Table I–2–9 The Collector Streets Network in Barranquillita

Cost by $1,000

Street Name	From	To	No. of Lanes	Distance (Km)	Direct cost	Land cost
Calle 4	New street	Cra. 46	2	0.92	74,546.2	48,438.00
Calle 6	Cra. 38	Cra. 46	4	1.30	123,088.8	99,450.00
Calle 7	New street	Via La Loma	4	1.00	109,701.3	54,400.00
Calle 17*	Cra. 36	Cra. 46	4	1.30	241,240.3	89,505.00
Cra. 43	Calle 4	Calle 30	4	0.90	61,681.1	60,750.00
Cra. 45	Calle 4	Calle 30	2	0.90	146,604.1	34,020.00
Cra. 46*	Bypass	Calle 30	4	1.00	184,066.5	76,500.00
New street	Bypass	Calle 17	2	0.926	81,641.0	38,753.10
Via La Loma	Bypass	Calle 17	2	1.65	97,998.8	66,825.0
				Subtotal	695,261.2	407,636.10

* They are not included in the subtotal because are considered in the Road Project Network

Table I–2–10 Street Term Road Improvement Cost

Cost by $1,000

Project	Direct Cost	Total Construction Cost	Land Cost	Compensation Cost	Subtotal
Repavement Short Term Plan	169,387.90	271,020.60	...	...	271,020.60
Road and Street Projects (including bridges cost)		22,645,100.00	1,546,500.00	4,073,200.00	28,264,800.00
				Subtotal	28,535,820.60
Arroyo Countermeasure Facility	603,176.70	965,082.70	...	...	965,082.70
Arroyo Facility for Central District	2,680,605.80	4,288,969.30	...	...	4,288,969.30
				Subtotal	5,254,052.00
Improvement Plan of the Collector Streets in Centro	321,154.10	513,846.60	...	97,892.60	611,739.20
Drainage Facility Plan in Central District	3,001,308.70	4,802,093.90	...	...	4,802,093.90
				Subtotal	5,413,833.10
The Collector Street Network in Barranquillita	695,261.20	1,112,417.90	407,636.10		1,520,054.00
The Drainage System in Barranquillita	1,023,634.50	1,637,815.20	...	...	1,637,815.20
				Subtotal	3,157,869.20
				Total Cost	42,361,574.90

The total construction cost is obtained multiplying the direct cost by 1.6.

Appendix J–1 THE GAP BETWEEN LINKED AND UNLINKED TRIPS OF URBAN BUS USERS

– The Problems of Urban Bus Routes –

1) Major Characteristics of Urban Bus Routes at Present

At present, there are 61 urban bus service routes in the city. These routes are composed into 18 integrated bus routes depending upon their route characteristics and their service areas.

Two of the 18 integrated bus routes are the circular type based on the shape of the route (Integrated Route [I.R.] IV, V). Six of the 18 IRs are the linear type (IR III, IX, XI, XV, XVII, XVIII). The rest of the routes are semi-linear types which means that they have a linear type of route between the center and their service area outside the center but within their service area, they have circular routes.

The functions of the semi-linear routes are similar to the linear type route connecting the center and their service areas directly.

In other words, almost all urban ubs routes in the metropolitan area of Barranquilla have a radial type of bus route.

2) The Zone-pairs without Bus Service

This study area is divided into 20 zones for the bus transportation analysis (See Fig. J–1–1).

Over-laying the integrated bus routes with the map of zones mentioned above, about 200 zone-pairs have no direct bus service (See Table J–1–1 and Fig. J–1–2).

According to the O-D matrix of bus passengers in 1983, about 200,000 passengers belong to the above-mentioned zone-pairs. In other words, those passengers will need at least two bus trips to arrive at their destinations.

3) The Gap between Linked and Unlinked Trip of Bus Passengers

Based on the differences of the characteristics of linked and unlinked trips, the problems of the bus routes can be identified (See Fig. J–1–3 and Fig. J–1–4).

Comparing two O-D matrices of linked and unlinked trips of bus users, the following items are identified:

(1) The difference in the total number of both O-D matrices is about 269,000. This means that about 130,000 users must transfer buses two or three times in one trip.

(2) 70 zone-pairs among 210 zone-pairs have more number of unlinked passengers than that of linked passengers. In the opposite casee the number is 134. About 260,000 bus users

who belonged to this latter case must pay double bus tariff to go their destination (See Table J–1–2).

(3) The distribution of bus passengers who have no direct bus route connecting their origin and destination is shown in Fig. J–1–5 (In this case, these zone-paris have more linked trips than unlinked trips.) The characteristic patterns of movement for these passengers are as follows: passengers who must pass through the central area of the city, (as almost all bus routes have that as their destination); and passengers moving between zone-pairs located along the Circunvalar.

(4) The distribution of zone-pairs which have more unlinked trips than the linked trips is Shown in Fig. J–1–6. Almost all of the zone-pairs toward the center of the city have more unlinked trips than linked trips. This phenomenon is a reflection of the urban bus route pattern.

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* Note: Definition of "Linked" and "Unlinked" Trip

One person trip using one kind of transportation measure is counted as one trip in both cases of linked and unlinked trips.

One person trip using plural types of transport measures, such as walking at first, then bus and again walking between the origin and destination of the trip, is counted as one trip in the case of a linked trip and is counted as three trips in the case of an unlinked trip.

If a person uses two busrides to go to work, this trip is considered to include two bus trips as an unlinked trip. However, in the case of a linked trip existing on this route, it is considered as only one bus trip.

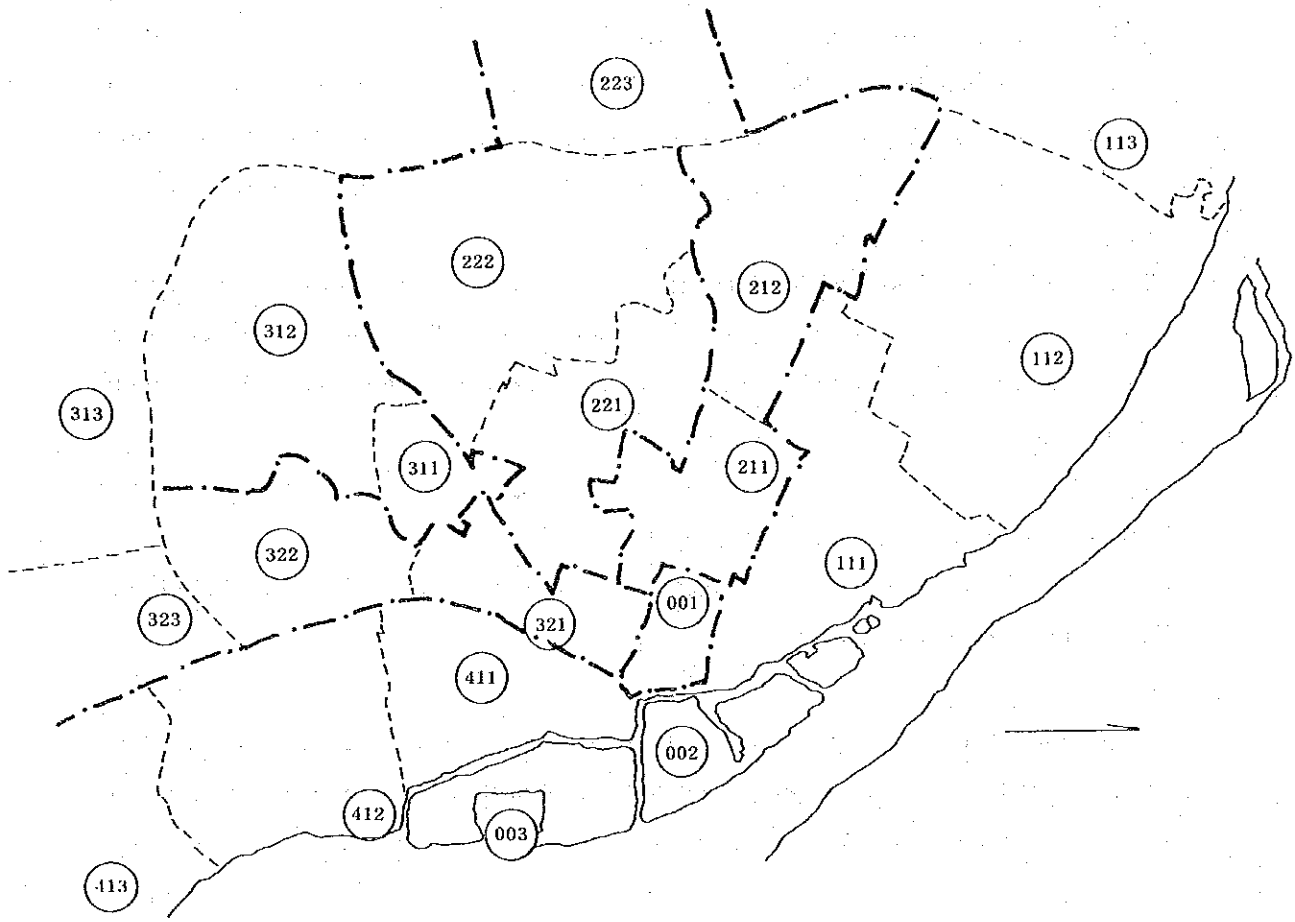


Fig. J–1–1 Zones for Bus Transport Analysis

Table J–1–1 O-D Matrix of Existence of Bus Service

	001	002	003	111	112	113	211	212	221	222	223	311	312	313	321	322	323	411	412	413	Total
001																					
002																					
003																					
111																					
112																					
113																					
211																					
212																					
221																					
222																					
223																					
311																					
312																					
313																					
321																					
322																					
323																					
411																					
412																					
413																					
A	0	7	11	8	9	16	7	12	6	12	14	10	11	10	3	11	11	4	13	13	188
B	20	13	9	12	11	4	13	8	14	8	6	10	9	10	17	9	9	16	7	7	212

A: No. of Zones With Bus Service
B: No. of Zones Without Bus Service

LEGEND
Without Direct Bus Service
With Direct Bus Service

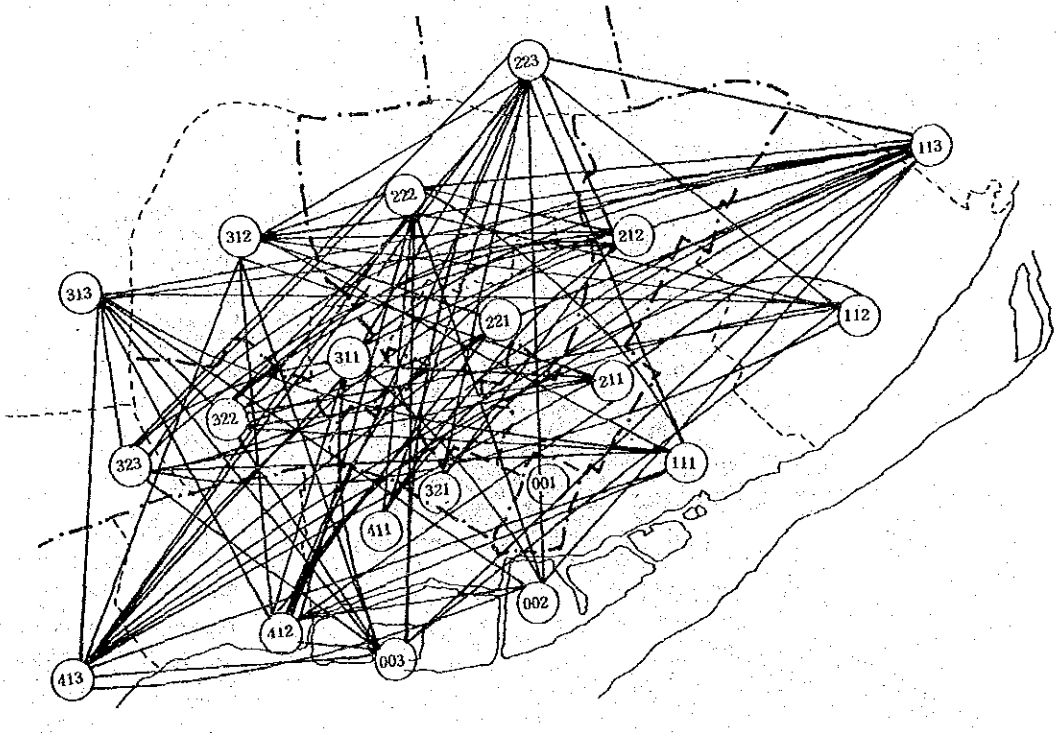


Fig. J–1–2 Zone Pairs without Direct Bus Service

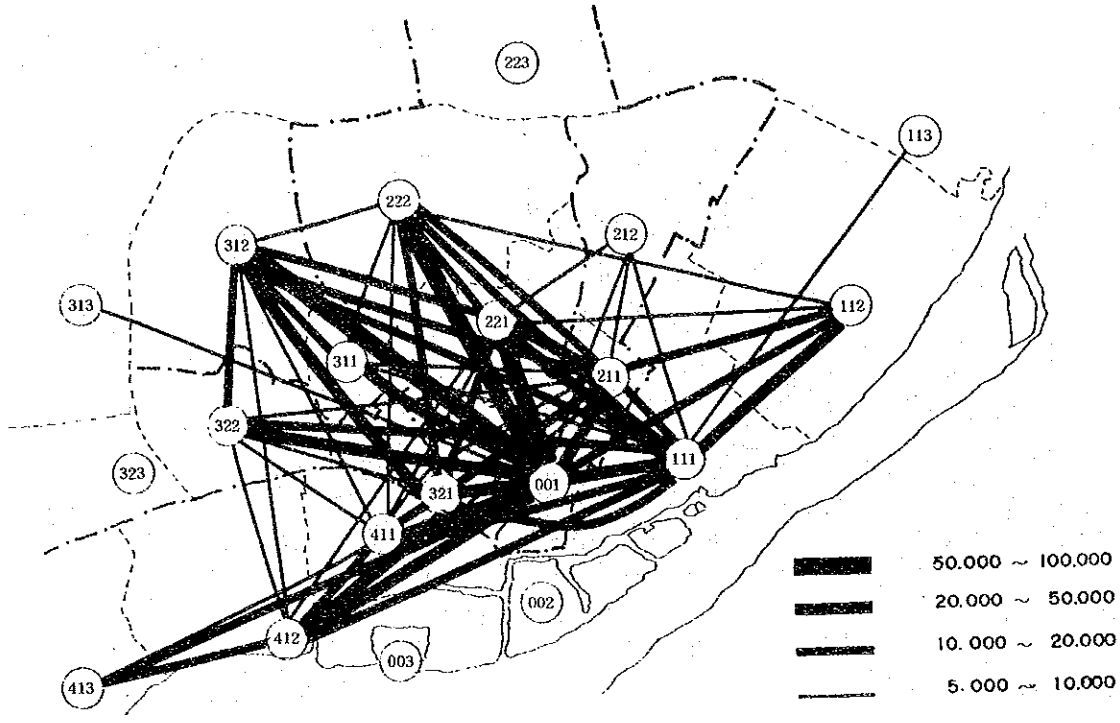


Fig. J–1–3 Desire Line of Bus Passengers in 1983 (Linked Trip Basis)

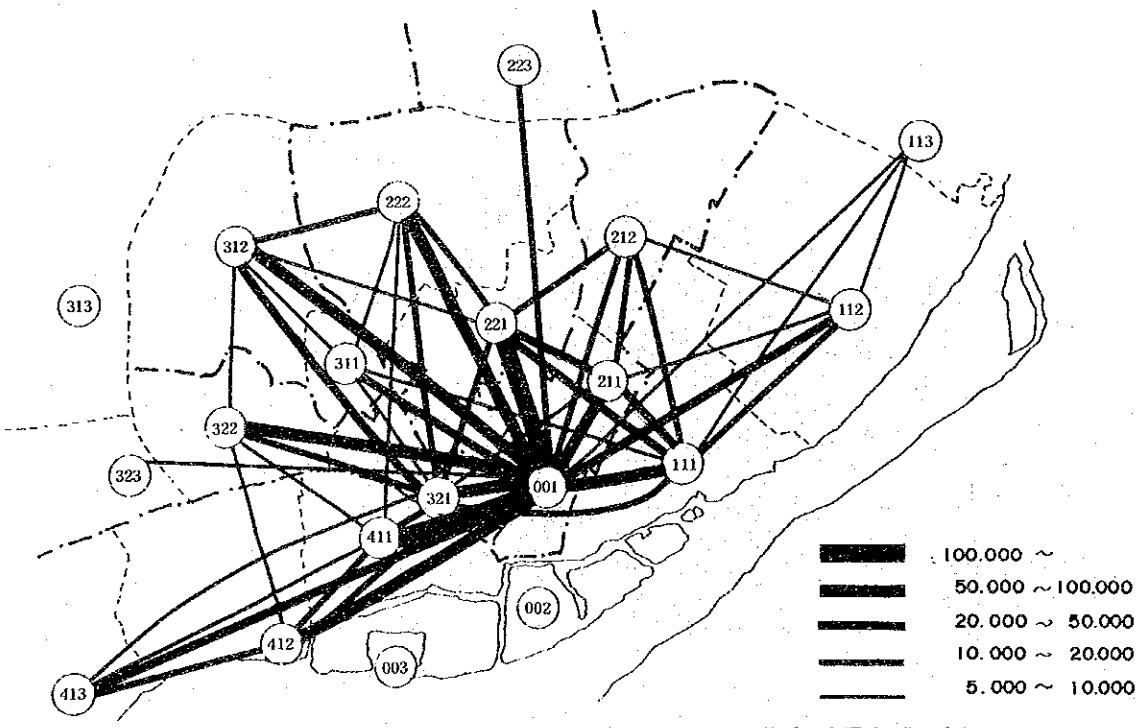


Fig. J–1–4 Desire Line of Bus Passengers in 1983 (Unlinked Trip Basis)

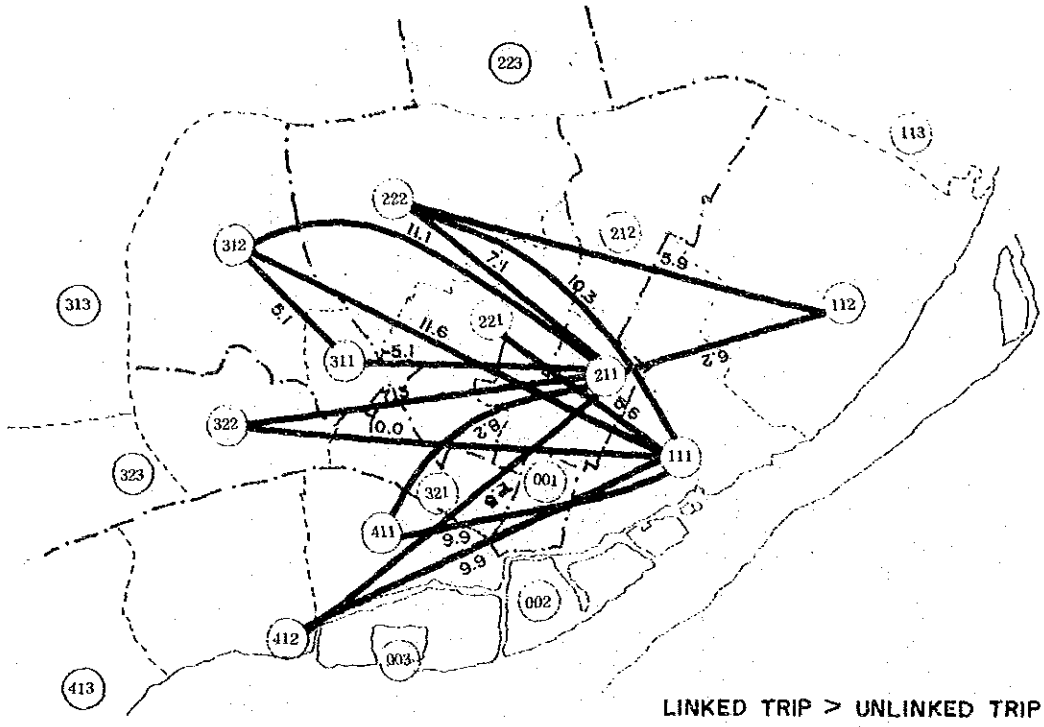


Fig. J–1–5 Bus Passengers Pattern Who Have No Bus Service Directly Connecting The Origin And Destination

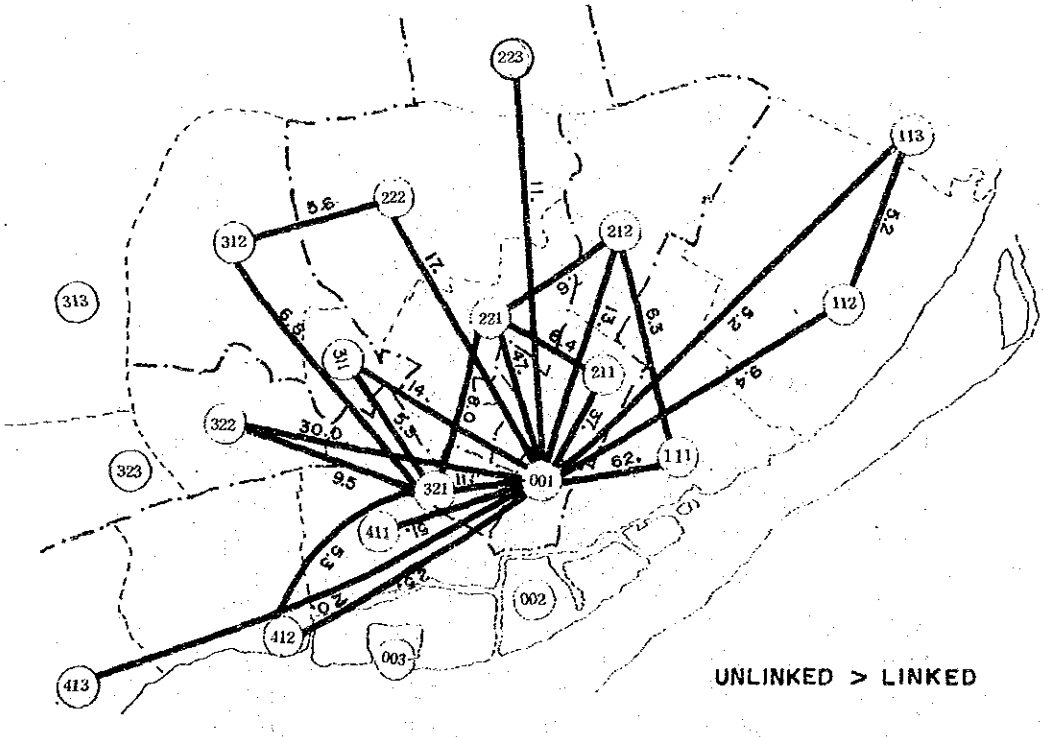


Fig. J–1–6 Bus Passengers Pattern Who Want To Transfer The Bus Route At Their Destination

Table J–1–2 Bus Passenger (2000–1988)

O-D		1983 Year (A)	83 Unlinked (B)	Difference (B) – (A)
001-	111	29,312	91,625	62,313
001-	411	57,864	108,514	50,650
001-	221	66,436	113,210	46,774
001-	211	30,217	67,038	36,821
001-	322	48,261	77,956	29,695
001-	412	43,793	68,438	24,645
001-	001-001	4,556	26,648	22,292
001-	413	16,552	35,990	19,638
001-	222	64,918	82,203	17,285
221-	221-221	10,902	25,829	14,927
001-	311	23,515	37,444	13,929
001-	212	5,985	19,068	13,083
001-	321	43,751	54,814	11,063
001-	223	4,856	15,767	10,911
321-	322	8,046	17,571	9,525
001-	112	16,534	25,903	9,369
111-	111-111	22,578	31,929	9,351
211-	221	20,407	28,764	8,357
221-	321	10,982	18,997	8,015
411-	411-411	11,590	19,250	7,660
212-	221	5,430	13,011	7,581
312-	321	23,616	30,453	6,837
111-	212	5,999	12,300	6,301
222-	312	5,395	10,979	5,584
311-	321	4,574	9,915	5,541
321-	412	11,612	16,897	5,285
001-	113	274	5,486	5,212
112-	113	1,230	6,380	5,150
001-	323	4,136	8,895	4,759
212-	212-212	2,267	6,295	4,028
111-	211	18,466	22,328	3,862
211-	212	6,616	10,060	3,444
321-	321-321	6,104	9,401	3,297
321-	413	3,716	6,929	3,213
411-	413	5,186	7,821	2,683
223-	321	593	3,210	2,617
112-	212	4,632	7,181	2,549
001-	001-003	348	2,891	2,543
321-	323	1,438	3,969	2,531
001-	001-002	1,786	4,178	2,392
001-	312	78,924	81,310	2,386
413-	413-413	3,969	5,942	1,973
212-	321	2,510	4,180	1,670
222-	321	14,196	15,839	1,643
221-	223	1,517	3,062	1,545
311-	322	1,929	3,326	1,397
002-	221	1,922	3,291	1,369
111-	311	7,438	8,621	1,183
211-	223	538	1,558	1,020
322-	322-322	4,741	5,721	930

(A) Number of Bus Passengers based on LINKED TRIP
(B) Same as above but UNLINKED TRIP basis

113-	113- 113	156	990	332
113-	222	0	715	715
321-	411	15,792	16,549	557
002-	212	213	641	428
222-	322	1,720	2,081	561
411-	412	13,803	14,061	258
002-	223	169	418	249
111-	118	5,566	5,796	230
113-	321	280	503	223
322-	411	6,710	6,876	166
322-	412	6,333	8,487	154
223-	223-223	154	259	105
221-	311	4,134	4,238	104
002-	113	0	90	20
313-	321	898	971	75
311-	311-311	1,229	1,268	39
222-	315	161	194	33
311-	313	92	120	28
212-	223	164	169	5
212-	323	222	224	2
002-	003	0	0	0
003-	113	0	0	0
003-	212	0	0	0
113-	223	0	0	0
113-	313	0	0	0
113-	413	0	0	0
003-	223	10	0	−10
113-	311	451	435	−16
113-	323	18	0	−18
003-	323	25	0	−25
003-	112	28	0	−28
223-	323	42	0	−42
003-	313	46	0	−46
212-	313	46	0	−46
002-	323	64	0	−64
002-	002- 002	230	150	−80
113-	221	663	581	−82
313-	322	159	72	−87
003-	311	134	38	−96
223-	413	99	0	−99
223-	322	102	0	−102
112-	411	221	108	−113
002-	111	824	710	−114
113-	312	121	0	−121
313-	413	256	126	−130
313-	313- 313	134	0	−134
313-	323	136	0	−136
113-	322	137	0	−137
223-	311	142	0	−142
223-	313	145	0	−145
003-	003- 003	201	54	−147
003-	111	193	43	−150
313-	412	293	140	−153
002-	321	1,245	1,084	−161

222-	311	6,334	6,164	–170
002-	313	174	0	–174
223-	411	218	0	–218
222-	323	223	0	–223
311-	413	443	197	–246
223-	312	256	0	–256
323-	323-323	280	24	–256
112-	313	266	0	–266
113-	412	272	0	–272
312-	313	524	248	–276
112-	223	310	17	–293
212-	413	298	0	–298
313-	411	301	0	–301
223-	412	385	22	–313
002-	322	1,206	384	–322
002-	211	468	248	–525
112-	321	4,340	5,997	–345
221-	222	17,748	17,336	–412
322-	413	1,952	1,509	–443
211-	323	510	63	–447
002-	311	1,043	590	–453
003-	413	586	116	–470
003-	211	533	47	–486
221-	323	689	196	–493
113-	211	742	188	–554
323-	411	1,982	1,347	–635
002-	222	1,895	1,245	–650
003-	222	696	0	–696
003-	321	382	179	–703
221-	313	987	217	–770
003-	221	1,254	460	–794
311-	411	1,704	385	–319
111-	321	14,199	13,378	–821
113-	212	364	24	–340
221-	413	1,028	171	–857
112-	413	887	0	–887
222-	411	6,838	5,940	–898
211-	313	936	32	–904
111-	223	1,320	401	–919
002-	112	1,108	117	–991
222-	413	1,021	28	–993
312-	413	1,508	484	–1,024
222-	223	1,446	370	–1,076
412-	413	17,433	16,336	–1,097
212-	311	1,314	184	–1,130
111-	323	1,250	100	–1,150
322-	323	1,490	317	–1,173
003-	322	1,229	23	–1,206
111-	313	1,253	0	–1,253
003-	312	1,340	59	–1,201
222-	412	1,570	284	–1,286
311-	323	1,421	24	–1,397
112-	311	2,167	767	–1,400
212-	412	1,508	78	–1,430

311-	412	2,720	1,278	−1,442
112-	328	1,502	0	−1,502
312-	411	6,242	4,716	−1,526
211-	211- 211	9,084	7,558	−1,531
002-	412	1,810	279	−1,537
323-	412	3,559	1,995	−1,564
002-	512	2,656	1,035	−1,601
212-	411	1,851	248	−1,603
212-	322	1,717	29	−1,688
112-	322	1,760	0	−1,760
002-	413	1,910	192	−1,778
312-	323	1,731	0	−1,781
003-	411	2,306	464	−1,842
312-	322	10,418	8,560	−1,858
312-	412	5,656	3,519	−2,157
221-	322	4,102	1,750	−2,352
003-	412	2,405	37	−2,368
212-	222	2,544	113	−2,431
323-	413	3,218	705	−2,513
221-	411	6,462	3,894	−2,568
111-	112	21,936	19,297	−2,639
211-	416	2,751	84	−2,667
112-	412	2,959	141	−2,818
412-	412- 412	13,748	10,441	−3,307
212-	312	8,477	39	−3,438
112-	411	3,599	80	−3,519
211-	821	10,283	6,589	−3,694
222-	222- 222	12,619	8,925	−3,694
001-	313	7,064	3,248	−3,816
111-	413	3,936	118	−3,818
112-	312	4,184	350	−3,834
112-	112- 112	7,605	3,666	−3,939
002-	411	4,885	650	−4,235
312-	312- 312	7,793	3,526	−4,267
112-	221	5,982	1,383	−4,599
221-	312	10,549	5,943	−4,606
221-	412	5,202	298	−4,904
311-	312	12,350	7,284	−5,066
211-	311	5,574	473	−5,101
111-	221	26,034	20,481	−5,553
112-	222	6,604	738	−5,866
112-	211	12,674	6,512	−6,162
211-	222	10,023	2,888	−7,135
211-	322	7,493	147	−7,346
211-	412	7,567	116	−7,451
211-	411	8,993	767	−8,226
111-	412	10,269	351	−9,918
111-	411	11,382	1,448	−9,934
111-	322	10,714	684	−10,030
111-	222	14,923	4,612	−10,311
211-	312	11,358	279	−11,079
111-	312	14,747	3,135	−11,612
Sub-total [in case (B) greater than (A)]				531,232
Sub-total [in case (A) greater than (B)]				−261,980
Grand Total		1,323,361	1,592,663	269,302

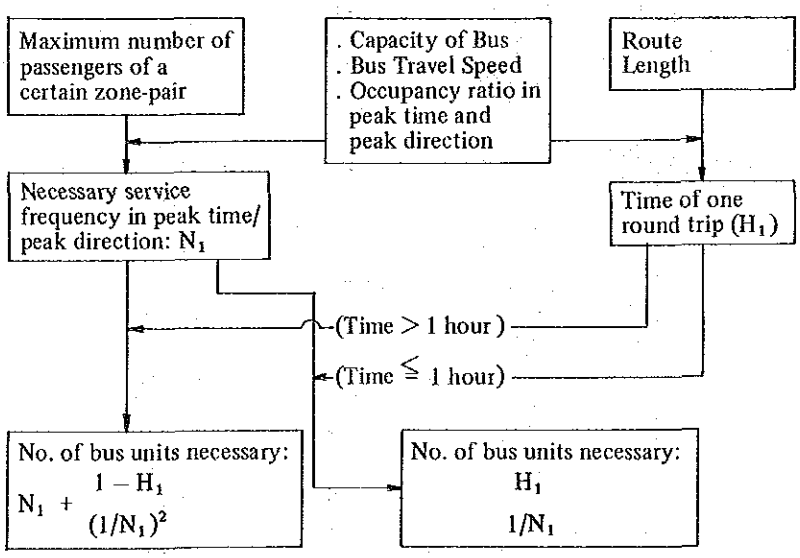
Appendix J–2 THE ESTIMATION METHOD FOR THE NECESSARY NUMBER OF UNITS BY BUS ROUTE

The process of the estimation is summarized in the following flow chart:

(1) The bus service frequency in peak times and peak directions has been decided by the maximum number of passengers in a certain zone-pair of the routes.

(2) The occupancy ratio of bus in the peak time and peak direction is 200% and the average occupancy ratio for the whole day is 70%.

(3) The interval of bus service after the peak hour is twice that of the peak hour.



Note: The interval of bus service after the peak hour is twice that of the peak hour.

Fig. J–2–1 Estimation Method for the Necessary Number of Buses by Bus Route

Appendix J–3

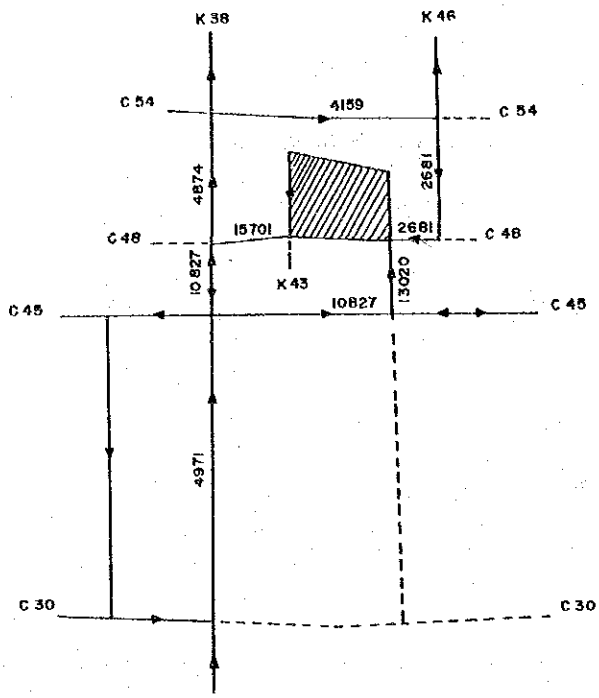


Fig. J–3–1 Bus Traffic by Alternative Bus Route Improvement Plan in the Central District (Alternative 1–1)

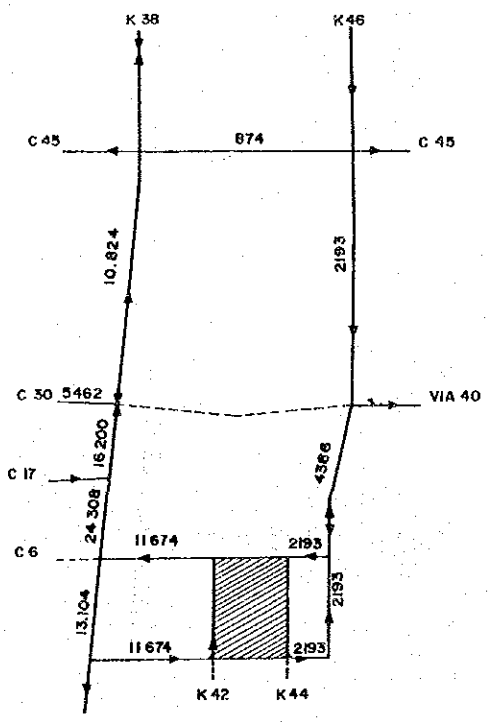


Fig. J–3–2 Bus Traffic by Alternative Bus Route Improvement Plan in the Central District (Alternative 1–2)

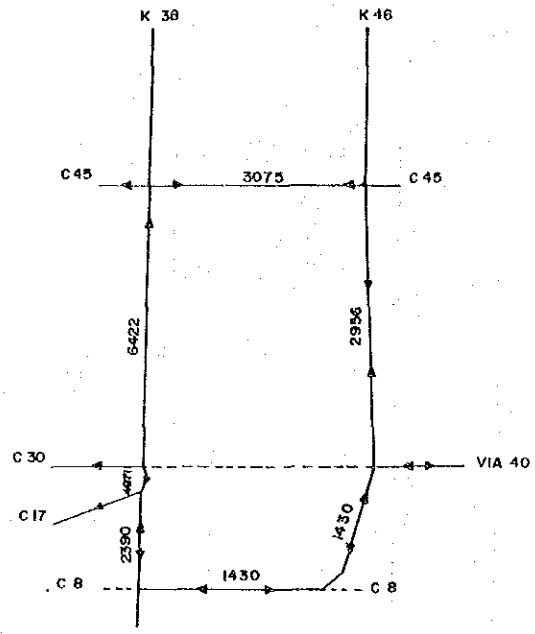


Fig. J–3–3 Bus Traffic by Alternative Bus Route Improvement Plan in the Central District (Alternative 2–1)

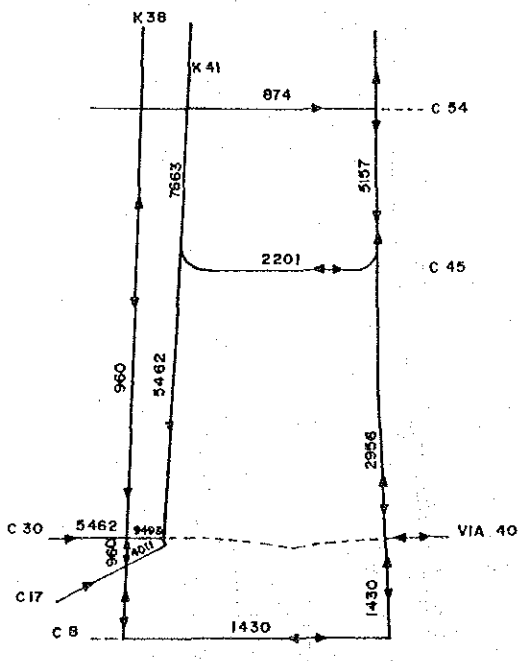


Fig. J–3–4 Bus Traffic by Alternative Bus Route Improvement Plan in the Central District (Alternative 2–2)

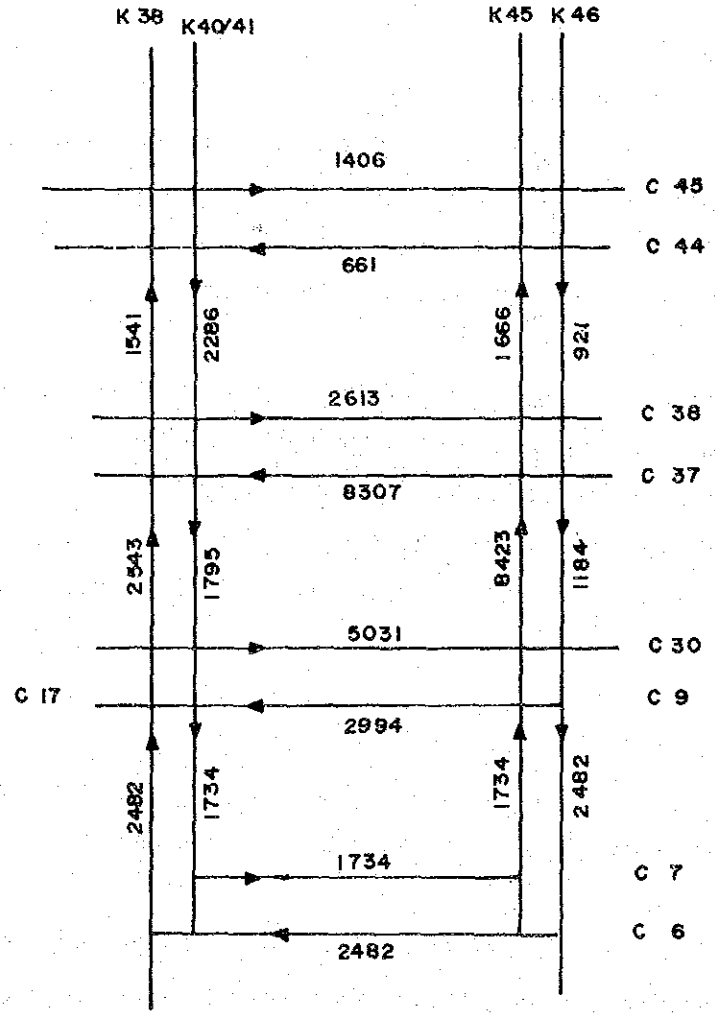


Fig. J–3–5 Bus Traffic by Alternative Bus Route Improvement Plan in the Central District (Alternative 2–3)

Appendix J–4 FUTURE PUBLIC TRANSPORT SYSTEM IN THE CENTRAL DISTRICT – On the Timing of the Introduction of a Rail Transit System –

1) Purpose

The purpose of this appendix is to examine the possible time when the introduction of a rail transit system may be deemed necessary, based on an analysis of the limits of the existing traffic capacity in the central city and on the Public Transport System Improvement Plan.

2) Method of Analysis

An analysis of the above-mentioned limits will be carried out using the index representing the vehicle density on the roads to compare the road space in the central city and the number of vehicles which are simultaneously present in the same area. Although the vehcile density index is usually shown as the number of vehciles/km or the number of vehicles/lane-km, the average vehicle intervales, which is easier to understand, will be used here.

The process of analysis commences with the checking of the limit of the existing road facility volume. It then proceeds to checking of the limit of the Public Transport Improvement Plan, proposed by the present plan. If the development of physical facilities for public transportation does not exceed the volume proposed by the present plan, the limit of this Improvement Plan will point out the right time when a rail transit system should be introduced.

3) Preconditions for Analysis

(1) Residual Number of Vehicles in the Centro District

- o Figures to be used for the calculation will be the generated and attracted traffic volumes shown in the PT and OD Tables by transit means for 1983, 1990 and 2000.

- o With regard to the number of bus passengers for 1983, the use of the OD Table (Unlinked OD Table), including the transfer passengers in the Centro district, is presupposed. With regard to 1990 and 2000, the use of the generated and attracted volume of traffic (1.25 times) which takes into account the number of transfer passengers in the Centro district given by the distribution of bus passengers in the year 2000, is presupposed.

- o The number of PT is converted into the number of vehicles using the following condi-

tions.

Bases: Average Capacity – 42.5 persons/bus
Peak Time Volume-Capacity Ratio – 150%
Other Vehicles: Average Number of Passengers – 1.57 persons/vehicle

o In principle, 15 minutes equivalent volume of the peak hour's generated and attracted volume in the area will be considered to be the residual number of vehicles.

When the Bus Circular System is introduced, the residual time will become 20–25 minutes under the following conditions.

Running Distance on Circular Routes	:	Average 3 km
Running Speed on Circular Routes	:	Average 10 km/hr
Turn-Over Ratio to Gran Paradas	:	Average 3.15 times
Turn-Over Time to Gran Paradas	:	Average 2.5 minutes/visit

(2) Preconditions for the Calculation of Road Traffic Capacities

o The aggregate length of the roads will be shown in lanes. The required figure will be given by multiplying the aggregate length of streets in the Centro district with the number of lanes for each section of streets.

o As there are a number of on-street parking lots, the number of lanes of existing streets is reduced using the following preconditions based on the Parking Inventory Survey. In principle, one lane is reduced when parking lots are provided. When parking lots are provided on both sides of a 2 through traffic lane street, this street is considered to have one free lane on the assumption that it originally had three lanes.

o The sections of major streets to be widened as proposed by the Centro Renewal Plan, are as follows.

The development of Calle 30 to a 6 lanes street (currently given as a 2 lanes street).
The development of Cra. 46 to a 6 lanes street (currently given as a 2 lanes street).

o Based on the above-mentioned preconditions, the aggregate road length used in the present analysis is as follows.

Existing road length 72.5 lanes·km

Practical aggregate road length after deducting spaces for parking lots
53.5 lanes·km

Aggregate road length for Bus Circular System (given as using 1 lane)
10.1 lanes·km

Remaining space for use by vehicles other than buses
62.4 lanes·km

Aggregate road length after street widening
78.8 lanes·km

Space for use by vehicles other than buses after street widening
68.8 lanes·km

4) Relation between Average Vehicles Interval and the Volume-Capacity Ratio of Major Roads and Streets

The index given as the vehicle interval is generally used as an instructive index to drivers for the safe running of vehicles. While the average vehicle intervals can be used in their own right to indicate vehicle density on the streets, it is unclear what figure expresses what extent of the problem of traffic congestion.

The relation, therefore, between the average vehicle interval to be used here and the volume-capacity ratio generally used in traffic analysis will be clarified in order that the former index can be used as a judgement standard for the volume of road traffic in a specific area. The method of the calculation of the average vehicle interval is as explained in the main report.

Based on the results of the traffic assignment, where the total study area is subject to this assignment, the volume-capacity ratio of each section of road has already been calculated for the roads subject to the traffic assignment (major streets). The weighed average of the aggregate road length and the volume-capacity ratio for each section of road will give the average volume-capacity ratio for a specific area.

The relation between the average vehicle interval and the average volume-capacity ratio

can be explained by the following evaluation example, i.e. when the average vehicle interval exceeds 17 m (present situation), the average volume-capacity ratio will slightly exceed 0.7 and when the average vehicle interval is something like 8.3 m, the average volume-capacity ratio will reach to almost 1.0.

5) Results of the Analysis

Under the existing road conditions, the functional capacity of the present street network is reduced by one fourth due to on-street parking lots. The vehicle interval during the peak hour in the Centro district can, therefore, be considered to be approximately 10 m. Although a smooth flow of traffic may not be achieved under this particular condition, traffic congestion will not be so bad that all transport functions come to a standstill. Should a no-parking vehicle regulation be introduced now, however, the average vehicle interval will increase to 15 m and will help in the establishment of a smooth traffic flow.

Without the removal of on-street parking lots, the average vehicle interval will be reduced to 7.4 m in 1990, causing severe traffic congestion. The removal of these parking lots is, therefore, an absolute necessity. The effect of their removal will be seen in the increase of the average vehicle interval to 12 m. It should be repeated, however, that the advancement of the rerouting of bus services and the resulting decreased demand for bus transfer in the Centro district have been presumed for 1990.

If only 50% or so of these parking lots is removed, the resulting average vehicle interval will be approximattely 8.8 m, thus reducing the necessity of introducing the Bus Circular System.

In the case of the year 2000, even if all existing road space is used entirely for vehicle traffic, the average vehicle interval in the Centro district will be 8.0 m, necessitating the application of countermeasures. With the introduction of the Bus Circular System incorporating Gran Paradas, the average vehicle interval between buses on bus lanes will be improved to 9.1 m. However, the average vehicle interval between other vehicles on the remaining streets will be 7.5 m, thus posing a serious problem.

As part of the Centro Renewal Plan, part of the Circunvalar will be widened and if this road is to be regarded as space for vehicles other than buses, the average vehicle interval will become 8.8 m, easing the traffic.

If a rail transit system is introduced instead of the Bus Circular System in the year 2000, the average vehicle interval will become 8.6 m, securing the mixed traffic of buses and other vehicles on the streets. If the Bus Circuit System for the smooth flow of buses is simultaneously introduced, however, a shortage of traffic space for other vehicles will occur. Because of this, the introduction of a rail transit system cannot be the trump card (in this respect, the application of the routes described in Chapter 12–6 is presupposed). A rail transit system will, therefore, only be necessary when the countermeasures put into practice before 2000 reach their limits, as stated in the main report.

The Bus Circular System is expected to reach its limit in 2011, based on the presupposition that the increase rate of the demand for public transport between 1990 and 2000 is 0.38%/year.

Space for vehicles other than buses will reach its limit in 2002 even if the streets are widened, using the increase rate of 3.0%/year.

As a result, the introduction of a rail transit system in 2000 will be too early, however, it should be realised in the first 10 years of the 21st Centruy. Accordingly, in the present plan where the target year is 2000, various plans should be made presupposing that the introduction of a rail transit system may occur sometime in the future.

Table J–4–1 Analysis on Limitation of Transportation Capacity of Existing Streets and Proposed Countermeasures

Year	Conditions for Estimation (Proposed Countermeasure)	No. of Vehicles Moving in Centro in Peak Hour			Average Vehicle Intervals (m)			
					Mixed Traffic		Segregated Traffic	
		Bus (1)	Car (2)	Total (3)	Prohibition of On-street Parking Lot	Existance of Permitted On-street Parking Lot	Bus	Car
1983	Present Street Network	564*1	2,794*6	3,358	15.8	10.1	7.5	17.8
1990	Present Street Network	419*2	3,715	4,134	12.0	7.4	14.1	11.6
1990	Bus Circular System with Gran Paradas	607*3	3,715	4,222	11.6	7.0	9.9	11.8
2000	Present Street Network	438*2	4,979	5,417	8.0	4.5	13.1	7.5
2000	Bus Circular System with Gran Paradas	528*3	4,979	5,507	7.7	4.2	9.1	7.5
2000	Rail Transit	304*4	4,929	5,233	8.6	4.9	23.3	7.7
2000	Rail Transit and Bus Circular System with Gran Paradas	280*5	4,929	5,209	18.1	14.5	26.2	7.7
2000	Street Improvement and Bus Circular System with Gran Paradas	528	4,979	5,507	8.8	4.2	9.1	8.8

Note: PT. Generated/attracted in Centro: 957,274 in 1983 (Unlinked Basis), 569,885 in 1990 and 595,430 in 2000 by Bus
116,963 in 1983, 154,641 in 1990, 208,469 in 2000 by Car.

*1 [(PT. Gen/Att) x 0.15 x 1/4]/(42.5 x 1.5) *2 [(PT. Gen/Att) x 1.25 x 0.15 x 1/4)/(42.5 x 1.5)
*3 [(PT. Gen Att) x 1.25 x 0.15 x 1/3]/(42.5 x 1.5)

*3 $\left[\left((\text{PT. Gen/Att}) \times 1.25 \times 0.15 \times 1/3\right)/(42.5 \times 1.5)\right] \times \left(1 - \frac{3.15 \times 2.5}{26}\right)$

*4 [(595,430 – 185,220) x 1.25 x 0.15 x 1/4] /(42.5 x 1.5)
*6 [(PT. Gen/Att) x 0.15 x 1/4)/1.57

*5 $\left[\left((595{,}430 - 185{,}220) \times 1.25 \times 0.15 \times 1/3\right)/(42.5 \times 1.5)\right] \times \left(1 - \frac{3.15 \times 2.5}{26}\right)$

Table J–4–2 (1) Check Demand/Capacity by Intersection

(Unit: No. of car/hour)

Intersection		Future Demand (No. of Vehicle/h)			Capacity	Volume/Capacity
		Car	Bus	Total		
Calle 45 - Cra. 38	C	1,534	195	1,729	1,553	1.11
Ⓒ Ⓓ	D	797	609	1,406	2,376	0.59
Calle 45 - Cra. 41	B	1,091	479	1,579	1,697	0.93
Ⓑ Ⓒ	C	1,224	264	1,448	1,496	0.96
Calle 45 - Cra 45	B	763	264	1,027	1,341	0.76
Ⓑ Ⓒ	C	1,470	716	2,186	1,925	1.13
Calle 45 - Cra. 46	B	1,579	540	2,119	2,002	1.05
Ⓑ Ⓒ	C	1,146	440	1,586	1,525	1.04
Calle 38 - Cra 38	C	364	507	871	1,836	0.47
Ⓒ Ⓓ	D	717	747	1,464	1,699	0.86
Calle 38 - Cra 40	A	148	670	818	1,093	0.75
Ⓐ Ⓑ	B	717	584	1,301	1,451	0.89
Calle 38 - Cra. 45	A	877	615	1,492	1,853	0.79
Ⓐ Ⓑ	B	936	755	1,691	1,700	0.94
Calle 38 - Cra. 46	A	878	907	1,785	1,822	0.98
Ⓐ Ⓑ	B	1,146	463	1,609	1,516	1.06
Calle 37 - Cra. 38	A	626	538	1,164	1,325	0.87
Ⓑ Ⓐ	B	742	747	1,489	1,672	0.89

Note: No. of Car = 1.78 x (Present No. of Car)

Table J–4–2 (2) Check Demand/Capacity by Intersection (cont'd)

(Unit: No. of car/hour)

Intersection		Future Demand (No. of Vehicle/h)			Capacity	Volume/Capacity
		Car	Bus	Total		
Calle 37 - Cra. 40	A	717	615	1,332	1,467	0.90
Ⓑ Ⓐ	B	148	639	787	1,050	0.75
Calle 37 - Cra. 45	A	936	1,078	2,014	1,800	1.11
Ⓑ Ⓐ	B	837	292	1,129	1,289	0.87
Calle 37 - Cra. 46	A	1,555	1,230	2,785	2,400	1.16
Ⓐ Ⓑ	B	878	140	1,018	1,269	0.80
Calle 44 - Cra. 38	A	797	670	1,467	2,142	0.68
Ⓑ Ⓐ	B	164	134	298	1,126	0.26
Calle 44 - Cra. 41	A	1,091	479	1,570	1,697	0.92
Ⓐ Ⓑ	B	164	264	428	1,126	0.38
Calle 44 - Cra. 45	A	936	907	1,843	1,853	0.99
Ⓐ	B	164	73	237	1,126	0.21
Calle 44 - Cra. 46	A	878	731	1,609	1,822	0.88
Ⓐ Ⓑ	B	164	249	413	1.126	0.37
Calle 30 - Cra. 45	A	91	1,164	1,255	2,562	0.49
Ⓑ Ⓐ	B	936	354	1,290	1,703	0.76
Calle 30 - Cra. 46	A	1,555	1,078	2,633	2,579	1.02
Ⓐ Ⓒ Ⓑ	B	936	86	1,022	1,703	0.60
	C	167	86	253	1,797	0.14

Note: No. of Car = 1.78 x (Present No. of Car)

Table J–4–2 (3) Check Demand/Capacity by Intersection (cont'd)

(Unit: No. of car/hour)

Intersection		Fugure Demand (No. of Vehicle/h)			Capacity	Volume/Capacity
		Car	Bus	Total		
Calle 9 - Cra. 45	A	260	354	614	1,623	0.38
	B	936	810	1,746	1,790	0.98
Calle 9 - Cra. 46	A	878	810	1,688	1,822	0.93
Calle 30 - Cra. 38	A	199	496	695	1,797	0.39
	B	507	504	1,011	2.142	0.47
	C	91	616	707	1,703	0.42
Calle 30 - Cra. 40	A	148	716	864	1,093	0.79
	B	167	234	401	1,797	0.22
	C	91	354	445	1,703	0.26
Calle 17 - Cra. 38	A	596	566	1,162	1,797	0.65
	B	724	810	1,534	2,142	0.72
	C	68	521	589	1,703	0.35
Calle 17 - Cra. 40	A	148	688	836	1,093	0.76
	B	596	521	1,117	1,797	0.62
Calle 17 - Cra. 41B	A	596	1,164	1,760	1,797	0.97

Note: No. of Car = 1.78 x (Present No. of Car)

Table J–4–3 Analysis on Limitation of Transportation Capacity of the Streets in the Central District

	No. of Vehicle Staying in Center (1) Bus	(2) Car	(3) Total	Actual Road Space: All Road Space (A)	All Excl. Parking Lots (B)	Circular Road (C)	One Lane of Circular Road (D)	All Excl. Circular Road (E)	All Excl. Circular Lane (F)	Average Safe Stopping Sight Distance: Case A (3):(A)	Case B (3):(B)	Case C (1):(C)	Case D (1):(D)	Case E (2):(E)	Case F (2):(F)
1983 (Unlinked)	(957,274) *1		Units of veh.						Lane km	m	m	m	m	m	m
	564	2,794	3,358	72.5	53.5	32.6	10.1	39.9	62.4	15.76	10.1	47.89	7.92	9.28	17.34
1983 (Unlinked)	(569,885)	(116,963)													
	331	2,794	3,125	"	"	"	"	"	"	17.6	11.59	88.76	20.58	"	"
1990 (Unlinked)	(569,885)	(154,641)													
	335	3,715	4,050	"	"	"	"	"	"	12.49	7.80	87.57	20.21	5.74	11.80
1990 (Unlinked)	*2														
	419	"	4,134	"	"	"	"	"	"	12,03	7.44	67.97	14.14	"	"
1990 (Unlinked)	$727\left(1-\frac{3.15\times 2.5}{26}\right)$ *3														
	507	"	4,222	"	"	"	"	"	"	11.57	7.07	95.71	9.94	"	"
2000 (Unlinked)	(595,430)	(208,469)													
	350	4,979	5,329	"	"	"	"	"	"	8.28	4.71	83.38	18.91	3.01	7.53
2000 (Unlinked)	*2														
	438	"	5,417	"	"	"	"	"	"	7.98	4.47	64.58	13,09	"	"
2000 (Unlinked)	$7,258\left(1-\frac{3.15\times 2.5}{26}\right)$ *3														
	528	"	5,507	"	"	"	"	"	"	7.69	4.23	51.84	9.14	"	"
2000 Introduction of rail	$\left(\frac{595,430-185,220}{}=410,210\right)$ *4														
	242	"	5,221	"	"	"	"	"	"	8.66	5.02	130.25	36.89	"	"

*1 No. of Vehicle (A x 0.15 x 1/41/(42.5 x 1.5) Wherein A = No. of PSGR Attracted/Generated in Zone 1 ~ 8
*2 (A x 1.25 x 0.15 x 1/4)/(42.5 x 1.5)
*3 (A x 1.25 x 0.15 x 1/3)/(42.5 x 1.5) In this case the turn overtime in Gran Parada is considered 2.5 min/Parada, at the some time the average times to go in to the Parada is considered as 3.15 times/bus.
*4 No. of Vehicle In this case 85,220 PSGR are cossidered to conect from bus in the bus transit.

Appendix J–5 BUS INSPECTION CENTER

In this section, the procedure and the result of selecting necessary items on the bus inspection are discussed (See Table J–5–1).

Table J–5–1 Classification of the Necessity of Inspection

Characteristics of Problems	Frequency of Occurring Problems	
	Large	Small
Urgent	A	B
Intermediate	C	D
Non-urgent	E	F

This table includes two types of analysis such as an analysis on the frequency of the periodic inspection by bus company and the other analysis on the official inspection items.

1) Criteria on Selecting the Periodic Inspection items

Criteria on selecting items on the periodic inspeciton items are as follows:

(1) Necessity of inspection clarified by two sub-criteria

– Characteristics of the problems

– Frequency of occurring the problems

(2) Difficulty of the inspection and maintenance clarified by the following two sub-criterias

– Technical level of the maintenance

– Technical level of the inspection

The characteristics of the problems are classified into three groups: Urgent, On-urgent and Intermediate. In this case, the urgent problems means that the breakdowns of the bus related safety of the driving such as the problems of brakes, lights, fuel system, and so on.

In this case, large frequency of occurring the problems menas that the breakdowns of some function of the bus occur, at least, once or twice a month. According to the combination of the criteria mentioned above, the necessity of the inspection are also classified into three groups: A, B and C (See Table J–5–2).

Table J–5–2 Classification of the Difficulty of Maintenance and Inspection

Technical Level of Maintenance	Technical Level of Inspection	
	Easy	Difficult
Easy	A	C
Difficult	B	D

The technical level of the maintenance and inspection are classified into two groups respectively: Difficult and easy. In this case, the meaning of the difficulty is that the activity of the maintenance and inspection are necessary to use trained personnels and spcial equipment and tools.

The difficulty of the maintenance and inspection are also classified into four groups: A, B, C and D (See Table J–5–3).

Table J–5–3 Classification of Frequency of Bus Inspection

Difficulty of Maintenance / Inspection	Necessity of Inspection					
	A	B	C	D	E	F
A	I	II	III	II	III	III
B	I	II	II	III	III	III
C	I	II	II	III	III	III
D	II	II	III	III	III	III

The criteria of the consideration of the bus inspection frequency are based on the combination of the necessity and difficulty of the maintenance and inspection (See Table J–5–4).

2) Criteria on the Selecting Official Inspection Items

The items checked by official inspection are limited than that of the periodic inspection items by bus company. Because number of the bus checked officially is large as the number of bus existing and forecasted in future.

Major items checked officially are two categories such as safety and comfort of buses. The safety of buses includes the function of the brake, steering, lights, fuel system and so on. The comfort of the bus includes the condition of the passenger's space and appearance of the buses.

The items for official inspection are selected amount the periodic bus inspection items by bus company. If there are some items in the list of items checked by bus company, these are classified into the maintenance which do not included in the official inspection.

The rest of the items in the list of items checked by bus company are classified into two categories such as "safety" and "comfort" group.

The official inspection items mentioned above, are categorized into four categories in terms of the inspection measures such as observation, mannual, automatic inspection line, and test driving.

Those classification are also indicated in the same Table J–5–4.

Table J–5–4 Inspection Frequency of Urban Buses and Necessity of Official Inspection

Items of Inspection	Level of Difficulty of Inspection and Maintenance	Inspection Need	Inspection Frequency	Inspection Need According To:			Official Inspection
				Safety	Comfort	Maintenance	
1. Engine							
1.1 Lubrication							
a. Check oil level	A	A	I			Yes	
b. Observe oil condition	A	A	I			Yes	
c. Observe engine sound and vibrations	B	B	II			Yes	
d. Observe any oil dripping	A	B	I	Yes			• √
e. Check conditions of functions and oil hose	B	A	II	Yes			• √
f. Check condition of oil filter and its fastening	B	A	II	Yes			• o
g. Observe function and condition of engine cylinder	B	D	III			Yes	
h. Check the exhaust gas with engine working	D	B	III			Yes	
i. Observe physical condition of engine	D	B	III	Yes			• √
j. Check ignition of engine	B	A	II	Yes			• o
k. Check condition of acceleration and power	B	B	II	Yes			• Δ
II. TRANSMISSION - GEAR BOX							
a. Check oil volume	D	B	III			Yes	
b. Check oil dripping from transmission	B	B	II	Yes			• √
c. Check dripping and fastening of the transmission	D	B	III			Yes	
d. Check function of gearshift	D	B	III	Yes			• Δ
2.1 Driving Axle							
a. Check tolerance of function and fastening	B	C	II			Yes	
b. Check turn vibration	B	D	II	Yes			• Δ
c. Check condition of function	B	D	II			Yes	
d. Check condition of bearings	B	D	II	Yes			• o
e. Check repture of Yoki	B	B	II	Yes			• Δ
2.2 Gear Box							
a. Check external condition, dripping, and fastening	B	B	II	Yes			• √
III. Clutch							
a. Check the liquid level	B	B	II			Yes	
b. Check cluth functions	B	B	II	Yes			• Δ
c. Check travel distance of the clutch and adjustment	B	B	II	Yes			• o

√ By Observation
o By Manual Check
• By Automatic Inspection Line
Δ By Test Driving

Table J–5–4 (cont'd)

Items of Inspection	Level of Difficulty of Inspection and Maintenance	Inspection Need	Inspection Frequency	Inspection Need According To.			Official Inspection
				Safety	Comfort	Maintenance	
III. (cont'd)							
d. Check function of booster	D	D	III			Yes	
e. Check function and smooth motion in movement	D	B	III			Yes	
IV. Shock Absorber - Suspension							
a. Check condition of springs	A	B	I	Yes			• △
b. Check shock absorber condition	A	B	I	Yes			• △
c. Check condition of laminated spring	A	B	I	Yes			• √
d. Check rupture in clamp of laminated spring	A	B	I	Yes			• √
e. Check fastening of bolt from laminated spring	A	B	I			Yes	
f. Check damage in the clip and its fastening	B	B	II	Yes			• √
g. Check loosing of laminated spring	B	B	II	Yes			• √
h. Check rupture and abrasion of suspension screw	D	B	III			Yes	
i. Check fastening of suspension support	D	B	III	Yes			• o
4.1 Differencial							
a. Check for dripping in the differential	B	B	II	Yes			• √
b. Check the oil level	D	B	III			Yes	
c. Check the sound of the differential	D	B	III	Yes			• △
4.2 Rear Axle							
a. Check bearings	D	D	III			Yes	
b. Check repture by torsion	B	D	II	Yes			• √
V. Steering							
a. Check travel of steering wheel	A	B	I	Yes			• △
b. Check travel of the steering box	A	B	I			Yes	
c. Check how hard is the steering and vibrations	A	B	I	Yes			• △
d. Check condition of hydraulic steering	A	B	I			Yes	
e. Check terminal of steering	A	B	I			Yes	
f. Check travel of the steering wheel conditinn and effectivity	B	B	II			Yes	
g. Check travel of the steering wheel and condition of use in movement	D	B	III	Yes			• △

Table J–5–4 (cont'd)

Items of Inspection	Level of Difficulty of Inspection and Maintenance	Inspection Need	Inspection Frequency	Inspection Need According To:			Official Inspection
				Safety	Comfort	Maintenance	
VI (cont'd)							
u. Check how reduce are the brakes band and shoes	C	D	III			Yes	
v. Check fastening condition of the hand brake drum	C	D	III			Yes	
w. Dismantle the brakes, check, clean and assemble	D	D	III			Yes	
x. Check brakes disk condition	D	B	III			Yes	
y. Check security brake condition	D	D	III			Yes	
VII Refrigeration							
a. Check the radiator water level	A	A	I			Yes	
b. Check condition of fan belt	A	A	I			Yes	
c. To check all the engine belt	A	A	II	Yes			• √
d. Check the radiator condition (dripping)	B	B	II			Yes	
e. Check fan condition	B	B	II	Yes			• √
f. Check fastening condition of the radiator cap	B	A	II	Yes			• √
g. Check damage in the pipes, hoses and junction of the cooling water	B	A	II	Yes			• √
h. Check internal condition of the radiator	B	B	II			Yes	• o
i. Check the water pump funcion	D	B	III			Yes	
j. Check damage of the baldes of the fan	D	B	III	Yes			•
VIII Fuel System							
a. Check the fuel level	A	A	I			Yes	
b. Check if there is any dripping in the fuel system (pipes)	A	A	I	Yes			• √
c. Check pipes condition of the fuel tank	B	A	II	Yes			• √
d. Check fastening of the fuel filter	B	A	II	Yes			• o
e. Check fastening of the fuel pump	B	A	II	Yes			• o
f. Check how clean is the fuel filter	F	A	III			Yes	
g. Check the fuel pressure inside	D	D	III			Yes	
h. Observe condition of the fuel mixture of air-fuel inside the engine	D	D	III			Yes	
i. Check engine times way out of the fuel and fuel volume from pump	D	D	III			Yes	
j. Check air filter condition	D	A	II			Yes	
k. Check water in the fuel tank	B	B	II			Yes	

Table J–5–4 (cont'd)

Items of Inspection	Level of Difficulty of Inspection and Maintenance	Inspection Need	Inspection Frequency	Inspection Need According To:			Official Inspection
				Safety	Comfort	Maintenance	
4.2 (Cont'd)							
h. Check condition of the steering arm, terminal and clips	B	D	II			Yes	
i. Check fastening condition of the function of steering arm	D	B	III			Yes	
j. Observe damage in steering sector	D	B	III			Yes	
k. Check alignment of steering	D	D	III	Yes			• △
VI. Brakes							
a. Check travel of the pedal and breaking distance	B	B	II	Yes			• √
b. Check any loose in pipes of air and liquid	A	A	I	Yes			• √
c. Check level of the braking liquid and dripping	B	A	II			Yes	
d. Test total braking and effectivity of brakes in each side wheel	D	B	II	Yes			• o
e. Check water level in the compressor lank	D	A	II			Yes	
f. Check function of the pressure manometer	A	B	I	Yes			• △
g. Check the sound of the brake pedal in its return	A	A	I	Yes			• △
h. Check the mechanism movement of the hand brake and effectivity	B	B	II			Yes	
i. Check effectivity and braking distance	A	B	I	Yes			• o
j. Check the piston travel inside the air chamber	A	B	I			Yes	
k. Check the brakes drums, band and shoe	A	B	I			Yes	
l. Check function and effectivity of the master cilinder	B	D	II			Yes	
m. Check the air sound when brake and its travel in the air chamber	B	B	II			Yes	
n. Check facility to brake	B	A	II	Yes			•
o. Check air filter and pressure difference	B	D	II			Yes	
p. Check any air scapes and junction condition	B	A	II			Yes	
q. Check space and alignment of brake drum	B	D	II			Yes	
r. Check function of the hand brake	B	B	II	Yes			• △
s. Check abration and cracks by the frinction in the hand brake wire	B	D	II			Yes	
t. Check condition of the connection with the hand brake	B	D	II			Yes	

Table J–5–4 (cont'd)

Items of Inspection	Level of Difficulty of Inspection and Maintenance	Inspection Need	Inspection Frequency	Inspection Need According To:			Official Inspection
				Safety	Comfort	Maintenance	
VIII (cont'd)							
1. Check air pressure regulator-discharge valve	D	D	III			Yes	
IX Exhaust System							
a. Observe the engine sound	D	B	III	Yes			• Δ
b. Observe the color of the exhaust gas	B	B	III	Yes			• o
c. Observe condition and function or the pipe and exhaust chamber	B	A	II	Yes			• o
d. Check head of manifold and its fastening condition	D	D	III	Yes			• o
X. Indicators - Documents Equipment and Others							
a. Check revised and stikes	D	A	II			Yes	
b. Verify the documents of the vehicle (opeaation and of property)	D	A	II	Yes			• √
c. Check the lug on auto car	B	A	II	Yes			• √
d. Verify it there is a fire extinguisher and it is full	A	B	I	Yes			• √
e. Verify if there is triangle for hazard	B	A	II	Yes			• √
f. Verify if there are some tools	B	A	II	Yes			• √
g. Check the advertisement and information board	D	A	II			Yes	
h. Check wash and greasing	D	A	II			Yes	
XI. Body							
a. Check the external conditions	D	A	II	Yes	Yes		• √
b. Check the fasturing of the chairs and hand rail	D	A	II	Yes	Yes		• √
c. Check the function of the windows and glass conditions	A	A	I	Yes	Yes		• √
d. Check the function of doors	A	A	I	Yes	Yes		• √
e. Check the plate number condition	D	A	II			Yes	
f. Check how clean are the body parts and its dangerous parts	F	A	III	Yes			• √
g. Observe damage - cracks and rivet of body	D	A	II			Yes	
h. Check damage of the internal para of body	B	A	II	Yes	Yes		• √

Table J–5–4 (cont'd)

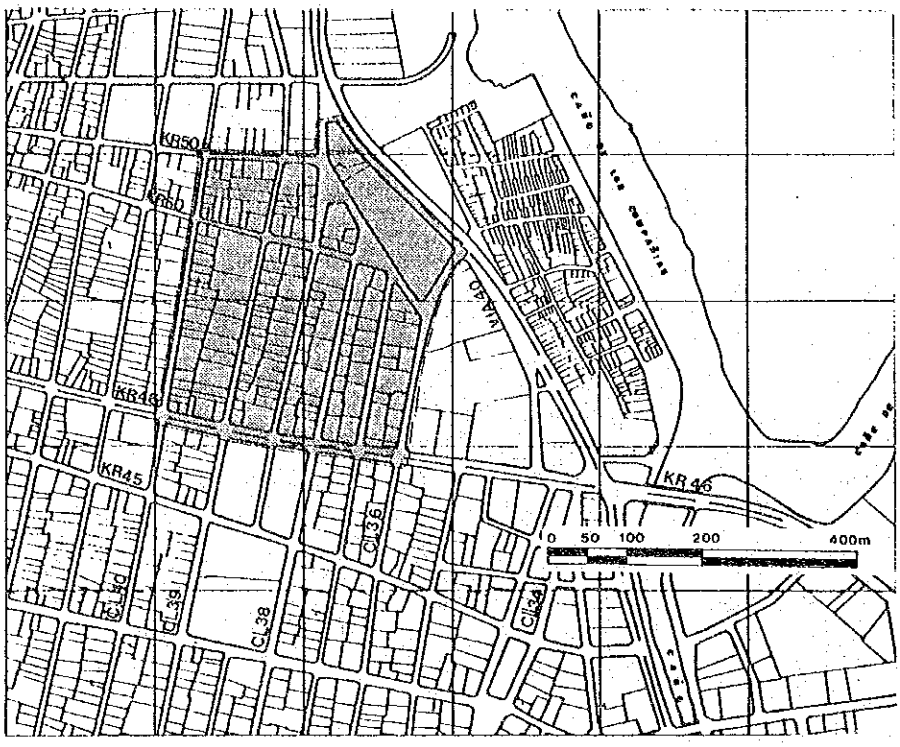
Items of Inspection	Level of Difficulty of Inspection and Maintenance	Inspection Need	Inspection Frequency	Inspection Need According To:			Official Inspection
				Safety	Comfort	Maintenance	
XI. (cont'd)							
i. Check function, fastening, cleaning and broken mirrors	B	A	II	Yes			• √
j. Check condition of the plates numbers and of the hook to tow	F	A	III			Yes	
k. Check fastening of the bumper	F	A	III	Yes			• √
l. Check how clean is inside the vehicle	A	A	I		Yes		• √
XII Electric System							
12.1 Batery							
a. Check the liquid level and of the cables and terminals	B	A	II			Yes	
b. Measure the specific weight of the liquid	D	C	III			Yes	
12.2 Generator - Starting Motor							
a. Verify the alternation function	B	B	II			Yes	
b. Check charge condition and fastening of the alternator	B	B	II			Yes	
c. Check the start function	B	A	II	Yes			• o
d. Verify the switch function and fastening	B	A	II	Yes			• o
e. Check the charging condition on the pannel	B	B	II	Yes			• o
f. Check the coil function	B	B	II				
12.3 Manometer							
a. Check function of the counter of the pannel	B	B	II	Yes			• o
b. Check oil pressure manometer	B	B	II			Yes	
c. Check temperature counter	B	B	II			Yes	
d. Check air pressure manometer	B	B	II			Yes	
e. Check on the pannel the fuel counter	B	B	II			Yes	
f. Check the speed tachometer	D	B	III	Yes			• o
12.4 Electric Circuit							
a. Check terminals and spark plug	B	B	II			Yes	
b. Check the cables conditions	B	A	II	Yes			• √
c. Check fastening of the spartk plug cable	B	A	II			Yes	
12.5 Switches							
a. Check fastening and function of all the switches	B	B	II			Yes	

Table J–5–4 (cont'd)

Items of Inspection	Level of Difficulty of Inspection and Maintenance	Inspection Need	Inspection Frequency	Inspection Need According To:			Official Inspection
				Safety	Comfort	Maintenance	
12.6 Others							
a. Check condition of the start during speed increase in movement pay attention to the engine sound	D	D	III			Yes	
b. Check engine condition in neutral and the exhaust gas color	D	D	III			Yes	
XIII Security							
a. Check the lights function	A	A	I	Yes			• o
b. Check the pannel lights and intervals	B	A	II	Yes			• o
c. Check the fastening of the directional lights and horn	B	A	II	Yes			• o
d. Check if the glass whippers function properly and it is well fasten	D	A	II	Yes			• o
e. Check condition and position of the mirrors	A	A	I	Yes			• √
f. Check the door mechanism	A	A	I	Yes			• o
g. Check the function of the position light	A	A	I	Yes			• o
h. Check the fastening of the lamp screw	A	A	I	Yes			• o
i. Check the external lights	B	A	II			Yes	
XIV Tires							
a. Check for any rupture on the rhines	B	A	II	Yes			• √
b. Verify the air pressure in the wheels, and and elements on the wheels, any rupture of wear on the rubber	A	A	I	Yes			• √
c. Verify fastening of the wheel bolts of the front wheels	A	A	I	Yes			• √
d. Verify the condition of the bearing of front wheels	B	D	II			Yes	
e. Check for the gas ket and oil seal	B	D	II			Yes	
f. Check how much are wear out the wheels	B	A	II	Yes			• √
g. Check for the aixel vibration	B	B	II			Yes	
h. Check for the tire bolt of the wheels	B	A	II	Yes			• √

Appendix K–1

Table K–1–1 Detailed Information on the Project Area 1



SPA1 : NO. OF LOTS= 155

*** LAND & BUILDING INFORMATION BY SUB-DIV. IN THE CENTRAL DISTRICT OF B/Q ***

ZONE NO.	LAND AREA	BUILD. AREA	FLOOR AREA	BUILD. AREA RATIO	FLOOR AREA RATIO	UNIT VALUE LAND	UNIT VALUE CONST.	UNIT VALUE RE.EST.	INVEST. INTENS. INDEX
	M2	M2	M2	%	%	$/M2	$/M2	$/M2	
SPA1	95223	53812	69296	57.5	74.0	1860	2920	4050	+0.68

▮ LAND USE INFORMATION ▮

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.
AREA(M2)	14235	17940	26771	1984	12825
RATIO(%)	14.9	18.8	28.1	2.1	13.5
LOT NO.	39	28	45	3	1
AV. AREA	365	641	595	661	12825

	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	0	488	12074	3309	5597	95223
RATIO(%)	0.0	0.5	12.7	3.5	5.9	100.0
LOT NO.	0	1	21	3	14	155
AV. AREA	0	488	575	1103	400	614

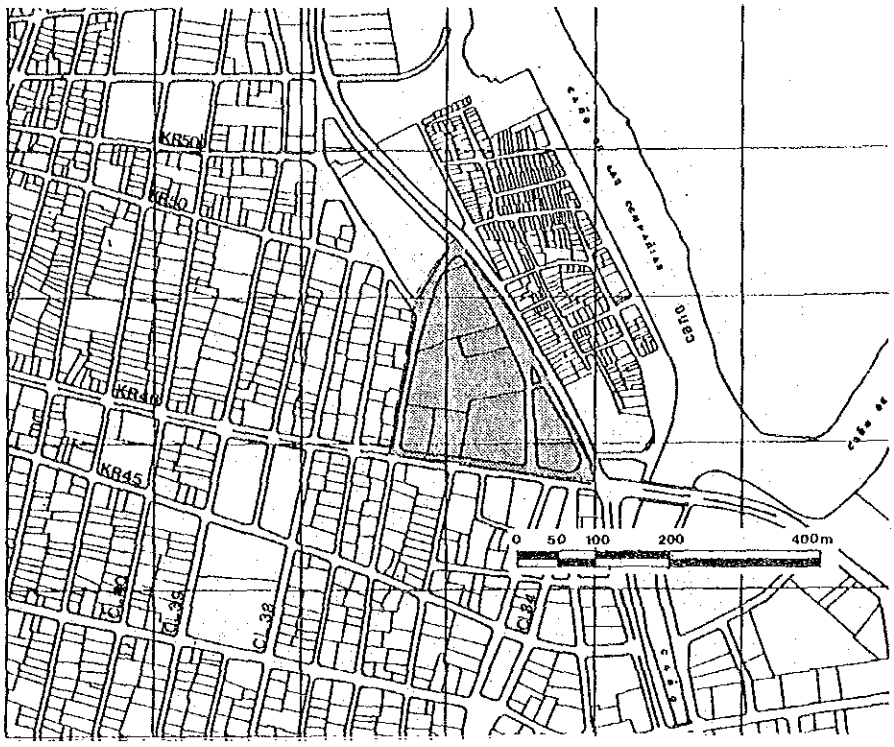
▮ BUILD. USE INFORMATION ▮

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.
AREA(M2)	6827	12660	17945	1705	3191
RATIO(%)	12.7	23.5	33.3	3.2	5.9
LOT NO.	39	28	45	3	1
AV. AREA	175	452	399	568	3191

	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	0	0	8097	0	3387	53812
RATIO(%)	0.0	0.0	15.0	0.0	6.3	100.0
LOT NO.	0	1	21	3	14	155
AV. AREA	0	0	386	0	242	347

AV. LAND AREA= 614(M2) AV. BUILD. AREA= 347(M2) AV. FLOOR AREA= 447(M2)

Table K–1–2 Detailed Information on the Project Area 2



SPA2 : NO. OF LOTS= 9

*** LAND & BUILDING INFORMATION BY SUB-DIV. IN THE CENTRAL DISTRICT OF B/Q ***

ZONE NO.	LAND AREA	BUILD. AREA	FLOOR AREA	BUILD. AREA RATIO	FLOOR AREA RATIO	UNIT VALUE LAND	UNIT VALUE CONST.	UNIT VALUE RE.EST.	INVEST. INTENS. INDEX
	M2	M2	M2	%	%	$/M2	$/M2	$/M2	
SPA2	35084	8870	9286	25.3	26.5	2030	2090	2610	+0.16

LAND USE INFORMATION

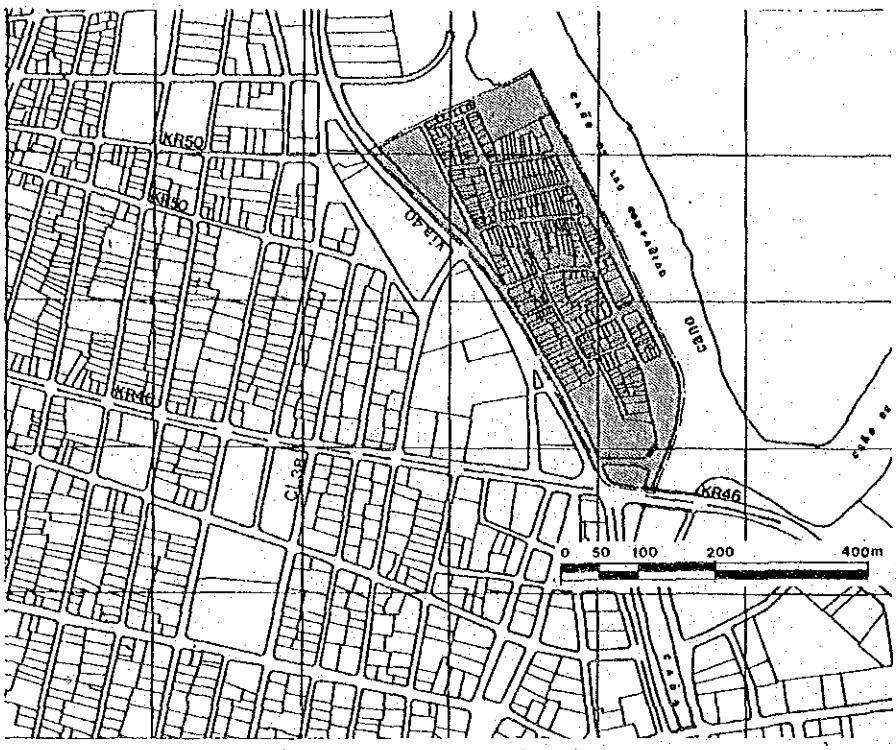
	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.	
AREA(M2)	0	1785	21697	0	2244	
RATIO(%)	0.0	5.1	61.8	0.0	6.4	
LOT NO.	0	1	4	0	1	
AV. AREA	0	1785	5424	0	2244	
	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	7140	0	2218	0	0	35084
RATIO(%)	20.4	0.0	6.3	0.0	0.0	100.0
LOT NO.	1	0	2	0	0	9
AV. AREA	7140	0	1109	0	0	3898

BUILD. USE INFORMATION

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.	
AREA(M2)	0	1000	7277	0	276	
RATIO(%)	0.0	11.3	82.0	0.0	3.1	
LOT NO.	0	1	4	0	1	
AV. AREA	0	1000	1819	0	276	
	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	224	0	93	0	0	8870
RATIO(%)	2.5	0.0	1.0	0.0	0.0	100.0
LOT NO.	1	0	2	0	0	9
AV. AREA	224	0	47	0	0	986

AV. LAND AREA= 3898(M2) AV. BUILD. AREA= 986(M2) AV. FLOOR AREA=1032(M2)

Table K–1–3 Detailed Information on the Project Area 3



SPA3 : NO. OF LOTS= 334

*** LAND & BUILDING INFORMATION BY SUB-DIV. IN THE CENTRAL DISTRICT OF B/Q ***

ZONE NO.	LAND AREA	BUILD. AREA	FLOOR AREA	BUILD. AREA RATIO	FLOOR AREA RATIO	UNIT VALUE LAND	UNIT VALUE CONST.	UNIT VALUE RE.EST.	INVEST. INTENS. INDEX
	M2	M2	M2	%	%	$/M2	$/M2	$/M2	
SPA3	61989	22092	23447	35.7	37.9	630	1590	1240	+0.57

LAND USE INFORMATION

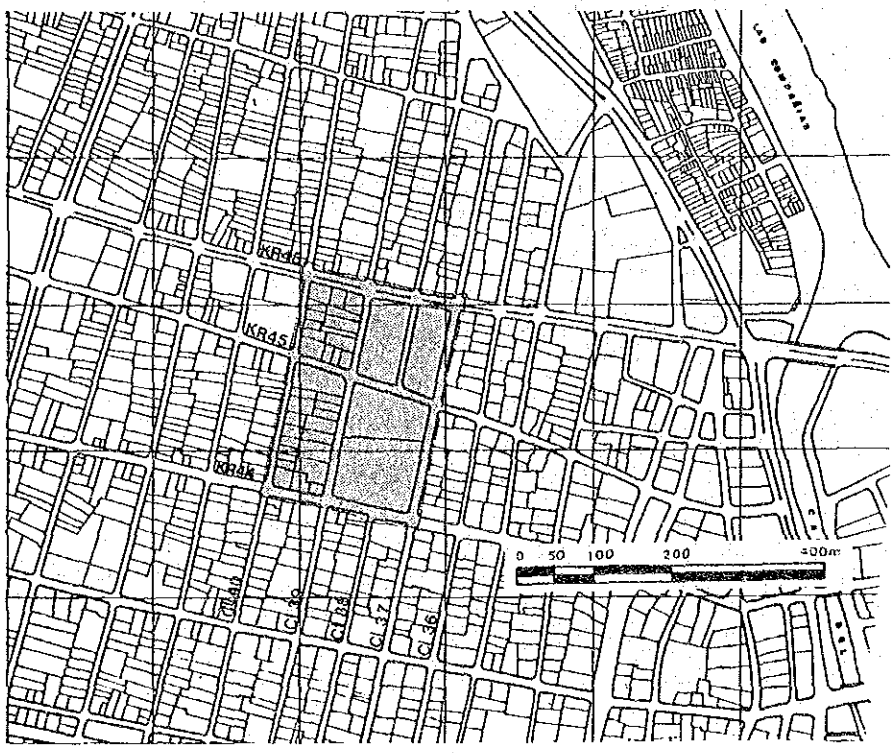
	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.	
AREA(M2)	34400	3089	2232	7940	1351	
RATIO(%)	55.5	5.0	3.6	12.8	2.2	
LOT NO.	270	16	7	2	1	
AV. AREA	127	193	319	3970	1351	
	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	0	0	4852	7958	167	61989
RATIO(%)	0.0	0.0	7.8	12.8	0.3	100.0
LOT NO.	0	0	29	7	2	334
AV. AREA	0	0	167	1137	84	186

BUILD. USE INFORMATION

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.	
AREA(M2)	14418	1738	518	2305	761	
RATIO(%)	65.3	7.9	2.3	10.4	3.4	
LOT NO.	270	16	7	2	1	
AV. AREA	53	109	74	1153	761	
	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	0	0	2241	0	111	22092
RATIO(%)	0.0	0.0	10.1	0.0	0.5	100.0
LOT NO.	0	0	29	7	2	334
AV. AREA	0	0	77	0	56	66

AV. LAND AREA= 186(M2) AV. BUILD. AREA= 66(M2) AV. FLOOR AREA= 70(M2)

Table K–1–4 Detailed Information on the Project Area 4



SPA4 : NO. OF LOTS= 38

*** LAND & BUILDING INFORMATION BY SUB-DIV. IN THE CENTRAL DISTRICT OF B/Q ***

ZONE NO.	LAND AREA	BUILD. AREA	FLOOR AREA	BUILD. AREA RATIO	FLOOR AREA RATIO	UNIT VALUE LAND	UNIT VALUE CONST.	UNIT VALUE RE.EST.	INVEST. INTENS. INDEX
	M2	M2	M2	%	%	$/M2	$/M2	$/M2	
SPA4	44623	18384	61863	41.8	140.6	3200	8620	16410	+2.21

■ LAND USE INFORMATION

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.
AREA(M2)	2733	8087	646	488	26335
RATIO(%)	6.1	18.1	1.4	1.1	59.0
LOT NO.	7	15	2	1	5
AV. AREA	390	539	323	488	5267

	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	1921	637	750	3026	0	44623
RATIO(%)	4.3	1.4	1.7	6.8	0.0	100.0
LOT NO.	3	1	1	3	0	38
AV. AREA	640	637	750	1009	0	1174

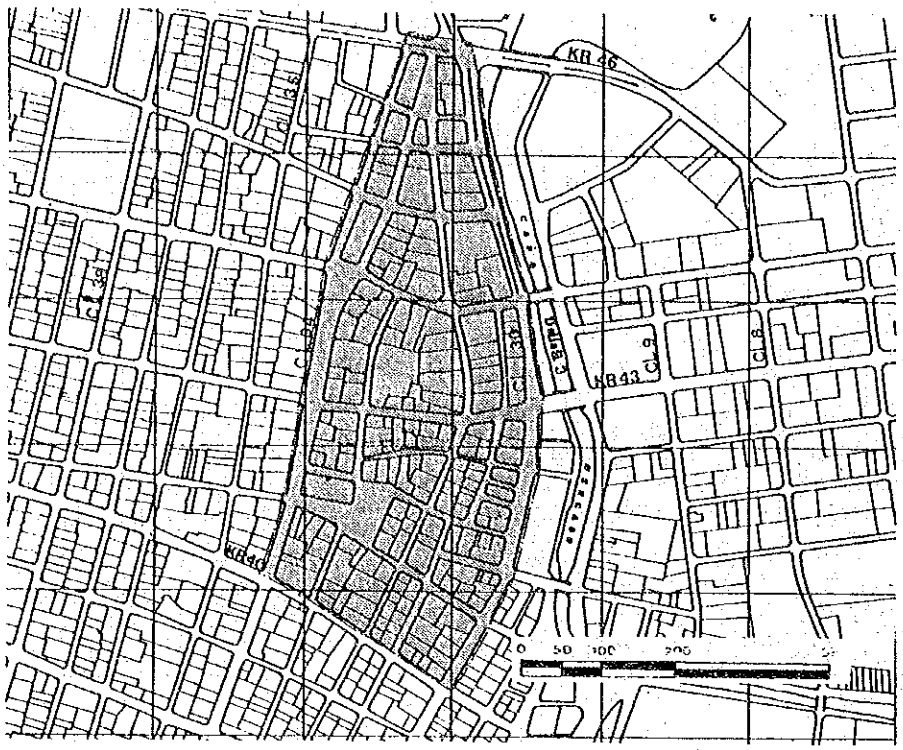
■ BUILD. USE INFORMATION

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.
AREA(M2)	1773	5418	428	430	10305
RATIO(%)	9.6	29.5	2.3	2.3	56.1
LOT NO.	7	15	2	1	5
AV. AREA	253	361	214	430	2061

	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	0	0	30	0	0	18384
RATIO(%)	0.0	0.0	0.2	0.0	0.0	100.0
LOT NO.	3	1	1	3	0	38
AV. AREA	0	0	30	0	0	484

AV. LAND AREA= 1174(M2) AV. BUILD. AREA= 484(M2) AV. FLOOR AREA=1628(M2)

Table K-1-5 Detailed Information on the Project Area 5



SPA5 : NO. OF LOTS= 180

*** LAND & BUILDING INFORMATION BY SUB-DIV. IN THE CENTRAL DISTRICT OF B/Q ***

ZONE NO.	LAND AREA	BUILD. AREA	FLOOR AREA	BUILD. AREA RATIO	FLOOR AREA RATIO	UNIT VALUE LAND	UNIT VALUE CONST.	UNIT VALUE RE.EST.	INVEST. INTENS. INDEX
	M2	M2	M2	%	%	$/M2	$/M2	$/M2	
SPA5	120987	101410	189650	86.7	162.2	3860	3550	9800	+0.85

■ LAND USE INFORMATION ■

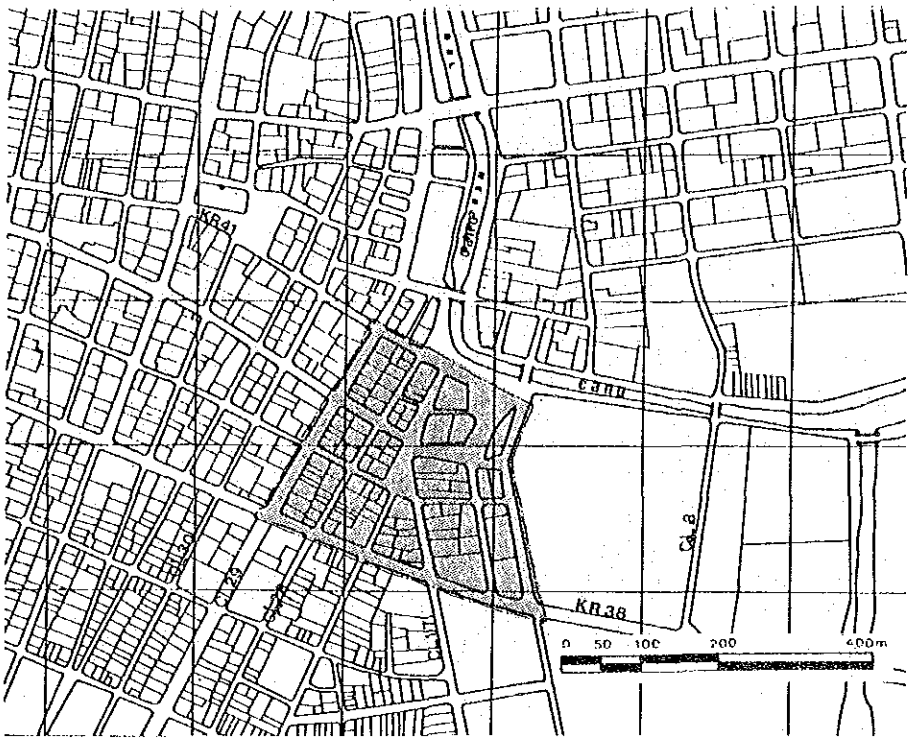
	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.	
AREA(M2)	0	99064	2213	1506	4885	
RATIO(%)	0.0	81.9	1.8	1.2	4.0	
LOT NO.	0	157	2	1	2	
AV. AREA	0	631	1107	1506	2443	
	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	4707	416	4222	0	3974	120987
RATIO(%)	3.9	0.3	3.5	0.0	3.3	100.0
LOT NO.	7	1	5	0	5	180
AV. AREA	672	416	844	0	795	672

■ BUILD. USE INFORMATION ■

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.	
AREA(M2)	0	87449	1423	1506	3706	
RATIO(%)	0.0	86.2	1.4	1.5	3.7	
LOT NO.	0	157	2	1	2	
AV. AREA	0	557	712	1506	1853	
	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	688	0	3752	0	2886	101410
RATIO(%)	0.7	0.0	3.7	0.0	2.8	100.0
LOT NO.	7	1	5	0	5	180
AV. AREA	98	0	750	0	577	563

AV. LAND AREA= 672(M2) AV. BUILD. AREA= 563(M2) AV. FLOOR AREA=1054(M2)

Table K–1–6 Detailed Information on the Project Area 6



SPA6 : NO. OF LOTS= 96

*** LAND & BUILDING INFORMATION BY SUB-DIV. IN THE CENTRAL DISTRICT OF B/O ***

ZONE NO.	LAND AREA	BUILD. AREA	FLOOR AREA	BUILD. AREA RATIO	FLOOR AREA RATIO	UNIT VALUE LAND	UNIT VALUE CONST.	UNIT VALUE RE.EST.	INVEST. INTENS. INDEX
	M2	M2	M2	%	%	$/M2	$/M2	$/M2	
SPA6	43813	30146	39290	68.8	89.7	1620	2660	4040	+0.87

LAND USE INFORMATION

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.
AREA(M2)	602	27735	7731	0	684
RATIO(%)	1.4	63.3	17.6	0.0	1.6
LOT NO.	2	70	11	0	2
AV. AREA	301	396	703	0	342

	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	3004	0	3408	138	511	43813
RATIO(%)	6.9	0.0	7.8	0.3	1.2	100.0
LOT NO.	2	0	6	1	2	96
AV. AREA	1502	0	568	138	256	456

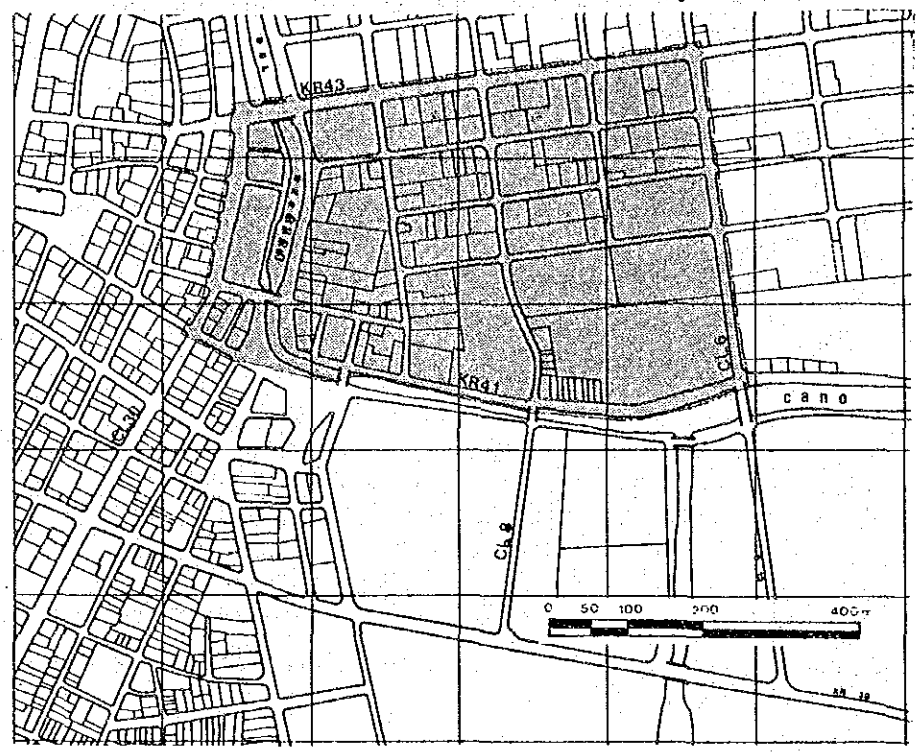
BUILD. USE INFORMATION

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.
AREA(M2)	222	22648	4265	0	521
RATIO(%)	0.7	75.1	14.1	0.0	1.7
LOT NO.	2	70	11	0	2
AV. AREA	111	324	388	0	261

	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	210	0	1956	0	324	30146
RATIO(%)	0.7	0.0	6.5	0.0	1.1	100.0
LOT NO.	2	0	6	1	2	96
AV. AREA	105	0	326	0	162	314

AV. LAND AREA= 456(M2) AV. BUILD. AREA= 314(M2) AV. FLOOR AREA= 409(M2)

Table K–1–7 Detailed Information on the Project Area 7



SPA7 : NO. OF LOTS= 106

*** LAND & BUILDING INFORMATION BY SUB-DIV. IN THE CENTRAL DISTRICT OF B/O ***

ZONE NO.	LAND AREA	BUILD. AREA	FLOOR AREA	BUILD. AREA RATIO	FLOOR AREA RATIO	UNIT VALUE LAND	UNIT VALUE CONST.	UNIT VALUE RE.EST.	INVEST. INTENS. INDEX
	M2	M2	M2	%	%	$/M2	$/M2	$/M2	
SPA7	194251	70249	75005	36.3	38.7	950	2190	1790	+0.53

LAND USE INFORMATION

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.
AREA(M2)	768	55972	43719	0	0
RATIO(%)	0.4	28.8	22.5	0.0	0.0
LOT NO.	1	56	23	0	0
AV. AREA	768	1000	1901	0	0

	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	3622	0	6505	77600	6065	194251
RATIO(%)	1.9	0.0	3.3	39.9	3.1	100.0
LOT NO.	2	0	5	13	6	106
AV. AREA	1811	0	1301	5969	1011	1833

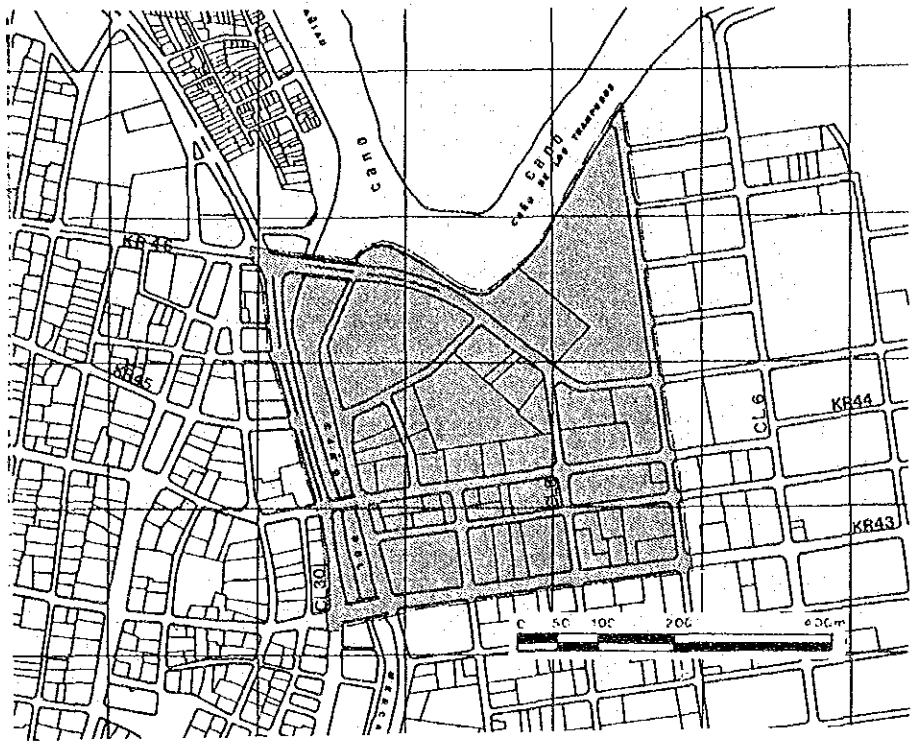
BUILD. USE INFORMATION

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.
AREA(M2)	60	37935	22791	0	0
RATIO(%)	0.1	54.0	32.4	0.0	0.0
LOT NO.	1	56	23	0	0
AV. AREA	60	677	991	0	0

	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	992	0	4451	0	4020	70249
RATIO(%)	1.4	0.0	6.3	0.0	5.7	100.0
LOT NO.	2	0	5	13	6	106
AV. AREA	496	0	890	0	670	663

AV. LAND AREA= 1833(M2) AV. BUILD. AREA= 663(M2) AV. FLOOR AREA= 708(M2)

Table K–1–8 Detailed Information on the Project Area 8



SPA8 : NO. OF LOTS= 66

*** LAND & BUILDING INFORMATION BY SUB-DIV. IN THE CENTRAL DISTRICT OF B/O ***

ZONE NO.	LAND AREA	BUILD. AREA	FLOOR AREA	BUILD. AREA RATIO	FLOOR AREA RATIO	UNIT VALUE LAND	UNIT VALUE CONST.	UNIT VALUE RE.EST.	INVEST. INTENS. INDEX
	M2	M2	M2	%	%	$/M2	$/M2	$/M2	
SPA8	214597	86551	91651	40.4	42.8	870	2480	1910	+0.72

■ LAND USE INFORMATION

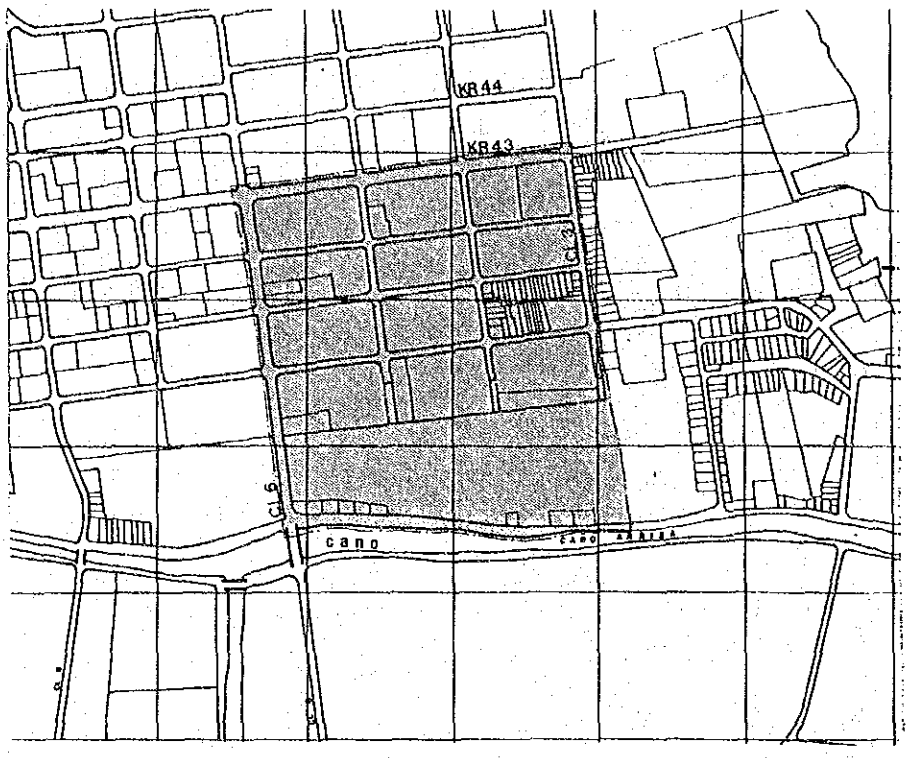
	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.	
AREA(M2)	950	64409	87113	0	0	
RATIO(%)	0.4	30.0	40.6	0.0	0.0	
LOT NO.	1	30	19	0	0	
AV. AREA	950	2147	4585	0	0	
	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	7985	0	9488	33005	11647	214597
RATIO(%)	3.7	0.0	4.4	15.4	5.4	100.0
LOT NO.	3	0	2	7	4	66
AV. AREA	2662	0	4744	4715	2912	3251

■ BUILD. USE INFORMATION

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.	
AREA(M2)	48	38716	38252	0	0	
RATIO(%)	0.1	44.7	44.2	0.0	0.0	
LOT NO.	1	30	19	0	0	
AV. AREA	48	1291	2013	0	0	
	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	1125	0	4153	0	4257	86551
RATIO(%)	1.3	0.0	4.8	0.0	4.9	100.0
LOT NO.	3	0	2	7	4	66
AV. AREA	375	0	2077	0	1064	1311

AV. LAND AREA= 3251(M2) AV. BUILD. AREA=1311(M2) AV. FLOOR AREA=1399(M2)

Table K–1–9 Detailed Information on the Project Area 9



SPA9 : NO. OF LOTS= 30

*** LAND & BUILDING INFORMATION BY SUB-DIV. IN THE CENTRAL DISTRICT OF B/D ***

ZONE NO.	LAND AREA	BUILD. AREA	FLOOR AREA	BUILD. AREA RATIO	FLOOR AREA RATIO	UNIT VALUE LAND	UNIT VALUE CONST.	UNIT VALUE RE.EST.	INVEST. INTENS. INDEX
	M2	M2	M2	%	%	$/M2	$/M2	$/M2	
SPA9	174912	8538	9513	4.9	5.4	470	1640	550	+0.11

▮ LAND USE INFORMATION ▮

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.
AREA(M2)	424	1830	14354	883	900
RATIO(%)	0.2	1.0	8.2	0.5	0.5
LOT NO.	2	2	3	1	1
AV. AREA	212	915	4785	883	900

	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	14950	0	0	94831	46740	174912
RATIO(%)	8.5	0.0	0.0	54.2	26.7	100.0
LOT NO.	2	0	0	14	5	30
AV. AREA	7475	0	0	6774	9348	5830

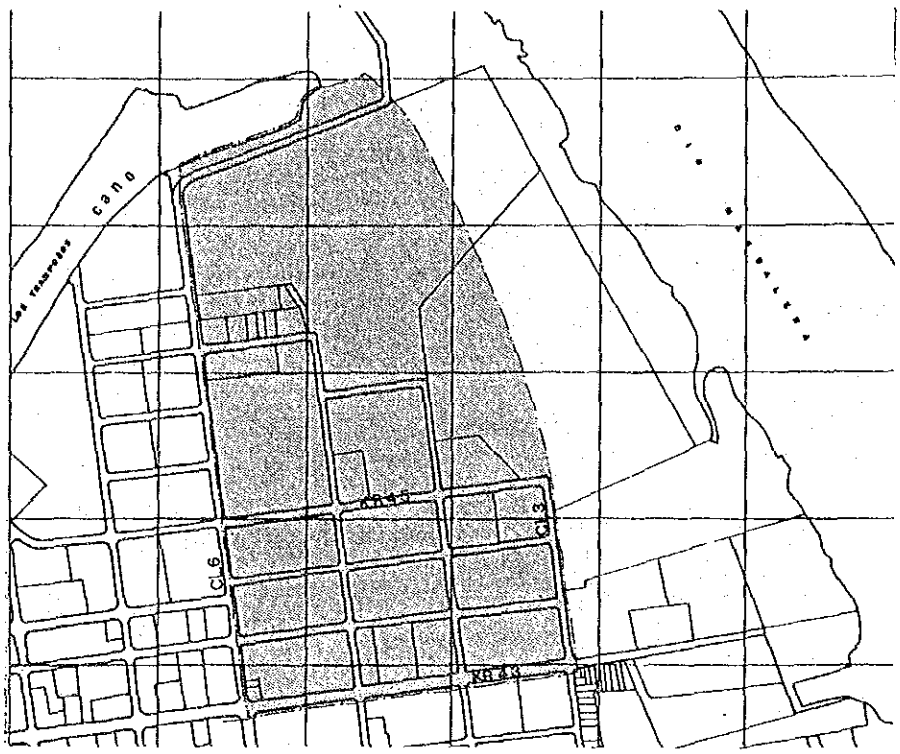
▮ BUILD. USE INFORMATION ▮

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.
AREA(M2)	133	232	5376	207	431
RATIO(%)	1.6	2.7	63.0	2.4	5.0
LOT NO.	2	2	3	1	1
AV. AREA	67	116	1792	207	431

	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	1254	0	0	0	905	8538
RATIO(%)	14.7	0.0	0.0	0.0	10.6	100.0
LOT NO.	2	0	0	14	5	30
AV. AREA	627	0	0	0	181	285

AV. LAND AREA= 5830(M2) AV. BUILD. AREA= 285(M2) AV. FLOOR AREA= 317(M2)

Table K–1–10 Detailed Information on the Project Area 10



SPA10 : NO. OF LOTS= 30

*** LAND & BUILDING INFORMATION BY SUB-DIV. IN THE CENTRAL DISTRICT OF B/Q ***

ZONE NO.	LAND AREA	BUILD. AREA	FLOOR AREA	BUILD. AREA RATIO	FLOOR AREA RATIO	UNIT VALUE LAND	UNIT VALUE CONST.	UNIT VALUE RE.EST.	INVEST. INTENS. INDEX
	M2	M2	M2	%	%	$/M2	$/M2	$/M2	
SPA10	259552	34195	34846	13.2	13.6	460	3280	920	+0.57

LAND USE INFORMATION

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.
AREA(M2)	1767	0	86737	0	0
RATIO(%)	0.7	0.0	33.4	0.0	0.0
LOT NO.	4	0	11	0	0
AV. AREA	442	0	7885	0	0

	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	13680	0	0	157368	0	259552
RATIO(%)	5.3	0.0	0.0	60.6	0.0	100.0
LOT NO.	4	0	0	11	0	30
AV. AREA	3420	0	0	14306	0	8652

BUILD. USE INFORMATION

	RESIDEN.	COMMER.	INDUST.	INSTIT.	PUB.AD.
AREA(M2)	338	0	32768	0	0
RATIO(%)	1.0	0.0	95.8	0.0	0.0
LOT NO.	4	0	11	0	0
AV. AREA	85	0	2979	0	0

	TRANSP.	PARK & RC	MIXED USE	VACANT	OTHERS	TOTAL
AREA(M2)	1089	0	0	0	0	34195
RATIO(%)	3.2	0.0	0.0	0.0	0.0	100.0
LOT NO.	4	0	0	11	0	30
AV. AREA	272	0	0	0	0	1140

AV. LAND AREA= 8652(M2) AV. BUILD. AREA=1140(M2) AV. FLOOR AREA=1162(M2)

Table L–1–1 Guard Fence Plan

	Street	Section From – to	Distance (km)
1.	Cra. 38	Calle 30 – Calle 45	1.40
		Calle 70 – Calle 76	1.00
2.	Calle 72	Cra. 35B – Cra. 41	0.50
		Cra. 49 – Cra. 44	0.50
3.	Cra. 43	Calle 34 – Calle 45	1.00
		Calle 50 – Calle 54	0.50
		Calle 72 (Intersection)	0.50
4.	Cra. 44	Calle 34 – Calle 35	1.00
5.	Cra. 45	Calle 34 – Calle 45	1.00
6.	Cra. 46	Via 40 – Calle 54	1.50
		Calle 75 – Calle 79	0.50
7.	Cra. 54	Calle 53 – Calle 62	1.00
		Calle 74 – Calle 79	0.50
8.	Cra. 14	Calle 30 – Calle 34	0.10
9.	Calle 47	Cra. 22 – Cra. 14	1.50
		Calle 45 (Intersection)	0.50
10.	Calle 30	Cra. 38 – Cra. 14	2.50
		Circunvalar – Cra. 30 (Soledad)	0.50
		Cra. 38 – Calle 49	1.50
11.	Calle 45	Cra. 46 – Cra. 38	1.50
12.	Calle 38	Cra. 46 – Cra. 38	0.90
13.	Calle 37	Cra. 46 – Cra. 38	0.90
14.	Calle 41	Cra. 46 – Cra. 38	0.90
15.	Calle 42	Cra. 46 – Cra. 38	0.90
16.	Calle 34	Cra. 46 – Cra. 38	0.90
17.	Calle 76	Cra. 47 – Cra. 45	0.50
		Cra. 50 – Cra. 56	0.50
18.	Cra. 40	Calle 34 – Calle 45	1.00
19.	Cra. 41	Calle 34 – Calle 45	1.00
20.	Via 40	Calle 72 (Intersection)	0.50
		Calle 76 (Intersection)	0.50
21.	Cra. 27	Calle 35 (Intersection)	0.50
22.	Circunvalar	In front of "Urbanización El Parque"	0.50
		Infront of "Ciudadela 20 de Julio"	0.50
		Infront of "Urbanización El Pueblo"	0.90
		In front of "Urbanización Las Flores"	0.50
		Cra. 38 (Intersection)	0.90
23.	Avenida 19	Circunvalar – Calle 17 (way to Santa Marta)	1.50
		Total	32.80

Table L–1–2 Road Marking Plan

	Street	Section From – to	Distance (km)
1.	Circunvalar	Calle 17 – Calle 6	21.90
2.	Via 40	Cra. 46 – Circunvalar	8.60
3.	Calle 17	Cra. 38 – Cra. 8	8.60
4.	Calle 30	Cra. 38 – Circunvalar	5.20
5.	Calle 45	Via 40 – Circunvalar	8.80
6.	Calle 72 – Cra. 14	Via 40 – Calle 30	9.80
7.	Calle 47	Cra. 46 – Circunvalar	8.70
8.	Cra. 38	Calle 17 – Circunvalar	8.00
9.	Cra. 43	Calle 84 – Calle 34	5.20
10.	Cra. 44	Calle 72 – Calle 34	3.40
11.	Cra. 46	Via 40 – Circunvalar	7.90
12.	Cra. 51B – Cra. 54	Via 40 – Circunvalar	7.40
13.	Cra. 45	Calle 72 – Calle 34	3.50
14.	Calle 41	Cra. 38 – Cra. 46	1.00
15.	Calle 42	Cra. 38 – Cra. 46	1.00
16.	Calle 76	Via 40 – Cra. 43	3.00
17.	Calle 84	Cra. 46 (Intersection)	0.50
18.	Cra. 27	Calle 35 (Intersection)	0.50
		Total	107.60

Table L–1–3 Reflector Plan

	Street	Section From – to	Distance (km)
1.	Calle 47	Cra. 46 – Circunvalar	8.70
2.	Cra. 38	Calle 17 – Circunvalar	8.70
3.	Cra. 43	Calle 84 – Calle 34	5.40
4.	Cra. 44	Calle 72 – Calle 34	3.50
5.	Cra. 51B – Cra. 54	Via 40 – Circunvalar	7.70
6.	Cra. 45	Calle 72 – Calle 34	3.60
7.	Calle 76	Via 40 – Cra. 43	3.00
		Total	40.60

Appendix M–1 Financial Statement of Transport Projects

Table M–1–1 Inter-Departmental Bus Terminal

(1) Profit/Loss Statement

No.	Year	Revenue	Operating	Net Income	Interest	Profit/Loss
1	1987	0	0	0	0	0
2	1988	0	0	0	-16	-16
3	1989	0	0	0	-69	-69
4	1990	246	78	169	-118	51
5	1991	304	96	209	-104	105
6	1992	377	117	260	-79	180
7	1993	466	143	323	-40	283
8	1994	576	175	401	23	425
9	1995	713	214	499	114	613
10	1996	882	262	620	205	825
11	1997	1312	333	979	299	1278
12	1998	1615	408	1207	580	1787
13	1999	1821	498	1322	974	2297
14	2000	2248	610	1638	1480	3118
15	2001	2775	747	2028	2166	4195
16	2002	3428	914	2514	3090	5603
17	2003	4233	1118	3115	4323	7438
18	2004	5227	1371	3856	5960	9816
19	2005	6456	1675	4781	8120	12901
20	2006	7977	2052	5925	10959	16884
	TOTAL	40654	10808	29846	37869	67715

(2) Cash Flow Statement

No.	Year	Capital and Loan	Profit before Depreciation	Total Inflow	Outflow (Investment+ Repayment)	Surplus or Deficit	Balance of the year	Balance Carried Foreward
1	1987	47	0	47	41	6	6	6
2	1988	140	-16	124	147	-22	-25	-19
3	1989	254	-69	185	254	-69	-77	-96
4	1990	0	51	51	0	51	56	-39
5	1991	0	105	105	0	105	115	76
6	1992	0	180	180	9	171	188	264
7	1993	0	283	283	26	257	283	547
8	1994	0	425	425	43	382	420	967
9	1995	0	613	613	228	385	423	1390
10	1996	0	825	825	425	400	440	1830
11	1997	0	1278	1278	26	1252	1377	3206
12	1998	0	1787	1787	26	1761	1937	5144
13	1999	0	2297	2297	26	2270	2497	7641
14	2000	0	3118	3118	26	3092	3401	11042
15	2001	0	4195	4195	26	4168	4585	15627
16	2002	0	5603	5603	26	5577	6135	21762
17	2003	0	7438	7438	26	7412	8153	29915
18	2004	0	9816	9816	26	9790	10769	40684
19	2005	0	12901	12901	26	12874	14162	54846
20	2006	0	16884	16884	26	16858	18544	73389
	TOTAL	441	67715	68156	1437	66719	73389	

Table M–1–2 Inter-Municipal Bus Terminal

(1) Profit/Loss Statement

No.	Year	Revenue	Operating	Net Income	Interest	Profit/Loss
1	1993	0	0	0	-17	-17
2	1994	0	0	0	-50	-50
3	1995	0	0	0	-96	-96
4	1996	135	40	95	-142	-47
5	1997	144	48	96	-155	-59
6	1998	178	59	119	-171	-53
7	1999	220	73	147	-186	-39
8	2000	271	89	182	-197	-15
9	2001	334	109	225	-202	24
10	2002	413	133	280	-196	84
11	2003	510	163	347	-175	172
12	2004	630	199	431	-130	301
13	2005	778	244	534	-51	483
14	2006	961	299	663	55	718
15	2007	1187	366	821	214	1035
16	2008	1467	448	1018	442	1460
17	2009	1813	548	1265	764	2028
18	2010	2240	671	1569	1210	2779
19	2011	2768	820	1948	1822	3770
20	2012	3418	1003	2415	2652	5068
	TOTAL	17467	5312	12154	5390	17544

(2) Cash Flow Statement

No.	Year	Capital and Loan	Profit before Depreciation	Total Inflow	Outflow (Investment+ Repayment)	Surplus or Deficit	Balance of the year	Balance Carried Forward
1	1993	182	-17	165	182	-17	-19	-19
2	1994	94	-50	43	94	-50	-56	-76
3	1995	172	-96	76	172	-96	-107	-183
4	1996	0	-47	-47	0	-47	-53	-236
5	1997	0	-59	-59	10	-69	-77	-313
6	1998	0	-53	-53	16	-68	-77	-390
7	1999	0	-39	-39	27	-66	-74	-464
8	2000	0	-15	-15	27	-42	-47	-511
9	2001	0	24	24	27	-4	-4	-515
10	2002	0	84	84	27	57	62	-453
11	2003	0	172	172	27	145	159	-294
12	2004	0	301	301	27	274	301	7
13	2005	0	483	483	27	455	501	508
14	2006	0	718	718	27	690	759	1268
15	2007	0	1035	1035	27	1007	1108	2376
16	2008	0	1460	1460	27	1433	1576	3952
17	2009	0	2028	2028	27	2001	2201	6153
18	2010	0	2779	2779	27	2752	3027	9180
19	2011	0	3770	3770	27	3743	4117	13296
20	2012	0	5068	5068	18	5050	5555	18851
	TOTAL	448	17544	17992	846	17146	18851	

Table M–1–3 Inter-Departmental and Inter-Municipal Bus Terminal

(1) Profit/Loss Statement

No.	Year	Revenue	Operating	Net Income	Interest	Profit/Loss
1	1987	0	0	0	0	0
2	1988	0	0	0	-2	-2
3	1989	0	0	0	-56	-56
4	1990	246	78	169	-102	67
5	1991	304	96	209	-84	124
6	1992	377	117	260	-57	203
7	1993	466	143	323	-12	311
8	1994	576	175	401	-64	338
9	1995	713	214	499	-54	445
10	1996	1285	350	935	-124	810
11	1997	1742	477	1265	-23	1242
12	1998	2145	584	1561	250	1811
13	1999	2477	715	1762	649	2411
14	2000	3057	875	2182	1180	3362
15	2001	3773	1072	2701	1920	4621
16	2002	4661	1311	3350	2937	6287
17	2003	5756	1605	4151	4321	8471
18	2004	7108	1965	5144	6185	11328
19	2005	8779	2404	6376	8677	15053
20	2006	10848	2944	7904	11990	19893
21	2007	13399	3616	9783	16367	26149
22	2008	16555	4412	12143	22120	34263
23	2009	20462	5398	15065	29657	44722
24	2010	25280	6601	18679	39496	58175
25	2011	31240	8062	23158	52295	75453
26	2012	38601	9891	28710	68894	97605
	TOTAL	199852	53124	146727	266359	413086

(2) Cash Flow Statement

No.	Year	Capital and Loan	Profit before Depreciation	Total Inflow	Outflow (Investment+ Repayment)	Surplus or Deficit	Balance of the year	Balance Carried Forward
1	1987	85	0	85	42	43	48	48
2	1988	95	-2	93	147	-54	-60	-13
3	1989	254	-56	198	254	-56	-63	-76
4	1990	0	67	67	0	67	74	-2
5	1991	0	124	124	0	124	137	135
6	1992	0	203	203	6	197	216	331
7	1993	0	311	311	567	-256	-286	45
8	1994	0	338	338	319	18	20	65
9	1995	0	445	445	740	-295	-330	-245
10	1996	0	810	810	422	388	427	182
11	1997	0	1242	1242	23	1218	1340	1522
12	1998	0	1811	1811	23	1788	1967	3489
13	1999	0	2411	2411	23	2387	2626	6115
14	2000	0	3362	3362	23	3338	3672	9787
15	2001	0	4621	4621	23	4598	5058	14845
16	2002	0	6287	6287	23	6264	6890	21735
17	2003	0	8471	8471	23	8448	9293	31028
18	2004	0	11328	11328	23	11305	12436	43463
19	2005	0	15053	15053	23	15030	16533	59996
20	2006	0	19893	19893	23	19870	21857	81853
21	2007	0	26149	26149	17	26132	28745	110598
22	2008	0	34263	34263	0	34263	37689	148287
23	2009	0	44722	44722	0	44722	49194	197481
24	2010	0	58175	58175	0	58175	63992	261474
25	2011	0	75453	75453	0	75453	82998	344472
26	2012	0	97605	97605	0	97605	107365	451838
	TOTAL	434	413086	413520	2746	410774	451838	

Table M–1–4 Rail Transit System (Centro-Soledad)

(1) Profit/Loss Statement

No.	Year	Revenue	Operating	Net Income	Interest	Profit/Loss
1	1992	0	0	0	0	0
2	1993	0	0	0	513	513
3	1994	0	0	0	542	542
4	1995	0	0	0	571	571
5	1996	0	0	0	599	599
6	1997	0	0	0	-668	-668
7	1998	0	0	0	-3786	-3786
8	1999	0	0	0	-11037	-11037
9	2000	9767	3197	6569	-18625	-12056
10	2001	12165	3914	8253	-22069	-13817
11	2002	15153	4790	10363	-25880	-15517
12	2003	18875	5863	13012	-29883	-16871
13	2004	23510	7177	16334	-33628	-17295
14	2005	29285	8784	20500	-38549	-18049
15	2006	36477	10752	25725	-43734	-18009
16	2007	45436	13160	32275	-49038	-16763
17	2008	56595	16108	40486	-54240	-13754
18	2009	70494	19717	50778	-59012	-8234
19	2010	87808	24133	63675	-62887	787
20	2011	109373	29539	79835	-65210	14624
21	2012	136236	36156	100080	-65097	34983
22	2013	169695	44254	125441	-61447	63994
23	2014	211372	54167	157205	-52698	104507
24	2015	263285	66301	196984	-36773	160211
25	2016	327948	81152	246796	-16045	230750
26	2017	408492	99331	309161	3606	312768
27	2018	508818	121581	387237	30841	418078
28	2019	633783	148815	484969	67822	552791
29	2020	789440	182149	607291	117276	724567
30	2021	983327	222950	760376	182632	943008
31	2022	1224832	272891	951940	267917	1219857
32	2023	1525651	334019	1191632	377719	1569351
33	2024	1900350	408839	1491511	516784	2008295
	TOTAL	9598166	2219740	7378426	816514	8194940

(2) Cash Flow Statement

No.	Year	Capital and Loan	Profit before Depreciation	Total Inflow	Outflow (Investment+ Repayment)	Surplus or Deficit	Balance of the year	Balance Carried Forward
1	1992	5934	0	5934	148	5786	6032	6032
2	1993	0	513	513	178	335	349	6381
3	1994	0	542	542	214	329	343	6724
4	1995	0	571	571	256	315	329	7052
5	1996	0	599	599	7988	-7388	-8020	-968
6	1997	5880	-668	5212	9585	-4373	-4747	-5715
7	1998	20205	-3786	16419	20205	-3786	-4110	-9824
8	1999	52336	-11037	41299	52336	-11037	-11980	-21805
9	2000	0	-12056	-12056	0	-12056	-13087	-34891
10	2001	0	-13817	-13817	402	-14219	-15435	-50326
11	2002	0	-15517	-15517	1818	-17336	-18818	-69144
12	2003	0	-16871	-16871	5559	-22431	-24349	-93493
13	2004	0	-17295	-17295	6071	-23366	-25363	-118856
14	2005	0	-18049	-18049	6650	-24699	-26811	-145667
15	2006	0	-18009	-18009	7306	-25315	-27479	-173146
16	2007	0	-16763	-16763	8048	-24811	-26932	-200078
17	2008	0	-13754	-13754	8888	-22642	-24578	-224656
18	2009	0	-8234	-8234	9839	-18074	-19619	-244275
19	2010	0	787	787	10916	-10129	-10995	-255270
20	2011	0	14624	14624	12135	2489	2595	-252675
21	2012	0	34983	34983	13516	21467	22380	-230295
22	2013	0	63994	63994	15078	48916	50995	-179311
23	2014	0	104507	104507	16847	87660	91386	-87925
24	2015	0	160211	160211	18849	141362	147370	59454
25	2016	0	230750	230750	21116	209634	218544	277998
26	2017	0	312768	312768	23682	289086	301372	579370
27	2018	0	418078	418078	26587	391491	408129	987499
28	2019	0	552791	552791	29876	522915	545138	1532637
29	2020	0	724567	724567	33599	690968	720334	2252971
30	2021	0	943008	943008	34397	908611	947226	3200198
31	2022	0	1219857	1219857	26994	1192863	1243560	4443758
32	2023	0	1569351	1569351	0	1569351	1636048	6079807
33	2024	0	2008295	2008295	0	2008295	2093647	8173454
	TOTAL	84355	8194940	8279294	429083	7850211	8173454	