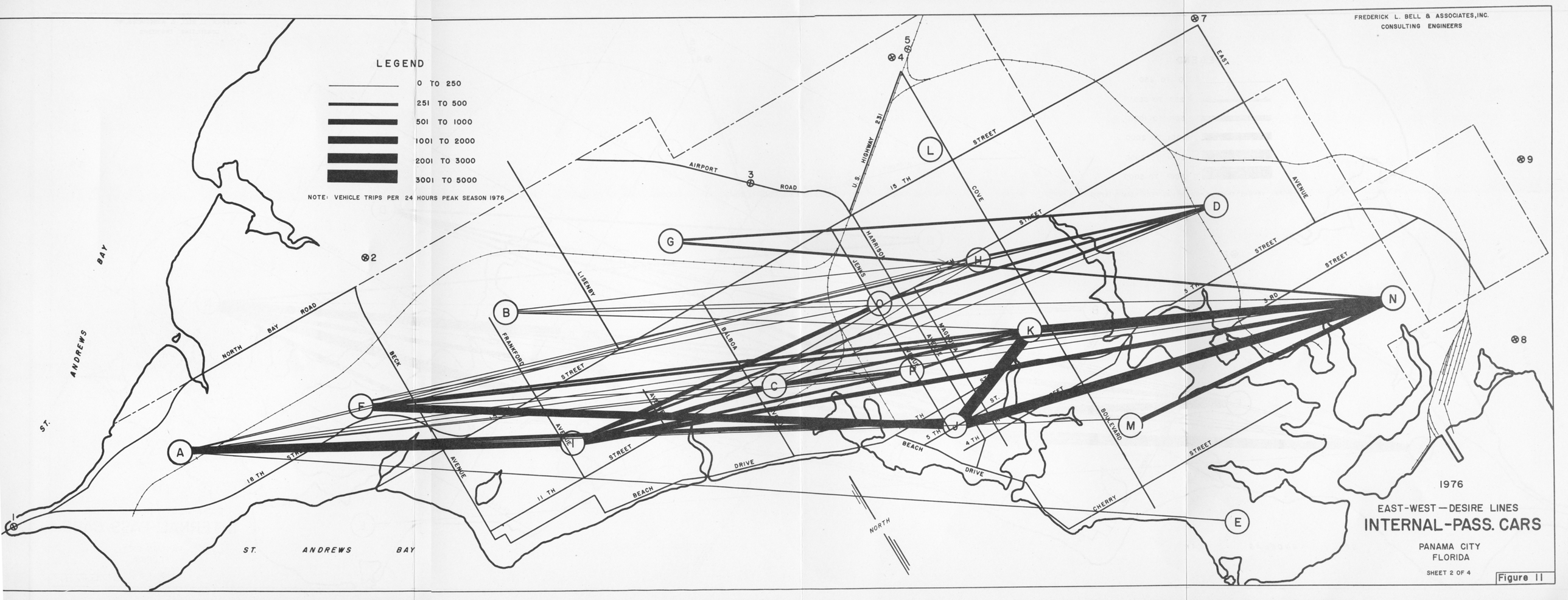
FREDERICK L. BELL & ASSOCIATES, INC.
CONSULTING ENGINEERS
LEGEND
0 TO 250
251 TO 500
501 TO 1000
1001 TO 2000
2001 TO 3000
3001 TO 5000
NOTE: VEHICLE TRIPS PER 24 HOURS PEAK SEASON 1976
1976
EAST-WEST — DESIRE LINES
INTERNAL-PASS. CARS
PANAMA CITY
FLORIDA
SHEET 2 OF 4
Figure 11
ST. ANDREWS BAY
NORTH BAY ROAD
BECK AVENUE
LISENBY AVENUE
FRANKFORD AVENUE
BALBOA STREET
AIRPORT ROAD
U.S. HIGHWAY 231
MARRIBO STREET
JENKS AVENUE
MAGNOLIA AVENUE
COVE BOULEVARD
EAST AVENUE
15 TH STREET
3 RD STREET
4 TH STREET
5 TH STREET
BEACH DRIVE
CHERRY STREET
NORTH
18 TH STREET
11 TH STREET
A
B
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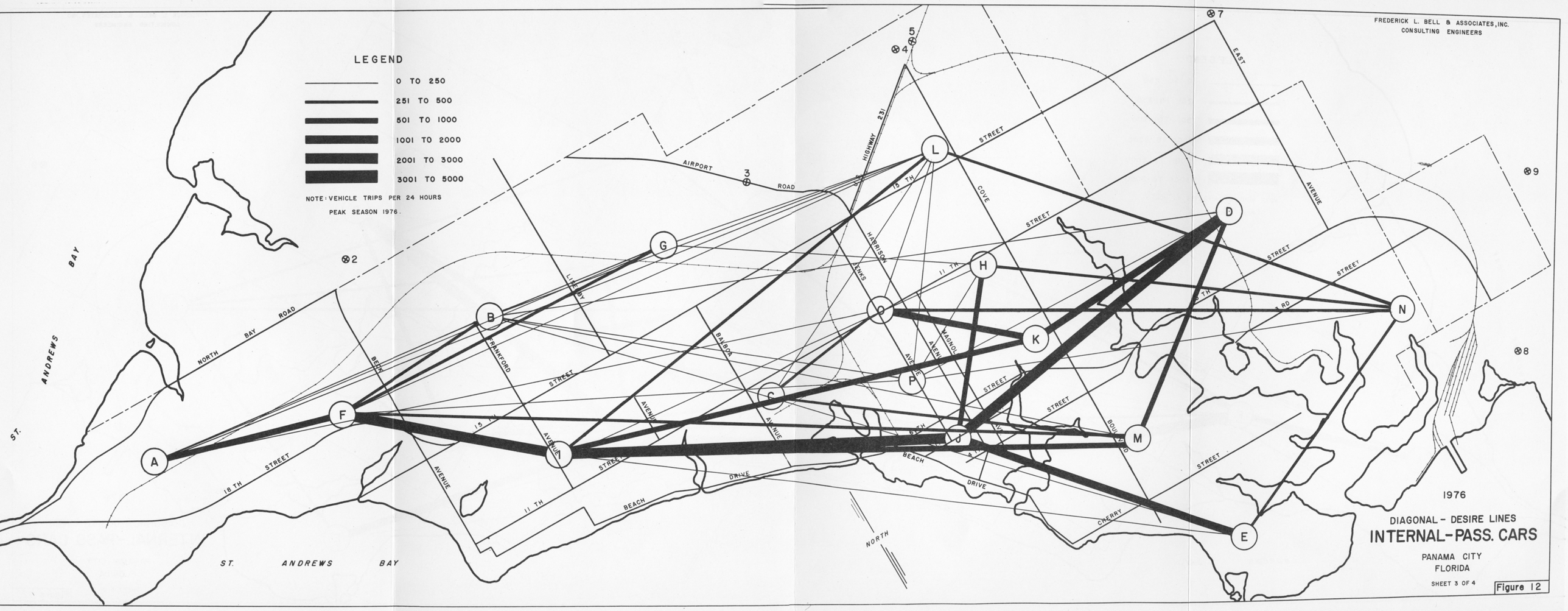
LEGEND
0 TO 250
251 TO 500
501 TO 1000
1001 TO 2000
2001 TO 3000
3001 TO 5000
NOTE: VEHICLE TRIPS PER 24 HOURS
PEAK SEASON 1976.
FREDERICK L. BELL & ASSOCIATES, INC.
CONSULTING ENGINEERS
1976
DIAGONAL - DESIRE LINES
INTERNAL-PASS. CARS
PANAMA CITY
FLORIDA
SHEET 3 OF 4
Figure 12
ST. ANDREWS BAY
NORTH BAY ROAD
AIRPORT ROAD
HIGHWAY 231
15 TH STREET
11 TH STREET
BEACH DRIVE
CHERRY STREET
HARRISON AVENUE
BERTHA AVENUE
FRANKFORD AVENUE
LINDEN AVENUE
BAYOU AVENUE
WAGNON AVENUE
COVE BOULEVARD
EAST AVENUE
NORTH
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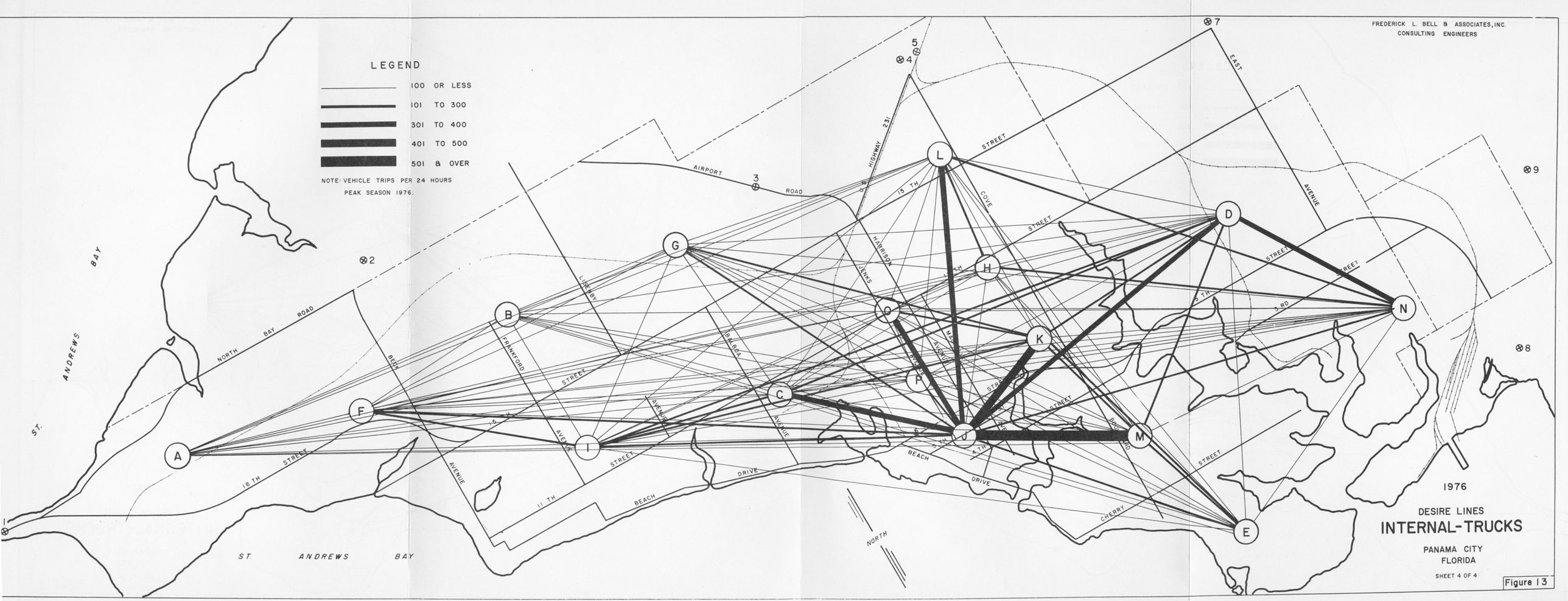
LEGEND
100 OR LESS
101 TO 300
301 TO 400
401 TO 500
501 & OVER
NOTE: VEHICLE TRIPS PER 24 HOURS
PEAK SEASON 1976.
FREDERICK L. BELL & ASSOCIATES, INC.
CONSULTING ENGINEERS
1976
DESIRE LINES
INTERNAL-TRUCKS
PANAMA CITY
FLORIDA
SHEET 4 OF 4
Figure 13
ST. ANDREWS BAY
NORTH BAY ROAD
BEACH DRIVE
AIRPORT ROAD
HIGHWAY 231
EAST AVENUE
CHERRY ROAD
15TH STREET
COVE BOULEVARD
HARRISON AVENUE
BALBOA AVENUE
FRANKFORD AVENUE
LISENBY AVENUE
18TH STREET
11TH STREET
A
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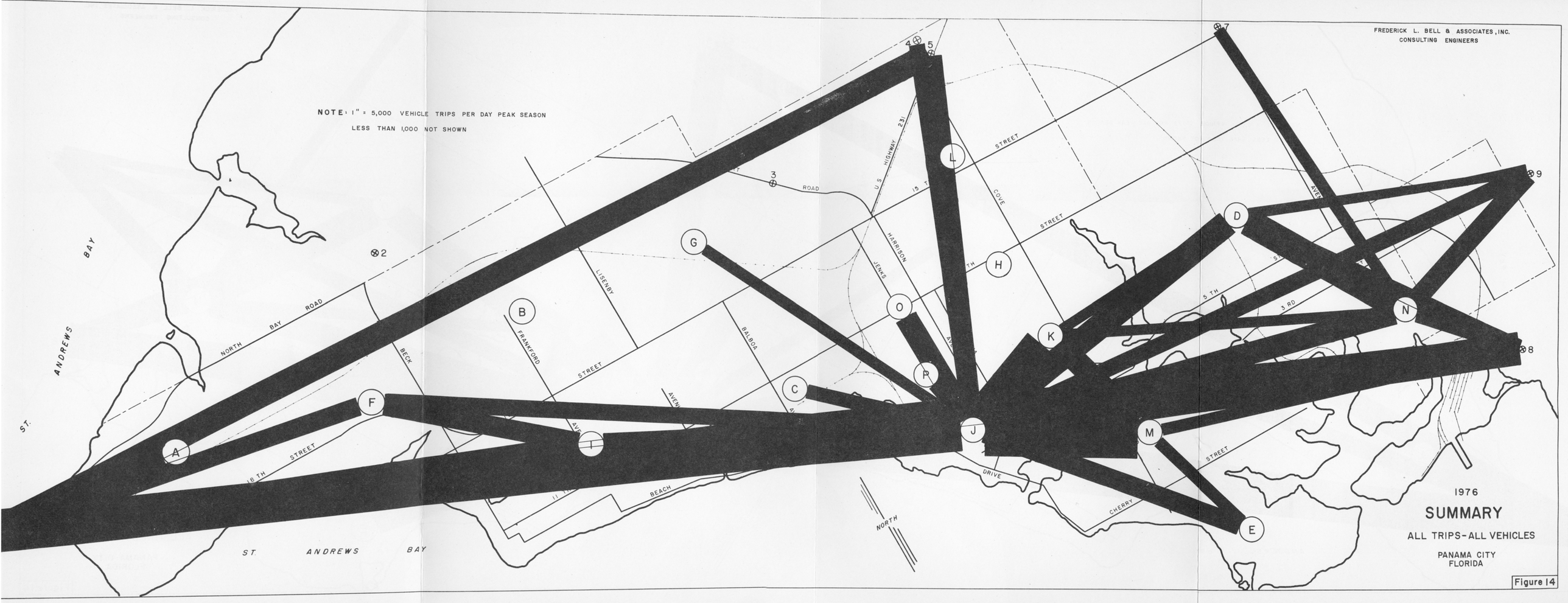
FREDERICK L. BELL & ASSOCIATES, INC.
CONSULTING ENGINEERS
NOTE: 1" = 5,000 VEHICLE TRIPS PER DAY PEAK SEASON
LESS THAN 1,000 NOT SHOWN
1976
SUMMARY
ALL TRIPS-ALL VEHICLES
PANAMA CITY
FLORIDA
Figure 14
ST. ANDREWS BAY
NORTH BAY ROAD
BECK AVENUE
FRANKFORD AVENUE
STREET
LISENBY AVENUE
BALBOA AVENUE
18 TH STREET
BEACH DRIVE
ROAD
U.S. HIGHWAY 231
HARRISON AVENUE
JENKS AVENUE
COVE BOULEVARD
5 TH STREET
3 RD STREET
CHERRY STREET
NORTH
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INVENTORY AND EVALUATION OF EXISTING STREETS

Before any estimate of need can be made, the existing facilities must be inventoried to determine; (1) structural sufficiency, (2) traffic capacity, and (3) service utility.

The first of these three criteria was satisfied by examination of the records of the City Engineer's office in Panama City to obtain standards of design of existing streets and dedicated rights-of-way. Further study in the field was needed to obtain paved street widths, general state of repairs, and existing traffic control devices. Since most of the major streets were a part of the state road network, some design standards were taken from State Road Department records.

The inventory of street traffic capacities required the study of forty-five major and minor street intersections. These studies established the maximum number of vehicles per hour that the street could carry without undue congestion or delay.

In addition to the capacity studies, traffic census were taken at fifty selected locations to measure the vehicle volumes using the street network. This census permitted the development of traffic flow maps to show the relative traffic patterns of the Panama City urban area, Figure 15. Further, these traffic counts would

permit analysis of need for traffic control at problem intersections, i.e.; signs, signals, and pavement markings.

The inventory included, also, a study of the operational characteristics of travel over the existing arterial street system. Speed and delay studies made of actual driving experience along each of the arterial streets pinpointed locations of delays and causes of restrictions to traffic movement.

To supplement these operational studies, all intersections controlled by traffic signals were investigated to ascertain if the signal was warranted and to record the signal timing. These inventoried data provide the base for evaluation of the arterial street system.

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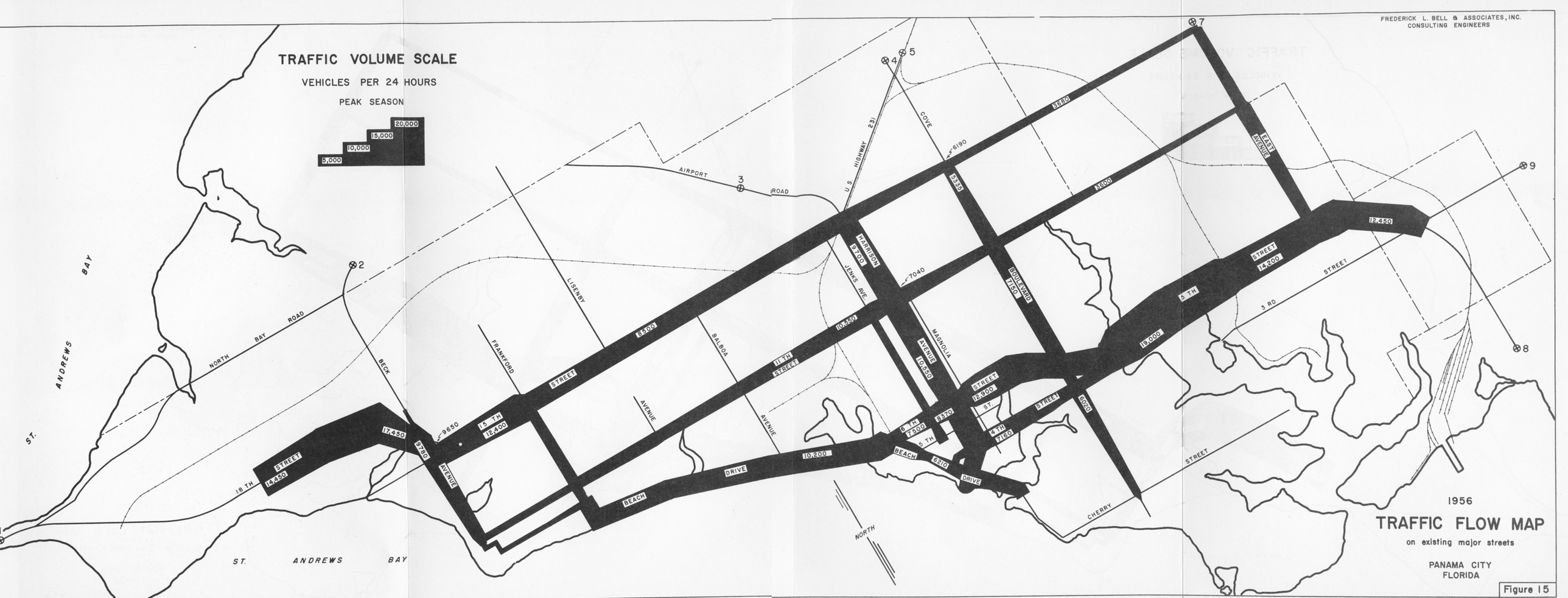

1956

TRAFFIC FLOW MAP

on existing major streets

PANAMA CITY
FLORIDA

Figure 15

EVALUATION OF EXISTING STREETS

The arterial street grid in Panama City has two principal functions and each should be borne in mind during the examination of its present adequacy. First, this network of superior type traffic facilities provides the means for the expeditious interchange of people and commodities between the areas of different land use within the city; and second, it provides the vital urban connecting links for the Florida and important U. S. highway routes which service the area.

Individual summary of the factors affecting movement over each major street in the arterial system is given on Figures 16, 17, and 18 to permit visual, as well as, mechanical study of the system.

Present Capacity Versus Present Usage: The ability of each arterial street to carry traffic was computed using the method outlined in the Highway Capacity Manual, 1950, U. S. Bureau of Public Roads. These capacity investigations were made at forty-five locations along the grid system, principally at signalized intersections. Comparison of these computed capacities with the peak-hour traffic volumes (manual counts, July - August, 1956) along with visual inspections, supplied the information needed to determine whether or not the system was being utilized to the fullest extent.

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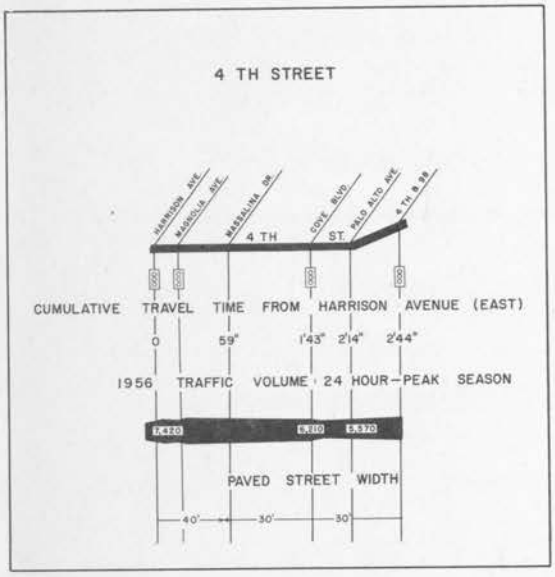
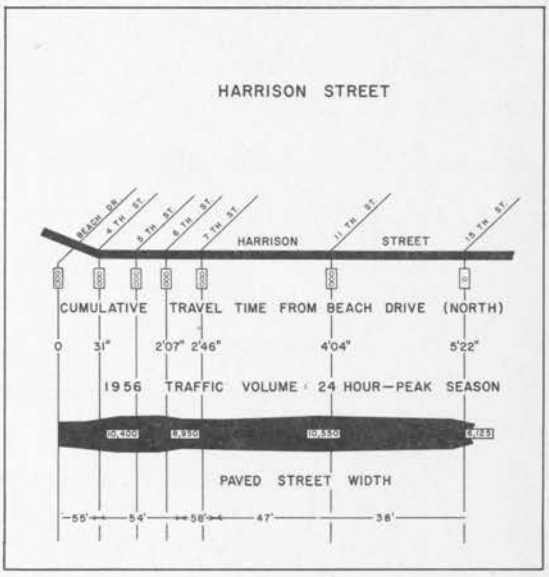
CONSULTING ENGINEERS

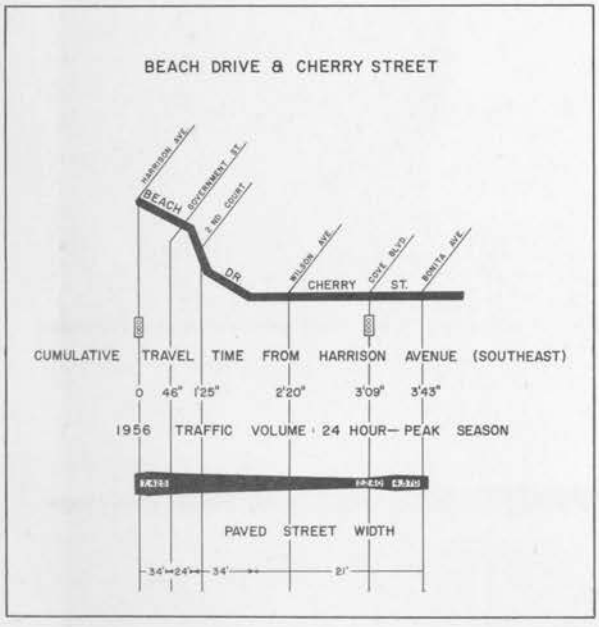
1956

ROUTE EVALUATION

PANAMA CITY
FLORIDA







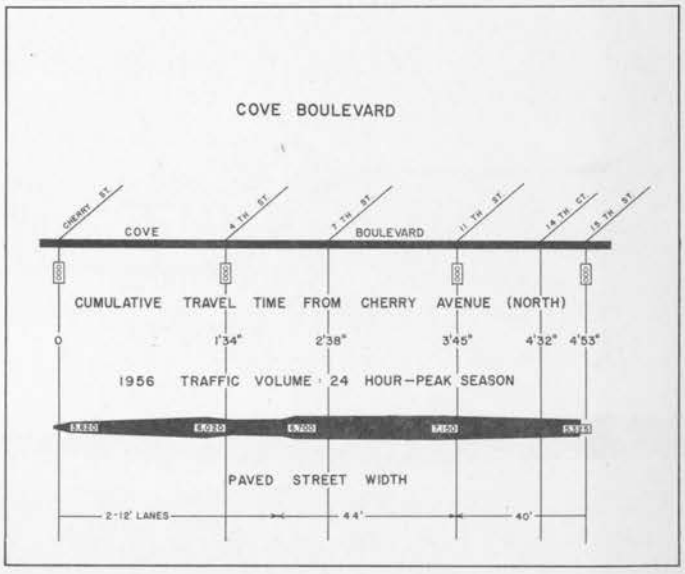


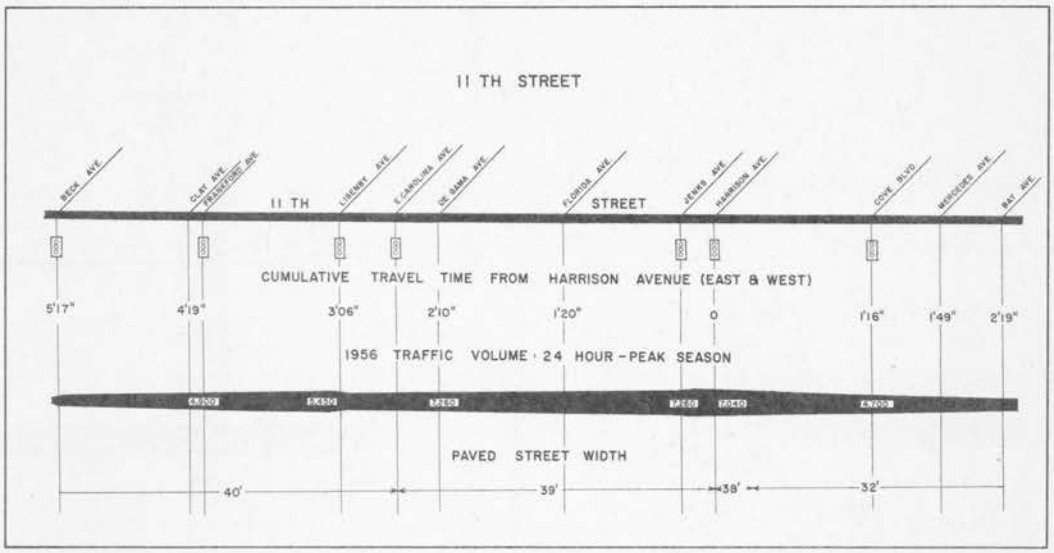
Figure 16

FREDERICK L. BELL & ASSOCIATES, INC.
CONSULTING ENGINEERS

1956

ROUTE EVALUATION

PANAMA CITY
FLORIDA



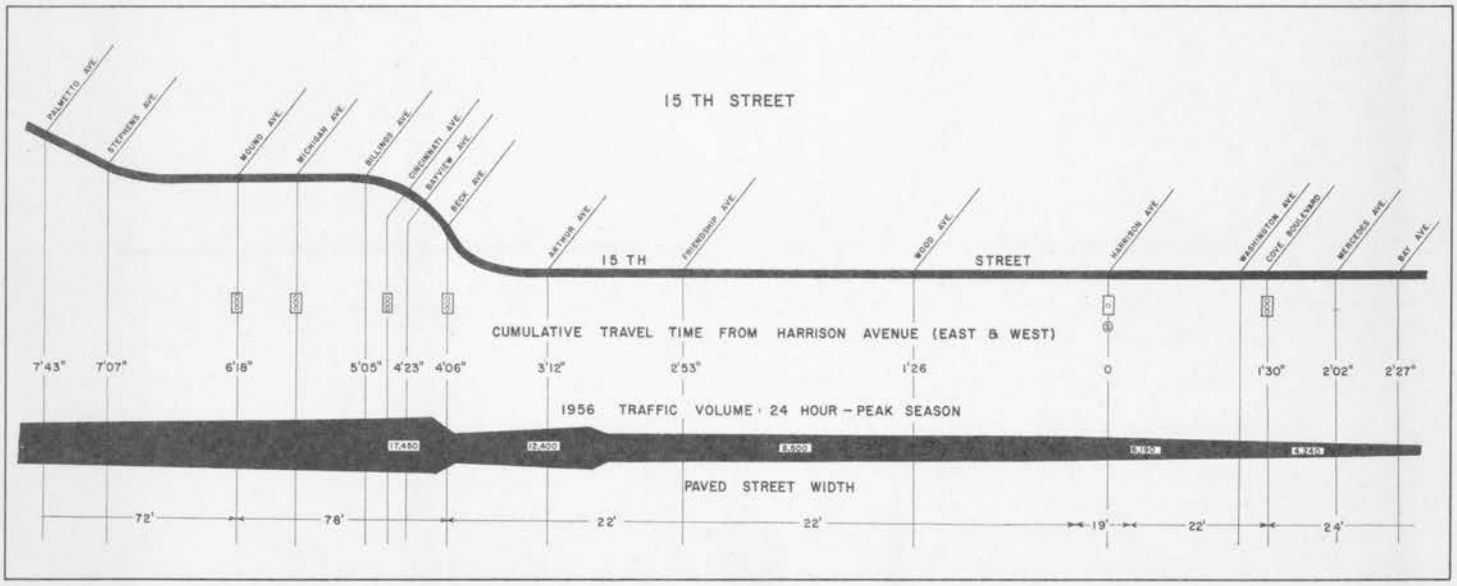


Figure 17

FREDERICK L. BELL & ASSOCIATES, INC.
CONSULTING ENGINEERS

1956

ROUTE EVALUATION

U.S. 98, SR 30

PANAMA CITY, FLORIDA

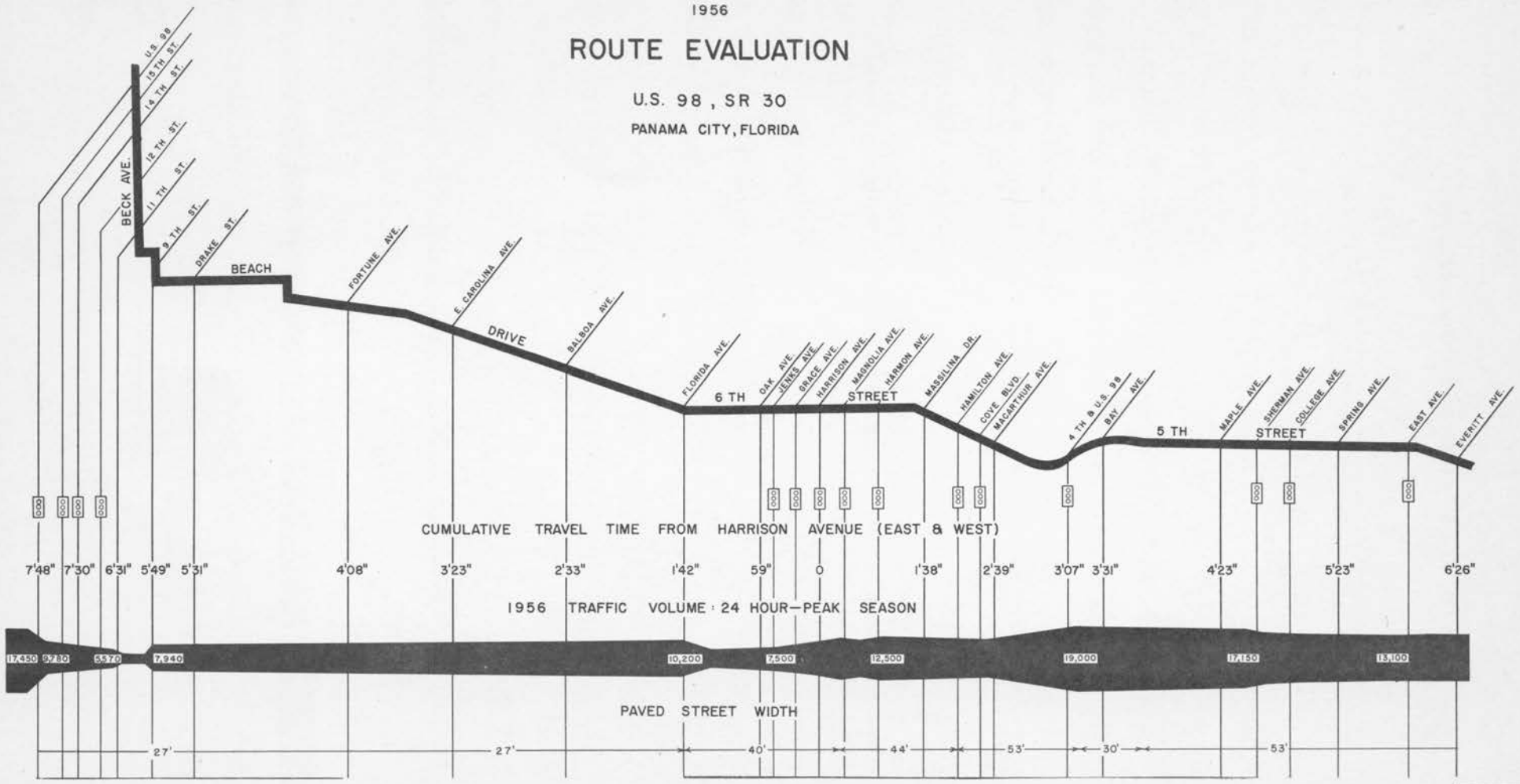


Figure 18

evaluation of existing streets

Excluding the central business district (treated separately as a unit, see page 65), this system of major streets is now operating well below possible capacity.

The largest gap between existing usage and capacity is on 11th Street (SR 22) where some sections are being utilized only 20-30% of ultimate values. For example, computed possible capacity of 11th Street on the west approach to the intersection of Beck Avenue is 311 vehicles per hour, while the actual number of vehicles using this approach during the peak hour was only sixty-three. Maximum utility of 11th Street, 46%, occurred east of the intersection with Cove Boulevard: capacity, 510 vph; peak-hour traffic volume, 234.

The potential of 15th Street (SR 75) is being utilized to about the same extent as 11th Street with a minimum of 52% excess capacity available east of Cove Boulevard (414 vph capacity as compared to a 199 vph peak-hour volume).

U. S. Route #98, carrying the largest east-west movement of vehicles, is functioning at 50-70% of its possible capacity with the maximum utilization of 90% obtained on the westerly approach to the intersection with Hamilton Avenue (capacity 508 vph, peak-hour 463 vph).

evaluation of existing streets

Maximum usage of the major north-south arterial street, Harrison Avenue, occurs south of 11th Street where 435 vehicles approached the intersection out of a possible 680 for a 64% utilization.

Average Vehicle Speeds and Causes of Delays: The "floating-car" method was used in making speed and delay studies of the urban area. Routes following the major arterial streets were selected since the majority of travel occurs on this system and at more efficient speeds. In the "floating-car" method, test cars made "runs" along these routes during peak and off-peak periods; floating with traffic inside the business district, and cruising at the posted speed limits, wherever possible, in the outlying regions. Each car was manned by a driver and a recorder. The recorder kept a record of the duration and cause of all delays and the accumulated travel time. The results of this phase of the survey are presented on the route evaluation diagrams (Figures 16, 17, and 18) in terms of travel time; and, also, they have been converted into average speeds over sections of the street (see Table VII).

Average speeds varied, over different sections of the arterial grid, with the highest speeds occurring

TABLE VII

Average Speeds
on
Present Arterial Streets

ROUTE	FROM	TO	AVERAGE SPEED
Harrison Avenue	Beach Drive	6th Street	11 MPH
	6th Street	11th Street	17 MPH
	11th Street	15th Street	21 MPH
Cove Boulevard	Cherry Street	4th Street	22 MPH
	4th Street	11th Street	21 MPH
	11th Street	15th Street	25 MPH
Cherry Street	Harrison Avenue	Wilson Avenue	15 MPH
	Wilson Avenue	Bonita Avenue	21 MPH
4th Street	Harrison Avenue	Cove Boulevard	20 MPH
	Cove Boulevard	U. S. 98	15 MPH
11th Street	Beck Avenue	Lisenby Avenue	26 MPH
	Lisenby Avenue	Harrison Avenue	25 MPH
	Harrison Avenue	Bay Avenue	25 MPH
15th Street	Palmetto Avenue	Billings Avenue	22 MPH
	Billings Avenue	Beck Avenue	27 MPH
	Beck Avenue	Arthur Avenue	25 MPH
	Arthur Avenue	Harrison Avenue	34 MPH
	Harrison Avenue	Bay Avenue	24 MPH
U. S. 98	14th Street	11th Street	22 MPH
	11th Street	Florida Avenue	21 MPH
	Florida Avenue	Harrison Avenue	15 MPH
	Harrison Avenue	4th Street	16 MPH
	4th Street	Everett Avenue	23 MPH

Note: Average speeds computed from speed and delay studies.

farthest from the central business district. These results, as they were computed, represent over-all average speeds; hence, on sections where accumulated time "wasted" in delays is appreciable, actual running speeds between stops would be considerably higher. The elimination of the causes of unnecessary delays will result in higher overall average speeds without increasing the actual running speeds. Traffic signals, found to be the principal causes of delay in Panama City, are discussed in the following section.

Traffic Controls: A thorough investigation of every signalized intersection (within the urban area) was made with particular attention focused on the justification of each signal. Since traffic signals are the most restrictive of traffic control devices, a uniform and logical set of criteria should be used as a guide in determining the need for their installation. The State Road Department has adopted the warrants for traffic signals (reference their Manual on Uniform Traffic Control Devices) developed by the Institute of Traffic Engineers. These criteria, compounded from the experiences of traffic engineers in every state, have been used as a guide in the evaluation of the present system of traffic signals.

Safety alone is only rarely used as a basis for the

installation of traffic signals, since they seldom act as an accident deterrent. Likewise, the use of traffic signals as a speed control, except in special cases, can not be condoned; particularly since this stop and go type of movement, while resulting in lower over-all speeds, will encourage higher speeds between stops. The major factor involved here is traffic volume. When the usage of both streets making up the intersection reach the minimum requirements as determined by these criteria, it is assumed that a traffic signal is justified to equitably divide the "go" time between each approach.

Table VIII is a listing of signalized intersections which do not come within 10% of minimum volume requirements. This 10% margin was used, as an economic consideration, to allow signals to remain at locations which would soon meet minimum requirements. The recommendation for removal of these signals is further substantiated by the fact that the arterial street system is operating below capacity, thereby, allowing cross traffic to proceed in the gaps that exist without undue delay or hazard.

In addition to the studies of intersections already under such controls, studies were made of locations where the need for traffic signal control might develop in the

TABLE VIII

Traffic Signals To Be Removed

	REMOVE TRAFFIC SIGNALS AT FOLLOWING LOCATIONS	INSTALL STOP SIGN GIVING RIGHT-OF-WAY TO FOLLOWING APPROACH
(1)	U. S. 98 and Hamilton Avenue	U. S. 98
(2)	U. S. 98 and Cherry Avenue	U. S. 98
(3)	U. S. 98 and College Avenue	U. S. 98
(4)	U. S. 98 and Kraft Avenue	U. S. 98
(5)	U. S. 98 and Mound Avenue	U. S. 98
(6)	U. S. 98 and Harmon Avenue	U. S. 98
(7)	U. S. 98 and Cincinnati Avenue	U. S. 98
(8)	U. S. 98 and Michigan Avenue	U. S. 98
(9)	11th Street and Jenks Avenue	11th Street
(10)	11th Street and Carolina Avenue	11th Street
(11)	11th Street and Lisenby Avenue	11th Street
(12)	11th Street and Frankford Avenue	Frankford
(13)	Beck Avenue and 15th Street	Beck Avenue
(14)	Beck Avenue and 15th Street	Beck Avenue
(15)	Beck Avenue and 12th Street	Beck Avenue
(16)	Cove Boulevard and Cherry Street	Cherry St.
(17)	Cove Boulevard and 15th Street	Cove Blvd.
(18)	East Avenue and 3rd Street	East Avenue
(19)	Oak Avenue and 4th Street	4th Street
(20)	Oak Avenue and Mercer Avenue	Oak Avenue

near future.

Installation of a traffic signal at one such location, 15th Street and Harrison Avenue, is warranted now. Minimum volume requirements are exceeded here by over 40%. A plan of this intersection including the suggested signal timing is presented in Figure 19. This plan is the first (and most important) of three sheets for traffic signalization and geometric redesign of traffic islands prepared by the Florida State Road Department. These plans were proposed as Scheme #1, under date of January 20, 1956. Blueprint copies of the complete works may be obtained from the Traffic and Planning Engineer, Florida State Road Department, Tallahassee, Florida. It is also recommended that volume studies at two other locations (Beach Drive and 6th Street, and Frankford Avenue and 15th Street) be made during the summer season of 1957. It is believed that increased traffic volumes will, at that time, warrant traffic signal controls.

Physical Characteristics: The structural condition of most of the arterial thoroughfares in the urban area indicates at least an additional ten years service under present vehicle loads.

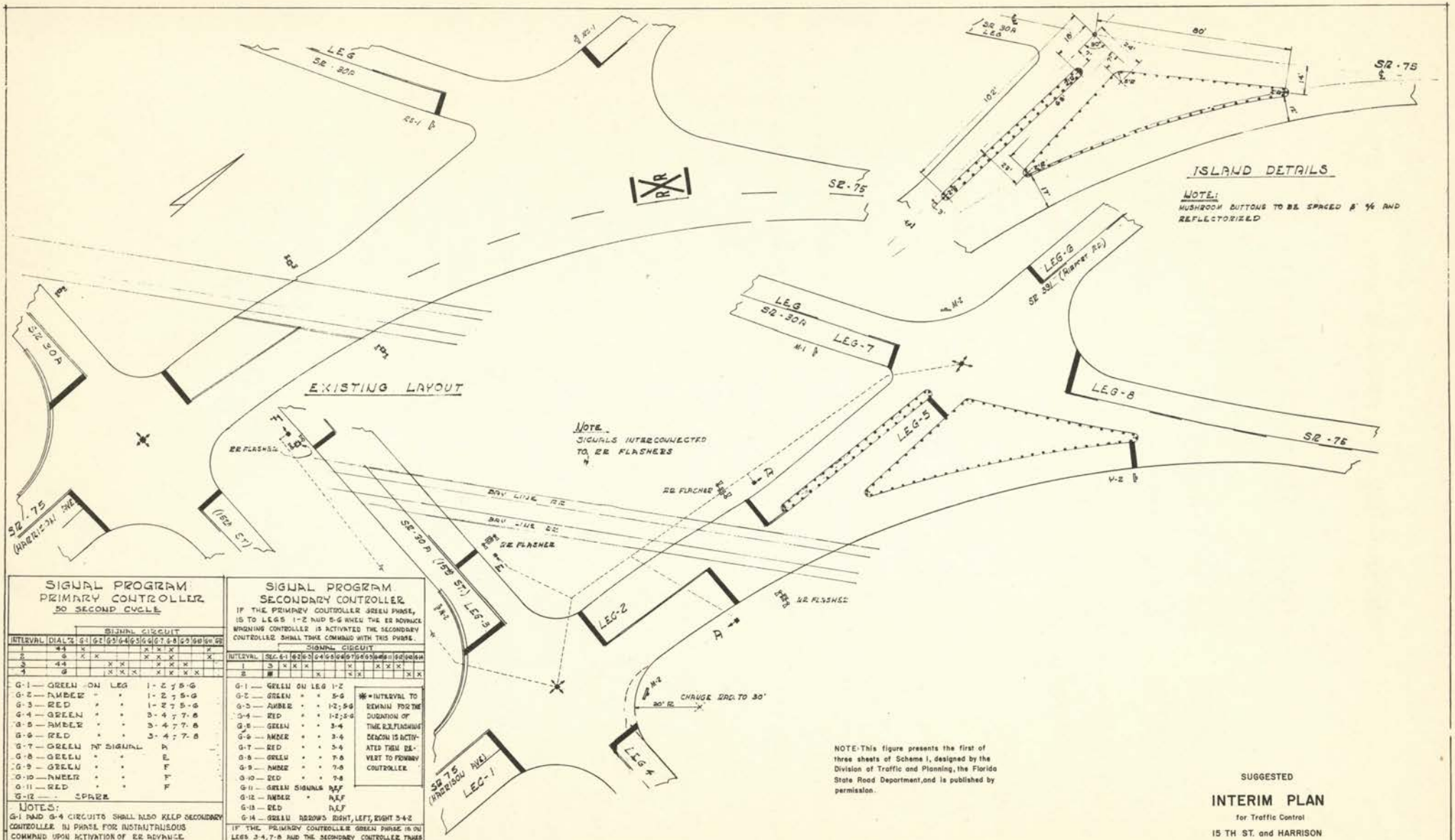
Alignment of these major streets into an efficient north-south, east-west grid, has in most cases, been

accomplished. One section of poor alignment exists on U. S. 98, between Frankford and Beck Avenues. Within this short distance, five 90° turns have the effect of a bottle-neck, impairing the efficient flow of vehicles. From Figure 15 it is seen that most motorists using U. S. 98 are by-passing this portion by traveling north on Frankford and then west on 15th Street.

The undesirable alignment condition, coupled with congestion on Beck Avenue in the St. Andrews business district, is the principal cause of this by-pass movement.

Four-Way Stop Sign Control: The installation of standard stop signs on all approaches to an intersection have been used effectively to control and regulate traffic. Such an installation serves most satisfactorily as an economic substitute at those locations where the traffic volumes are approaching the minimum requirements for traffic signal control. They have also brought about a reduction of motor vehicle accidents, in certain instances, at hazardous intersections. Their use, however, should be employed only after comprehensive study and prescription by an experienced traffic engineer.

Traffic at three intersections in Panama City is presently controlled by this technique: Grace at 9th



SIGNAL PROGRAM
PRIMARY CONTROLLER
50 SECOND CYCLE

INTERVAL	DIAL %	SIGNAL CIRCUIT G-1	G-2	G-3	G-4	G-5	G-6	G-7	G-8	G-9	G-10	G-11	G-12
1	44	X					X	X	X				X
2	6	X	X				X	X	X				X
3	44			X	X			X	X	X			
4	6			X	X	X		X	X	X	X		

- G-1 — GREEN ON LEG 1-2, 5-6
- G-2 — AMBER " " 1-2, 5-6
- G-3 — RED " " 1-2, 5-6
- G-4 — GREEN " " 3-4, 7-8
- G-5 — AMBER " " 3-4, 7-8
- G-6 — RED " " 3-4, 7-8
- G-7 — GREEN Nº SIGNAL A
- G-8 — GREEN " " E
- G-9 — GREEN " " F
- G-10 — AMBER " " F
- G-11 — RED " " F
- G-12 — SPARE

NOTES:
G-1 AND G-4 CIRCUITS SHALL ALSO KEEP SECONDARY CONTROLLER IN PHASE FOR INSTANTANEOUS COMMAND UPON ACTIVATION OF RR ADVANCE WARNING CONTROLLER.
THE RR ADVANCE WARNING CONTROLLER SHALL BE SO LOCATED TO PROVIDE A 3 SECOND AMBER INTERVAL BEFORE THE RR FLASHING BEACONS ARE ACTIVATED.

SIGNAL PROGRAM
SECONDARY CONTROLLER
IF THE PRIMARY COUTROLLER GREEN PHASE, IS TO LEGS 1-2 AND 5-6 WHEN THE RR ADVANCE WARNING CONTROLLER IS ACTIVATED THE SECONDARY CONTROLLER SHALL TAKE COMMAND WITH THIS PHASE.

INTERVAL	SEC.	SIGNAL CIRCUIT G-1	G-2	G-3	G-4	G-5	G-6	G-7	G-8	G-9	G-10	G-11	G-12	G-13	G-14
1	3	X	X	X			X		X	X	X				
2	*				X		X	X				X	X		

- G-1 — GREEN ON LEG 1-2
- G-2 — GREEN " " 5-6
- G-3 — AMBER " " 1-2, 5-6
- G-4 — RED " " 1-2, 5-6
- G-5 — GREEN " " 3-4
- G-6 — AMBER " " 3-4
- G-7 — RED " " 3-4
- G-8 — GREEN " " 7-8
- G-9 — AMBER " " 7-8
- G-10 — RED " " 7-8
- G-11 — GREEN SIGNALS R & F
- G-12 — AMBER " R & F
- G-13 — RED R & F
- G-14 — GREEN ARROWS RIGHT, LEFT, RIGHT 3-4-2

* = INTERVAL TO REMAIN FOR THE DURATION OF TIME R.R. FLASHING BEACON IS ACTIVATED THEN REVERT TO PRIMARY CONTROLLER.

IF THE PRIMARY COUTROLLER GREEN PHASE IS ON LEGS 3-4, 7-8 AND THE SECONDARY CONTROLLER TAKES COMMAND THIS PHASE SHALL BE IN COMMAND.

INTERVAL	SEC.	SIGNAL CIRCUIT G-1	G-2	G-3	G-4	G-5	G-6	G-7	G-8	G-9	G-10	G-11	G-12	G-13	G-14
1	3				X	X	X		X			X	X		
2	*				X			X	X					X	X

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CONSULTING ENGINEERS

SUGGESTED

INTERIM PLAN

for Traffic Control

15 TH ST. and HARRISON

PANAMA CITY
FLORIDA

Figure 19

Street, Grace at 12th Street, and Grace at 13th Street. Neither the traffic volumes, nor the physical characteristics of these intersections warrant four-way stop sign control. It is recommended that changes be effected to assign the right-of-way to traffic on Grace Avenue.

PRESENT ARTERIAL SYSTEM AND THE CENTRAL BUSINESS DISTRICT

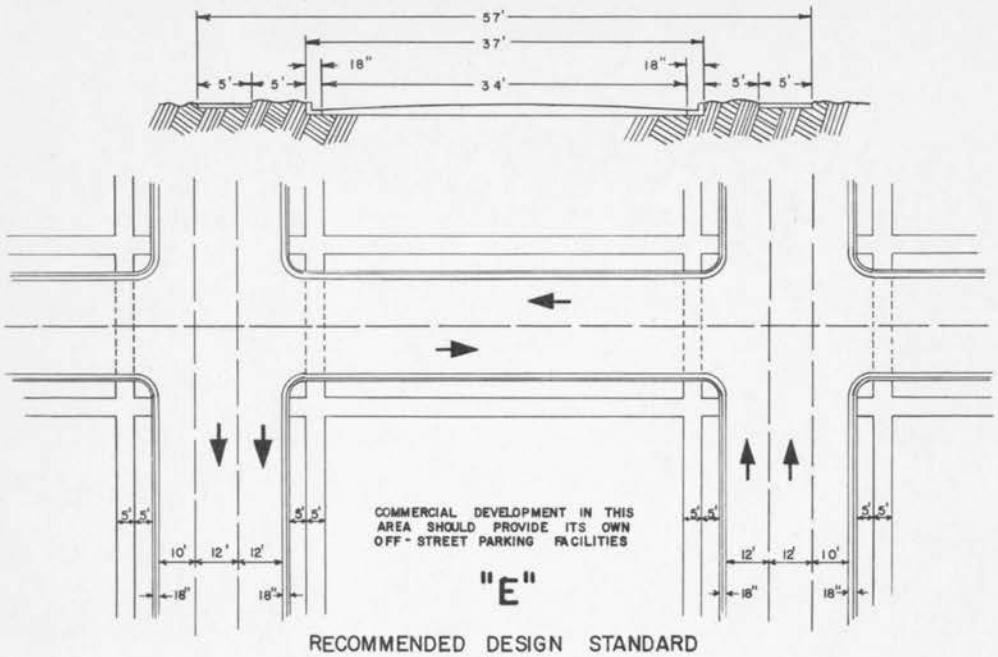
If the economic integrity of the downtown commercial district is to be preserved, easy ingress and egress must be provided and maintained. Time consuming congestion and delay on the principal roads serving the district will serve as a major encouragement to the growth of outlying shopping districts and the subsequent stagnation of the downtown area as the commercial and business center. This condition has developed time and again in practically every major city in the country and has necessitated costly corrective measures. Panama City has the opportunity to profit from these mistakes of other cities by taking preventive steps now, before the situation becomes more severe.

East-West Arterials: There exists now a minor problem of insufficient capacity on the principal east-west artery (U. S. Route #98). With the estimated increases in traffic volumes to come in the next five to ten years, the problem will become magnified. The limited, dedicated right-of-way (60') inside and close to the business district will not permit extention of the pavement beyond the existing width of 40'. The least expensive method of supplying the needed extra capacity is the removal of parking on U. S. 98 from the west extremity of the Massalina Bayou Bridge to the

intersection of Beach Drive. With strict enforcement of this no-parking regulation, the added capacity gained will be sufficient to carry the increased traffic volumes to be generated in the next ten years. Near the end of this ten-year period, congestion at peak hours will develop at enough locations to warrant the adoption of a permanent one-way street plan.

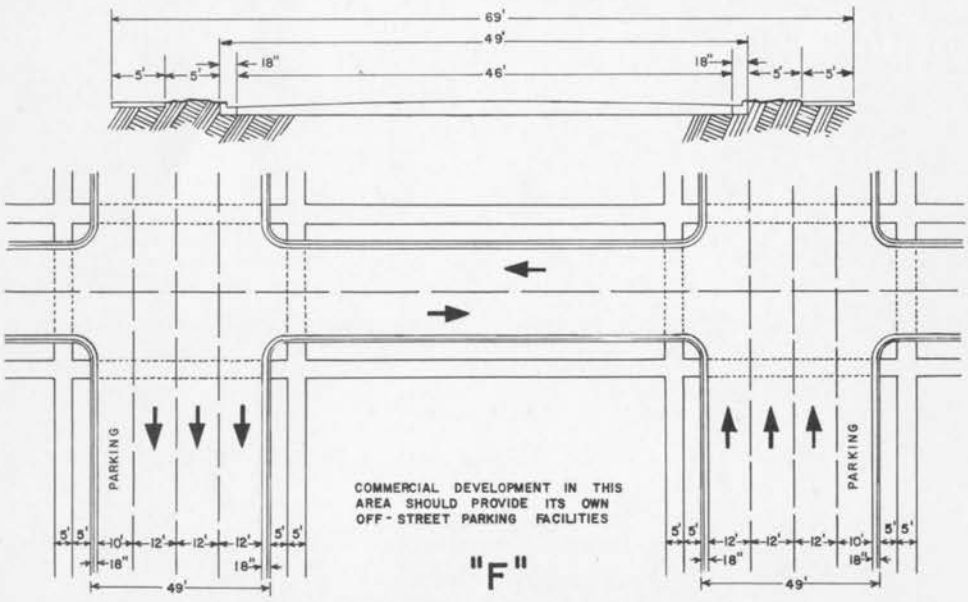
Maximum efficiency of operation on downtown streets can be obtained under one-way traffic flow conditions. The best suited east-west street to unite with 6th Street into a one-way pair is 5th Street. This street provides good alignment with U. S. 98 East and West, hence, insuring smooth flow into and out of the business district. The addition of a bridge on 5th Street spanning Massalina Bayou will be necessary. The recommended design standards (U. S. Bureau of Public Roads) for one-way streets are shown in Figure 20. It will be noted that these standards allow the return of parking on one curb. If these minimum design standards are met, Federal Aid may be secured on construction costs, including the bridge structure.

As part of the one-way street plan, it will be necessary to improve Mulberry Avenue to arterial street standards (from 5th Street to 6th Street). This street, to be made



RECOMMENDED DESIGN STANDARD
FOR
ONE-WAY PAIR

VOLUMES UP TO 20,000 VEHICLES
PER 24HRS IN BOTH DIRECTIONS



RECOMMENDED DESIGN STANDARD
FOR
ONE-WAY PAIR

VOLUMES UP TO 30,000 VEHICLES
PER 24HRS IN BOTH DIRECTIONS

NOTE:
DESIGNED IN ACCORDANCE WITH
BUREAU OF PUBLIC ROAD STANDARDS

FREDRICK L. BELL & ASSOCIATES
CONSULTING ENGINEERS

Figure 20

one-way, will carry northbound traffic leaving Beach Drive at the intersection of 5th Street.

Establishment of this one direction traffic flow, west-bound on 6th Street and east-bound on 5th Street, will stimulate the concentration and unification of the central business district into a compact and efficient unit.

The possibility of the acquisition of additional right-of-way along U. S. Route 98 through the business district and subsequent widening of the roadway as a solution to the capacity problem was explored, but determined economically infeasible.

North-South Arterials: Analysis of the capacity studies, the present use, and the route evaluations of the north-south arterial streets (of which Harrison Avenue is the principal) reveals they are now adequate and will be for at least five years, with two isolated exceptions: 4th Street and Harrison Avenue and 7th Street and Harrison Avenue. Elimination of parking on the approaches to these two intersections and the addition of left-turn lanes will more than provide the needed extra capacity.

Progressive Traffic Controls: Analysis of the speed and delay studies made on Harrison Avenue and U. S. 98

show that nearly all delays were caused by traffic signals. As an example, on Harrison Avenue from 15th Street to Beach Drive there are six fixed-time, independently operated traffic controls. Stops resulting from these signals (on speed and delay runs over the entire length of the route) averaged four per trip. This stop and go type of movement results in high speeds between stops and low overall average speeds.

Correction of this undesirable condition can be accomplished by the electrical interconnection of the traffic signals. Proper design of such a co-ordinated or progressive system of traffic controls will permit smooth uninterrupted vehicle flow with fewer irksome delays to motorists. A recommended timing schedule for a progressive system is presented in Table IX. This design is based on a 20 mph average speed north-bound on Harrison Avenue, 14.5 mph south-bound on Harrison Avenue; 20 mph west-bound on 6th Street, and 16.5 mph east-bound on 6th Street. Such a system is needed now on Harrison Avenue from Beach Drive to 7th Street and on U. S. Route 98 from Harmon Avenue to Beach Drive. With the adoption of the one-way street plan as described in the preceding section, the progressive traffic signal system would have to include 5th Street,

from Beach Drive east to Harmon Avenue. Provision for this addition has been made in Table IX.

In order that the maximum possible capacity may be provided to insure most efficient operation of the progressive traffic signal system at design levels, parking should be removed for a distance of 100 feet on the approaches of 5th Street to Harrison Avenue, as well as, the removal of parking along the course of 6th Street as recommended elsewhere in this report.

TABLE IX

Recommended Traffic Signal Progression

60 second cycle - 3 second amber interval

INTERSECTION	*PROGRESSIVE DIAL SETTING (% of cycle length)	GREEN TIME PER CYCLE (seconds)
Sixth Street Schedule		
Magnolia Avenue	88	37
Harrison Avenue	0	29
Grace Avenue	32	39
Jenks Avenue	52	22
Harrison Avenue Schedule		
Beach Drive	33	23
4th Street	68	30
5th Street	13	25
6th Street	53	25
7th Street	38	40
Fifth Street Schedule		
Harrison Avenue	47	29
Grace Avenue	87	34
Jenks Avenue	90	25
Beach Drive	35	24

* Progression determined for beginning of green period along 6th Street. Master controller to be located at 6th and Harrison.

TRAFFIC SAFETY

While it is true that the rate of increase of traffic volume has far surpassed the rate of increase of traffic accidents in this country, the fact remains that a percentage of these accidents can be prevented by a combination of sound engineering practices and sufficient police enforcement of existing traffic laws. A metropolitan transportation survey would be incomplete without a study of traffic safety.

In small municipalities such as Panama City, the employment of a full time traffic engineer is usually deemed impractical for economic reasons and the responsibilities of traffic controls and safety are delegated to the police department. With a trained traffic safety officer, a sufficient staff, and an adequate yearly budget, this system can be satisfactory.

Since the first step in any engineering investigation is the definition of the problem, a traffic accident study would begin with an analysis of the historical records to determine the high frequency accident locations.

Traffic accident records in Panama City have been filed chronologically only and not by location. To first determine the high frequency accident locations, the complete rearrangement of these records by location would

have been necessary. The large amount of time required for this task rendered it beyond the scope of this survey and report. It is suggested that this revision in the method filing accident records be undertaken as soon as possible by the traffic safety officer. Assistance in this matter and the subsequent preparation of an accident spot map, depicting the locations of all traffic accidents, may be requested from the Florida Department of Safety. Once this is accomplished, an engineering analysis of those locations of high accident frequency could be undertaken.

The traffic safety record of Panama City can be further improved if all traffic control devices, that is; signs, signals, and pavement markings are made to conform to the standards published in the Manual of Uniform Traffic Control Devices by the State Road Department of Florida. Copies of the Manual may be obtained free by writing The State Road Department of Florida, Tallahassee, Florida.

TERMINAL STORAGE FACILITIES: INVENTORY

Purpose: The integral relationship between traffic flow and storage facilities is apparent to everyone, especially so within the central business district. This center of business activity, as was delineated in Panama City, is shown in Figure 21, bounded by an imaginary cordon line. Within the central business district is a further subdivision, the core area (see Figure 21) which contains the most dense concentration of shops, business and professional offices, hotels and other producers of parking demand.

It was the purpose of the parking study to locate the areas of storage deficiency and to suggest general locations for new facilities as they are needed. While recent court decisions have upheld the theory that off-street facilities are merely an extension of the curb parking facilities, an analysis of the legal, administrative and financial aspects of the problem are beyond the scope and intent of this report.

Inventory: In order to accurately determine the amount of storage space available, a complete inventory (Table X) was prepared of the curb space within the central business district, and the off-street parking lots (see Figures 21 and 22) within the core area. The survey of off-street

facilities was confined to the core area when it was determined that usage of these facilities outside of the core did not warrant further investigation.

The inventory of curb space included the tabulation of the number of parking spaces at each block face. In fringe areas where the parking stalls were not marked off, a length of twenty feet per parking space was used in computing the capacity. All time restrictions on parking were recorded as were the locations and lengths of loading zones, and the number of parking meters. A few private parking zones existed and they are also shown on the inventory map (Figure 21). These private parking zones are primarily reserved for city, county, and federal agencies. Zones reserved for hotel patrons were also classified in the private parking category.

The capacities of off-street parking facilities were determined by present usage and design. Each parking lot was classified into one of four groups. Public pay facilities are those, as the name implies, that are open to the public on a rental basis, either on a short or long-term basis. Data on the rates charged at these parking lots was gathered as an aid in the analysis of the use of these facilities. All parking lots excluded from general

Panama City Off-Street Parking Study

TABLE X

Inventory of Existing Facilities
Core Area
1956

FACILITY	TYPE OF PARKING	SPACES AVAILABLE	SPACE HOURS AVAILABLE 8 A.M. - 6 P.M.
015 - 1	public free	33	330
030 - 4	customer	12	120
- 5	private	6	60
- 6	private	27	270
- 7	private	9	90
- 8	private	7	70
- 9	customer	11	110
031 - 4	customer	5	50
- 5	private	9	90
- 6	private	12	120
- 7	private	23	230
- 8	private	8	80
- 9	private	7	70
- 10	private	3	30
032 - 4	private	9	90
- 5	public pay	41	410
- 6	private	29	290
034 - 5	private	11	110
035 - 4	private	9	90
- 5	customer	12	120
- 6	private	3	30
036 - 4	public pay	25	250
- 5	customer	12	120
- 6	customer	12	120
- 7	private	13	130
040 - 4	customer	10	100
- 5	public pay	51	510
061 - 4	private	10	100
- 5	private	13	130
- 6	private	8	80
- 7	public pay	23	230
- 8.	customer	22	220
- 9	customer	22	220
062 - 4	customer	11	110
- 5	public pay	26	260
- 6	private	18	180
- 7	public pay	21	210

TABLE X (cont'd)

FACILITY	TYPE OF PARKING	SPACES AVAILABLE	SPACE HOURS AVAILABLE 8 A.M. - 6 P.M.
063 - 4	private	16	160
- 5	public pay	19	190
- 6	public pay	20	200
- 7	private	9	90

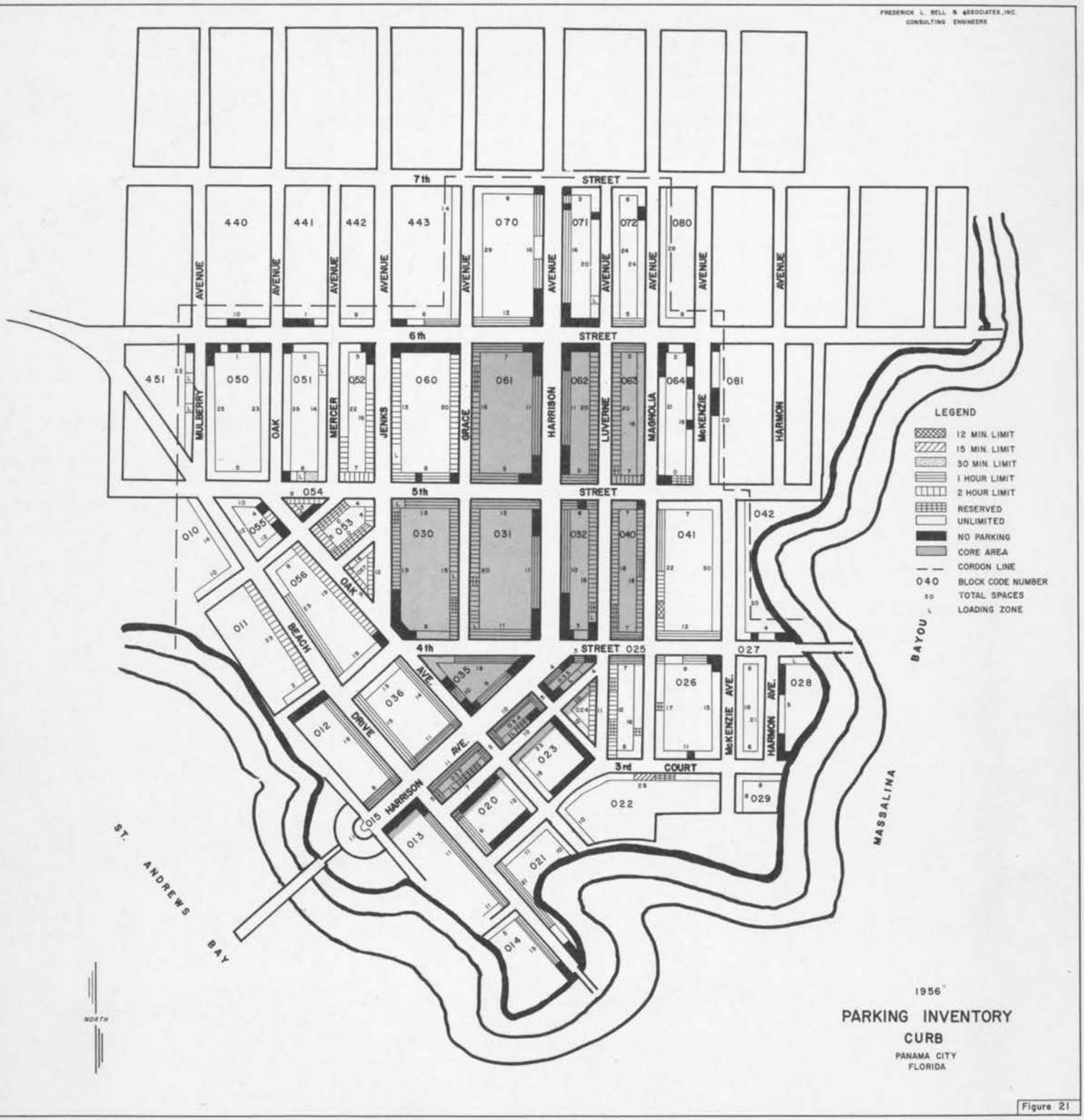

FREDERICK L. BELL & ASSOCIATES, INC.
CONSULTING ENGINEERS
7th STREET
6th STREET
5th STREET
4th STREET
3rd COURT
AVENUE
DRIVE
BEACH
OAK
MULBERRY
MERCER
JENKS
GRACE
HARRISON
LUVERNE
MAGNOLIA
McKENZIE
HARMON
440
441
442
443
070
071
072
080
081
451
050
051
052
060
061
062
063
064
054
055
053
056
057
010
011
030
031
032
040
041
042
012
013
014
015
020
021
022
023
025
026
027
028
029
035
036
BAYOU
MASSALINA
ST. ANDREWS BAY
NORTH
LEGEND
12 MIN. LIMIT
15 MIN. LIMIT
30 MIN. LIMIT
1 HOUR LIMIT
2 HOUR LIMIT
RESERVED
UNLIMITED
NO PARKING
CORE AREA
CORDON LINE
040 BLOCK CODE NUMBER
50 TOTAL SPACES
L LOADING ZONE
1956
PARKING INVENTORY
CURB
PANAMA CITY
FLORIDA

Figure 21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CONSULTING ENGINEERS
7th STREET
6th STREET
5th STREET
4th STREET
3rd COURT
AVENUE
MULBERRY
OAK
MERCER
JENKS
GRACE
HARRISON
LUVERNE
MAGNOLIA
McKENZIE
HARMON
BEACH DRIVE
McKENZIE AVE.
HARMON AVE.
061
062
063
030
031
032
040
033
034
035
036
037
012
013
015
ST. ANDREWS BAY
MASSALINA BAYOU
NORTH
LEGEND
PUBLIC FREE
PRIVATE
PUBLIC PAY
CUSTOMER
CORE AREA
CORDON LINE
15 CAPACITY
015 BLOCK CODE NUMBER
FACILITY NUMBER
1956
PARKING INVENTORY
OFF-STREET
PANAMA CITY
FLORIDA

Figure 22

public use were classified as private. An example of this type facility would be a parking lot specifically provided for employees of a business concern. Parking facilities, provided by business enterprise for use by its patrons, were classed as customer parking lots. One parking lot at the foot of Harrison Avenue, which is open to the public free of charge, was classed as a public, free parking lot.

A tabular presentation of this inventory in terms of space hours is given in Table XI. The term space-hour is used to denote one parking space available for a one-hour period. Hence, a facility having one space for the ten-hour period 8:00 A. M. - 6:00 P. M. would be inventoried as ten space hours available. If this one space were to be utilized by a number of cars during the day, some available time would be consumed by these cars maneuvering into and out of the space against the normal flow of traffic. Thus, by measuring this lost time on several of the most utilized facilities, the theoretical space hours available on all curb facilities were reduced to practical by a space hour available factor of 96.8.

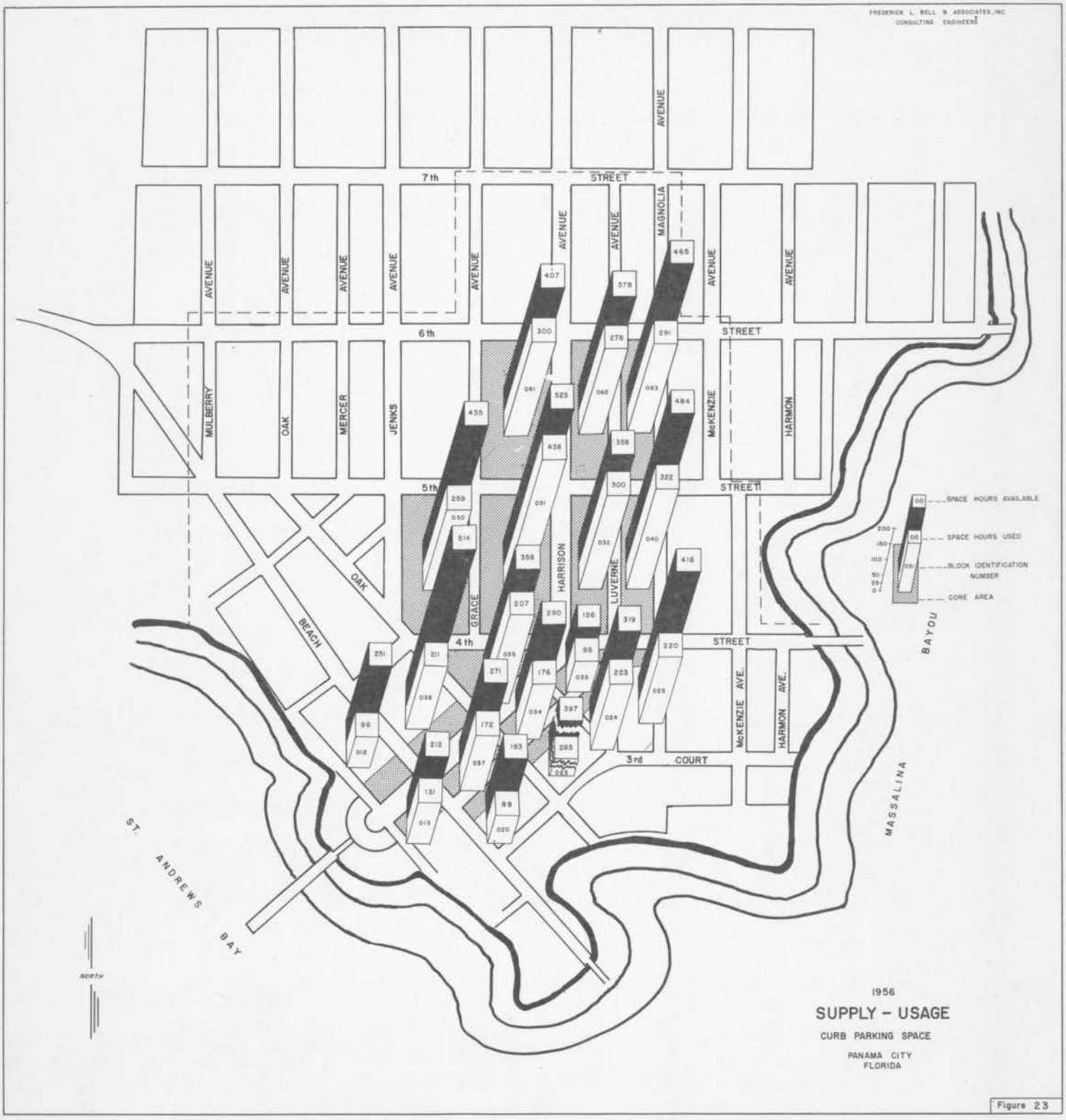
Only twenty-seven per cent (485 spaces) of the total curb parking spaces (1,756 spaces within the cordon line) are inside the core or critical area. The total off-street

spaces within the core is 589.

Usage of Existing Facilities: As an indication of parking demand, cruising studies of curb facilities were made in the central business district. These studies entailed cruising each block face at half-hourly periods from 8:00 A. M. to 6:00 P. M. on average weekdays and recording information pertaining to the number of vehicles parked and length of time parked. Figure 23 offers a graphic comparison between the supply of curb space hours (as determined by the curb inventory) and the usage of these space hours (as determined by the cruising studies). This information is also presented in Table XI.

Counts of vehicles parked in off-street parking lots were made at the morning and afternoon peak hours of 11:00 A. M. and 2:00 P. M. to determine the present maximum usage of the facilities. These data supplemented the curb accumulation counts in the selection of areas of maximum concentration as an indication of demand, and also permitted comparison of the usage of off-street lots with the rates charged for parking. This criterion was necessary to the consideration of the economic feasibility of proposed additional public off-street parking facilities.

Table XII will be of considerable value to city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CONSULTING ENGINEERS
7th STREET
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4th STREET
3rd COURT
AVENUE
MULBERRY
OAK
MERCER
JENKS
GRACE
HARRISON
LUVERNE
McKENZIE
HARMON
BEACH
MAGNOLIA
BAYOU
MASSALINA
ST. ANDREWS BAY
NORTH
SPACE HOURS AVAILABLE
SPACE HOURS USED
BLOCK IDENTIFICATION NUMBER
CORE AREA
1956
SUPPLY - USAGE
CURB PARKING SPACE
PANAMA CITY
FLORIDA

Figure 23

Panama City Curb Parking Study
Central Business District

TABLE XI

SPACE HOURS AVAILABLE vs SPACE HOURS USED

1956

BLOCK & FACILITY	NO. SPACES AVAIL.	SPACE HOURS AVAIL.	PRACTICAL SPACE HOURS AVAIL.	SPACE HOURS USED	SURPLUS SPACE HOURS
010 - 1	14	140	135	90	45
- 2	10	100	97	24	73
011 - 1	23	230	223	85	138
- 2	2	20	20	0	20
012 - 1	18	180	174	42	132
- 2	8	80	77	54	23
013 - 0	11	110	106	32	74
- 1	11	110	106	99	7
014 - 0	13	130	126	25	101
- 2	5	50	48	13	35
015 - 0	11	110	106	87	19
020 - 0	12	120	116	83	33
- 2	8	80	77	5	72
021 - 0	10	100	97	0	97
- 2	21	210	203	41	162
- 3	11	110	106	39	67
022 - 0	28	280	271	64	207
- 2	10	100	97	57	40
023 - 2	18	180	174	128	46
- 3	23	230	223	165	58
024 - 0	11	110	106	81	25
- 1	12	120	116	81	35
- 2	10	100	97	61	36
025 - 0	7	70	68	46	22
- 1	16	160	155	112	43
- 2	8	80	77	34	43
- 3	12	120	116	28	88
026 - 0	9	90	87	34	53
- 1	15	150	145	103	42
- 2	11	110	107	23	84
- 3	17	170	165	105	60
027 - 0	6	60	58	9	49
- 1	21	210	203	122	81

TABLE XI (cont'd)

BLOCK & FACILITY	NO. SPACES AVAIL.	SPACE HOURS AVAIL.	PRACTICAL SPACE HOURS AVAIL.	SPACE HOURS USED	SURPLUS SPACE HOURS
027 - 2	6	60	58	27	31
- 3	18	180	174	135	39
028 - 3	5	50	48	39	9
029 - 0	8	80	77	36	41
- 3	8	80	77	20	57
030 - 0	13	130	126	68	58
- 1	15	150	145	108	37
- 2	6	60	58	40	18
- 4	13	130	126	43	83
031 - 0	12	120	116	98	18
- 1	11	110	107	103	4
- 2	11	110	106	86	20
- 3	20	200	194	151	43
032 - 0	6	60	58	57	1
- 1	18	180	174	122	52
- 2	3	30	29	25	4
- 3	10	100	97	96	1
033 - 0	5	50	48	38	10
- 1	4	40	39	26	13
- 3	4	40	39	32	7
034 - 0	5	50	48	29	19
- 1	10	100	97	45	52
- 2	5	50	48	35	13
- 3	10	100	97	71	26
035 - 0	18	180	174	111	63
- 1	9	90	87	51	36
- 3	10	100	97	45	52
036 - 0	13	130	126	39	87
- 1	14	140	136	43	93
- 2	11	110	107	80	27
- 3	15	150	145	49	96
037 - 0	5	50	48	22	26
- 1	7	70	68	52	16
- 2	5	50	48	28	20
- 3	11	110	107	70	37
040 - 0	7	70	68	56	12
- 1	18	180	174	73	101
- 2	7	70	68	50	18
- 3	18	180	174	143	31
041 - 0	7	70	68	28	40
- 1	30	300	290	31	259

TABLE XI (cont'd)

BLOCK & FACILITY	NO. SPACES AVAIL.	SPACE HOURS AVAIL.	PRACTICAL SPACE HOURS AVAIL.	SPACE HOURS USED	SURPLUS SPACE HOURS
041 - 2	12	120	116	46	70
- 3	22	220	213	73	140
042 - 2	4	40	39	6	33
- 3	30	300	290	11	279
050 - 0	1	10	10	2	8
- 1	23	230	224	32	192
- 2	5	50	48	29	19
- 3	25	250	241	109	132
051 - 0	5	50	48	23	25
- 1	14	140	135	81	54
- 2	6	60	58	35	23
- 3	25	250	241	24	217
052 - 0	5	50	48	10	38
- 1	16	160	155	61	94
- 2	7	70	68	31	37
- 3	22	220	213	143	70
053 - 0	4	40	39	32	7
- 1	4	40	39	29	10
- 3	5	50	48	17	31
054 - 0	8	80	77	20	57
- 2	5	50	48	2	46
055 - 0	10	100	97	2	95
- 1	4	40	39	11	28
- 2	12	120	116	0	116
- 3	12	120	116	69	47
056 - 0	8	80	77	49	28
- 1	19	190	184	39	145
- 2	19	190	184	48	136
- 3	23	230	224	40	184
057 - 0	12	120	116	91	25
- 1	9	90	87	51	36
- 2	14	140	145	57	88
060 - 1	20	200	194	91	103
- 2	9	90	87	51	36
- 3	15	150	145	57	88
061 - 0	7	70	68	36	32
- 1	11	110	107	107	0
- 2	8	80	77	73	4
- 3	16	160	155	84	71
062 - 1	20	200	194	122	72
- 2	8	80	77	60	17

TABLE XI (cont'd)

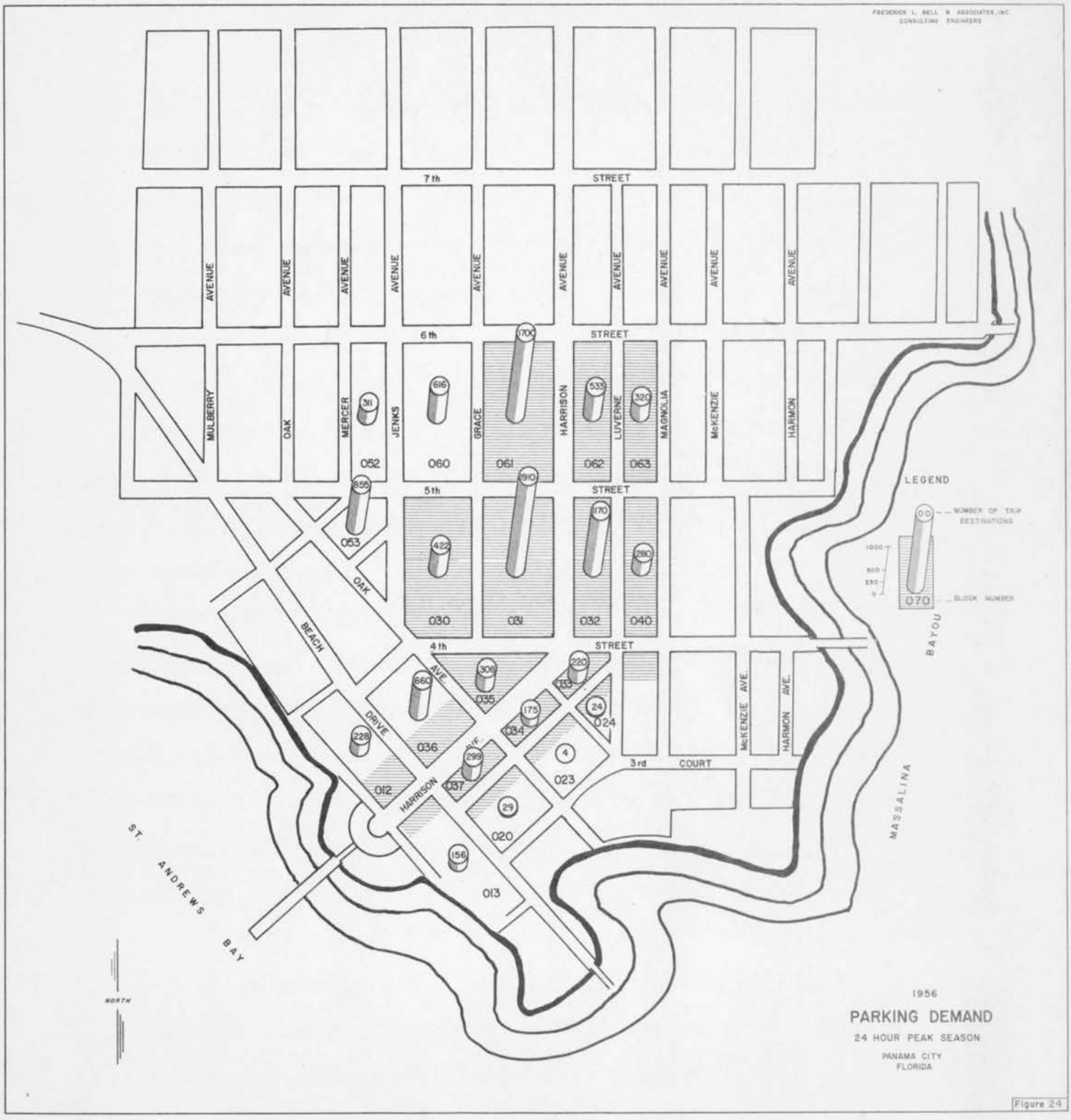
BLOCK & FACILITY	NO. SPACES AVAIL.	SPACE HOURS AVAIL.	PRACTICAL SPACE HOURS AVAIL.	SPACE HOURS USED	SURPLUS SPACE HOURS
062 - 3	11	110	107	96	11
063 - 0	5	50	48	10	38
- 1	16	160	155	135	20
- 2	7	70	68	51	17
- 3	20	200	194	95	99
064 - 0	2	20	19	7	12
- 1	16	160	155	19	136
- 3	21	21	203	177	26
070 - 0	8	80	77	50	27
- 1	16	160	155	30	125
- 2	12	120	116	58	58
- 3	29	290	280	198	82
071 - 0	3	30	29	1	28
- 1	20	200	194	44	150
- 3	16	160	155	22	133
072 - 0	8	80	77	0	77
- 1	24	240	233	42	191
- 2	5	50	48	2	46
- 3	24	240	233	85	148
080 - 2	9	90	87	37	50
- 3	29	290	280	65	215
081 - 3	20	200	194	33	161
440 - 0	10	100	97	8	89
441 - 2	1	10	10	3	7
442 - 2	9	90	87	86	1
443 - 1	14	140	135	40	95
- 2	8	80	77	19	58
451 - 1	22	220	213	14	199

officials in the planning of time restrictions on curb facilities. This table presents an analysis of the lengths of time parked by motorists at each curb facility inside the central business district and, thus, is a realistic guide in choosing the limits (based on need) of these time restrictions.

Demand: Parkers, regardless of the purposes of their trips, desire to park as close to their final destination as possible. Cruising studies, as they were used to indicate the demand for parking space, were based on actual parking practices; and, since there might well be considerable distance between the places people parked and the places they desired to park, an analysis of trips (as reported by the internal and external origin and destination surveys) with destinations within the core area was made to verify and supplement the cruising studies.

A tabulation was prepared of trips (passenger cars only) to each block in the core area during a twenty-four hour period for an average weekday (August, 1956).

The number of trips made to these blocks was used as a measurement of the demand for parking space. Figure 24, a pictorial presentation of this data, shows that the three blocks where available curb-parking space is most utilized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CONSULTING ENGINEERS
7th STREET
6th STREET
5th STREET
4th STREET
3rd COURT
AVENUE
MULBERRY
OAK
MERCER
JENKS
GRACE
HARRISON
LUVERNE
MAGNOLIA
McKENZIE
HARMON
BEACH
DRIVE
AVE.
McKENZIE AVE.
HARMON AVE.
BAYOU
MASSALINA
ST. ANDREWS BAY
NORTH
LEGEND
NUMBER OF TRIP DESTINATIONS
BLOCK NUMBER
1000
500
250
0
052
060
061
062
063
053
030
031
032
040
035
034
024
036
012
037
023
020
013
700
616
533
320
311
856
910
170
280
422
660
308
220
175
24
228
299
4
29
156
1956
PARKING DEMAND
24 HOUR PEAK SEASON
PANAMA CITY
FLORIDA

Figure 24

are also the blocks of greatest demand.

These three blocks, numbers 031, 032, and 061 (see Figure 24) contain the most powerful generators of parking space demand. Here are located several large chain stores, the largest theatre in the urban area, the city hall and police station, a seventy-three unit commercial hotel, and numerous smaller shops and offices.

The large demand for parking space in Block 053, which is outside of the core area, is attributed to the presence of the U. S. Post Office.

At the same time that the demand for parking space will be increasing along with development of the central business, the supply of curb space available for parking will be decreasing. This loss of curb space for parking purposes will occur as more and more of the dedicated right-of-way is needed to carry the increasing numbers of motor vehicles.

Analysis of the Problem: The parking problem in Panama City is localized to Blocks 031, 032 and 061 and exists principally at the peak hours of 9:00 A. M. - 12:00 P. M. and 3:00 P. M. - 4:00 P. M. The physical make-up of the business district with its long 600-foot blocks and lack of available space for off-street parking facilities within these critical blocks accentuates the problem.

Panama City Curb Parking Study
Central Business District

TABLE XII

PARKING DURATION

1956

BLOCK & FACILITY	TOTAL VEHICLES PARKED 8 A.M. - 6 P.M.	PERCENTAGE OF VEHICLES PARKED 30 minutes or less	1 hour or less	2 hours or less
010 - 1	72	45	61	86
- 2	7	0	29	29
011 - 1	55	25	51	73
012 - 1	59	75	90	98
- 2	71	61	92	100
013 - 0	56	66	77	88
- 1	43	19	33	58
014 - 0	42	83	98	100
- 3	19	74	90	100
015 - 0	23	30	48	52
020 - 0	21	10	15	30
- 2	9	45	78	78
021 - 2	51	79	85	94
- 3	20	35	45	65
022 - 0	35	14	34	69
- 2	24	17	39	54
023 - 2	42	14	30	43
- 3	44	7	7	16
024 - 0	26	66	73	81
- 1	27	15	22	52
- 2	20	20	30	65
025 - 0	56	72	86	95
- 1	40	20	40	55
- 2	12	25	42	42
- 3	48	92	96	100
026 - 0	46	65	89	100
- 1	52	25	42	65
- 2	14	36	50	72
- 3	49	31	53	67
027 - 0	16	94	94	100
- 1	41	12	20	44
- 2	20	25	55	85
- 3	69	30	41	72

TABLE XII (cont'd)

BLOCK & FACILITY	TOTAL VEHICLES PARKED 8 A.M. - 6 P.M.	PERCENTAGE OF VEHICLES PARKED 30 minutes or less	1 hour or less	2 hours or less
028 - 3	12	8	25	33
029 - 0	11	0	9	27
- 3	6	17	33	67
030 - 0	74	60	83	95
- 1	75	47	64	84
- 2	12	25	42	58
- 4	45	65	80	94
031 - 0	104	57	77	94
- 1	99	56	79	95
- 2	71	48	68	89
- 3	115	55	72	92
032 - 0	60	50	83	97
- 1	141	63	82	97
- 2	24	54	75	96
- 3	107	56	82	98
033 - 0	43	75	86	91
- 1	28	36	54	72
- 3	36	75	83	94
034 - 0	41	76	88	100
- 1	17	19	35	53
- 2	31	55	74	87
- 3	79	70	80	91
035 - 0	87	44	71	87
- 1	71	49	79	96
- 3	26	42	62	69
036 - 0	9	22	22	22
- 1	43	53	81	91
- 2	90	60	82	95
- 3	54	72	85	94
037 - 0	28	64	82	100
- 1	27	33	48	55
- 2	29	55	90	90
- 3	95	67	86	96
040 - 0	26	29	58	73
- 1	101	68	91	100
- 2	48	50	67	96
- 3	150	57	79	97
041 - 0	11	27	45	54
- 1	13	31	46	46
- 2	57	67	86	97
- 3	67	40	73	90
042 - 2	9	78	78	100

TABLE XII (cont'd)

BLOCK & FACILITY	TOTAL VEHICLES PARKED 8 A.M. - 6 P.M.	PERCENTAGE OF VEHICLES PARKED 30 minutes or less	1 hour or less	2 hours or less
042 - 3	7	14	43	86
050 - 0	1	0	0	100
- 1	13	58	69	69
- 2	19	53	69	74
- 3	82	21	23	26
051 - 0	20	40	65	90
- 1	46	48	61	67
- 2	33	76	85	94
- 3	19	37	74	90
052 - 0	13	59	92	100
- 1	66	62	85	94
- 2	50	86	96	100
- 3	61	38	49	56
053 - 0	25	68	72	80
- 1	47	83	96	100
- 3	24	88	92	92
054 - 0	39	97	100	100
- 2	3	100	100	100
055 - 0	4	100	100	100
- 1	15	80	87	87
- 3	61	39	69	90
056 - 0	14	39	36	50
- 1	52	79	96	96
- 2	27	41	56	78
- 3	17	30	47	65
057 - 0	44	75	98	98
- 1	18	78	100	100
- 2	18	0	11	28
060 - 1	105	61	84	97
- 2	61	59	84	98
- 3	44	32	48	95
061 - 0	48	54	90	100
- 1	112	52	79	96
- 2	79	44	85	98
- 3	91	55	83	93
062 - 1	153	66	86	98
- 2	60	50	78	92
- 3	116	66	86	98
063 - 0	11	55	73	100
- 1	33	6	9	18
- 2	63	65	84	98
- 3	128	65	90	99

TABLE XII (cont'd)

BLOCK & FACILITY	TOTAL VEHICLES PARKED 8 A.M. - 6 P.M.	PERCENTAGE OF VEHICLES PARKED 30 minutes or less	1 hour or less	2 hours or less
064 - 0	9	67	89	100
- 1	4	0	25	25
- 3	31	6	13	23
070 - 0	21	52	52	62
- 1	45	69	100	100
- 2	59	55	85	92
- 3	48	17	23	36
071 - 0	1	0	100	100
- 1	16	12	44	50
- 3	38	87	100	100
072 - 1	15	28	40	53
- 2	2	50	50	100
- 3	19	5	5	10
080 - 2	42	55	81	98
- 3	27	37	44	71
081 - 3	16	31	44	69
440 - 2	8	50	75	100
441 - 2	5	80	100	100
442 - 2	22	59	73	73
443 - 1	25	24	32	44
- 2	14	57	64	79
451 - 1	21	81	90	100

terminal storage facilities: analysis

Usage of the curb facilities of these three blocks, which front on Harrison Avenue (031-1, 032-3, 061-1), exceeds 95%; while usage of facilities on the opposite faces of the same blocks (031-3, 032-1, 061-3) does not exceed 70%. A further rapid decrease in usage of curb parking space takes place in the facilities one block from Harrison Avenue (060, 030, 040), indicating the reluctance of the motorist to pay for parking space that necessitates a long walk to his ultimate destination.

A shopper, parking on Grace Avenue midway between 5th and 6th Streets, would have to walk approximately 900 feet if his destination were in the middle of the same block on Harrison Avenue. While the maximum distance that parkers will walk from parking site to final destination varies with trip purpose and length of time parked, an average figure of 400 feet was used as a basis for parcels of land that could be used to provide additional parking space.

Although the problem is confined to a small number of blocks it will be necessary, for the reason discussed above, to locate several smaller parking lots on the fringe of parking demand: each to serve a portion of that demand. Ideal locations for these facilities are the southernmost

eighty feet of Block 040 (described as lots 14 and 15 of Block 1, Gulf Coast Developers Sub-Division on the city plat) and 100 feet in the northern part of Block 062 (lots 19, 20, 21, and 22 of Block 19 of Gulf Coast Developers Sub-Division). The combined capacity of these two proposed facilities places a minimum of ninety-eight parking spaces within acceptable walking distance of the centers of parking demand.

As development of the business district proceeds, accompanied by rising land valuations, increasing amounts of now vacant land will become improved. An example of the improvement of whole blocks in the business district without provision for parking space presently exists in the "critical" blocks already discussed in this section. Such further development without intelligent planning will be the cause of a widespread and critical parking space deficiency, necessitating the expenditure of large amounts of capital to effect a solution.

Providing a good system of arterial streets offering efficient flow to and from the business district and at the same time ignoring the problem of where to store these vehicles would, indeed, be solving only half the problem. Panama City should proceed with acquisition of the recom-

mended parcels of land as soon as funds will allow. The addition of these proposed metered parking facilities will be an added stimulus to the healthy development of the downtown business district.

Curb Parking: Outside of the core area there exists a heavy demand for parking space in Block 053 (see Figure 24). This demand is generated by the United States Government Post Office. This parking demand was confirmed by the parking cruising study which revealed a maximum space usage of 81% of capacity.

It will be noted on the parking inventory maps (Figures 21 and 22) that most of the curb space on facilities 053-2 and 053-4 are presently reserved for the use of government employees, while the Post Office has an off-street parking lot that could be used to store these vehicles, and enlarged if necessary.

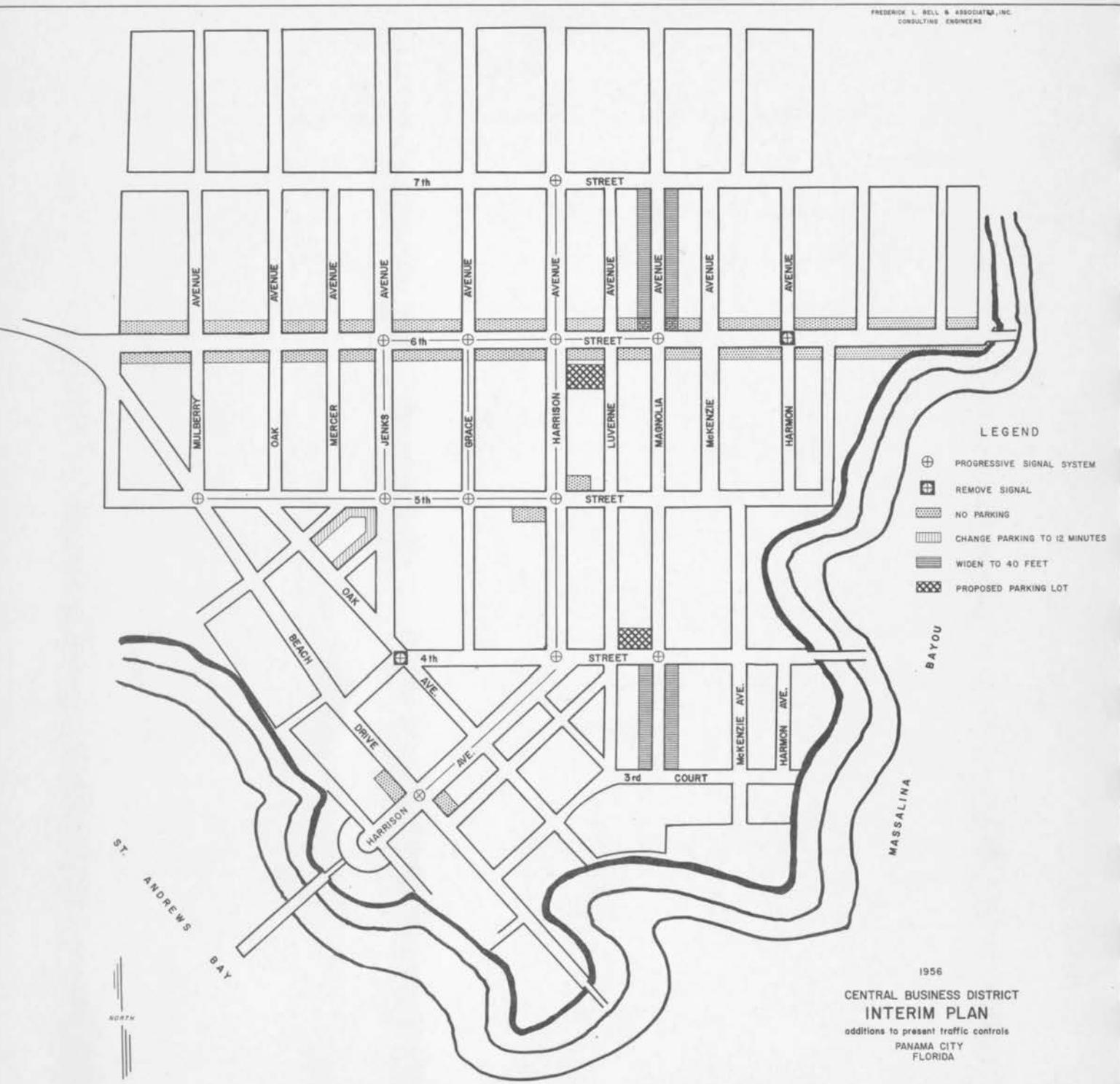
The demand for parking space in this block is for short periods of parking time to transact business in the Post Office. With this demand in mind, the installation of twelve-minute parking meters on all curbs of Block 053, except the Oak Street curb, would benefit a greater number of motorists.

St. Andrews Business District: Angle parking along

a curb seriously hampers the efficient flow of vehicles. When permitted on streets of less than seventy-feet in width, the traffic stream is halted on the adjacent one-half of the street each time a vehicle backs out of a parking stall. An additional disadvantage of this type of parking is the increased accident hazard created by vehicles backing into the traffic stream. The congestion resulting from the angle parking in the St. Andrews business district is cause enough for its elimination. The substitution of ten-foot parallel parking lanes from 11th Street to 12th Street is recommended.

Zoning: There are additional measures that should be taken by the city to ensure that an adequate and well distributed supply of parking space will be available in the future. The encouragement of commercial enterprise to provide parking space for its patrons should be emphasized. Zoning regulations should require the owners of new business and commercial buildings to provide sufficient off-street parking space. The Institute of Traffic Engineers has prepared a summary of these zoning practices in other cities, by type of building (see the Traffic Engineers Handbook); and it may be used as an excellent guide in preparing such a zoning regulation for Panama City. The entire urban area should

be subject to this zoning provision to ensure equitable regulation and to preclude the possibility of new problem areas developing.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7th STREET
6th STREET
5th STREET
4th STREET
3rd COURT
AVENUE
MULBERRY
OAK
MERCER
JENKS
GRACE
HARRISON
LUVERNE
MAGNOLIA
McKENZIE
HARMON
BEACH DRIVE
4th AVE.
McKENZIE AVE.
HARMON AVE.
HARRISON AVE.
BAYOU MASSALINA
ST. ANDREWS BAY
NORTH
LEGEND
PROGRESSIVE SIGNAL SYSTEM
REMOVE SIGNAL
NO PARKING
CHANGE PARKING TO 12 MINUTES
WIDEN TO 40 FEET
PROPOSED PARKING LOT
1956
CENTRAL BUSINESS DISTRICT
INTERIM PLAN
additions to present traffic controls
PANAMA CITY
FLORIDA

Figure 25

SUMMARY

The basic premise of developing an integrated arterial street and highway plan for the urban area of Panama City involves long-range planning and an interim plan of action channeled toward the ultimate goal.

This summary programs all action into three stages; (1) immediate needs, (2) the needs that will have developed by 1965, and (3) the ultimate long-range plan.

Immediate Needs: The evaluation of the present traffic arteries, traffic volumes, and traffic patterns indicates but a few existing problems. Basically, the arterial street system and traffic controls are sound and presently adequate: the recent changes along Harrison Avenue in the central business district are most commendable.

The following recommendations will improve conditions considerably:

1. Install traffic signal control and channelization, Scheme 1, Florida State Road Department (Figure 19 in this report) at 15th Street and Harrison Avenue.

2. Remove traffic signals at those intersections enumerated in Table VIII.

3. Change angle parking to parallel parking along Beck Avenue between 11th and 12th Streets.

4. Change routing of U. S. 98 from Beck Avenue between 9th and 15th Streets to travel Frankford Avenue from Beach Drive to 15th Street.

5. Provide By-Pass for U. S. 98 "thru" traffic over East Avenue and 15th Street; sign existing U. S. 98, "Business District Route".

6. Remove parking along 6th Street (U. S. 98) from Massalina Bayou Bridge to Beach Drive (Figure 25).

7. Remove parking on the approaches of 5th Street to Harrison Avenue (refer to Figure 25).

8. Remove parking on the approaches of Beach Drive to Harrison Avenue (refer to Figure 25).

9. Widen Magnolia Avenue to 40 feet (paved street width) from 6th Street to 7th Street, and from 3rd Court to 4th Street (Figure 25).

10. Change parking meter control about the U. S. Post Office as shown on Figure 25.

11. Remove stop sign controls from Grace Avenue at 9th Street, 12th Street, and 13th Street.

12. Establish progressive timing control of the traffic signals in the central business district as interconnected on Figure 25. Timing schedules are given in Table IX.

13. Acquire off-street parking facilities as described in this report and shown on Figure 25.

Traffic Needs - 1965: The suggestions outlined under "immediate needs" will provide adequate traffic facilities for approximately ten years. However, as pointed out in this report, by 1965, traffic volumes will approximate the capacity of the traffic facilities and changes in street usage will be required. Study of the existing rights-of-way and the economics of acquiring additional property for street use support construction of an important phase of the long-range plan, that is:

1. Construct a bridge structure (28-foot roadway)

spanning Massalina Bayou at 5th Street.

2. Acquire additional right-of-way along 5th Street, from Massalina Bayou to Cove Boulevard as sketched on Figure 26.

3. Re-design the intersection of U. S. 98 (6th Street) at Cove Boulevard as shown on Figure 26.

4. Establish one-way traffic flow on 6th Street, west-bound, between Cove Boulevard and Beach Drive, and one-way on 5th Street, east-bound, from Beach Drive to Cove Boulevard (Figure 27).

5. Regulate the directional flow of traffic on Mulberry Avenue and Beach Drive between 5th and 6th Streets as follows:

   a. Mulberry Avenue; one-way, north-bound.

   b. Beach Drive; one-way, south-bound.

The Long-Range Plan: The security of the long-range plan must be, first, guaranteed. Interim action should establish the fact of the long-range plan, provide zoning controls for the protection of right-of-way requirements needed to expand the street system to the ultimate design, and schedule stage construction of the needed facilities as the availability of public funds will permit.

To achieve this singular purpose, the following recommendations are given:

1. Proclaim the arterial street plan, Figure 27, by City Ordnance.

2. By City Ordnance, regulate building set-back through zoning control to protect the right-of-way require-

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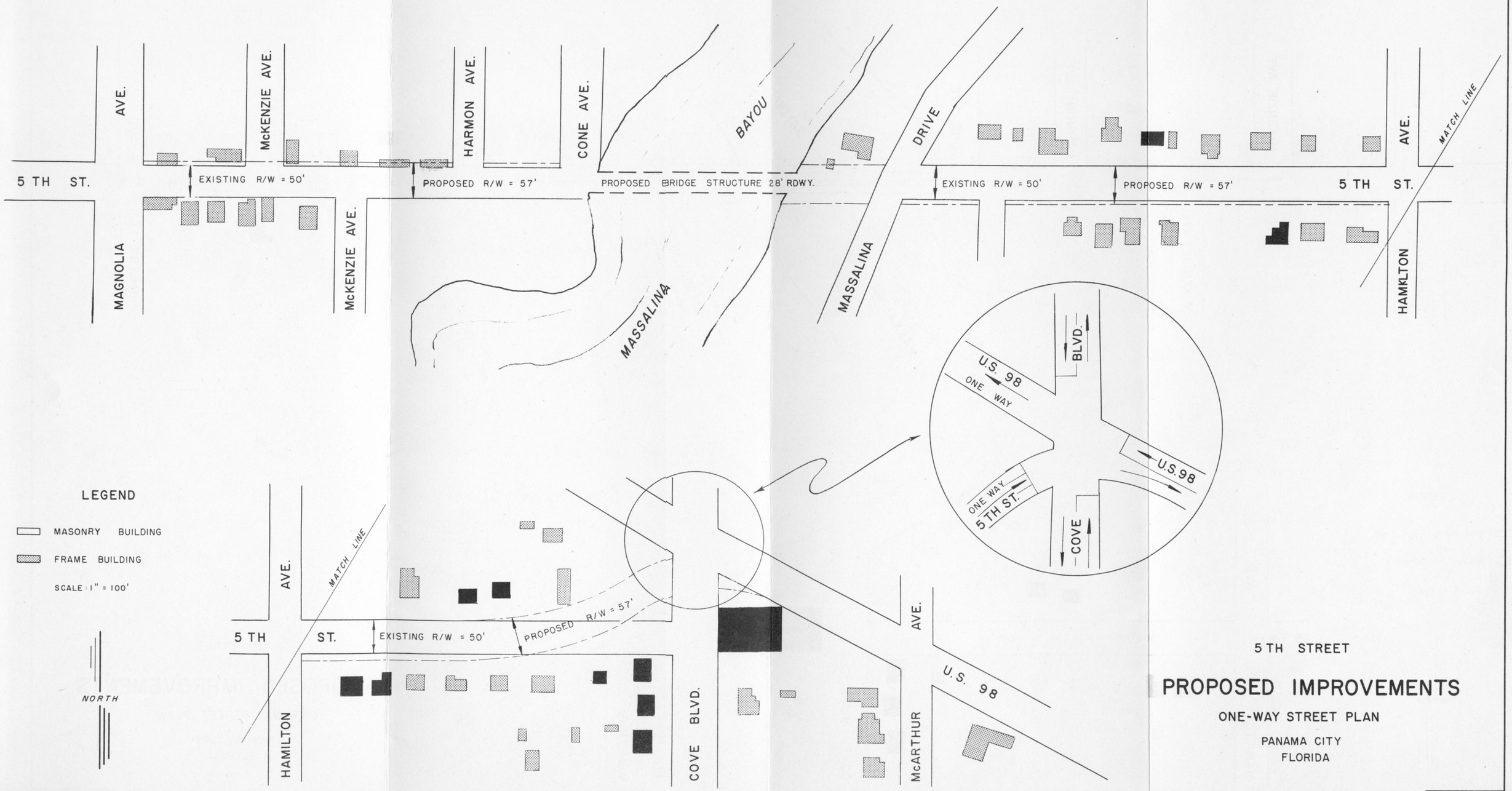


LEGEND

- MASONRY BUILDING
- FRAME BUILDING

SCALE: 1" = 100'

NORTH

5 TH STREET

PROPOSED IMPROVEMENTS

ONE-WAY STREET PLAN

PANAMA CITY
FLORIDA

Figure 26

ments of given sections of design, refer to Table XIII and Figure 27.

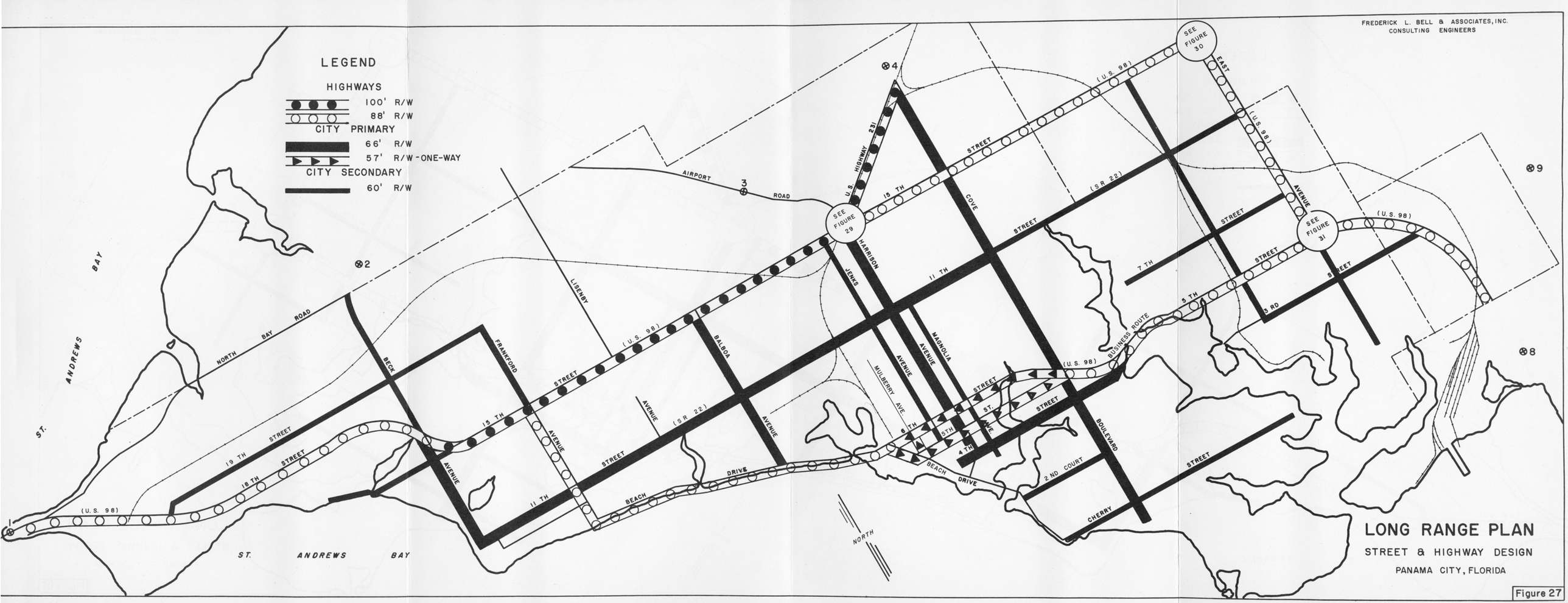
3. Acquire the additional rights-of-way as given by the schedule in Table XIII.

4. Co-ordinate municipal construction activities with the fiscal programs of Bay County and the Florida State Road Department to obtain the maximum benefits of traffic facility continuity and financing.

Figure 27 presents the desirable long-range plan designed to serve the anticipated traffic volumes and patterns to the year 1976.

Three problem intersections have been selected for more detailed presentation of geometric plan and have been identified on Figure 27 by circles. These intersections have been studied and designs are given to provide adequate capacity to the traffic forecast year, 1976.

1. Figure 29, 15th Street and Harrison Avenue.
2. Figure 30, 15th Street and East Avenue.
3. Figure 31, East Avenue and U. S. 98.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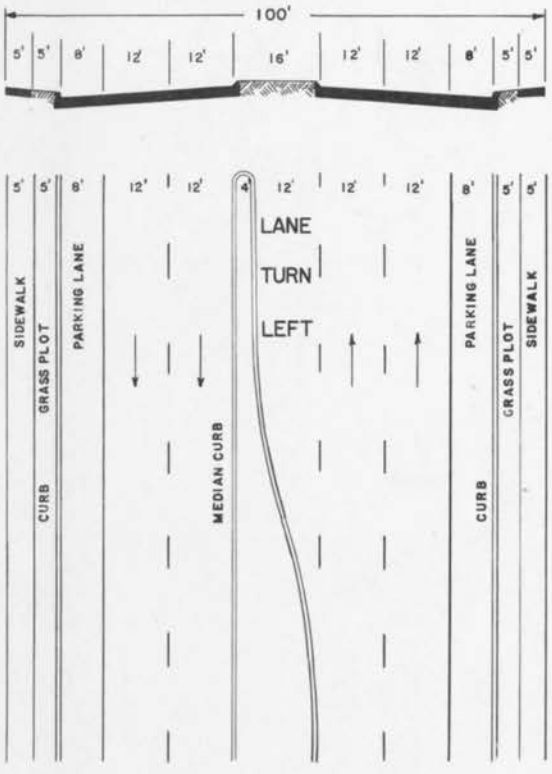
LEGEND
HIGHWAYS
100' R/W
88' R/W
CITY PRIMARY
66' R/W
57' R/W - ONE-WAY
CITY SECONDARY
60' R/W
ST. ANDREWS BAY
NORTH BAY ROAD
BECK AVENUE
19 TH STREET
18 TH STREET
(U.S. 98)
FRANKFORD AVENUE
15 TH STREET
LISENBY AVENUE
11 TH STREET
BEACH DRIVE
BALBOA AVENUE
(SR 22)
AIRPORT ROAD
U.S. HIGHWAY 231
JENKS AVENUE
HARRISON AVENUE
COVE BOULEVARD
MULBERRY AVE.
MAGNOLIA AVENUE
6 TH STREET
5TH STREET
4TH STREET
BUSINESS ROUTE
2 ND COURT
CHERRY STREET
EAST AVENUE
7 TH STREET
5 TH STREET
3 RD STREET
SEE FIGURE 29
SEE FIGURE 30
SEE FIGURE 31
NORTH
LONG RANGE PLAN
STREET & HIGHWAY DESIGN
PANAMA CITY, FLORIDA
Figure 27

TYPICAL SECTIONS

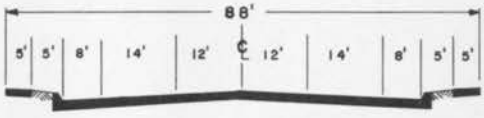
ARTERIAL STREET DESIGN - DIVIDED

"A"



ARTERIAL STREET DESIGN - RESTRICTED R/W

"B"



THIS SECTION FOR USE ON RESTRICTED R/W WHERE LEFT-TURNING MOVEMENTS ARE NEGLIGIBLE.

"C"

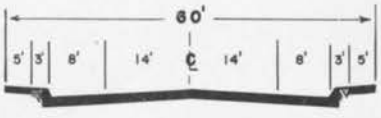
AS ABOVE, AND WHERE THE "NO-PARKING" REGULATION WILL BE ENFORCED.

NOTE:

TYPICAL SECTION DESIGN IN ACCORDANCE WITH BUREAU OF PUBLIC ROADS STANDARDS

ARTERIAL STREET DESIGN - 60' R/W

"D"



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CONSULTING ENGINEERS

Figure 28

TABLE XIII

RIGHTS-OF-WAY - ARTERIAL STREETS
PANAMA CITY

North-South

* TYPE	STREET	DESIGN R/W	EXISTING R/W	RIGHT-OF-WAY NEEDS
S	Beck-north from 18th Street	60'	55'	5'
A	Beck-south from U.S. 98 to 11th Street	66'	55'	10'
A	Frankford-north from Beach Drive to 15th Street	88'	66'	22'
A	Balboa-north from Beach Drive to 15th Street	66'	60'	6'
S	Jenks-north from 4th and Oak to 15th Street	60'	60'	---
A	Harrison Avenue-north from Beach Drive to 15th Street	66'	75'	---
S	Magnolia-north from 3rd Court to 11th Street	60'	60'	---
A	Cove Boulevard-north from Cherry to U.S. 231	66'	75'	---
S	Sherman-north			
	3rd St. - 5th St.	60'	40'	20'
	5th St. - 6th St.	60'	No Dedication	
	6th St. - 7th St.	60'	30'	30'
	7th St. - 7th Ct.	60'	20'	40'
	7th Ct. - 9th St.	60'	30'	30'
	9th St. - 11th St.	60'	25'	35'
	11th St. - 15th St.	60'	No Dedication	
A	East Avenue-north from U.S. 98 to 15th Street	88'	60'	28'
S	East Avenue-south from U.S. 98 to 3rd Street	60'	60'	---
A	U. S. 231-northeast from Harrison	100'	66'	34'

TABLE XIII

RIGHTS-OF-WAY - ARTERIAL STREETS
PANAMA CITY

East-West

* TYPE	STREET	DESIGN R/W	EXIST-ING R/W	RIGHT-OF-WAY NEEDS
S	19th Street (E-W)			
	Patten - Moates	60'	73'	---
	Moates - Lombardy	60'	66'	---
	Lombardy - Michigan	60'	52'-38'	8'-22'
	Michigan - Frankford	60'	66'	---
	Frankford - Fairlane	60'	66'	---
S	15th Street from Beck West (E-W)	60'	66'	---
A	15th Street from Beck east to Harrison Avenue	100'	80'	20'
A	15th Street from Harrison to East Avenue	88'	80'	8'
A	11th Street from Beck to Harrison Avenue	66'	66'	---
A	11th Street from Harrison to Cove Boulevard	66'	60'	6'
A	11th Street from Cove Boulevard to Bay Avenue	60'	60'	---
A	11th Street from Bay Avenue to East Avenue	60'	80'	---
S	7th Street (E-W)			
	Bay - Redwood	60'	63'	---
	Redwood - Cedar	60'	58'	2'
	Cedar - Sherman	60'	25'	35'
	Sherman - College	60'	25'	35'
	College - East	60'	No Dedication	
A	Beach Drive east from Frankford Ave. to 4th and Oak	66'	55'	11'
S	3rd Street from Sherman east to East Avenue	60'	50'	10'

TABLE XIII

RIGHTS-OF-WAY - ARTERIAL STREETS
PANAMA CITY

East-West

* TYPE	STREET	DESIGN R/W	EXISTING R/W	RIGHT-OF-WAY NEEDS
S	3rd Street from East Avenue east to U. S. 98	60'	55'	5'
A	6th Street east from Beach Drive to Massalina Drive	66'	60'	6'
A	6th Street east from Massalina Drive to 3rd St.	88'	66'	22'
S	2nd Court east from Beach Drive to Cove Boulevard	60'	50'	10'
S	Cherry Street east from Beach Drive to Cove Blvd.	60'	55'	5'
S	Cherry Street east from Cove Boulevard to Tyndal Drive	60'	60'	---

* Type A = Arterial
Type S = Secondary

Design Standard "A" - 100' R/W
" " "B" - 88' R/W
" " "C" - 66' R/W
" " "D" - 60' R/W

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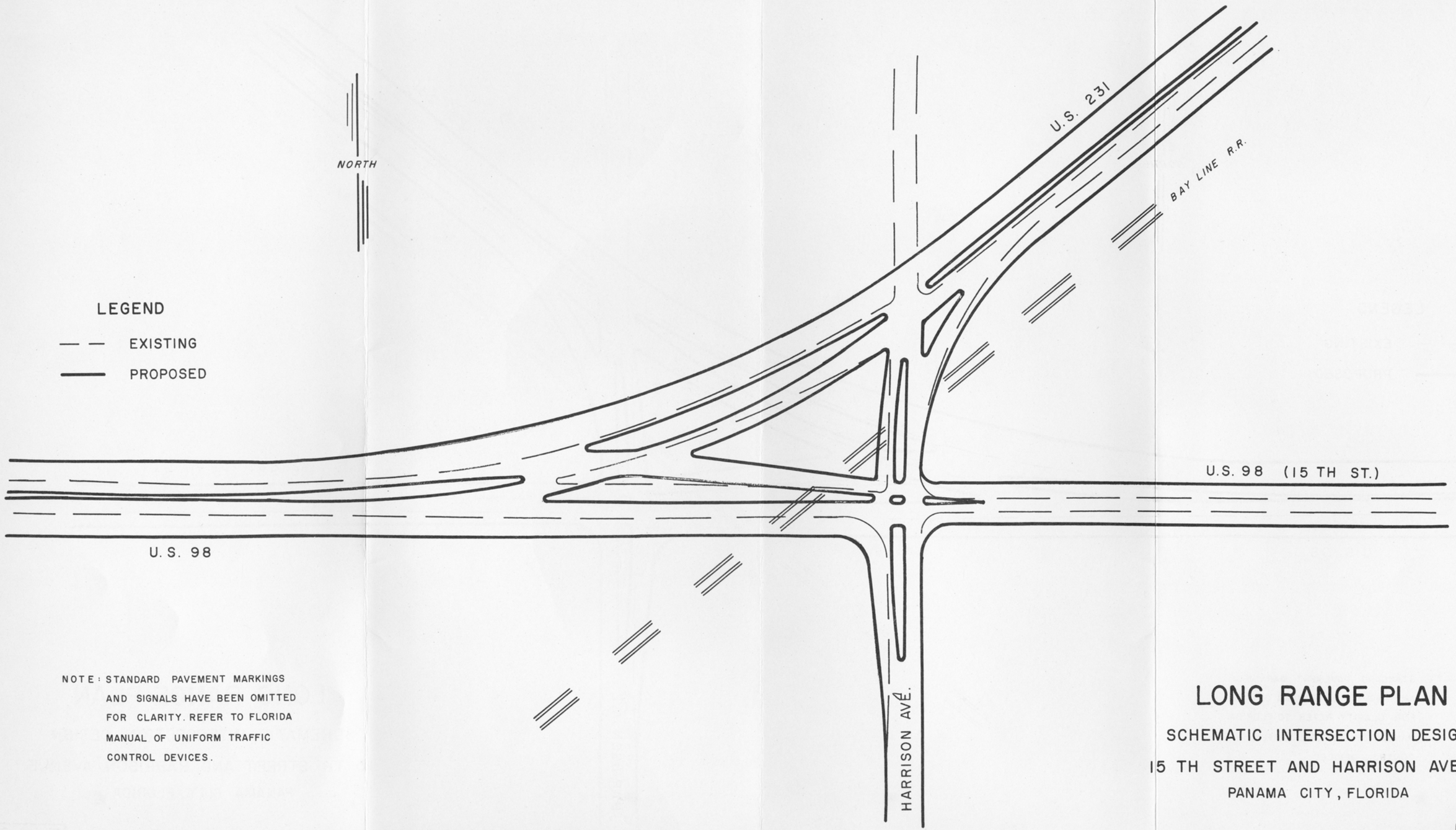

LEGEND

— — EXISTING

——— PROPOSED

NOTE: STANDARD PAVEMENT MARKINGS AND SIGNALS HAVE BEEN OMITTED FOR CLARITY. REFER TO FLORIDA MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

LONG RANGE PLAN

SCHEMATIC INTERSECTION DESIGN

15 TH STREET AND HARRISON AVENUE

PANAMA CITY, FLORIDA

Figure 29

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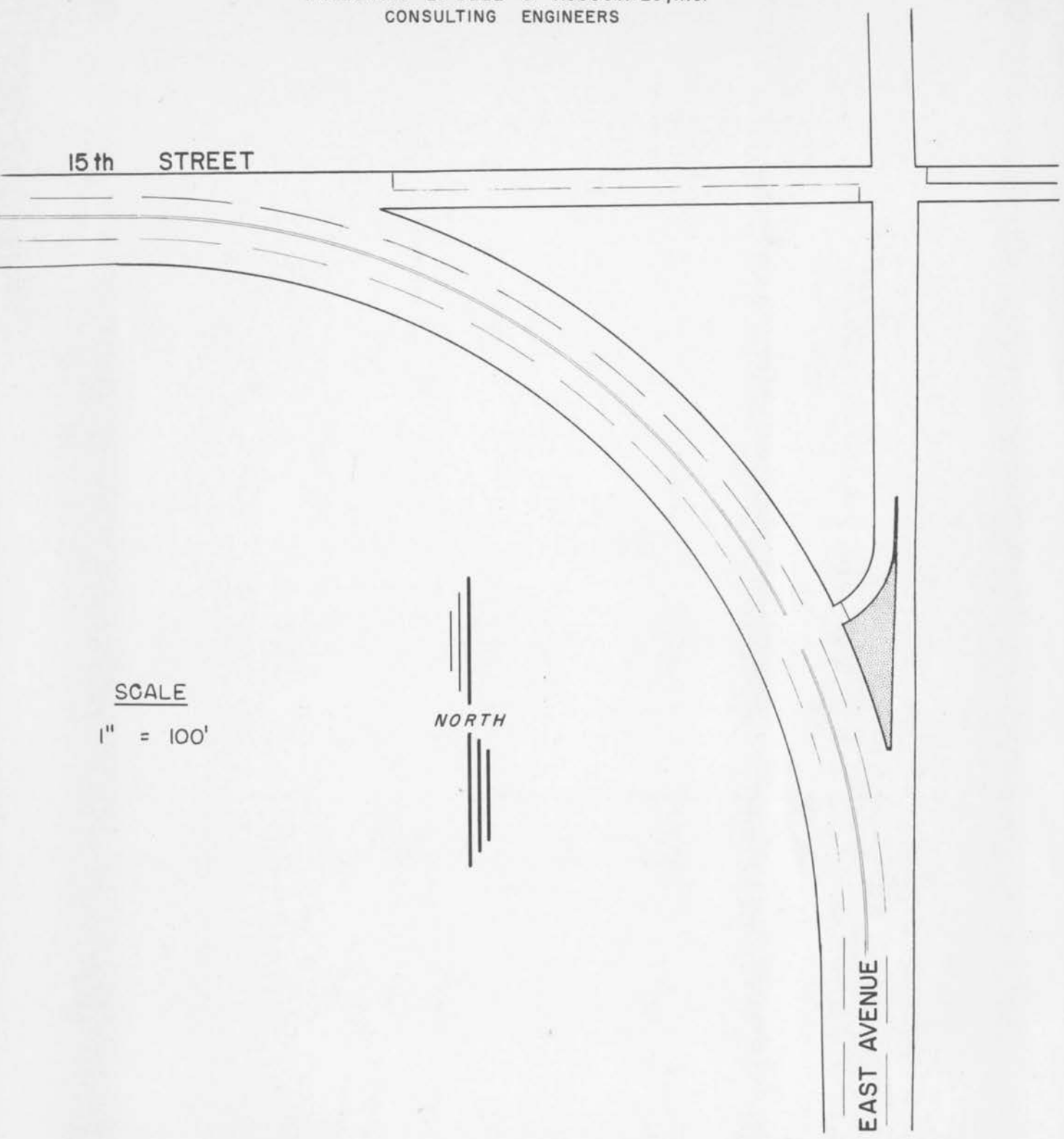
CONSULTING ENGINEERS



LONG RANGE PLAN

SCHEMATIC INTERSECTION DESIGN

15 TH STREET AND EAST AVENUE

PANAMA CITY, FLORIDA

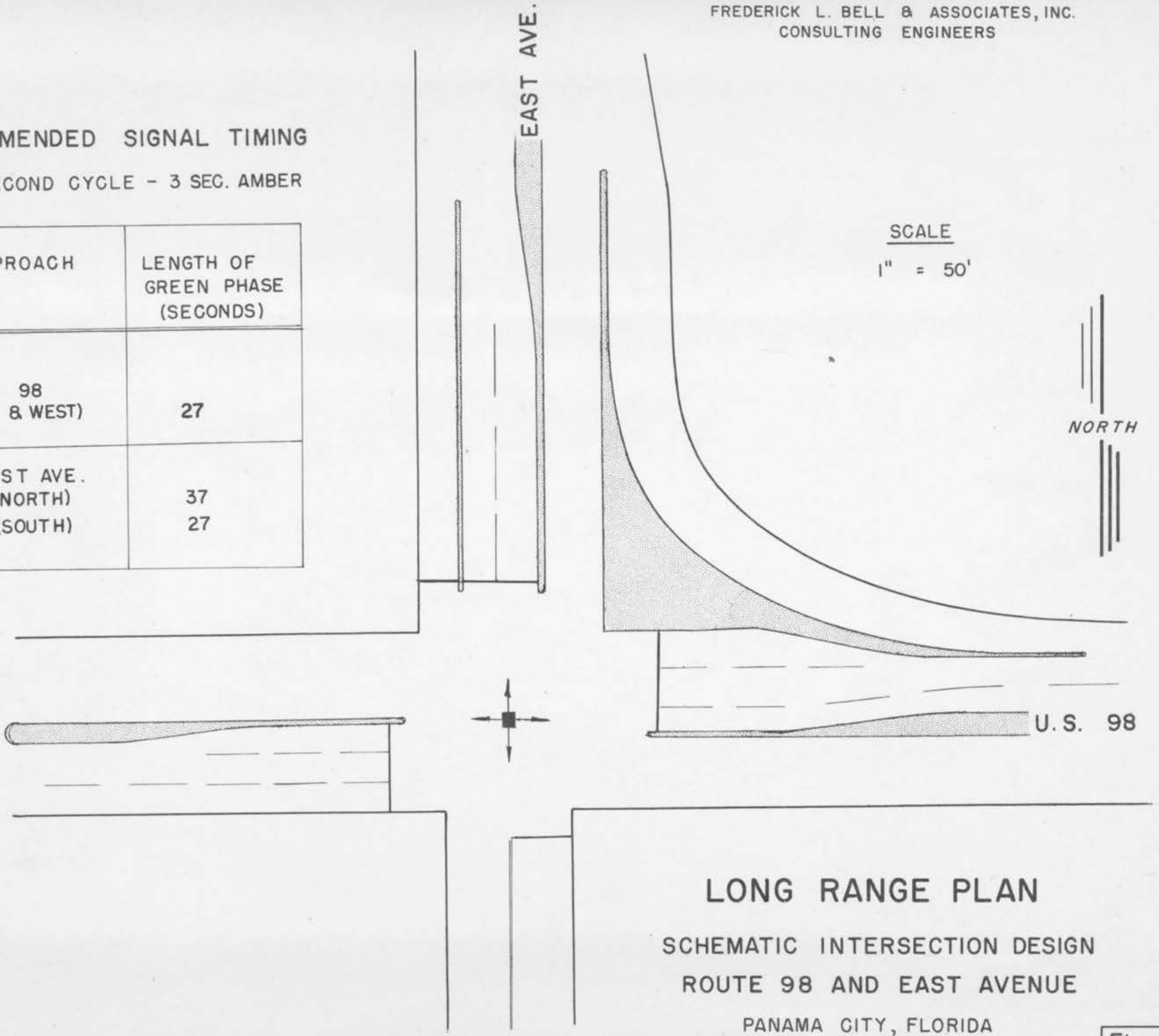
Figure 30

FREDERICK L. BELL & ASSOCIATES, INC.
CONSULTING ENGINEERS

RECOMMENDED SIGNAL TIMING

70 SECOND CYCLE - 3 SEC. AMBER

APPROACH	LENGTH OF GREEN PHASE (SECONDS)
U.S 98 (EAST & WEST)	27
EAST AVE. (NORTH)	37
(SOUTH)	27



LONG RANGE PLAN

SCHEMATIC INTERSECTION DESIGN
ROUTE 98 AND EAST AVENUE

PANAMA CITY, FLORIDA

Figure 31