Case 3 is due to the difference of additional investment caused by the difference in construction completion time. This difference in construction completion time includes other factors which raise the EIRR of Case 3. That is, unlike other two cases, some part of initial investment is carried backward to later years in Case 3 and enjoys greater discount in economic calculation, with the result that total investment after discount becomes smaller. Also, the decrease in maintenance and operation costs due to the carrying backward of operation commencement year cannot be neglected.

In Case 2, construction costs decrease since the construction section is partly reduced as mentioned before. However, this section is to be constructed in later years in Case 1 and the discount rate of the relative construction costs is rather great. Therefore, in Case 2 the reduction of the construction section does not greatly contribute to the reduction of investment after discount compared with Case 1. This can also be said concerning maintenance and operation costs. Therefore, when compared with Case 1, the EIRR of Case 2 does not rise greatly. There is no substantial difference in time saving benefit between Case 1 and Case 2, and the figure is negligible in view of economic calculation.

As a result, Case 3 is the most appropriate purely from the viewpoint of economic analysis. However, this is due to the time lag of investment and may be regarded as a natural result. As Case 1 is also feasible, the selection of a case should be made taking other factors into consideration.

9-5 Sensitivity Analysis

In an economic analysis, sensitivity analyses are usually conducted from pessimistic point of view concerning investment and demands. In this Report, these were conducted for Case 1 and Case 3. As mentioned in 9-4 'Evaluation,' there is no great differences between Case 1 and Case 2. The result of sensitivity analyses are shown in Table 9-5-1.

Table 9-5-1 Sensitivity Analysis (EIRR %)

	Kind of Analysis \ Case	Case 1	Case 3
1	Base case	10.0	11.5
2	Cost overrun 10%	9.2	10.6
3	Demand decrease of 10%	8.9	10.3
4	2 + 3	8.1	9.4

As shown in the above Table, the EIRR of Case 1 decreases to 8.1 percent in the most pessimistic case, but that of Case 3 is considerably safer, remaining 9.4 percent. This combination, however, is only a possibility, chosen to be pessimistic. Even if the EIRR of Case 1 becomes 8.1 percent, it does not necessarily follow that this case is not feasible. Rather, even this case seems to remain feasible, since this project has benefits which cannot be expressed in terms of quantity, such as urban development for example.

(References) Other data used in economic analysis

- Price of bus (DINA 531) 3,500,000 Pesos
  (The IVA and the registration fee 3,700 Pesos were excluded from the market price of 4,316,000 Pesos. Also, the imported portion was estimated as 40 percent, and the related import duty of 20 percent was deducted.)
- Bus maintenance costs 1,114,000 Pesos
  (Calculated by multiplying the market price of 1,393,000 Pesos by the ratio of economic price/market price of the vehicle itself, namely 80 percent)

FINANCIAL ANALYSIS
CHAPTER 10

CHAPTER 10 FINANCIAL ANALYSIS

10-1 Purpose and Presuppositions

10-1-1 Purpose of financial analysis

The purpose of financial analysis varies with the project management policy. However, it generally aims at evaluating the profitability of the project. In other words, a financial analysis is not normally conducted on a non-profit project.

It is not yet known how and under what policies the State Government will operate this project. It seems, however, that the State Goverenment intends to keep the train fare low enough so as to compete with bus transportation services. Therefore, a commercially profitable operation or a balance of income and expenditure does not seem to be an absolute precondition for the implementation of this project.

One aspect of the project, rather, is a political objective, that of re-locating the population. Therefore, even if the operating income should be inadequate to meet the operational expenditures, it is thought that the State Government would support project operations by providing subsidies.

From the foregoing observations, the purpose of this analysis is not only to work out the Financial Internal Rate of Return (FIRR), but also to examine the following points:

(1) To consider whether State Government subsidies are necessary or not, according to the prospective income and expenditure of the project, and

(2) To study the financial implications brought about by the necessary loans made for the project implementation, and to prepare a cash flow projection to examine the capacity to repay these loans.

10-1-2 Preconditions for financial analysis

In the economic analysis, the capital investment and the maintenance and operation costs did not include taxes. However, in the financial analysis,

the tax portion has been included, and all costs have been based on market values. A controlled exchange rate was used for imported materials.

The project life and the date at which costs were determined are the same as in the economic analysis.

10-2 Cash Flow Statement Items

10-2-1 Income and expenditure

(1) Operating income

Income from train fares was projected. The fare income was obtained by multiplying the fare rate by the annual passenger traffic (passenger kilometers), discussed in Chapter 5 'Traffic Demand Forecast.' In accordance with the State Government's policy, the fare rate is expected to be set at a level competitive with the current bus fare. In this analysis, however, the fare rate was set at the same level as the bus fare. For sensitivity analysis, two other cases, in which fare rates were set 10 percent below and above the bus fare, were considered. The basic fare rate was tentatively set at 1.60 Pesos per km, but in actual calculation 1.40 Pesos (excluding 15 percent IVA) was used.

(2) Operating expenditure

The operating expenditure is the sum of maintenance costs of railway facilities, labor costs, motive power costs, and depreciation costs. The depreciation costs have been calculated in accordance with the useful life as applied in the economic analysis.

(3) Operating and net profits

The operating profit is obtained by subtracting the operating expenditure from the operating income. Further, the net profit is obtained by deducting the taxes on facilities and real properties from the operating profit. In this study, tax exemption was assumed. Therefore, the operating profit is equal to the net profit.

10-2-2 Investment and debt financing

(1) Investment plan

The investment plan used in the economic analysis has been applied. All the costs are based on market values including taxes. Tables 10-2-1 to -3 show a breakdown of investment classified by type of construction, kind of currency and the stage of construction.

Table 10-2-1 Financial Cost of Investment (Case 1)

(Unit: Million Pesos)

		Stage 1 (1984 - 1989)	Stage 2 (1990 - 1994)	Stage 3 (1995 - 1999)	Additional Construction (2000 - 2013)	Total
Electric power facilities	Foreign currency	1,176	464	752	0	2,392
	Domestic currency	2,155	950	1,161	0	4,266
Signals and telecommu-nications	Foreign currency	1,429	844	334	841	3,448
	Domestic currency	701	423	166	360	1,650
Civil engineering work	Foreign currency	838	431	691	18	1,978
	Domestic currency	8,024	4,351	4,919	422	17,716
Land acquisition including compensation	Foreign currency	0	0	0	0	0
	Domestic currency	933	362	88	140	1,523
Electric cars	Foreign currency	3,689	1,987	4,771	6,837	17,284
	Domestic currency	1,189	641	1,539	2,205	5,574
Machinery at depot	Foreign currency	207	243	0	0	450
	Domestic currency	484	555	0	0	1,039
Total	Foreign currency	7,339	3,969	6,548	7,696	25,552
	Domestic currency	13,486	7,282	7,873	3,127	31,768
Gross total		20,825	11,251	14,421	10,823	57,320

Note: The costs include reinvestment, but exclude residual values.

Table 10-2-2 Financial Cost of Investment (Case 2)

(Unit: Million Pesos)

		Stage 1 (1984 - 1989)	Stage 2 (1990 - 1994)	Stage 3 (1995 - 1999)	Additional Construction (2000 - 2013)	Total
Electric power facilities	Foreign currency	1,176	381	666	0	2,223
	Domestic currency	2,156	757	982	0	3,895
Signals and telecommu-nications	Foreign currency	1,435	815	108	904	3,262
	Domestic currency	683	389	91	378	1,541
Civil engineering work	Foreign currency	838	322	580	18	1,758
	Domestic currency	8,013	3,566	4,384	397	16,360
Land acquisition including compensation	Foreign currency	0	0	0	0	0
	Domestic currency	933	264	62	138	1,397
Electric cars	Foreign currency	3,689	1,703	4,533	5,832	15,757
	Domestic currency	1,189	549	1,462	1,880	5,080
Machinery at depot	Foreign currency	207	243	0	0	450
	Domestic currency	484	555	0	0	1,039
Total	Foreign currency	7,345	3,464	5,887	6,754	23,450
	Domestic currency	13,458	6,080	6,981	2,793	29,312
Gross total		20,803	9,544	12,868	9,547	52,762

Note: The costs include reinvestment, but exclude residual values.

Table 10-2-3 Financial Cost of Investment (Case 3)

(Unit: Million Pesos)

		Stage 2 (1984 - 1994)	Stage 3 (1995 - 1999)	Additional Construction (2000 - 2013)	Total
Electric power facilities	Foreign currency	1,640	752	0	2,392
	Domestic currency	3,105	1,161	0	4,266
Signals and telecommu-nications	Foreign currency	2,273	334	0	2,607
	Domestic currency	1,124	166	0	1,290
Civil engineering work	Foreign currency	1,269	691	18	1,978
	Domestic currency	12,375	4,919	422	17,716
Land acquisition including compensation	Foreign currency	0	0	0	0
	Domestic currency	1,295	88	140	1,523
Electric cars	Foreign currency	5,676	4,771	3,517	13,964
	Domestic currency	1,830	1,539	1,135	4,504
Machinery at depot	Foreign currency	450	0	0	450
	Domestic currency	1,039	0	0	1,039
Total	Foreign currency	11,308	6,548	3,535	21,391
	Domestic currency	20,768	7,873	1,697	30,338
Gross total		32,076	14,421	5,232	51,729

Note: The costs include reinvestment, but exclude residual values.

(2) Debt financing plan

The means of financing the project will considerably influence the result of financial analysis (net cash flow). The following presuppositions are made in this paper:

1) Foreign currency

Through overseas governmental loans.

Interest: 10 percent per annum

Period: 20 years (with a grace period of 5 years)

Repayment: Equal semiannual installments for 15 years

2) Domestic currency

Through the budget of the State or the Federal Government. In this case, neither interest payment nor repayment of principal is necessary.

10-3 Method of Financial Analysis

10-3-1 Method of FIRR calculation (Profitability analysis by means of cash flow)

The main purpose of the financial analysis is to forecast income and expenditure and also cash flow. The method of calculating the FIRR, however, is similar to the economic analysis in that it seeks to obtain a discount rate at which the sum of discounted cash flows becomes zero. It is expressed by the following equation:

$$0 = \sum_{i=1}^{30} \text{Cash flow } i/(1 + \text{FIRR})^{i-1}$$

Here, the cash flow is the operating profit (operating income minus operating expenditure) plus the depreciation cost (which does not include cash outflow) minus investment costs. Interest has not yet been paid. Therefore, the FIRR can be used as an indicator of the capacity to pay interest on loans or dividends for capital investments. In calculating the FIRR of this project, the residual value of investment is added to the cash flow of the final year of the project life.

As is clear from the above cash flow formula, the cash flow or the FIRR is not influenced by the loan repayment conditions or the level of interest payable mentioned in 10-2-2 (2) 'Debt financing plan.' It is the net cash flow that those repayment conditions or the interest level has influence upon. The net cash flow shall be expounded in the later paragraphs.

In the financial analysis, the influence of inflation factors shall be studied. (However, as it is difficult to forecast inflation rates, more or less standard rates of 5 percent and 10 percent shall be adopted in this Report.)

10-3-2 Net cash flow projection

Net cash flow is obtained by adding the financed funds to the cash flow and then subtracting the loan repayment and interest payment. Here, the financed funds is equal to the investment costs mentioned in 10-3-1 'Method of FIRR calculation.' The net cash flow is, therefore, obtained by the following equation as well.

Net cash flow = Operating profit + Depreciation - (Loan repayment + Interest payment)

10-4 Result of Cash Flow/Net Cash Flow Calculation

The results of cash flow and net cash flow calculations for the three cases are shown in Tables 10-4-1 to -3.

Table 10-4-1 Major Items for Cash Flow Projection (Case 1)

(Unit: Million Pesos)

	1984 - 1989	1990 - 1994	1995 - 1999	2000 - 2013	Total
Operating income	0 (0)	5,897 (5,897)	13,721 (19,618)	98,664 (118,282)	118,282
Operating profit	Δ1,346 (Δ1,346)	Δ1,321 (Δ2,667)	486 (Δ2,181)	46,907 (44,726)	44,726
Depreciation	453 (453)	2,530 (2,983)	4,782 (7,765)	17,173 (24,938)	24,938
Investment	20,825 (20,825)	11,251 (32,076)	14,421 (46,497)	10,823 (57,320)	57,320
Cash flow	Δ21,718 (Δ21,718)	Δ10,042 (Δ31,760)	Δ9,153 (Δ40,913)	53,257 (12,344)	12,344
Loan repayment, Interest payment	10 (10)	4,873 (4,883)	8,488 (13,371)	34,801 (48,172)	48,172
Net cash flow	Δ903 (Δ903)	Δ3,664 (Δ4,567)	Δ3,220 (Δ7,787)	29,279 (21,492)	21,492

Note: Figures in ( ) show cumulative amount.

Table 10-4-2 Major Items for Cash Flow Projection (Case 2)

(Unit: Million Pesos)

	1984 - 1989	1990 - 1994	1995 - 1999	2000 - 2013	Total
Operating income	0 (0)	5,897 (5,897)	13,691 (19,588)	98,513 (118,101)	118,101
Operating profit	Δ1,348 (Δ1,348)	Δ1,269 (Δ2,617)	1,337 (Δ1,280)	50,758 (49,478)	49,478
Depreciation	455 (455)	2,509 (2,964)	4,599 (7,563)	15,849 (23,412)	23,412
Investment	20,803 (20,803)	9,544 (30,347)	12,868 (43,215)	9,547 (52,762)	52,762
Cash flow	Δ21,696 (Δ21,696)	Δ8,304 (Δ30,000)	Δ6,932 (Δ36,932)	57,060 (20,128)	20,128
Loan repayment, Interest payment	10 (10)	4,877 (4,887)	8,173 (13,060)	31,334 (44,394)	44,394
Net cash flow	Δ903 (Δ903)	Δ3,637 (Δ4,540)	Δ2,237 (Δ6,777)	35,273 (28,496)	28,496

Note: Figures in ( ) show cumulative amount.

Table 10-4-3 Major Items for Cash Flow Projection (Case 3)

(Unit: Million Pesos)

	1984 - 1994	1995 -1999	2000 - 2013	Total
Operating income	0 (0)	13,721 (13,721)	98,664 (112,385)	112,385
Operating profit	Δ2,112 (Δ2,112)	486 (Δ1,626)	46,906 (45,280)	45,280
Depreciation	714 (714)	4,783 (5,497)	17,171 (22,668)	22,668
Investment	32,076 (32,076)	14,421 (46,497)	5,232 (51,729)	51,729
Cash flow	Δ33,474 (Δ33,474)	Δ9,152 (Δ42,626)	58,845 (16,219)	16,219
Loan repayment, Interest payment	16 (16)	7,930 (7,946)	38,693 (46,639)	46,639
Net cash flow	Δ1,414 (Δ1,414)	Δ2,661 (Δ4,075)	25,384 (21,309)	21,309

Note: Figures in ( ) show cumulative amount.

10-5 Evaluation

10-5-1 Profitability (FIRR)

The FIRR for the project is estimated as shown in Table 10-5-1.

Table 10-5-1 FIRR (%)

Case	Case 1	Case 2	Case 3
FIRR	3.4	4.1	3.8

It is observed that the FIRRs for the project as shown in the preceding Table remain at rather low levels compared with international level of opportunity costs. However, in a public project like this, where there is strategic necessity to keep the train fare low, it is difficult to expect high FIRRs.

On the other hand, if the fare could be increased in proportion to and at the same time as the inflation, the FIRRs for Case 1 and Case 2 will rise as shown in Table 10-5-2, going near or above the international level of opportunity costs.

Table 10-5-2 FIRR with Inflation Factor (%)

	Case 1	Case 2
Inflation 5 %	8.3	9.1
Inflation 10 %	13.5	14.3

Out of the three cases, the FIRR of Case 2 is the highest. It is because Case 2 has the highest operating profit by cutting off non-profitable sections and thus reducing the operating expenditure and the depreciation costs greatly while the operating income does not vary much. The operating income of Case 3 is the lowest among the three cases, since its start of operations will be delayed. However, its operating profit is higher than Case 1, because both the expenditure and the depreciation costs are smaller.

Generally, the FIRR must exceed the weighted average rate of interest payable for the loan.

10-5-2 Net cash flow analysis

As shown in Tables 10-4-1 to -3, in all of the three cases, the net cash flow will continue to be minus until the stage ending in 1999. However, in the final stage of the project, the figures will gradually go into the black, offsetting the minus values in the past, and moreover accumulating surplus funds.

Table 10-5-3 shows the years in which surplus funds are generated after compensating for the minus values in the past.

Table 10-5-3 Generation of Surplus Funds

Case	Case 1	Case 2	Case 3
Year	2010	2008	2010

The accumulated surplus funds in the final year of the project is the largest in Case 2, and the smallest in Case 3. The accumulated surplus funds in Case 1 is at about the same level as Case 3. The main reasons for the largest surplus funds in Case 2 are the largest operating profit and the least loan repayment/interest payment.

10-5-3 Necessity of subsidies or additional loans

Should deficits arise in operating profits or net cash flow, it will be necessary to obtain subsidies or additional loans. The amounts of such necessary subsidies or additional loans are given in Tables 10-5-4 to -6. The figure "0" means a surplus.

Suppose any net cash flow deficit is covered by a loan at an annual interest rate of 10 percent for a 10-year period (including a 3-year grace period), for instance, then the balance of the loans covering these deficits as of the final year of the project life would be as shown in Table 10-5-7. In the above calculation, it has been assumed that, if a net cash flow surplus generates in any year, such surplus will be appropriated for loan repayments.

Table 10-5-7 Loan Balance (For Net Cash Flow Deficits) at the Final Year of Project Life

(Unit: 1,000 Million Pesos)

	Case 1	Case 2	Case 3
Loan balance at the final year of project life	24.7	7.8	0.0

It is estimated that such balances as cited above can be paid up in full within a short period of 5 years in Case 1 and 2 years in Case 2 even though passenger traffic demand after expiration of the project life should remain at the same level as in the final project year. As for Case 3, it is expected that the loans will be paid up in the final year of the project life.

Table 10-5-4 Amount of Necessary Subsidies or Additional Loans (Case 1)

(Unit: Million Pesos)

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	After 2003
For operating profit	1,346	492	354	193	6	276	84	60	116	0	0	0	0	0	0
For net cash flow	903	879	741	621	543	880	1,114	750	770	355	231	949	837	393	0

Table 10-5-5 Amount of Necessary Subsidies or Additional Loans (Case 2)

(Unit: Million Pesos)

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	After 2003
For operating profit	1,348	494	356	195	8	215	0	0	0	0	0	0	0	0	0
For net cash flow	903	882	743	623	546	843	956	593	572	155	0	613	489	44	0

Table 10-5-6 Amount of Necessary Subsidies or Additional Loans (Case 3)

(Unit: Million Pesos)

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	After 2006
For operating profit	2,112	84	60	116	0	0	0	0	0	0	0	0	0
For net cash flow	1,414	735	467	586	334	539	1,258	1,146	707	270	20	35	0

10-5-4 Conclusion

Since this analysis assumes that the domestic currency portion will be totally financed by the budget of the State or the Federal Government without the obligation of paying any interests nor repaying the principal, the project remains barely profitable even in the Base Case. However, it must be noted that the cash flow of the project will continue to be tight up to the final stage of the project. Therefore, in order to ensure a successful implementation of the project, it is required that the project should be financed by as much equity capital as possible and, at the same time, the interest rate for borrowed funds should be as low as possible.

10-6 Sensitivity Analysis

Sensitivity analyses were conducted for Case 1 and Case 2, as stated in 10-2-1 (1) 'Operating Income,' and their results are summarized in Table 10-6-1. Inflational factors are not considered here, and the traffic demand is not supposed to be influenced by the fare adjustment.

Table 10-6-1 Sensitivity Analysis of Train Fare (FIRR, %)

	Case 1	Case 2
Base case	3.4	4.1
10 % decrease in fare rate	2.4	3.1
10 % increase in fare rate	4.4	5.0

CONCLUSION AND RECOMMENDATIONS
CHAPTER 11

CHAPTER 11 CONCLUSION AND RECOMMENDATIONS

As mentioned in Chapter 9, the EIRR of this railway construction project reaches an internationally acceptable level of 10 percent even in Case 1 and the project can be deemed to be feasible. The EIRR of this analysis counts as benefits time savings by passengers and saving of operating cost for the transport facilities which are both quantifiable. Therefore, if other unquantifiable benefits such as effects on urban development, energy saving, and conservation of rich farm land, are taken into account, the EIRR in real terms will rise higher.

On the other hand, if the project is evaluated from the enterprise management aspect, it is noticed that the FIRR is rather low. This means that it will be difficult to implement the project unless necessary funds for both construction and operation can be borrowed under very favorable terms and conditions. Therefore, the success of the project depends solely upon whether or not the funds for construction and operation of the railway can be financed at low interest rates. In this respect, so far as the construction fund is concerned, every possible effort must be made in order to raise interest-free funds (such as equity fund or governmental investment) as much as possible.

The alternative Cases 1, 2, and 3 being compared, it appears that they are not significantly different in terms of EIRR and FIRR. However, from the viewpoints of the urban development, housing development, and industrial location plans, the railway should be put into operation as early as possible, and in this respect, either Case 1 or Case 2 should be selected. Moreover, Case 1 would be more preferable in terms of promoting dispersion, because the railway extends longer than in Case 2.

In financial terms, however, Case 2 is more advantageous in the construction cost and the outstanding debt at the final year of the project. As mentioned before, the feasibility of this project depends solely upon financial conditions. Therefore, the financial aspect should be emphasized and Case 2 is recommended.

APPENDICES

APPENDIX 2-1 Outline of Each City

Apaseo el Grande City

Outline

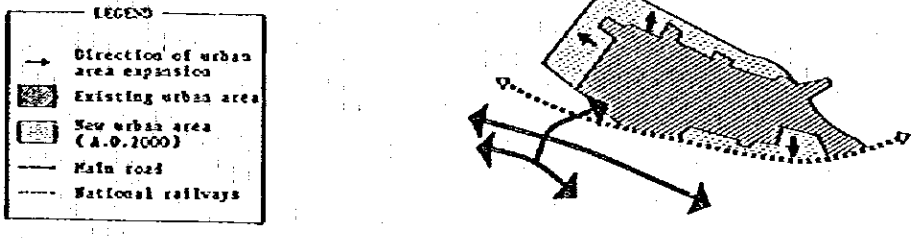
Apaseo el Grande Municipio depends chiefly upon agriculture, with the smallest scale of urban area, comparable to Villagran city, and the minimum population in all the interrelated cities.

Because it is situated in the middle between Celaya City and Queretaro City, a large city in the neighboring state of Queretaro, Apaseo el Grande City depends upon those neighboring cities in seeking working places.

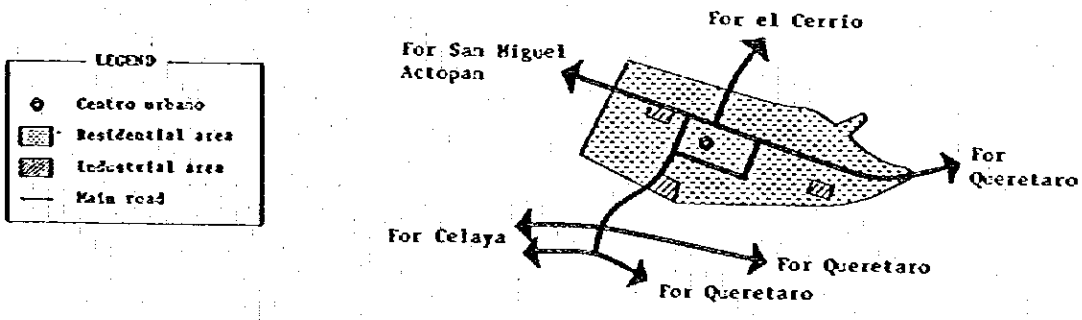
Urban area population and dimensions

	1980 (A)	2000 (B)	$\frac{(B)}{(A)} \times 100\%$
Urban area population (1,000) (Note 1)	11	21	186
Urban area population concentration rate (%)	24	26	-
Urban area dimensions (ha)	110	180	162
Urban area population density (person/ha)	98	113	115

Direction of urban area expansion (Note 2)



Urban structure and land use (Note 2)



(Note 1) Ratio of main urban area population in each city to population in each Municipio.
(Note 2) Reference to urban development plan toward target year of A.D. 2000.

Celaya City

Outline

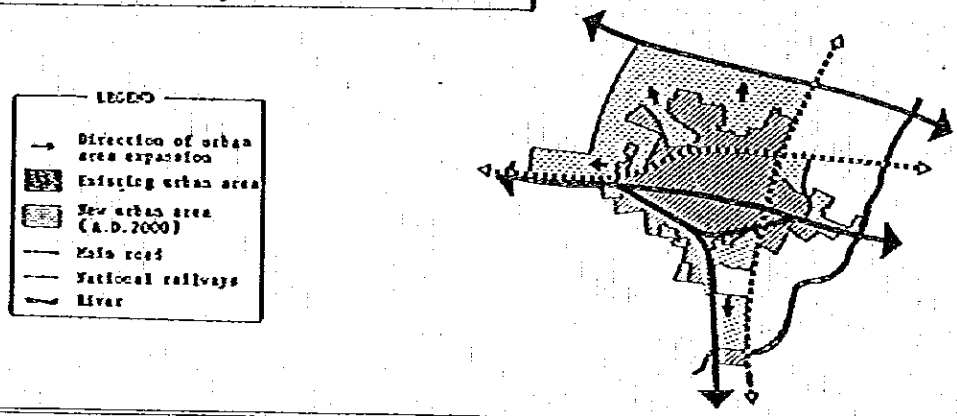
Celaya City is the center in the eastern part of the Bajio Industrial Corridor within the State of Guanajuato. It is situated at the node point of traffic in both north-south and east-west directions in the State. Same as in the case of Irapuato City, it serves as the traffic pivot for the wide service territory.

The city would presumably be ahead of any other eight cities in urban area population growth and urban area expansion for the period of 1980 to 2000. Therefore, in carrying out the urban development, the proper urban development program based on the urban development policy should be prepared.

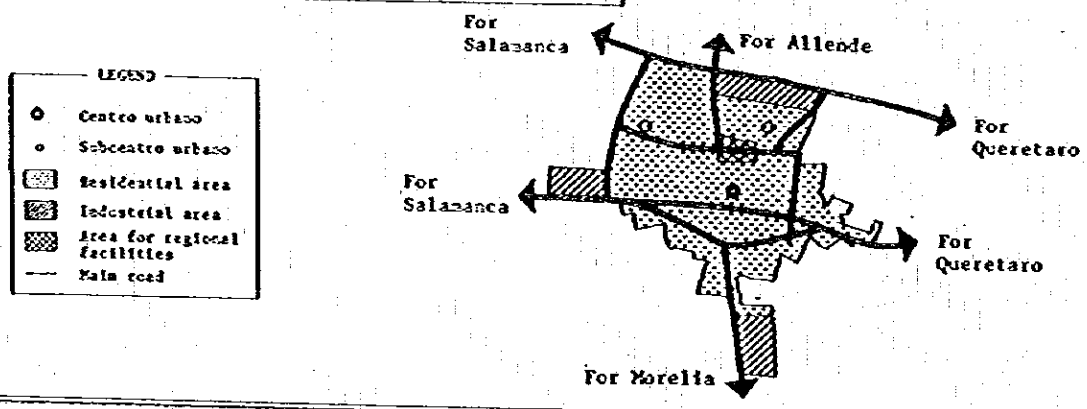
Urban area population and dimensions

	1980 (A)	2000 (B)	$\frac{(B)}{(A)} \times 100\%$
Urban area population (1,000)	133	367	276
Urban area population concentration rate (%)	62	78	-
Urban area dimensions (ha)	810	1,870	231
Urban area population density (person/ha)	164	196	120

Direction of urban area expansion



Urban structure and land use



Cortazar City

Outline

Cortazar Municipio depends chiefly upon agriculture and its central urban area serves as the core of the agricultural zone.

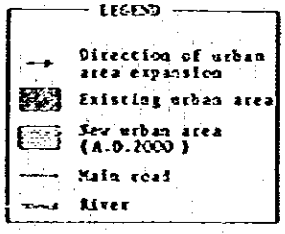
The central urban area of the Cortazar City is near that of Villagran City and is situated in the middle between Salamanca and Celaya, the main cities in the Bajio Industrial Corridor.

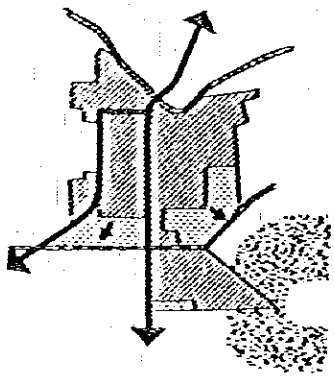
Because of such geographical proximity, Cortazar City is tied more and more tightly with those major cities, especially with Celaya City based on daily living.

Urban area population and dimensions

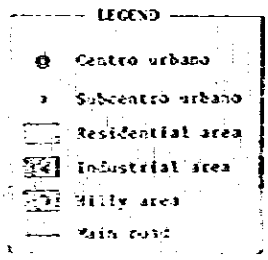
	1980 (A)	2000 (B)	$\frac{(B)}{(A)} \times 100\%$
Urban area population (1,000)	33	62	189
Urban area population concentration rate (%)	54	52	-
Urban area dimensions (ha)	340	600	174
Urban area population density (person/ha)	95	103	108

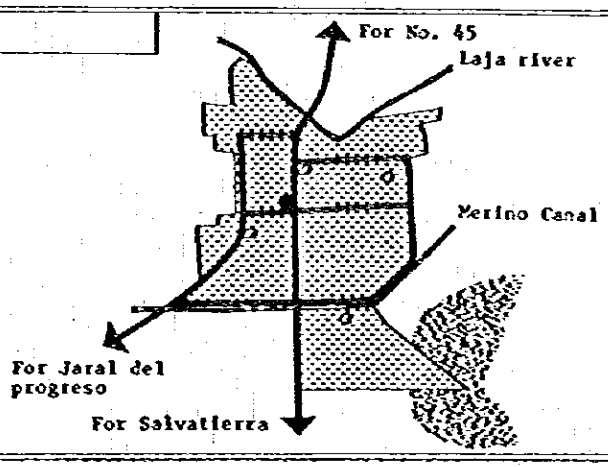
Direction of urban area expansion





Urban structure and land use





Villagran City

Outline

Villagran Municipio is mainly an agriculture area sandwiched between Salamanca and Celaya, the core cities in the Bajio Industrial Corridor.

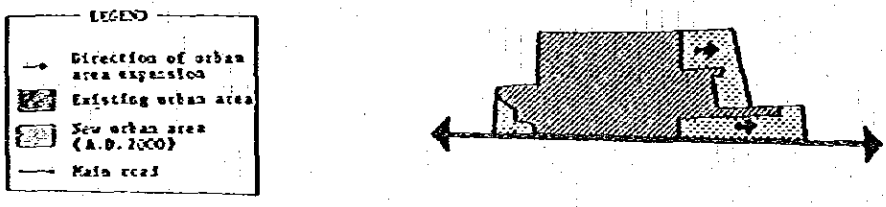
The area is topographically and geologically suited for agriculture and is expected to contribute largely toward growth of farm production in the Corridor.

Under such circumstance, therefore, the plan for urbanization of the central urban area of Villagran, which is surrounded by rich farm land, is being carried out prudently, with the future target being most efficient development of the urban area.

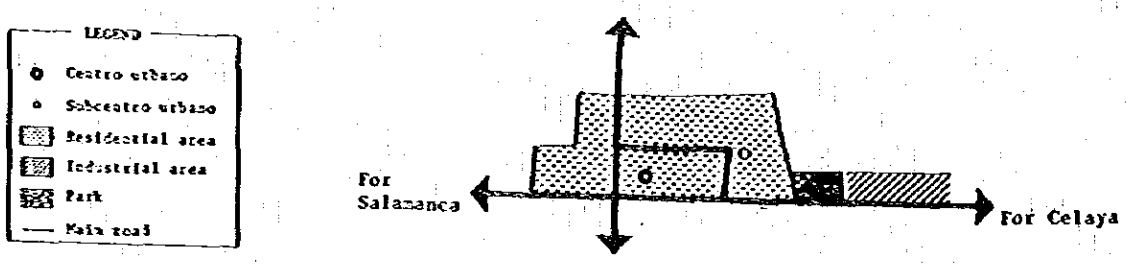
Urban area population and dimensions

	1980 (A)	2000 (B)	$\frac{(B)}{(A)} \times 100\%$
Urban area population (1,000)	13	25	186
Urban area population concentration rate (%)	45	49	-
Urban area dimensions (ha)	130	150	116
Urban area population density (person/ha)	104	167	161

Direction of urban area expansion



Urban structure and land use



Salamanca City

Outline

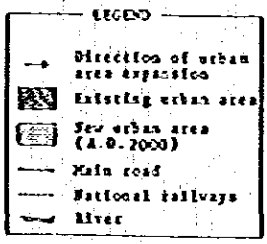
Salamanca City is an industrialized city typically represented by PEMEX with its large expansion area of 670 ha in the northeast of the central urban area. Before establishment of PEMEX, the urban area had been developed between the National Railways line and Lerma River. The northern area of the Railways was urbanized gradually after siting of PEMEX there.

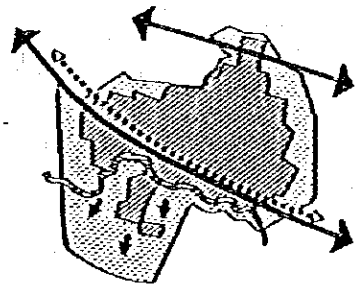
In recent years, the urban area the south of Lerma River has been becoming urbanized. This tendency of urbanization is expected to continue further in the future as well as at present. Therefore, every effort should be exerted in the public sector to carry out the urbanization plan in a systematic may so as to prevent any disorder in sprawling.

Urban area population and dimensions

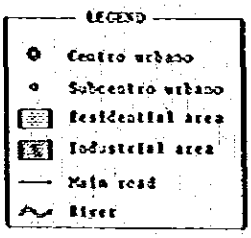
	1980 (A)	2000 (B)	$\frac{(B)}{(A)} \times 100\%$
Urban area population (1,000)	95	260	273
Urban area population concentration rate (%)	61	70	-
Urban area dimensions (ha)	910	1,480	162
Urban area population density (person/ha)	104	175	168

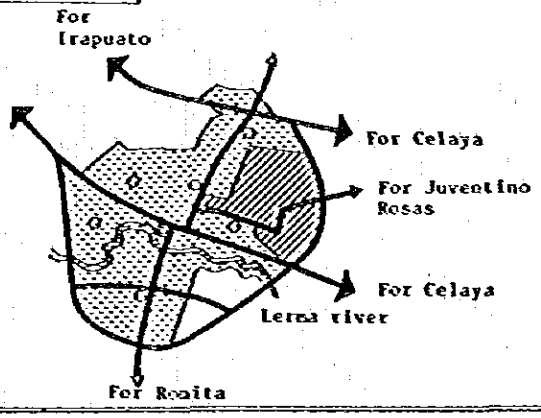
Direction of urban area expansion





Urban structure and land use





Irapuato City

Outline

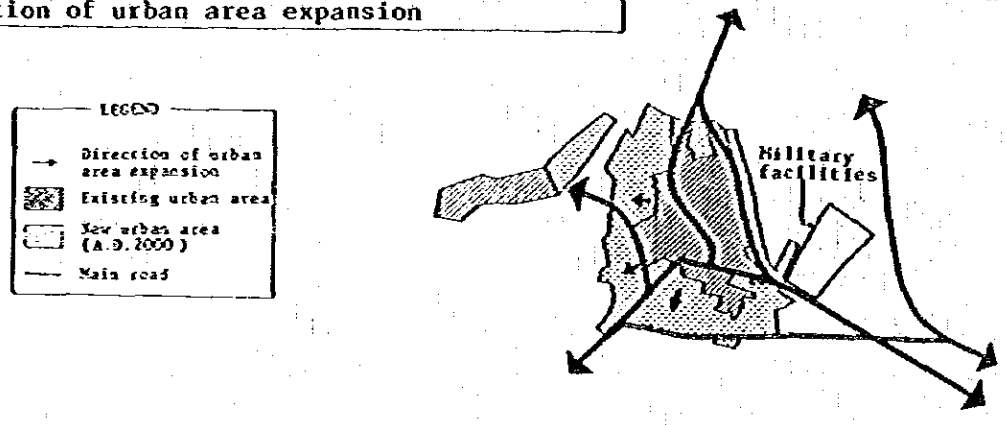
Conventionally Irapuato City has been the agricultural and commercial center in the Bajio Corridor. The city is the largest producer of strawberries and asparagus in the state, having an increasing number of processing plants for farm products.

In the commercial sector, the city is holding its firm position as one of the main centers in the Bajio Corridor because it is a traffic pivot point. Therefore, in the future as well as at present, the city will play its expected role, not only as the traffic center in the Bajio Corridor, but also as the core city next in importance to Leon City.

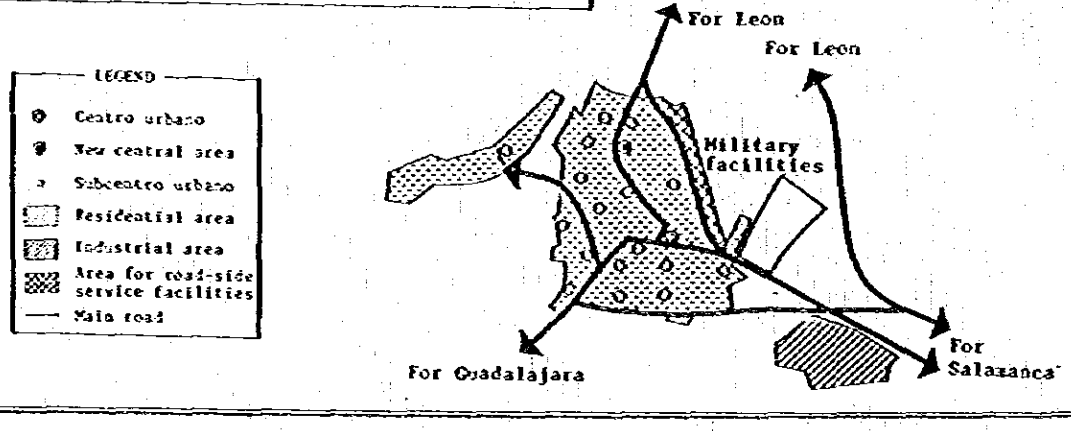
Urban area population and dimensions

	1980 (A)	2000 (B)	$\frac{(B)}{(A)} \times 100\%$
Urban area population (1,000)	162	410	252
Urban area population concentration rate (%)	64	65	-
Urban area dimensions (ha)	1,020	2,160	212
Urban area population density (person/ha)	159	190	119

Direction of urban area expansion



Urban structure and land use



Silao City

Outline

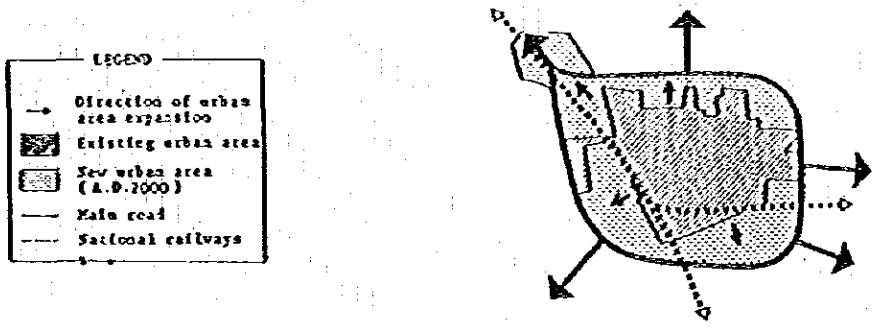
Silao City is situated about 33 km from Leon City about 20 km from Guanajuato City and about 30 km from Irapuato City, and closely interrelated with those cities.

With acute increase of populations in Leon City and Irapuato City in the future and also with development of the new railway under this project, it is expected that interrelations with Leon, Guanajuato and Irapuato will be tightened more closely. Accordingly, Silao City will be expected to be the base of housing supply to the populations of those major cities in the future. It is therefore absolutely necessary to take appropriate measures based on broad vision of the needs of Silao City so that external impacts can be absorbed smoothly.

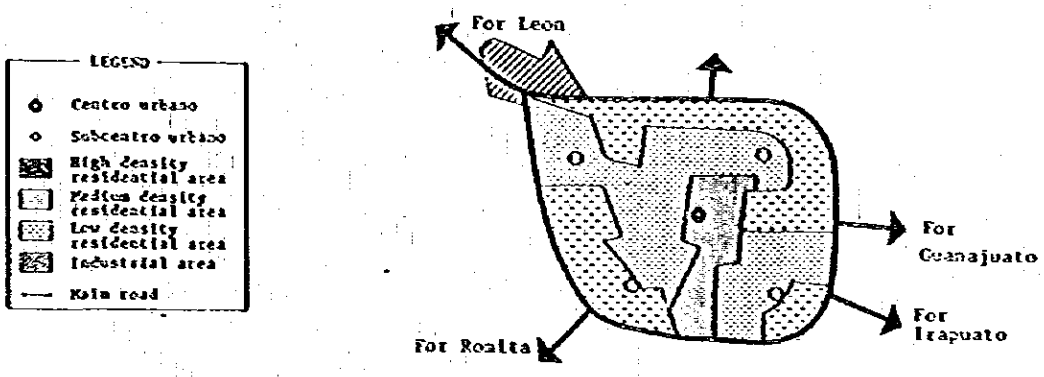
Urban area population and dimensions

	1980 (A)	2000 (B)	$\frac{(B)}{(A)} \times 100\%$
Urban area population (1,000)	43	72	169
Urban area population concentration rate (%)	51	64	–
Urban area dimensions (ha)	410	580	142
Urban area population density (person/ha)	105	125	119

Direction of urban area expansion



Urban structure and land use



Leon City

Outline

The city is the largest in the State of Guanajuato. In the future as well as at present, it holds a position of vital importance as the commercial center, while Guanajuato City serves as the administrative center in the state.

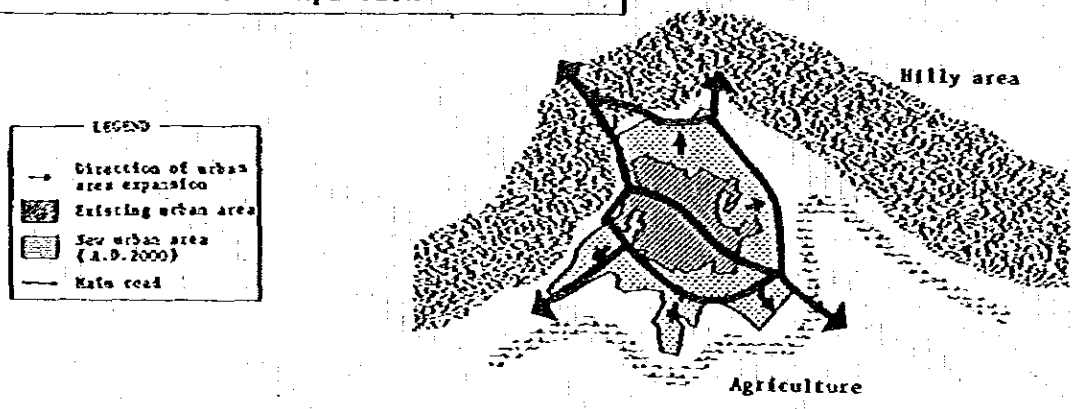
The biggest urban problem with which Leon City is confronted is excessive concentration of the Population, which has resulted in significant shortages of such urban facilities as highway traffic capacity and water supply.

Since it is anticipated that this situation will be more intensified with future population increases, the municipal authority now should take positive measures basically by due reference to the urban development plan reflecting full consensus of local communities.

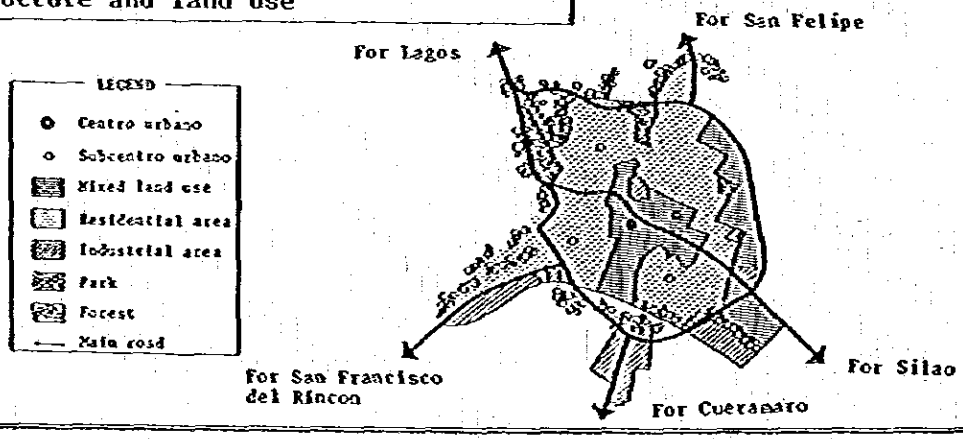
Urban area population and dimensions (Note)

	1980 (A)	2000 (B)	$\frac{(B)}{(A)} \times 100\%$
Urban area population (1,000)	617	1,600	260
Urban area population concentration rate (%)	96	82	-
Urban area dimensions (ha)	4,000	8,000	200
Urban area population density (person/ha)	154	200	130

Direction of urban area expansion



Urban structure and land use



(Note) Not including residential town (1,000 ha, 160,000 population)

San Francisco del Rincon City

Outline

As observed from an example of residential development on the hilly area in the northern part of the city, this city is holding its position as the housing supply town for Leon City.

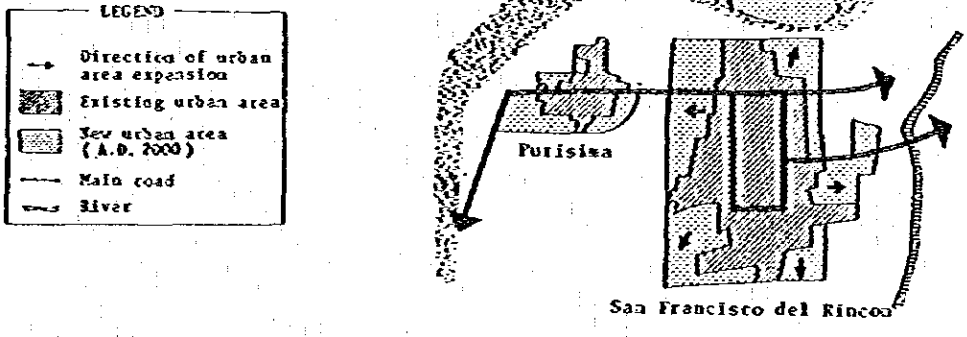
As the population in the urban area of Leon City approaches its critical limit in A.D. 2000, the population in the area between San Francisco del Rincon City and Leon City is expected to increase. Proper countermeasures must be taken after fully considering the role and functional share to be performed by San Francisco del Rincon City in the urban sphere of Leon City.

It is further necessary to promote development of the urban area of San Francisco del Rincon in close coordination with the neighboring urban area of Purisima de Bustos (with area of 54 ha and population of 7,500 in 1980).

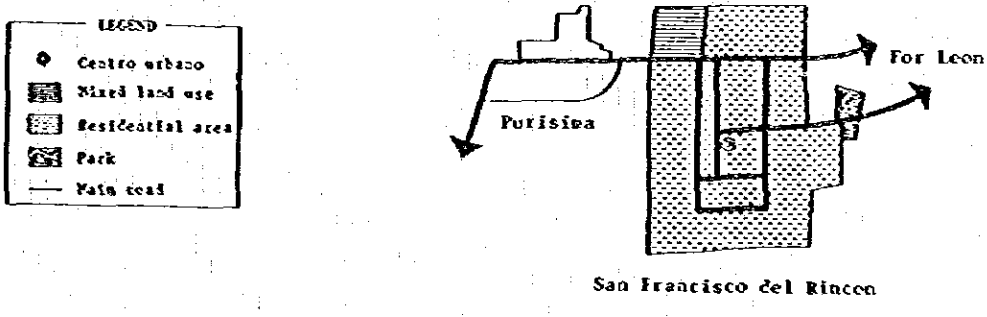
Urban area population and dimensions

	1980 (A)	2000 (B)	$\frac{(B)}{(A)} \times 100\%$
Urban area population (1,000)	36	57	160
Urban area population concentration rate (%)	56	56	-
Urban area dimensions (ha)	340	550	160
Urban area population density (person/ha)	105	105	100

Direction of urban area expansion



Urban structure and land use



APPENDIX 5-1 ATPF Passengers, GDP and Population of Mexico

Year	ATPF Passengers	GDP	Population
1972	499	502,086	52,640
1973	509	544,307	54,529
1974	525	577,568	56,496
1975	589	609,976	58,416
1976	700	635,831	62,329
1977	783	657,722	63,822
1978	836	711,983	65,844
1979	1,004	777,163	67,899
1980	1,151	841,855	69,336

Source: "Autotransporte Publico Federal y Equipo de Transporte", SCT; "Informe Anual 1982", Banco de Mexico

Note : ATPF passengers; 1 million passengers
GDP; 1 million pesos in 1970 year prices
population; 1,000 persons

APPENDIX 5-2 Origin - Destination Table of Bus Passengers in 1982 (Monthly)

(Unit: person)

Destination		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Origin		S.F.Rincon	Leon	Silao	Irapuato	Salamanca	Villagran	Celaya	A.E.Grande	Acambaro	V.Santiago	Penjamo	S.M.Allende	Guanajuato	S.Felipe
2	Leon	2,514													
3	Silao	113	137,059												
4	Irapuato	278	68,417	59,598											
5	Salamanca	21	18,601	2,321	141,642										
6	Villagran	0	377	91	3,076	771									
7	Celaya	64	21,354	2,417	35,474	41,024	119,766								
8	A.E.Grande	0	312	35	382	298	140	7,954							
9	Acambaro	0	404	384	685	377	440	133,423	2,518						
10	V. Santiago	0	18,748	533	58,422	138,010	817	33,492	161	4,329					
11	Penjamo	703	876	1,100	38,623	999	0	237	45	0	0				
12	S. M. Allende	31	1,971	284	352	82	21	44,084	103	2,257	0	0			
13	Guanajuato	271	121,909	90,224	118,439	11,927	0	18,816	167	564	8,667	293	5,646		
14	S. Felipe	29	3,187	56	0	0	0	0	0	0	0	0	52	0	
15	S.J. Iturubide	43	1,802	0	0	0	0	376	17	0	0	0	4,767	3,803	1,118

SOURCE: The State Government

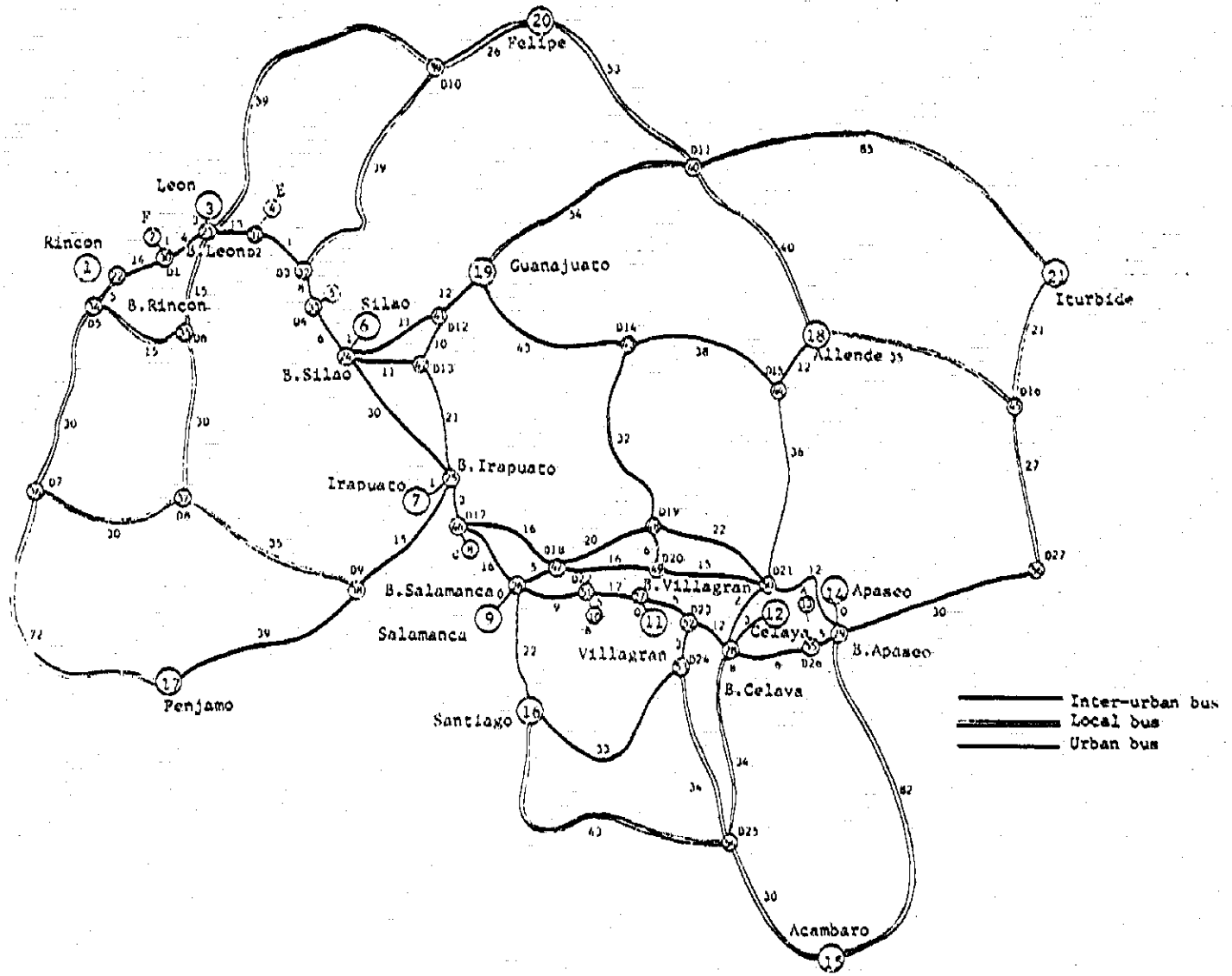
APPENDIX 5-3 Population of Each Zone in 1982

(Unit: Person)

No.	Zone Name	Population
1	Apaseo el Grande	84,835
2	Celaya	237,489
3	Villagran	94,921
4	Salamanca	169,826
5	Irapuato	273,957
6	Silao	121,440
7	Leon	698,401
8	Sn. Fco. del Rincon	92,327
9	Acambaro	337,895
10	Valle de Santiago	306,841
11	Penjamo	246,789
12	San Miguel de Allende	172,989
13	Guanajuato	186,327
14	San Felipe	85,790
15	San Jose de Iturbide	193,765
Total		3,303,592

(Source: The State Government)

APPENDIX 5-4 Road Network and Bus Services within the State



APPENDIX 5-5

Origin - Destination Table of Bus Passengers in 2000 (Without the Project, monthly)

Unit: person

	1 S.F.RNCN	2 F	3 LEON	4 E	5 D	6 SILAO	7 IRAPUATO	8 C	9 SALAMANC	10 B	11 VILLAGRN
1 S.F.RNCN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2 F	309.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3 LEON	13167.	22668.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4 E	3537.	2732.	1071363.	0.	0.	0.	0.	0.	0.	0.	0.
5 D	12.	1104.	46934.	12470.	0.	0.	0.	0.	0.	0.	0.
6 SILAO	151.	13390.	570807.	155954.	388.	0.	0.	0.	0.	0.	0.
7 IRAPUATO	1087.	19609.	836170.	78436.	15240.	185211.	0.	0.	0.	0.	0.
8 C	31.	577.	24127.	2307.	433.	47177.	1196899.	0.	0.	0.	0.
9 SALAMANC	72.	4699.	200386.	18819.	523.	6358.	1138710.	289819.	0.	0.	0.
10 B	4.	235.	9891.	916.	26.	313.	56179.	1598.	381.	0.	0.
11 VILLAGRN	24.	66.	2804.	263.	14.	172.	17075.	492.	3772.	186.	0.
12 CELAYA	171.	4183.	178531.	16754.	423.	5137.	221305.	6383.	225589.	11131.	454745.
13 A	18.	440.	18516.	1739.	44.	533.	22970.	653.	23411.	1150.	90915.
14 A.E.GRND	17.	40.	1698.	159.	4.	48.	1551.	45.	1066.	53.	346.
15 ACAMBARO	15.	45.	1925.	181.	38.	465.	2436.	70.	1182.	58.	952.
16 SANTIAGO	10.	1334.	56834.	5334.	34.	408.	132163.	3807.	275194.	13572.	1125.
17 PENJAMO	1204.	110.	4693.	440.	123.	1498.	234317.	6750.	3519.	174.	24.
18 S.M.ALND	63.	296.	12617.	1184.	38.	462.	1682.	48.	345.	17.	61.
19 GUANJUTO	463.	15292.	651711.	178515.	10087.	122641.	472487.	13611.	41940.	2068.	24.
20 S.FELIPE	33.	267.	11374.	1068.	4.	51.	26.	1.	24.	1.	16.
21 S.J.ITRB	78.	240.	10250.	962.	1.	15.	43.	1.	37.	2.	26.
22 TOTAL	20466.	87327.	3710631.	475501.	27420.	370489.	3497843.	323278.	576460.	28412.	548234.

	12 CELAYA	13 A	14 A.E.GRND	15 ACAMBARO	16 SANTIAGO	17 PENJAMO	18 S.M.ALND	19 GUANJUTO	20 S.FELIPE	21 S.J.ITRB	22 TOTAL
1 S.F.RNCN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2 F	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	309.
3 LEON	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	35835.
4 E	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1077632.
5 D	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	60520.
6 SILAO	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	740690.
7 IRAPUATO	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1135753.
8 C	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1271551.
9 SALAMANC	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1659386.
10 B	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	69543.
11 VILLAGRN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	24868.
12 CELAYA	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1124352.
13 A	367158.	0.	0.	0.	0.	0.	0.	0.	0.	0.	527547.
14 A.E.GRND	22097.	4571.	0.	0.	0.	0.	0.	0.	0.	0.	31695.
15 ACAMBARO	324500.	65102.	3987.	0.	0.	0.	0.	0.	0.	0.	400956.
16 SANTIAGO	51825.	5377.	162.	3818.	0.	0.	0.	0.	0.	0.	550997.
17 PENJAMO	648.	67.	80.	16.	10.	0.	0.	0.	0.	0.	253673.
18 S.M.ALND	144040.	28611.	219.	4203.	12.	21.	0.	0.	0.	0.	193919.
19 GUANJUTO	51344.	5327.	297.	877.	8576.	512.	11796.	0.	0.	0.	1587568.
20 S.FELIPE	18.	2.	12.	10.	7.	12.	73.	12.	0.	0.	13011.
21 S.J.ITRB	1092.	113.	32.	17.	11.	19.	10597.	7060.	1386.	0.	31982.
22 TOTAL	962722.	109170.	4789.	8941.	8616.	564.	22466.	7072.	1386.	0.	10791787.

APPENDIX 5-6 Origin - Destination Table of Railway Passengers in 2000
(Case 1, Case 3, With the Project, monthly)

Unit: person

	1 S.F.RNCN	2 F	3 LEON	4 E	5 D	6 SILAO	7 IRAPUATO	8 C	9 SALAMANC	10 B	11 VILLAGRN
1 S.F.RNCN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2 F	250.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3 LEON	8089.	18834.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4 E	2918.	2559.	926970.	0.	0.	0.	0.	0.	0.	0.	0.
5 D	9.	1005.	38422.	11888.	0.	0.	0.	0.	0.	0.	0.
6 SILAO	105.	11295.	428771.	138581.	330.	0.	0.	0.	0.	0.	0.
7 IRAPUATO	745.	15558.	604091.	64412.	11641.	124494.	0.	0.	0.	0.	0.
8 C	25.	516.	20362.	2118.	396.	41041.	731011.	0.	0.	0.	0.
9 SALAMANC	56.	4053.	162499.	16675.	455.	5209.	604414.	263857.	0.	0.	0.
10 B	3.	214.	8721.	847.	24.	283.	48021.	1522.	358.	0.	0.
11 VILLAGRN	19.	56.	2284.	230.	12.	141.	11265.	435.	2932.	172.	0.
12 CELAYA	134.	3516.	143372.	14355.	355.	4149.	151093.	5438.	178022.	10054.	318591.
13 A	15.	386.	15625.	1553.	39.	458.	17758.	593.	20498.	1083.	77110.
14 A.E.GRND	13.	33.	1350.	135.	3.	38.	1013.	38.	819.	48.	232.
15 ACAMBARO	11.	35.	1454.	143.	29.	348.	1635.	54.	835.	46.	603.
16 SANTIAGO	7.	1091.	43568.	4475.	27.	307.	61029.	3096.	0.	11928.	650.
17 PENJAMO	781.	80.	3162.	327.	84.	925.	0.	3826.	1887.	135.	15.
18 S.M.ALND	40.	207.	8239.	843.	25.	0.	819.	32.	190.	13.	27.
19 GUANJUTO	249.	10640.	383183.	129206.	5385.	0.	160857.	8793.	25190.	1695.	10.
20 S.FELIPE	21.	192.	0.	703.	2.	30.	16.	1.	16.	1.	11.
21 S.J.ITRB	56.	182.	7518.	739.	1.	11.	28.	1.	25.	2.	17.
22 TOTAL	13550.	70452.	2799390.	387232.	18810.	177435.	1788959.	287683.	230772.	25175.	397273.

	12 CELAYA	13 A	14 A.E.GRND	15 ACAMBARO	16 SANTIAGO	17 PENJAMO	18 S.M.ALND	19 GUANJUTO	20 S.FELIPE	21 S.J.ITRB	22 TOTAL
1 S.F.RNCN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2 F	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	250.
3 LEON	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	26923.
4 E	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	932447.
5 D	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	51324.
6 SILAO	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	579081.
7 IRAPUATO	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	820941.
8 C	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	795468.
9 SALAMANC	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1057219.
10 B	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	59993.
11 VILLAGRN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	17546.
12 CELAYA	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	829080.
13 A	309451.	0.	0.	0.	0.	0.	0.	0.	0.	0.	444568.
14 A.E.GRND	14141.	3905.	0.	0.	0.	0.	0.	0.	0.	0.	21770.
15 ACAMBARO	0.	47338.	0.	0.	0.	0.	0.	0.	0.	0.	52533.
16 SANTIAGO	32655.	4052.	97.	0.	0.	0.	0.	0.	0.	0.	162982.
17 PENJAMO	416.	47.	50.	10.	5.	0.	0.	0.	0.	0.	11750.
18 S.M.ALND	0.	15765.	79.	0.	5.	11.	0.	0.	0.	0.	26296.
19 GUANJUTO	35054.	4018.	198.	591.	4668.	213.	0.	0.	0.	0.	769957.
20 S.FELIPE	12.	1.	8.	0.	5.	7.	0.	0.	0.	0.	1026.
21 S.J.ITRB	696.	78.	0.	0.	7.	12.	0.	0.	0.	0.	9372.
22 TOTAL	392427.	75205.	431.	602.	4690.	242.	0.	0.	0.	0.	6670527.

APPENDIX 5-7 Origin - Destination Table of Bus Passengers in 2000 (Case 1, Case 3, With the Project, monthly)

Unit: person

	1 S.F.RNCN	2 F	3 LEON	4 E	5 D	6 SILAO	7 IRAPUATO	8 C	9 SALAMANC	10 B	11 VILLAGRN
1 S.F.RNCN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2 F	59.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3 LEON	5078.	3834.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4 E	619.	173.	144393.	0.	0.	0.	0.	0.	0.	0.	0.
5 D	3.	99.	8512.	582.	0.	0.	0.	0.	0.	0.	0.
6 SILAO	46.	2095.	142036.	17373.	58.	0.	0.	0.	0.	0.	0.
7 IRAPUATO	342.	4051.	232079.	14024.	3599.	60717.	0.	0.	0.	0.	0.
8 C	6.	61.	3765.	189.	37.	6136.	465888.	0.	0.	0.	0.
9 SALAMANC	16.	646.	37887.	2144.	68.	1149.	534296.	25962.	0.	0.	0.
10 B	1.	21.	1170.	69.	2.	30.	8158.	76.	23.	0.	0.
11 VILLAGRN	5.	10.	520.	33.	2.	31.	5810.	57.	840.	14.	0.
12 CELAYA	37.	667.	35159.	2399.	68.	988.	70212.	945.	47567.	1077.	136154.
13 A	3.	54.	2891.	186.	5.	75.	5212.	60.	2913.	67.	13805.
14 A.E.GRND	4.	7.	348.	24.	1.	10.	538.	7.	247.	5.	114.
15 ACAMBARO	4.	10.	471.	38.	9.	117.	801.	16.	347.	12.	349.
16 SANTIAGO	3.	243.	13266.	859.	7.	101.	71134.	711.	275194.	1644.	475.
17 PENJAMO	423.	30.	1531.	113.	39.	573.	234317.	2924.	1632.	39.	9.
18 S.M.ALND	23.	89.	4378.	341.	13.	462.	863.	16.	155.	4.	34.
19 GUANJUTO	214.	4652.	268528.	49309.	4702.	122641.	311630.	4818.	16750.	373.	8.
20 S.FELIPE	12.	75.	11374.	365.	2.	21.	10.	0.	8.	0.	5.
21 S.J.ITRB	22.	58.	2732.	223.	0.	4.	15.	0.	12.	0.	9.
22 TOTAL	6916.	16875.	911041.	89269.	8610.	193054.	1708884.	35595.	345688.	3237.	150961.

	12 CELAYA	13 A	14 A.E.GRND	15 ACAMBARO	16 SANTIAGO	17 PENJAMO	18 S.M.ALND	19 GUANJUTO	20 S.FELIPE	21 S.J.ITRB	22 TOTAL
1 S.F.RNCN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2 F	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	59.
3 LEON	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	8912.
4 E	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	145185.
5 D	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	9196.
6 SILAO	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	161609.
7 IRAPUATO	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	314612.
8 C	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	476083.
9 SALAMANC	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	602167.
10 B	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	9550.
11 VILLAGRN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	7322.
12 CELAYA	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	295272.
13 A	57707.	0.	0.	0.	0.	0.	0.	0.	0.	0.	82979.
14 A.E.GRND	7956.	666.	0.	0.	0.	0.	0.	0.	0.	0.	9925.
15 ACAMBARO	324500.	17764.	3987.	0.	0.	0.	0.	0.	0.	0.	348423.
16 SANTIAGO	19170.	1325.	65.	3818.	0.	0.	0.	0.	0.	0.	388015.
17 PENJAMO	232.	20.	30.	6.	5.	0.	0.	0.	0.	0.	241923.
18 S.M.ALND	144040.	12846.	140.	4203.	7.	10.	0.	0.	0.	0.	167623.
19 GUANJUTO	16290.	1309.	99.	286.	3908.	299.	11796.	0.	0.	0.	817611.
20 S.FELIPE	6.	1.	4.	10.	2.	5.	73.	12.	0.	0.	11985.
21 S.J.ITRB	396.	35.	32.	17.	4.	7.	10597.	7060.	1386.	0.	22610.
22 TOTAL	570295.	33965.	4358.	8339.	3926.	322.	22466.	7072.	1386.	0.	4121260.

APPENDIX 5-8

Origin - Destination Table of Railway Passengers in 2000 (Case 2, With the Project, monthly)

Unit: person

	1 S.F.RNCN	2 F	3 LEON	4 E	5 D	6 SILAO	7 IRAPUATO	8 C	9 SALAMANC	10 B	11 VILLAGRN
1 S.F.RNCN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2 F	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3 LEON	6495.	18834.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4 E	2669.	2559.	926970.	0.	0.	0.	0.	0.	0.	0.	0.
5 D	8.	1005.	38422.	11888.	0.	0.	0.	0.	0.	0.	0.
6 SILAO	93.	11295.	428771.	138581.	330.	0.	0.	0.	0.	0.	0.
7 IRAPUATO	683.	15558.	604091.	64412.	11641.	124494.	0.	0.	0.	0.	0.
8 C	24.	516.	20362.	2118.	396.	41041.	731011.	0.	0.	0.	0.
9 SALAMANC	54.	4053.	162499.	16675.	455.	5209.	604414.	263857.	0.	0.	0.
10 B	3.	214.	8721.	847.	24.	283.	48021.	1522.	358.	0.	0.
11 VILLAGRN	18.	56.	2284.	230.	12.	141.	11265.	435.	2932.	172.	0.
12 CELAYA	130.	3516.	143372.	14355.	355.	4149.	151093.	5438.	178022.	10054.	318591.
13 A	14.	386.	15625.	1553.	39.	458.	17758.	593.	20498.	1083.	77110.
14 A.C.GRND	12.	32.	1299.	131.	3.	36.	891.	36.	728.	46.	181.
15 ACAMBARO	11.	35.	1454.	143.	29.	348.	1635.	54.	835.	46.	603.
16 SANTIAGO	7.	1091.	43568.	4475.	27.	307.	61029.	3096.	0.	11928.	650.
17 PENJAMO	730.	80.	3162.	327.	84.	925.	0.	3826.	1887.	135.	15.
18 S.M.ALND	38.	207.	8239.	843.	25.	0.	819.	32.	190.	13.	27.
19 GUANJUTO	211.	10640.	383183.	129206.	5383.	0.	160857.	8793.	25190.	1695.	16.
20 S.FELIPE	20.	192.	0.	703.	2.	30.	16.	1.	16.	1.	11.
21 S.J.ITRB	55.	182.	7497.	736.	1.	11.	27.	1.	25.	2.	17.
22 TOTAL	11274.	70450.	2799518.	387224.	18809.	177433.	1788837.	287681.	230681.	25173.	397222.

	12 CELAYA	13 A	14 A.E.GRND	15 ACAMBARO	16 SANTIAGO	17 PENJAMO	18 S.M.ALND	19 GUANJUTO	20 S.FELIPE	21 S.J.ITRB	22 TOTAL
1 S.F.RNCN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2 F	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3 LEON	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4 E	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	25330.
5 D	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	932198.
6 SILAO	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	51323.
7 IRAPUATO	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	579069.
8 C	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	820878.
9 SALAMANC	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	795467.
10 B	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1057216.
11 VILLAGRN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	59993.
12 CELAYA	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	17545.
13 A	309451.	0.	0.	0.	0.	0.	0.	0.	0.	0.	829075.
14 A.E.GRND	10707.	0.	0.	0.	0.	0.	0.	0.	0.	0.	444567.
15 ACAMBARO	0.	47338.	0.	0.	0.	0.	0.	0.	0.	0.	14103.
16 SANTIAGO	32655.	4052.	80.	0.	0.	0.	0.	0.	0.	0.	52533.
17 PENJAMO	416.	47.	45.	10.	5.	0.	0.	0.	0.	0.	162965.
18 S.M.ALND	0.	15765.	60.	0.	5.	11.	0.	0.	0.	0.	11694.
19 GUANJUTO	35054.	4018.	181.	591.	4668.	213.	0.	0.	0.	0.	26275.
20 S.FELIPE	12.	1.	8.	0.	5.	7.	0.	0.	0.	0.	769903.
21 S.J.ITRB	690.	0.	0.	0.	7.	12.	0.	0.	0.	0.	1025.
22 TOTAL	388985.	71222.	374.	602.	4690.	242.	0.	0.	0.	0.	9260.
											6660413.

APPENDIX 5-9

Origin - Destination Table of Bus Passengers in 2000
(Case 2, With the Project, monthly)

Unit: person

	1 S.F.RNCN	2 F	3 LEON	4 E	5 D	6 SILAO	7 IRAPUATO	8 C	9 SALAMANC	10 B	11 VILLAGRN
1 S.F.RNCN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2 F	309.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3 LEON	6672.	3834.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4 E	868.	173.	144393.	0.	0.	0.	0.	0.	0.	0.	0.
5 D	4.	99.	8512.	582.	0.	0.	0.	0.	0.	0.	0.
6 SILAO	58.	2095.	142036.	17373.	58.	0.	0.	0.	0.	0.	0.
7 IRAPUATO	404.	4051.	232079.	14024.	3599.	60717.	0.	0.	0.	0.	0.
8 C	7.	61.	3765.	189.	37.	6136.	465888.	0.	0.	0.	0.
9 SALAMANC	18.	646.	37887.	2144.	68.	1149.	534296.	25962.	0.	0.	0.
10 B	1.	21.	1170.	69.	2.	30.	8158.	76.	23.	0.	0.
11 VILLAGRN	6.	10.	520.	33.	2.	31.	5810.	57.	840.	14.	0.
12 CELAYA	41.	667.	35159.	2399.	68.	988.	70212.	945.	47567.	1077.	136154.
13 A	4.	54.	2891.	186.	5.	75.	5212.	60.	2913.	67.	13805.
14 A.E.GRND	5.	8.	399.	28.	1.	12.	660.	9.	338.	7.	165.
15 ACAMBARO	4.	10.	471.	38.	9.	117.	801.	16.	347.	12.	349.
16 SANTIAGO	3.	243.	13266.	859.	7.	101.	71134.	711.	275194.	1644.	475.
17 PENJAMO	474.	30.	1531.	113.	39.	573.	234317.	2924.	1632.	39.	9.
18 S.M.ALND	25.	89.	4378.	341.	13.	462.	863.	16.	155.	4.	34.
19 GUANJUTO	252.	4652.	268528.	49309.	4702.	122641.	311630.	4818.	16750.	373.	8.
20 S.FELIPE	13.	75.	11374.	365.	2.	21.	10.	0.	8.	0.	5.
21 S.J.ITRB	23.	58.	2753.	226.	0.	4.	16.	0.	12.	0.	9.
22 TOTAL	9192.	16877.	911113.	88277.	8611.	193056.	1709006.	35597.	345779.	3239.	151012.

	12 CELAYA	13 A	14 A.E.GRND	15 ACAMBARO	16 SANTIAGO	17 PENJAMO	18 S.M.ALND	19 GUANJUTO	20 S.FELIPE	21 S.J.ITRB	22 TOTAL
1 S.F.RNCN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2 F	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	309.
3 LEON	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	10505.
4 E	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	145434.
5 D	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	9197.
6 SILAO	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	161621.
7 IRAPUATO	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	314875.
8 C	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	476084.
9 SALAMANC	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	602170.
10 B	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	9550.
11 VILLAGRN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	7323.
12 CELAYA	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	295277.
13 A	57707.	0.	0.	0.	0.	0.	0.	0.	0.	0.	82980.
14 A.E.GRND	11390.	4571.	0.	0.	0.	0.	0.	0.	0.	0.	17592.
15 ACAMBARO	324500.	17764.	3987.	0.	0.	0.	0.	0.	0.	0.	348423.
16 SANTIAGO	19170.	1325.	82.	3818.	0.	0.	0.	0.	0.	0.	388032.
17 PENJAMO	232.	20.	35.	6.	5.	0.	0.	0.	0.	0.	241979.
18 S.M.ALND	144040.	12846.	159.	4203.	7.	10.	0.	0.	0.	0.	167644.
19 GUANJUTO	16290.	1309.	116.	286.	3908.	299.	11796.	0.	0.	0.	817665.
20 S.FELIPE	6.	1.	4.	10.	2.	5.	73.	12.	0.	0.	11986.
21 S.J.ITRB	402.	113.	32.	17.	4.	7.	10597.	7060.	1386.	0.	22722.
22 TOTAL	573737.	37948.	4415.	8339.	3926.	322.	22466.	7072.	1386.	0.	4131369.

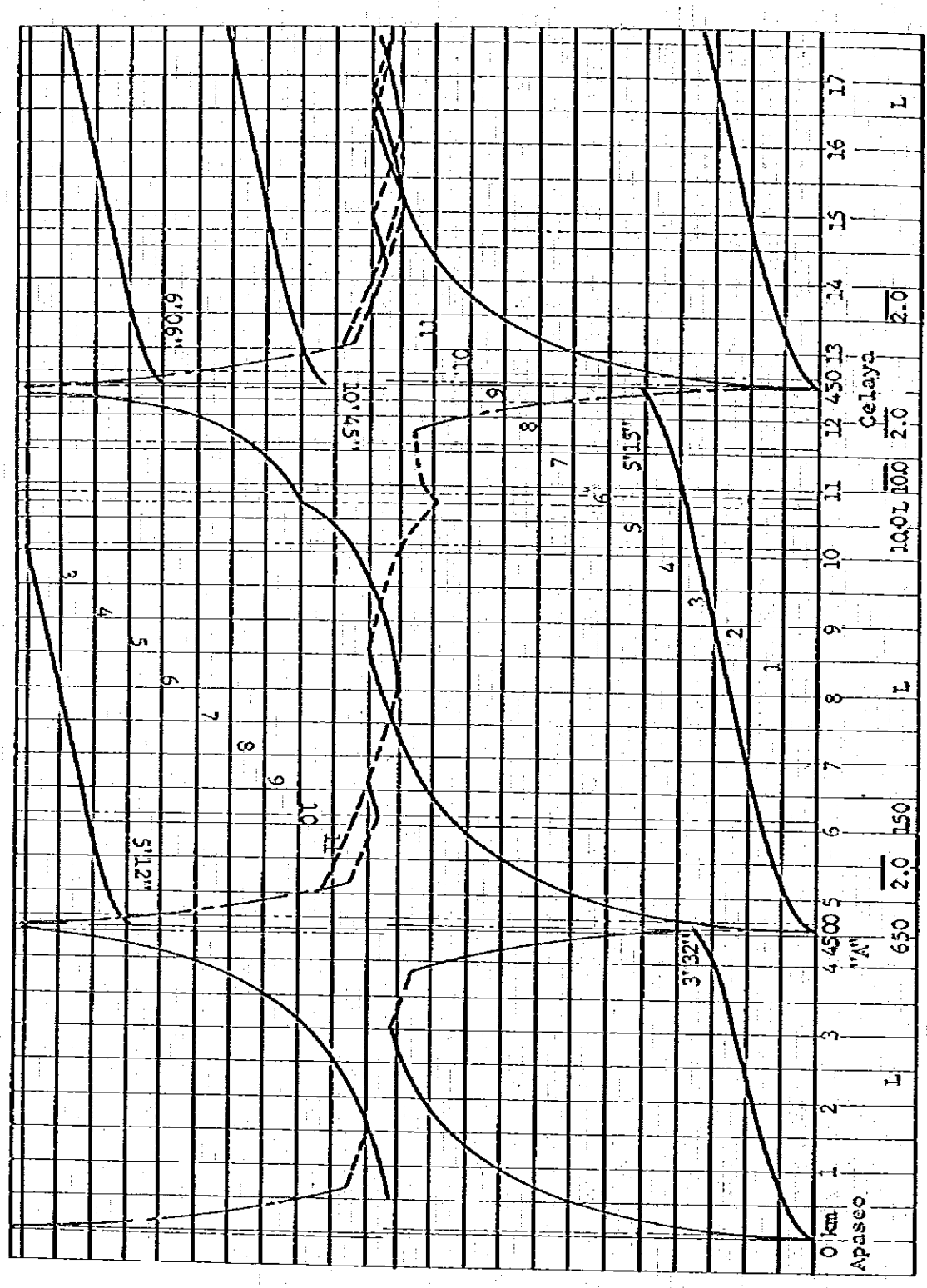
APPENDIX 5-10 No. of Passengers and Share by Time Zones of Mass Transit Railway in Mexico City

(Unit: 1,000 persons)

	Total		VIA1		VIA2	
	No. of passengers	%	No. of passengers	%	No. of passengers	%
6						
7	67	6.36	52	9.17	15	3.09
8	82	7.79	58	10.23	24	4.94
9	88	8.36	64	11.29	24	4.94
10	67	6.36	47	8.29	20	4.12
11	56	5.32	36	6.35	20	4.12
12	54	5.13	31	5.47	23	4.73
13	51	4.84	27	4.76	24	4.94
14	59	5.60	29	5.11	30	6.17
15	61	5.79	30	5.29	31	6.38
16	64	6.08	31	5.47	33	6.79
17	54	5.13	27	4.76	27	5.56
18	66	6.27	30	5.29	36	7.41
19	83	8.36	33	5.82	55	11.31
20	71	6.74	26	4.59	45	9.25
21	52	4.94	18	3.17	34	7.00
22	40	3.80	14	2.47	26	5.35
23	23	2.18	10	1.76	13	2.67
24	10	0.95	4	0.71	6	1.23
Total	1,053	100.00	567	100.00	486	100.00

(Source: "Anuario de Operación 1978", Metro de Mexico)

APPENDIX 6-1 Operation Line Chart



APPENDIX 6-2 Running Time (1)

Double track, EC 4M2T (1920 kW)

To the North			Station	To the South		
Stopping time	Operating time	Distance		Distance	Operating time	Stopping time
	3'45"	4.5 km	Apaseo	4.5 km	3'45"	
30"	5'30"	7.95	[A]	7.95	5'30"	30"
30"	11'10"	19.65	Celaya	19.65	11'10"	30"
30"	8'30"	14.7	Villagran	14.7	8'30"	30"
30"	5'45"	8.4	[B]	8.4	5'45"	30"
30"	8'30"	14.3	Salamanca	14.3	8'30"	30"
30"	5'30"	8.25	[C]	8.25	5'30"	30"
60"	17'20"	32.55	Irapuato	32.55	17'20"	60"
30"	4'45"	6.2	Silao	6.2	4'45"	30"
30"	6'45"	10.5	[D]	10.5	6'30"	30"
30"	9'45"	15.9	[E]	15.9	9'45"	30"
60"	5'30"	8.1	Leon	8.1	5'30"	60"
30"	9'15"	16.12	[F]	16.12	9'30"	30"
			SFD Rincon			
7'00"	102'00"	167.12	Total	167.12	101'30"	7'00"
92.0 km/h			Comercial speed	92.4 km/h		

APPENDIX 6-3 Running Time (2)

Double track, EC 4M2T (1920 kW)
DL (3300 HP), PC 6 CARS (240 ton)

Station	Distance	Operating time		Stopping time
		EC	DL	
Apaseo				
	4.5 km	3'45"	3'45"	
[A]				30"
	7.95	5'30"	5'45"	
Celaya				30"
	19.65	11'10"	11'15"	
Villagran				30"
	14.7	8'30"	9'00"	
[B]				30"
	8.4	5'45"	6'00"	
Salamanca				30"
	14.3	8'30"	8'45"	
[C]				30"
	8.25	5'30"	6'00"	
Irapuato				60"
	32.55	17'20"	18'15"	
Silao				30"
	6.2	4'45"	5'15"	
[D]				30"
	10.5	6'45"	7'15"	
[E]				30"
	15.9	9'45"	10'15"	
Leon				60"
	8.1	5'30"	5'30"	
[F]				30"
	16.12	9'15"	9'30"	
SFD Rincon				
Total	167.12	102'00"	106'30"	7'00"
Commercial speed		92.0 km/h	88.3 km/h	

APPENDIX 6-4 Running Time (3)

Single track, EC 4M2T (1920 kW)

[F] -- Silao Double track

*Peak hour (morning) 25 Minute headway

To the North			Station	To the South		
Stopping time	Operating time	Distance		Distance	Operating time	Stopping time
			Apaseo			
	3'45"	4.5 km		4.5 km	3'45"	
30"			[A]			30"
	5'30"	7.95		7.95	5'30"	
60"			Celaya			60"
		9.85		9.85		
	11'30"		(1)		11'30"	
		9.8		9.8		
60"			Villagran			60"
		7.4		7.4		
	11'30"		(2)		11'30"	
		7.3		7.3		
60"			[B]			60"
	5'45"	7.3		7.3	5'45"	
60"			Salamanca			60"
	4'45"	6.4		6.4	4'45"	
60"			(3)			60"
	5'30"	7.9		7.9	5'30"	
30"			[C]			30"
	5'30"	8.25		8.25	5'30"	
60"			Irapuato			60"
		8.1		8.1		
	11'30"		(4)		11'30"	
		8.15		8.15		
60"			(5)			60"
		8.15		8.15		
	11'30"		(6)		11'30"	
		8.15		8.15		
30"			Silao			30"
	4'45"	6.2		6.2	4'45"	
30"			[D]			30"
	6'45"	10.5		10.5	6'45"	
30"			[E]			30"
	9'45"	15.9		15.9	9'45"	
60"			Leon			60"
	5'30"	8.1		8.1	5'30"	
60"			[F]			60"
	5'30"	7.9		7.9		
6'00"			(7)		9'45"	
	5'30"	8.22		8.22		
			SFD Rincon			
17'30"	114'30"	167.12	Total	167.12	113'15"	11'30"
75.9 km/h			Commercial speed	80.4 km/h		

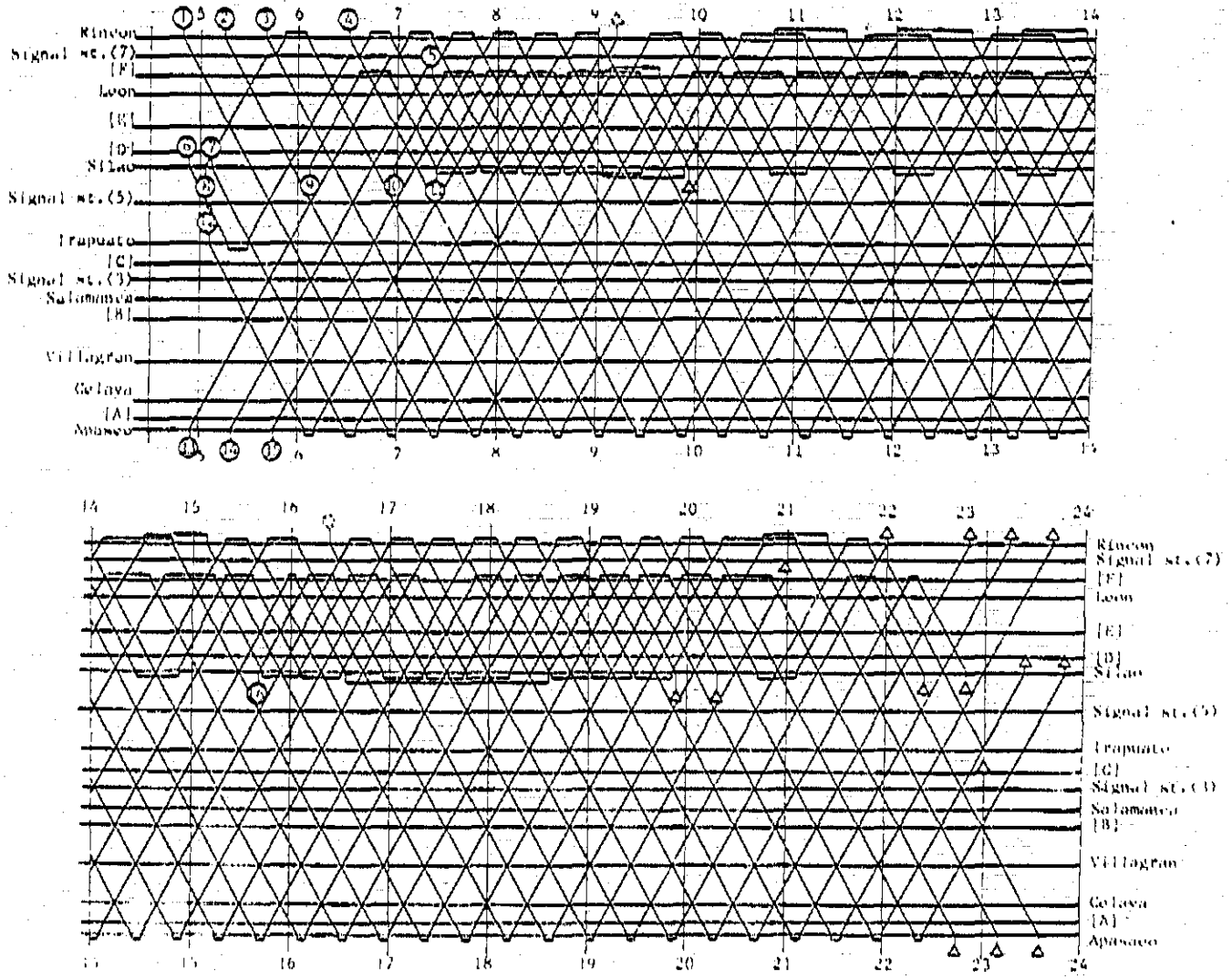
APPENDIX 6-5 Running Time (4)

Single track, DL (3300 HP) + PC 6 CARS (240 ton)

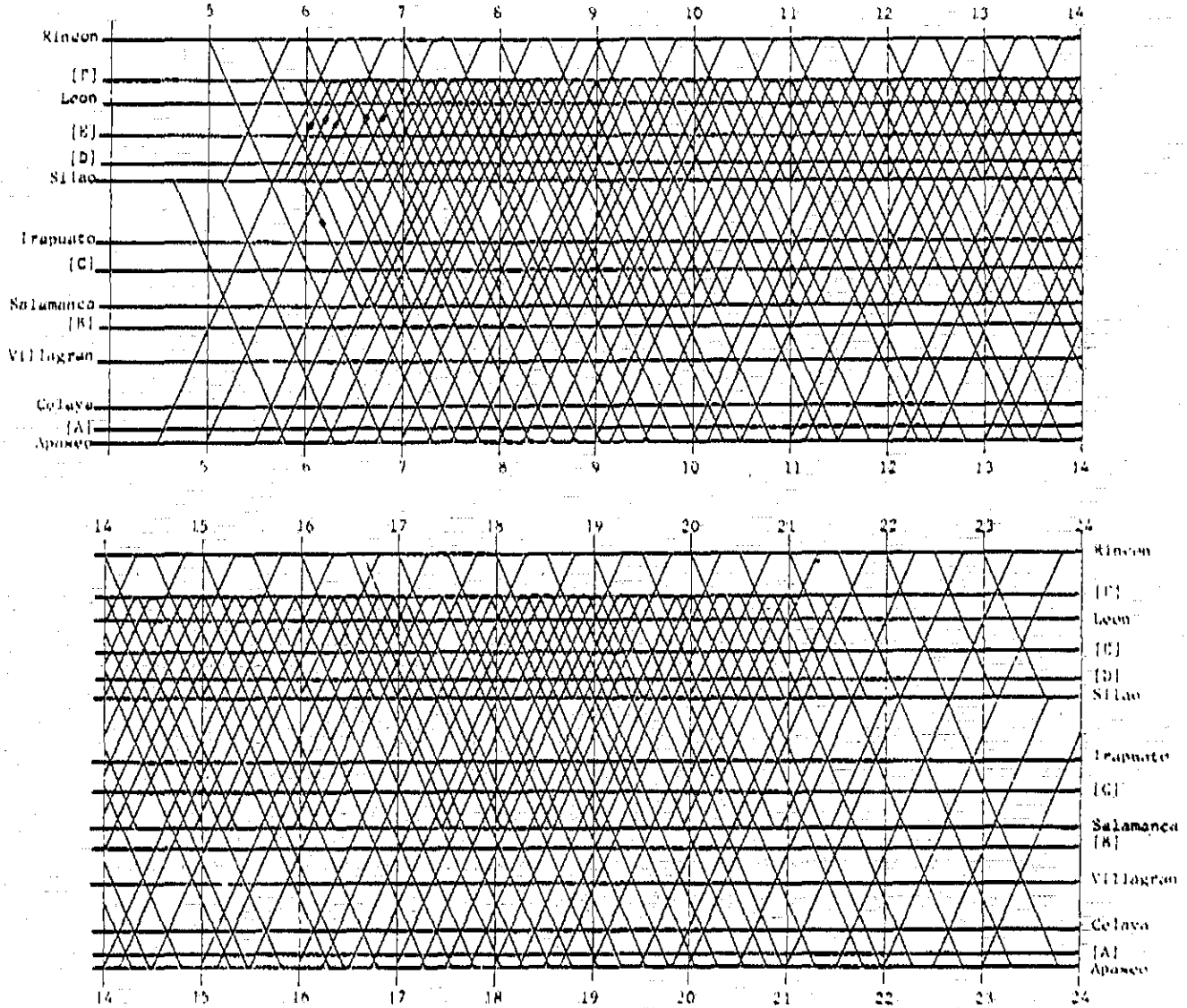
* [F] -- Silao Double track
* Peak hour (morning) 26.5 Minute headway

To the North			Station	To the South		
Stopping time	Operating time	Distance		Distance	Operating time	Stopping time
	3'45"	4.5 km	Apaseo	4.5 km	3'45"	
30"			[A]			30"
	5'45"	7.95		7.95		
60"			Celaya			60"
		9.85		9.85		
	12'15"		(1)		12'15"	
		9.8		9.8		
60"			Villagran			60"
		7.4		7.4		
	12'15"		(2)		12'15"	
		7.3		7.3		
50"			[B]			60"
	6'00"	7.3		7.3	6'00"	
60"			Salamanca			60"
	4'45"	6.4		6.4	4'45"	
60"			(3)			60"
	5'45"	7.9		7.9	5'45"	
30"			[C]			30"
	6'00"	8.25		8.25	6'00"	
60"			Irapuato			60"
		8.1		8.1		
	12'15"		(4)		12'15"	
		8.15		8.15		
60"			(5)			60"
		8.15		8.15		
	12'15"		(6)		12'15"	
		8.15		8.15		
30"			Silao			30"
	5'15"	6.2		6.2	5'15"	
30"			[D]			30"
	7'15"	10.5		10.5	7'15"	
30"			[E]			30"
	10'15"	15.9		15.9	10'15"	
60"			Leon			60"
	5'30"	8.1		8.1	5'30"	
60"			[F]			60"
	5'30"	7.9		7.9		
7'45"			(7)		9'45"	
	5'30"	8.22		8.22		
			SFD Rincon			
18'45"	119'45"	167.12	Total	167.12	118'30"	11'30"
72.4 km/h			Commercial speed	77.1 km/h		

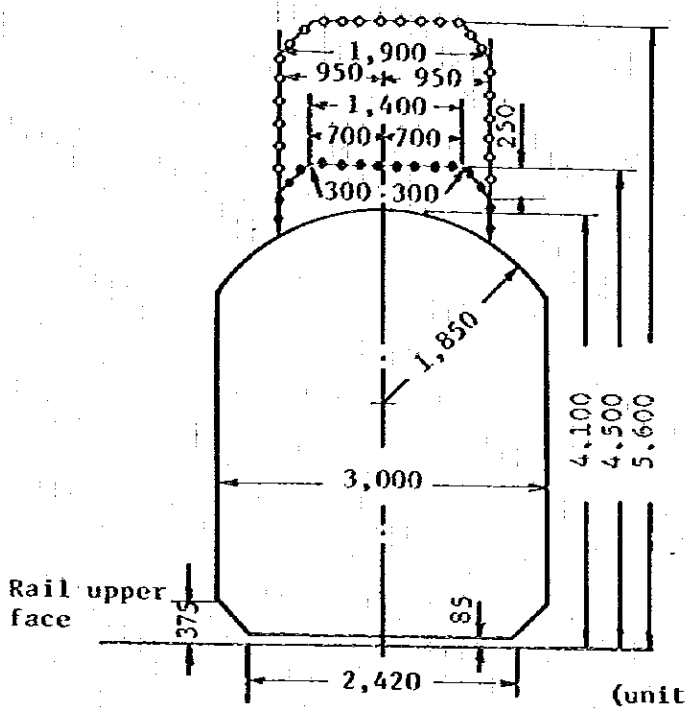
APPENDIX 6-6 Transportation Plan in 1995 and 2000
(Train and Car Operation Diagram)



APPENDIX 6-7 Example of Train Diagram (in 2010)



APPENDIX 6-8 Car Clearance



—— Basic clearance

•—•—• Clearance to the device installed on roof in case when the transforming device of an electric car which is operated by AC electric power is folded.

o—o—o Clearance to the device installed on roof in case when the transforming device of an electric car which is operated by AC electric power is raised.

APPENDIX 6-9 Major Design Specifications of Car

Principal characteristics of rolling stock are shown below.

1) Electric system Single-phase AC 25 kV

2) Kind of car

		Capacity	No. of seat	Approximate weight (tons)
Control electric motorcar with cab:	Mc	112	64	45
Electric motorcar (with pantograph):	M'	124	76	48
Control trailer with cab:	Tc	112	64	43
Trailer (intermediate):	T	124	76	39
Electric motorcar (intermediate):	M	124	76	41

3) Train formation

3-car:	Mc M' Tc
6-car:	Mc M' T M M' Tc
9-car:	Mc M' T M M' T M M' Tc

4) Rolling stock performance

Maximum speed:		130 km/h
Acceleration:		0.43 m/s^2
Deceleration:	Normal use	0.70 m/s^2
	Emergency	0.83 m/s^2

5) Continuous rating (1 unit, around MM')

Output:	960 kW
Tensile force:	4,860 kg
Speed:	72 km/h

6) Dimensions of body

Length:	20,000 mm (in case with cab 21,000 mm)
Width:	2,949
Maximum height:	3,895
Height of folded pantograph:	4,141
Distance between centers of trucks:	14,150

7) Truck

Wheel diameter:	860 mm
Fixed shaft distance:	2,100
Spring system:	Air spring
Gear ratio:	22:77 = 1:3.50

8) Main motor

System:	Pulsating series motor
Continuous rating:	120 kW
Rated voltage:	375 V
Rated current:	360 A

9) Control system

Power:	Series-parallel, weak magnetic field, regenerative brake total control system
Brake:	Electromagnetic direct control brake with power generating brake
Safety system:	ATS

10) Body structure

Body:	Made of steel
Side sliding door:	Automatic two-panel sliding door
End door:	Sliding door system
Gangway	Apron lifting system
Seat:	Open-sided, semi-cross type
Ventilation:	Natural and fandelia
Illumination:	Fluorescent and emergency
Coupler:	Direct tube attaching system

APPENDIX 6-10 Inspection Workload and Repairing Capacity at Car Depot

			1990	1995		2000		2010
			Stage 1	Stage 1	Stage 2	Stage 2	Stage 3	Stage 3
Case 1	Number of cars for inspection	Every 2 months	1.62 cars	1.62	2.62	5.25	5.55	8.50
		Annual	0.16	0.16	0.26	0.52	0.56	0.86
	Accommodating capacity for repair	Every 2 months	3 cars × 1 track	3 cars × 1 track	3 cars × 1 track	6 cars × 1 track	6 cars × 1 track	6 cars × 2 tracks
		Annual	2 cars × 1 track	2 cars × 1 track	2 cars × 1 track	2 cars × 1 track	2 cars × 1 track	2 cars × 1 track
Case 2	Number of cars for inspection	Every 2 months	1.62	1.62	2.38	4.76	4.95	8.03
		Annual	0.16	0.16	0.24	0.48	0.49	0.80
	Accommodating capacity for repair	Every 2 months	3 cars × 1 track	3 cars × 1 track	3 cars × 1 track	6 cars × 1 track	6 cars × 1 track	6 cars × 2 tracks
		Annual	2 cars × 1 track	2 cars × 1 track	2 cars × 1 track	2 cars × 1 track	2 cars × 1 track	2 cars × 1 track
Case 3	Number of cars for inspection	Every 2 months	—	—	2.62	5.25	5.55	8.50
		Annual	—	—	0.26	0.52	0.56	0.86
	Accommodating capacity for repair	Every 2 months	—	—	3 cars × 1 track	6 cars × 1 track	6 cars × 1 track	6 cars × 2 tracks
		Annual	—	—	2 cars × 1 track	2 cars × 1 track	2 cars × 1 track	2 cars × 1 track

Note: 1. Annual inspection is scheduled for two (2) days to inspect each unit of two (2) cars.

2. Two-month inspection is scheduled for one (1) day to inspect each unit of train makeup.

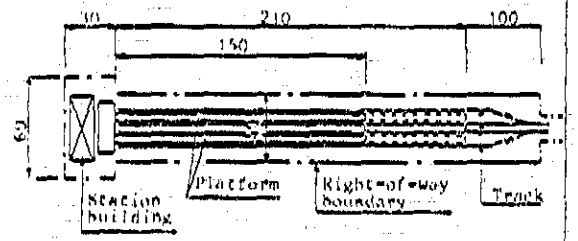
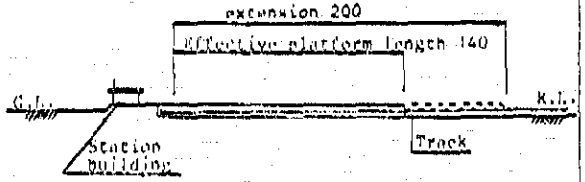
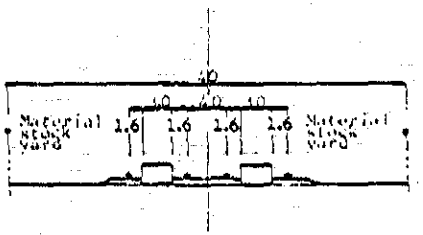
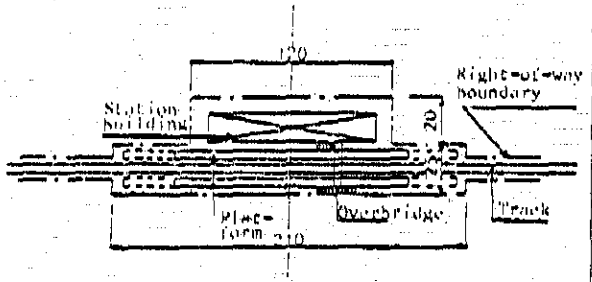
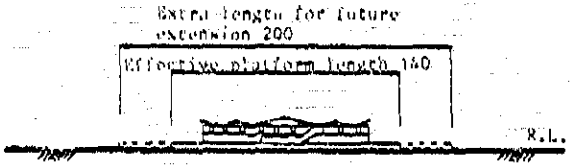
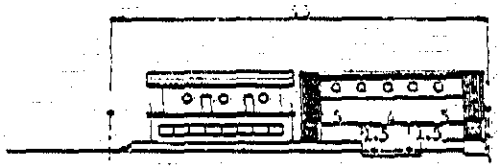
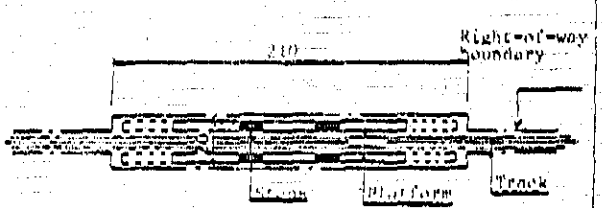
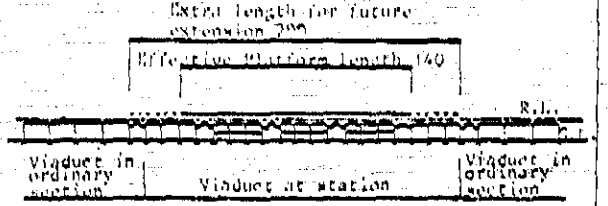
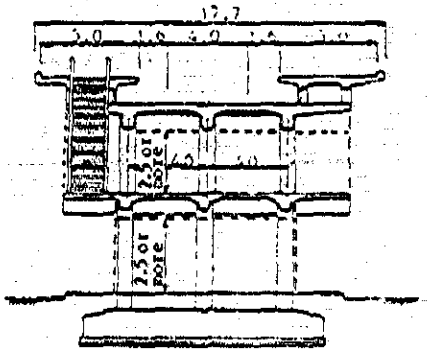
APPENDIX 6-11 Inspection Workload at Car Workshop

		1990	1995		2000		2010
		Stage 1	Stage 1	Stage 2	Stage 2	Stage 3	Stage 3
Case 1	Key parts check	1.01 cars	1.01 cars	1.64	3.28	3.47	5.38
	General inspection	1.26	1.26	2.05	4.10	4.34	6.72
	Total	2.27	2.27	3.69	7.38	7.81	12.10
	Number of trains staying at workshop	3 cars × 1 makeup	3 cars × 1 makeup	3 cars × 2 makeups	6 cars × 2 makeups	6 cars × 2 makeups	6 cars × 2 makeups
Case 2	Key parts check	1.01	1.01	1.49	2.98	3.09	5.02
	General inspection	1.26	1.26	1.86	3.72	3.87	6.27
	Total	2.27	2.27	3.35	6.70	6.96	11.29
	Number of trains staying at workshop	3 cars × 1 makeup	3 cars × 1 makeup	3 cars × 2 makeups	6 cars × 2 makeups	6 cars × 2 makeups	6 cars × 2 makeups
Case 3	Key parts check	—	—	1.64	3.28	3.47	5.38
	General inspection	—	—	2.05	4.10	4.34	6.72
	Total	—	—	3.69	7.38	7.81	12.10
	Number of trains staying at workshop	—	—	3 cars × 2 makeups	6 cars × 2 makeups	6 cars × 2 makeups	6 cars × 2 makeups

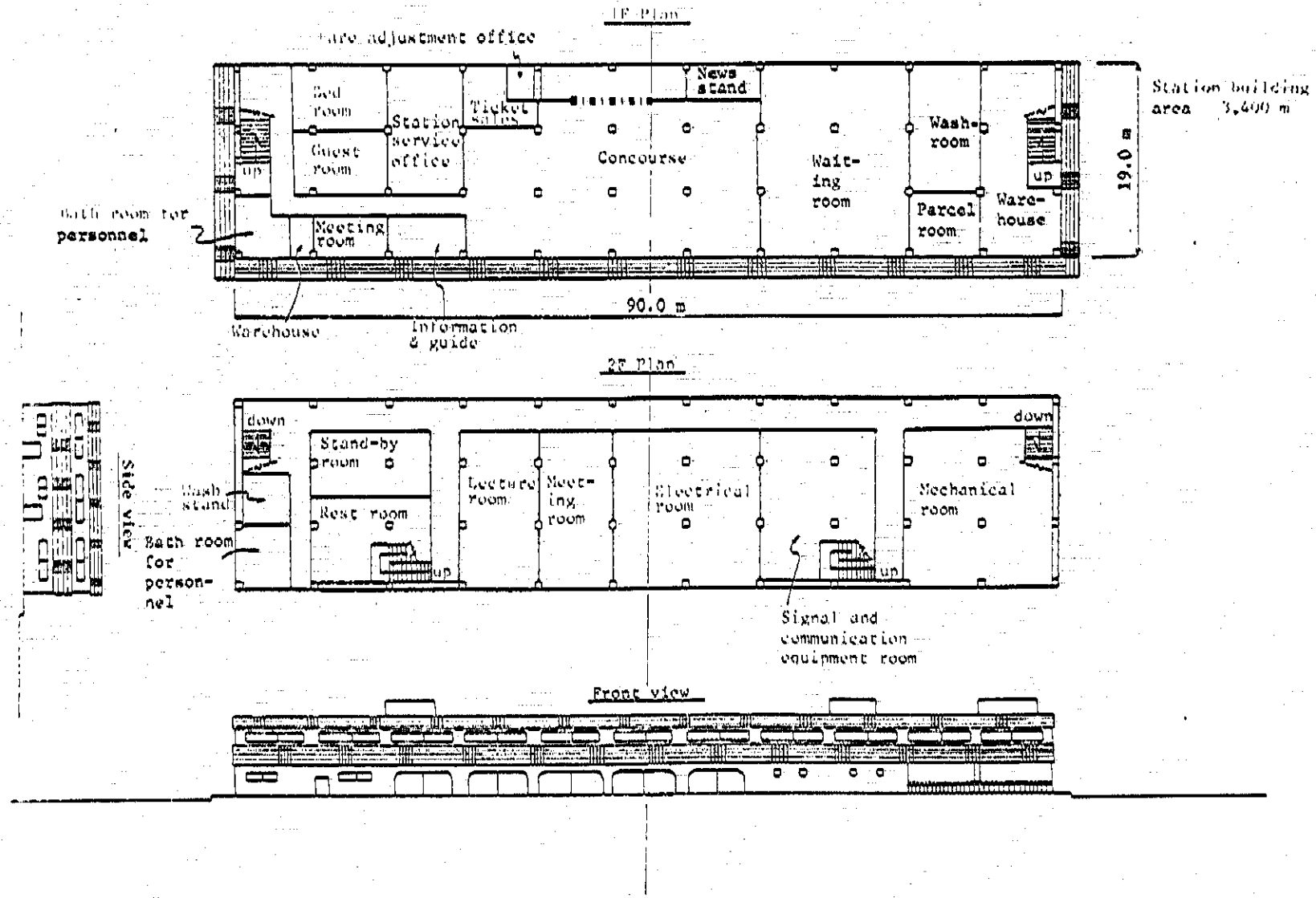
APPENDIX 7-1 Reference Plan of Station Building (1)

Platform Plan

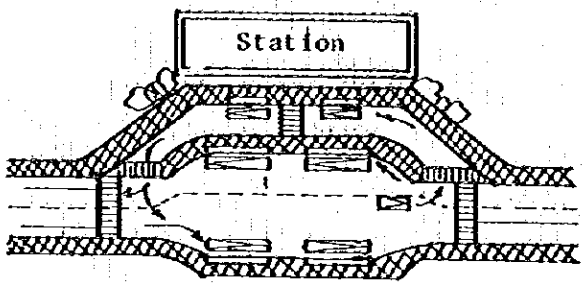
(Unit: m)

Plan	Side view	Cross section
Apaseo el Grande St. San Francisco del Rincon St. 		
Irapuato St. 		
Leon St. 		

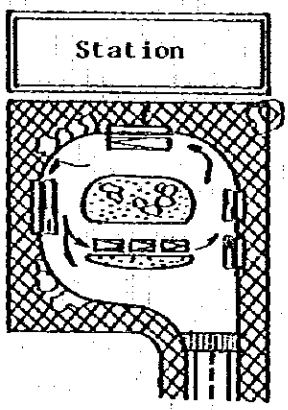
APPENDIX 7-1 Reference Plan of Station Building (2)



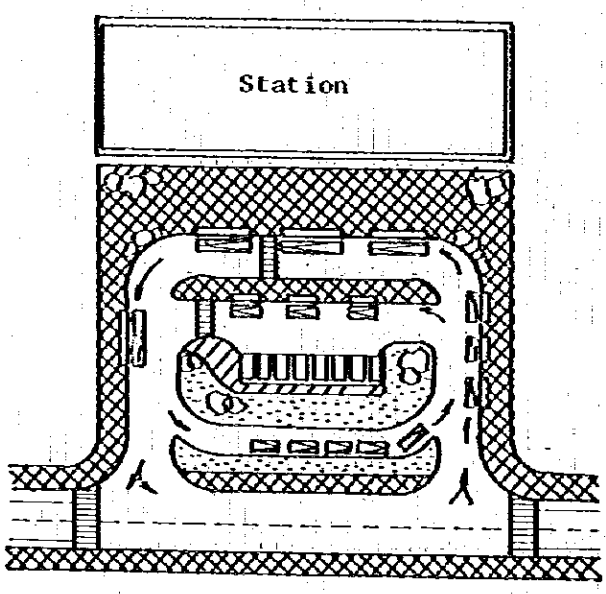
APPENDIX 7-2 Standard of Station Plaza (1)



1,000 m²

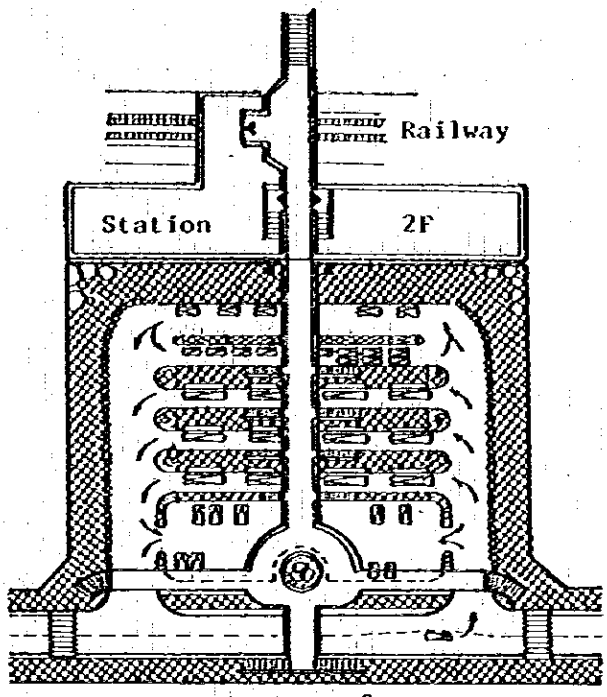


2,000 m²

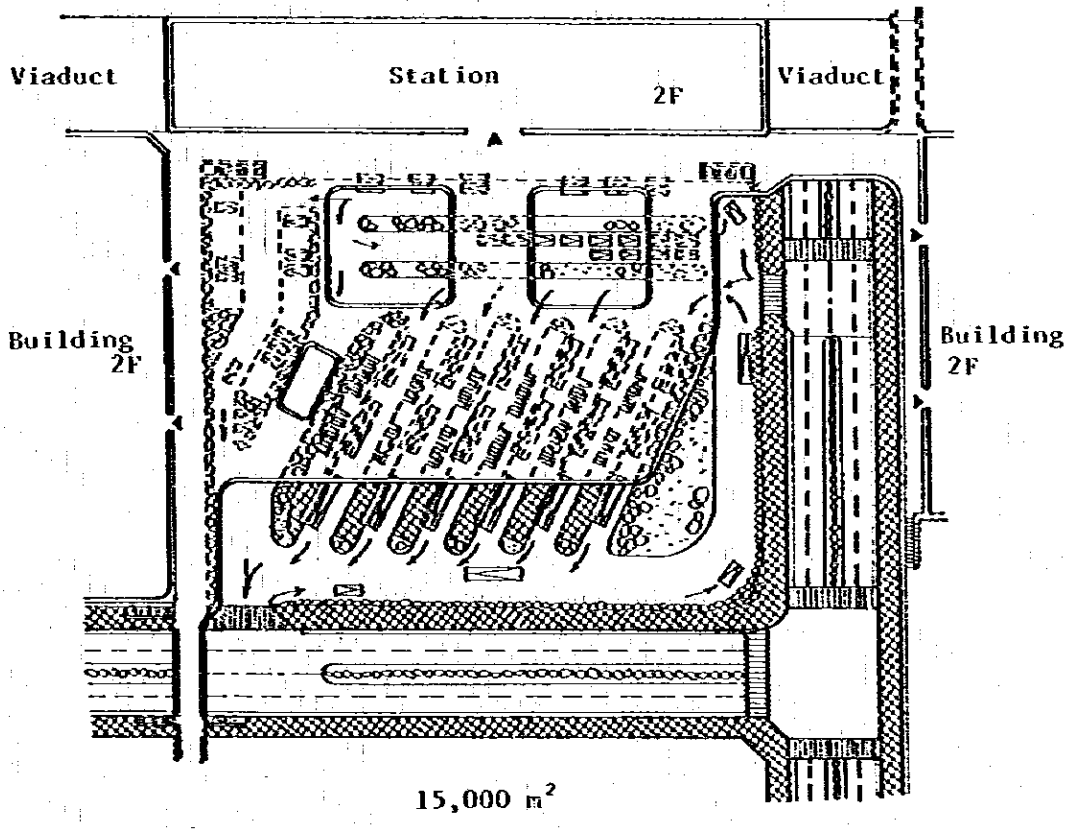


4,000 m²

APPENDIX 7-2 Standard of Station Plaza (2)

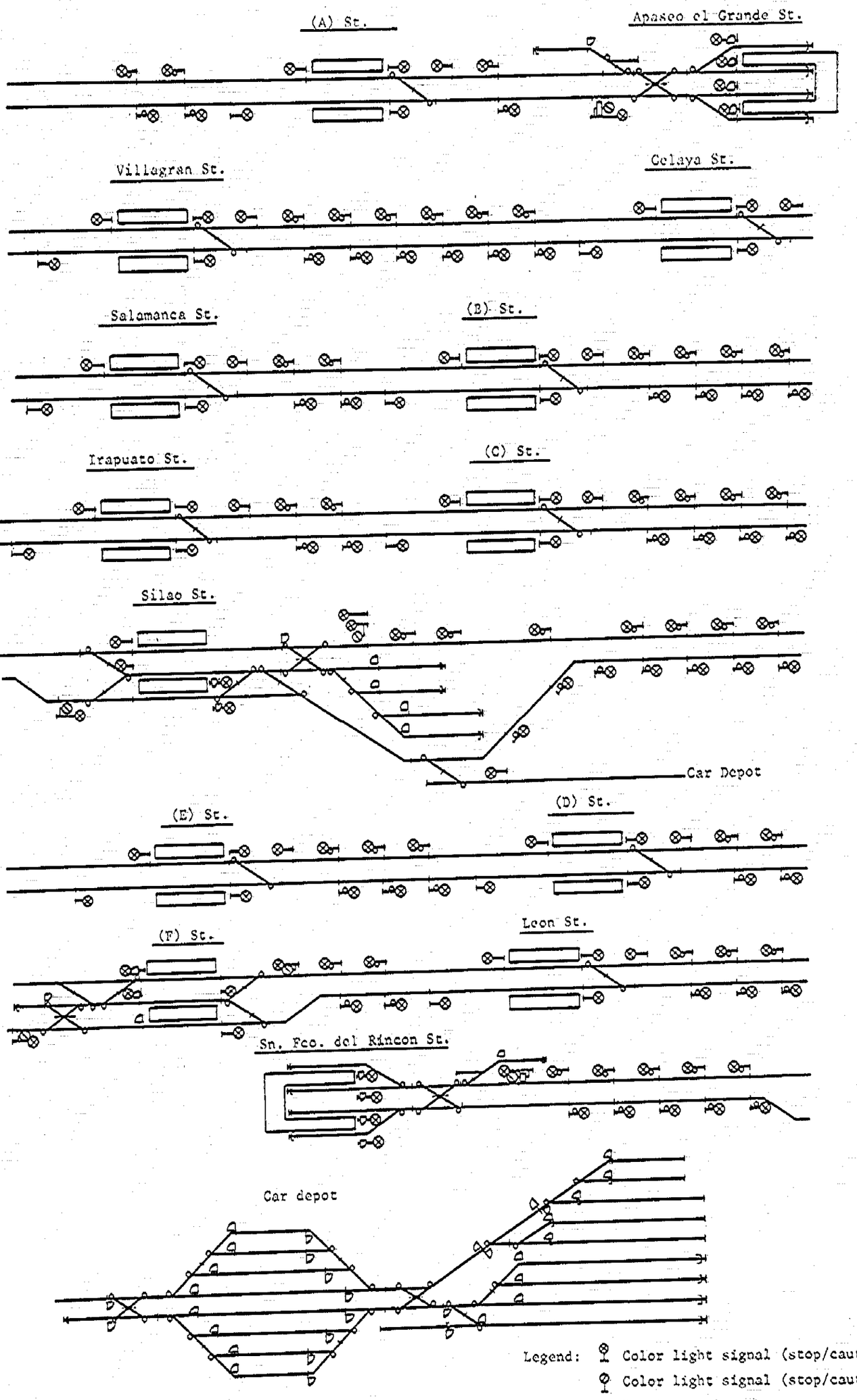


10,000 m²

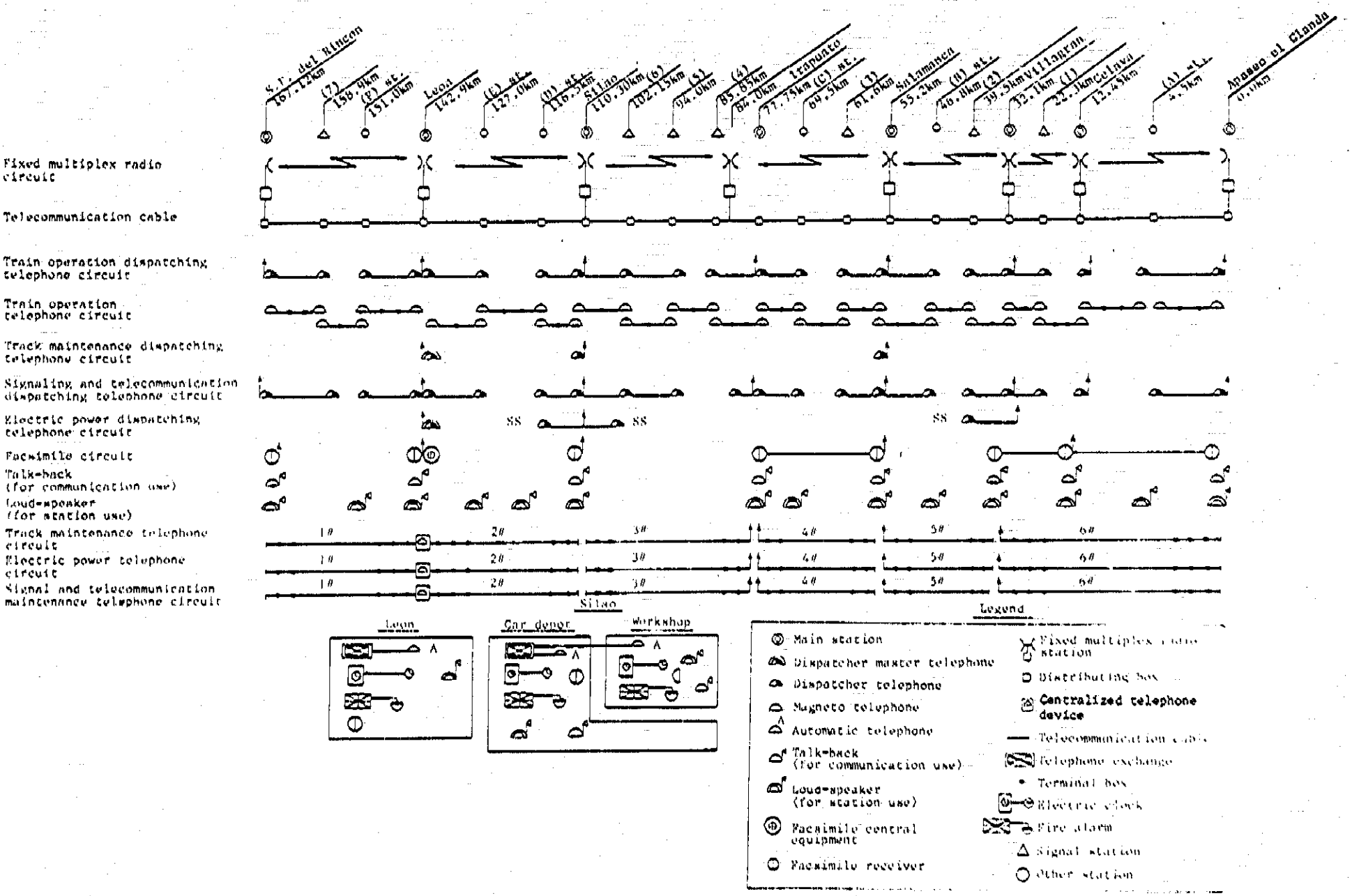


15,000 m²

APPENDIX 7-3 Configuration of the Signaling System



APPENDIX 7-4 Composition Diagram of the Telecommunication System



APPENDIX 9-1 List of Personnel (Case 1)

(Unit: Person)

		1990 - 1994	1995 - 1996	1997 - 1999	2000 - 2004	2005 - 2013	Remarks
C.T.C.	A	11	17	17	8	8	
Station personnel	A	27	48	49	49	49	Administrators (station master, assistant)
	B	63	101	123	161	231	Ticket personnel, train operator
	C	36	58	62	96	125	Ticket, platform personnel
Motormen	A	31	49	49	45	67	Administrators (section chief, assistant) 50% of motormen
	B	43	61	61	57	89	50% of motormen, clerical personnel on duty
Conductors	A	2	2	2	2	3	Administrator (section chief, assistant)
	B	51	78	78	73	106	Conductors, clerical personnel on duty
Car maintenance personnel	A	3	3	3	3	3	Administrator (section chief, assistant)
	B	19	22	24	24	29	Clerical and technical personnel, 30% of inspection personnel
	C	21	28	34	34	46	70% of inspection personnel
Management personnel	A	12	18	19	23	28	50%
	B	12	19	19	23	28	50%
Total	A	86	137	139	130	158	
	B	188	291	305	338	483	
	C	57	86	96	130	171	

APPENDIX 9-2 ECONOMIC ANALYSIS FOR MEXICO NEW RAILWAY DEVELOPMENT PROJECT (1)

Case 1

(Million pesos)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
INVESTMENT DIFF	353	610	918	2253	5559	9547	127	143	960	1455	4168	-468	6604	175	1219	1515	-175	54	-448	-487	4138	-578	-639	-690	-753	4786	-1862	-1138	-1243	-13271
WITH	353	610	918	2253	5559	9547	1541	370	1619	2673	5085	65	7066	1386	2810	2659	35	547	91	102	4775	112	123	130	137	5752	606	231	256	-24261
ELECTRIFICATION				950	1583	633			400	667	266			550	917	367														
SIGNALS & TELECOM	223			375	938	563	130		223	558	335	45		88	221	132														
CIVIL WORK		371	740	928	3038	2806		307	910	1365	1668		633	633	1546	2217		386								1193				
LAND ACQ & COMP	130	239	178				214					50						74												
CARS						4898					2638		6335								4670					4499				
CAR DEPOT FACILITIES						647	749																							
ACCESS BUS							448	63	77	84	98	-11	98	116	126	144	35	88	91	102	105	112	123	130	137	151	606	231	256	277
-SALVAGE VALUE																														24538
WITHOUT							1414	228	650	1218	817	553	462	1211	1591	1344	210	494	539	588	637	690	753	819	889	966	2468	1369	1498	-10991
CIVIL WORK									293	715	474			510	834	651														
LAND ACQ & COMP									97	202				169	155															
BUS							1414	228	259	391	343	553	462	532	602	693	210	494	539	588	637	690	753	819	889	966	2468	1369	1498	1649
-SALVAGE VALUE																														12639
MAINT/OPE COST DIFF						778	-2	-135	-282	-457	-455	-680	-974	-986	-1370	-1617	-1700	-2028	-2390	-2783	-3212	-3224	-3733	-4289	-4897	-5556	-6279	-7065	-7921	-8853
FACILITY MAINT COST DIFF						528	221	168	110	41	164	87	-29	107	-45	-23	-48	-178	-320	-475	-644	-516	-717	-936	-1176	-1435	-1720	-2030	-2368	-2735
WITH																														
ELECTRIC FACILITIES						62	62	62	62	62	89	89	89	89	89	139	139	130	130	130	130	139	130	130	130	130	130	139	130	130
SIGNALS & TELECOM						72	72	72	72	72	116	116	116	116	116	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134
CIVIL WORK						192	192	192	192	192	290	290	290	290	290	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
CARS						164	164	164	164	164	164	267	267	535	535	535	565	565	565	565	565	877	877	877	877	877	877	877	877	877
CAR DEPOT FACILITIES						38	38	38	38	38	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82
ACCESS BUS							143	163	187	214	245	242	273	310	350	395	407	434	463	496	529	565	604	645	688	736	786	840	897	958
WITHOUT																														
CIVIL WORK											12	12	12	12	12	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
BUS							450	522	605	701	810	986	1133	1302	1494	1714	1781	1936	2119	2297	2500	2719	2959	3219	3502	3810	4145	4508	4903	5332
OPERATING COST DIFF						250	-223	-303	-392	-498	-618	-767	-945	-1092	-1325	-1594	-1652	-1851	-2070	-2308	-2568	-2708	-3016	-3353	-3721	-4120	-4559	-5034	-5553	-6118
WITH						250	469	500	537	579	626	748	796	909	971	1041	1086	1128	1173	1222	1274	1471	1531	1594	1661	1735	1812	1894	1981	2076
PSNL COST						204	410	439	475	514	559	662	707	780	838	904	944	985	1027	1073	1122	1296	1353	1413	1476	1545	1618	1695	1777	1866
FUEL COST							13	14	16	19	22	21	24	27	31	35	36	38	41	44	47	50	53	57	61	65	69	74	79	84
ELEC COST						46	46	46	46	46	46	64	64	102	102	102	106	106	106	106	106	125	125	125	125	125	125	125	125	125
WITHOUT							692	803	930	1077	1245	1515	1741	2001	2296	2635	2733	2979	3243	3539	3842	4179	4547	4948	5383	5855	6370	6929	7535	8194
PSNL COST							652	757	876	1015	1173	1428	1641	1887	2164	2434	2581	2808	3057	3328	3622	3940	4287	4664	5074	5520	6006	6532	7103	7725
FUEL COST							40	46	53	62	71	87	100	115	131	151	157	171	186	202	220	239	260	283	308	335	365	397	431	469
TIME SAVING BENEFIT							-11	11	43	85	142	542	732	973	1278	1660	2486	2762	3068	3407	3783	4201	4664	5178	5748	6380	7043	7816	8671	9619
NET FLOW	-353	-610	-918	-2253	-5559	-10325	-136	3	-635	-913	-3591	1691	-4899	1783	1429	1761	4352	4737	5906	6676	2858	8003	9027	10157	11397	7150	15184	16018	17835	31744
EIRR	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991	9.991

APPENDIX 9-2 ECONOMIC ANALYSIS FOR MEXICO NEW RAILWAY DEVELOPMENT PROJECT (2)

Case 2

(Million pesos)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
INVESTMENT DIFF	323	610	918	2257	5568	9553	-10	260	469	1407	3217	-525	6183	162	1396	663	-175	27	-445	-403	2803	-578	-634	-686	-749	4874	-1859	-1138	-1239	-11650
WITH	323	610	918	2257	5568	9553	1404	488	1110	2625	4034	28	6645	1185	2826	2080	32	524	55	102	3440	116	119	130	140	5840	609	231	259	-22316
ELECTRIFICATION				948	1580	632			322	537	215			475	792	316														
SIGNALS & TELECOM	193			361	956	573	111		217	564	326	17		34	84	59										1285				
CIVIL WORK		371	740	928	3032	2892		363	493	1459	1133		507	564	1825	1546		364												
LAND ACQ & COMP	130	239	176				95	62				18	17					73												
CARS						4898					2261		6019								3335					4409				
CAR DEPOT FACILITIES						647	749																							
ACCESS BUS							448	63	77	84	98	-7	102	112	126	147	32	88	95	102	105	116	119	130	140	147	609	231	259	277
-SALVAGE VALUE																														22592
WITHOUT							1414	228	650	1218	817	553	462	1023	1431	1197	207	497	539	585	637	693	753	816	889	966	2468	1369	1498	-10666
CIVIL WORK									294	715	474			372	681	504														
LAND ACQ & COMP									97	202				123	148															
BUS							1414	228	259	301	343	553	462	529	602	693	207	497	539	585	637	693	753	816	889	966	2468	1369	1498	1649
-SALVAGE VALUE																														12314
MAINT/OPE COST DIFF						760		-133	-289	-455	-459	-767	-1058	-1103	-1487	-1769	-1836	-2167	-2525	-2916	-3345	-3382	-3593	-4447	-5052	-5713	-6434	-7219	-8073	-9005
FACILITY MAINT COST DIFF						530	222	170	112	43	129	30	-85	24	-128	-142	-159	-260	-422	-576	-745	-642	-843	-1062	-1300	-1561	-1645	-2155	-2491	-2859
WITH																														
ELECTRIC FACILITIES						62	62	62	62	62	81	81	81	81	81	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116
SIGNALS & TELECOM						74	74	74	74	74	113	113	113	113	113	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121
CIVIL WORK						192	192	192	192	192	266	266	266	266	266	395	395	395	395	395	395	395	395	395	395	395	395	395	395	395
CARS						164	164	164	164	164	164	243	243	484	484	484	532	532	532	532	532	819	819	819	819	819	819	819	819	819
CAR DEPOT FACILITIES						38	38	38	38	38	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82
ACCESS BUS							143	163	187	214	245	243	275	311	351	393	408	436	466	493	531	568	606	647	692	739	790	843	901	962
WITHOUT																														
CIVIL WORK											12	12	12	12	12	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
BUS							459	522	605	701	810	936	1133	1301	1493	1713	1779	1937	2109	2295	2498	2718	2958	3217	3500	3808	4143	4506	4900	5329
OPERATING COST DIFF						250	-222	-383	-392	-498	-618	-797	-974	-1126	-1359	-1626	-1686	-1836	-2104	-2340	-2600	-2740	-3050	-3385	-3752	-4152	-4589	-5065	-5582	-6147
WITH						250	469	500	538	579	627	718	767	873	935	1097	1018	1091	1137	1187	1238	1437	1496	1559	1627	1699	1778	1860	1949	2043
FSNL COST						204	411	440	475	514	559	638	685	754	812	830	918	959	1002	1049	1097	1271	1326	1386	1450	1518	1592	1670	1754	1842
FUEL COST							13	14	16	19	22	21	24	27	31	35	36	38	41	44	47	50	53	57	61	65	70	74	79	85
ELEC COST						46	46	46	46	46	46	58	58	92	92	92	94	94	94	94	94	116	116	116	116	116	116	116	116	116
WITHOUT							692	883	930	1077	1245	1515	1741	2000	2294	2633	2734	2977	3241	3527	3838	4177	4545	4944	5379	5852	6367	6925	7531	8190
FSNL COST							652	757	876	1015	1173	1428	1641	1885	2163	2482	2578	2807	3055	3325	3619	3938	4285	4661	5071	5517	6002	6529	7100	7721
FUEL COST							40	46	53	62	71	87	100	114	131	151	157	170	186	202	220	239	260	283	308	335	365	396	431	469
TIME SAVING BENEFIT							-11	11	43	85	142	536	724	964	1268	1650	2172	2745	3049	3386	3760	4174	4634	5145	5710	6338	7010	7777	8629	9572
NET FLOW	-323	-610	-918	-2257	-5568	-10332	-1	-116	-137	-866	-2586	1829	-4400	1905	1359	2555	4483	4885	6919	6785	4301	8134	9161	10278	11511	7176	15302	16134	17930	30227
EIRR	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528	10.528

APPENDIX 9-2 ECONOMIC ANALYSIS FOR MEXICO NEW RAILWAY DEVELOPMENT PROJECT (3)

Case 3

(Million pesos)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
INVESTMENT DIFF	130	230	248	279	743	1343	2282	2743	3707	6627	9548	-2288	6649	634	2093	184	-175	53	-448	-487	4138	-578	-639	-690	-753	-816	-896	-973	-1061	-10348
WITH	130	230	248	279	743	1343	2282	2743	4097	7549	10021	830	7311	1846	3683	3528	35	547	91	102	4775	112	123	130	137	151	158	168	179	-19923
ELECTRIFICATION																														
SIGNALS & TELECOM							225	449	674	2246	898			550	917	367														
CIVIL WORK						353	149	299	449	1196	897		45	88	221	135														
LAND ACQ & COMP	130	230	248	174	695	990	1908	1995	2975	3125	279		633	1092	2420	883		365												
CARS				105	48							50						74												
CAR DEPOT FACILITIES											7537		6335								4670									
ACCESS BUS										977	420																			
-SALVAGE VALUE												769	93	116	126	144	35	68	91	102	105	112	123	130	137	151	158	168	179	193
																														20116
WITHOUT									391	917	474	3098	462	1211	1591	1359	210	494	539	588	637	690	753	819	889	966	1054	1141	1239	-9575
CIVIL WORK									294	715	474			510	834	651														
LAND ACQ & COMP									97	202				169	155															
BUS																														
-SALVAGE VALUE												3098	462	532	602	693	210	494	539	588	637	690	753	819	889	966	1054	1141	1239	1348
																														10923
MAINT/OPE COST DIFF											1238	-680	-974	-986	-1370	-1617	-1700	-2028	-2393	-2783	-3212	-3224	-3733	-4289	-4897	-5555	-6279	-7065	-7921	-8853
FACILITY MAINT COST DIFF											831	87	-29	107	-45	-23	-48	-178	-320	-475	-644	-516	-717	-936	-1176	-1435	-1720	-2030	-2368	-2735
WITH																														
ELECTRIC FACILITIES											89	89	89	89	89	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
SIGNALS & TELECOM											116	116	116	116	116	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134
CIVIL WORK											290	290	290	290	290	442	442	442	442	442	442	442	442	442	442	442	442	442	442	442
CARS											267	267	267	535	535	535	565	565	565	565	565	877	877	877	877	877	877	877	877	877
CAR DEPOT FACILITIES											82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82
ACCESS BUS												242	273	310	359	395	497	439	463	496	529	565	604	645	688	735	786	840	897	958
WITHOUT																														
CIVIL WORK											12	12	12	12	12	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
BUS												986	1133	1302	1494	1714	1781	1938	2110	2297	2503	2719	2959	3219	3502	3810	4145	4508	4903	5332
OPERATING COST DIFF											376	-767	-945	-1092	-1325	-1594	-1652	-1851	-2070	-2308	-2568	-2708	-3016	-3353	-3721	-4120	-4559	-5034	-5553	-6118
WITH											376	748	796	909	971	1041	1086	1128	1173	1222	1274	1471	1531	1599	1661	1735	1812	1894	1981	2076
PSNL COST											312	662	707	789	838	934	944	985	1027	1073	1122	1296	1353	1413	1476	1545	1618	1695	1777	1866
FUEL COST												21	24	27	31	35	35	38	41	44	47	50	53	57	61	65	69	74	79	84
ELEC COST											64	64	64	102	102	102	106	106	106	106	106	125	125	125	125	125	125	125	125	125
WITHOUT												1515	1741	2001	2296	2635	2738	2979	3243	3530	3842	4179	4547	4948	5383	5855	6370	6929	7535	8194
PSNL COST												1428	1641	1887	2169	2484	2591	2838	3057	3328	3622	3940	4287	4664	5074	5520	6006	6532	7103	7725
FUEL COST												87	100	115	131	151	157	171	185	202	220	239	260	283	308	335	365	397	431	469
TIME SAVING BENEFIT												542	732	973	1278	1660	2486	2762	3068	3407	3783	4201	4664	5178	5748	6380	7043	7816	8671	9619
NET FLOW	-130	-230	-248	-279	-743	-1343	-2282	-2743	-3707	-6627	-10755	3510	-4944	1324	555	3092	4362	4737	5996	6676	2858	8003	9027	10157	11397	12751	14218	15853	17653	28821
EIRR	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523	11.523

APPENDIX 10-1 FINANCIAL ANALYSIS FOR MEXICO NEW RAILWAY DEVELOPMENT PROJECT (1)

Case 1

(Million pesos)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
OPERATING PROFIT						-1346	-492	-354	-193	-6	-276	-84	-60	-116	292	454	547	891	1267	1678	1917	1841	2376	2960	3598	4295	5059	5890	6798	7790
OPERATING REVENUE							854	992	1153	1300	1557	2028	2336	2690	3098	3569	3732	4076	4452	4862	5310	5800	6335	6919	7557	8253	9017	9848	10756	11748
OPERATING EXPENSE						1346	1346	1346	1346	1306	1833	2112	2396	2606	2806	3116	3184	3184	3184	3184	3394	3958	3958	3958	3958	3958	3958	3958	3958	3958
WORKERS COST						892	892	892	892	892	1119	1398	1398	1603	1808	2038	2107	2107	2107	2107	2107	2672	2672	2672	2672	2672	2672	2672	2672	2672
MAINTENANCE COST						579	579	579	579	579	805	922	922	1225	1225	1455	1489	1489	1489	1489	1489	1843	1843	1843	1843	1843	1843	1843	1843	1843
PERSONNEL COST						234	234	234	234	234	234	359	359	380	380	359	406	406	406	406	406	545	545	545	545	545	545	545	545	545
ENERGY COST						80	80	80	80	80	80	118	118	203	203	203	213	213	213	213	213	284	284	284	284	284	284	284	284	284
DEPRECIATION						454	454	454	454	454	714	714	997	997	997	1077	1077	1077	1077	1077	1266	1286	1286	1286	1286	1286	1286	1286	1286	1286
INVESTMENT	433	817	1165	2454	6020	9938	1277	354	1702	2817	5100	127	7039	1394	2906	2952		580			4652					5591				
FOREIGN TOTAL	143			610	1650	4936	327		291	753	2598	33	4771	285	756	701		18			3517					4161				
LOCAL TOTAL	290	817	1165	1844	4370	5002	950	354	1411	2064	2502	94	2268	1109	2150	2251		562			1135					1430				
ELECTRIFICATION				999	1666	666			424	707	282			574	957	383														
FOREIGN CURRENCY				353	588	235			139	232	93			225	377	150														
LOCAL CURRENCY				647	1078	431			285	475	190			348	581	232														
SIGNALS & TELECOM	203			385	964	579	117		230	575	345	39		91	229	137														
FOREIGN CURRENCY	143			257	643	386	84		152	380	228	33		60	149	89										1201				
LOCAL CURRENCY	60			128	321	193	33		78	195	117	6		32	80	48										841				
CIVIL WORK		427	652	1069	3390	3124		354	1048	1535	1845		729	729	1720	2432		440								360				
FOREIGN CURRENCY					419	419				141	290				230	461		18												
LOCAL CURRENCY		427	852	1069	2971	2705		354	1048	1394	1555		729	729	1490	1971		422												
LAND ACQ & COMP	230	390	313				362					68						140												
LOCAL CURRENCY	230	390	313				362					68						140												
CARS						4878					2628		6310								4652					4390				
FOREIGN CURRENCY						3689					1987		4771								3517					3320				
LOCAL CURRENCY						1189					641		1539								1135					1070				
CAR DEPOT FACILITIES						691	798																							

SIGNALS & TELECOM	203			385	964	579	117		230	575	345	39		91	229	137											1201				
FOREIGN CURRENCY	143			257	643	386	84		152	380	228	33		60	149	89											841				
LOCAL CURRENCY	60			128	321	193	33		78	195	117	6		32	80	48											360				
CIVIL WORK		427	852	1069	3390	3124		354	1048	1535	1845		729	729	1720	2432		440													
FOREIGN CURRENCY					419	419				141	290				230	461		18													
LOCAL CURRENCY		427	852	1069	2971	2705		354	1048	1394	1555		729	729	1490	1971		422													
LAND ACQ & COMP	230	390	313				362					88						140													
LOCAL CURRENCY	230	390	313				362					88						140													
CARS						4878					2628		6310								4652					4390					
FOREIGN CURRENCY						3689					1987		4771								3517					3320					
LOCAL CURRENCY						1189					641		1539								1135					1070					
CAR DEPOT FACILITIES						691	798																								
FOREIGN CURRENCY						207	243																								
LOCAL CURRENCY						484	555																								
-SALVAGE VALUE																															24052
INT DURING CONST	11	16	17	66	214	656	25	36	62	133	365	3	367	552	674	816															
FINANCE PROGRAM																															
FINANCE TOTAL																															
BORROWING	444	833	1182	2519	6234	10594	1302	390	1764	2951	5465	130	7406	1946	3580	3768		580			4652					5591					
REPAYMENT						10	11	12	58	182	555	578	580	604	663	661	863	1206	1261	1357	1448	1447	1447	1402	1277	1139	1115	1113	1089	1030	
BALANCE	444	1277	2459	4978	11212	21796	23087	23465	25171	27940	32850	32402	39228	40570	43487	46394	45531	44906	43644	42287	45492	44045	42599	41197	39920	44372	43257	42144	41054	40024	
INTEREST							830	829	824	809	763	1165	1107	1047	982	901	1711	1600	1476	1342	1464	1407	1262	1121	990	1185	1177	1065	956	851	
FINANCE IN FOREIGN CCY																															
BORROWING	154	16	17	676	1864	5592	352	36	353	887	2963	36	5138	837	1429	1517		18			3517					4161					
REPAYMENT						10	11	12	58	182	555	578	580	604	663	861	863	1206	1261	1357	1448	1447	1447	1402	1277	1139	1115	1113	1089	1030	
BALANCE	154	170	187	863	2727	8309	8650	8673	8969	9674	12083	11540	16098	16331	17097	17754	16891	15703	14441	13085	15159	13708	12261	10859	9582	12604	11489	10376	9286	8256	
INTEREST							830	829	824	809	763	1165	1107	1047	982	901	1711	1600	1476	1342	1464	1407	1262	1121	990	1185	1177	1065	956	851	
FINANCE IN LOCAL CCY																															
BORROWING	290	817	1165	1844	4370	5002	950	354	1411	2064	2502	94	2268	1109	2150	2251		562			1135					1430					
REPAYMENT																															
BALANCE	290	1107	2272	4116	8485	13488	14437	14791	16202	18266	20768	20862	23139	24239	26390	28641	28641	29203	29203	29203	30338	30338	30338	30338	30338	31768	31768	31768	31768	31768	
INTEREST																															
NET CASHFLOW						-903	-880	-741	-621	-543	-880	-1114	-759	-770	-355	-231	-949	-837	-393	56	292	274	954	1724	2617	3257	4053	4998	6039	7194	
CASH IN	444	833	1182	2519	6234	9702	1264	490	2025	3393	5903	759	8344	2828	4870	5299	1624	2549	2344	2755	7855	3128	3663	4247	4884	11173	6345	7176	8084	9076	
OPERATING PROFIT						-1346	-492	-354	-193	-6	-276	-84	-60	-116	292	454	547	891	1267	1678	1917	1841	2376	2960	3598	4295	5059	5890	6798	7790	
DEPRECIATION						454	454	454	454	454	714	714	997	997	997	1077	1077	1077	1077	1077	1286	1286	1286	1286	1286	1286	1286	1286	1286	1286	
BORROWING	444	833	1182	2519	6234	10594	1302	390	1764	2951	5465	130	7406	1946	3580	3768		580			4652					5591					
CASH OUT	444	833	1182	2519	6234	10604	2144	1231	2646	3991	6783	1873	9094	3597	5225	5530	2574	3386	2737	2699	7563	2853	2709	2523	2267	7915	2292	2178	2045	1882	
INVESTMENT	433	817	1165	2454	6020	9938	1277	354	1702	2817	5100	127	7039	1394	2906	2552		580			4652					5591					
INT DURING CONST.	11	16	17	66	214	656	25	36	62	133	365	3	367	552	674	816															
REPAYMENT						10	11	12	58	182	555	578	580	604	663	861	863	1206	1261	1357	1448	1447	1447	1402	1277	1139	1115	1113	1089	1030	
INTEREST							830	829	824	809	763	1165	1107	1047	982	901	1711	1600	1476	1342	1464	1407	1262	1121	990	1185	1177	1065	956	851	
CASHFLOW <ROI>	-433	-817	-1165	-2454	-6020	-10831	-1316	-254	-1441	-2369	-4662	502	-6102	-512	-1616	-1421	1624	1389	2344	2755	-1449	3128	3663	4247	4884	-10	6345	7176	8084	33128	
FIRR <ROI>	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	3.421	
CUM OPE REVENUE							854	1847	3000	4334	5897	7925	10260	12950	16049	19518	23350	27426	31877	36739	42049	47649	54184	61102	68659	76912	85929	95778	106534	118282	
CUM OPE PROFIT						-1346	-1839	-2192	-2385	-2391	-2667	-2751	-2812	-2927	-2635	-2181	-1634	-742	525	2203	4119	5961	8337	11297	14895	19190	24248	30138	36936	44726	
CUM INVESTMENT	433	1250	2415	4869	10888	20827	22104	22458	24160	26977	32077	32204	39243	40637	43543	46495	46495	47075	47075	47075	51727	51727	51727	51727	51727	57319	57319	57319	57319	57319	
CUM REPAYMENT						10	22	34	92	273	828	1406	1986	2591	3254	4114	4977	6183	7445	8801	10249	11695	13142	14544	15821	16960	18075	19188	20278	21308	
CUM INTEREST							830	1659	2483	3292	4055	5220	6327	7374	8356	9257	10968	12568	14046	15366	16850	18257	19519	20640	21630	22815	23992	25057	26013	26864	
CUM NET CASHFLOW						-903	-1782	-2523	-3144	-3688	-4567	-5680	-6431	-7200	-7556	-7787	-8736	-9573	-9986	-9910	-9618	-9344	-8390	-6666	-4049	-792	3261	8259	14298	21492	
	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	

APPENDIX 10-1 FINANCIAL ANALYSIS FOR MEXICO NEW RAILWAY DEVELOPMENT PROJECT (2)

Case 2

(Million pesos)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
OPERATING PROFIT						-1348	-494	-356	-195	-8	-215	61	78	61	469	688	765	1109	1484	1855	2193	2145	2679	3263	3900	4597	5357	6188	7096	8087
OPERATING REVENUE							854	992	1153	1340	1557	2023	2330	2684	3092	3562	3724	4068	4443	4853	5301	5790	6325	6909	7546	8243	9003	9834	10742	11733
OPERATING EXPENSE						1348	1348	1348	1348	1348	1772	1982	2252	2623	2623	2874	2959	2959	2959	2959	3108	3646	3646	3646	3646	3646	3646	3646	3646	3646
WORKING COST						894	894	894	894	894	1081	1291	1291	1662	1662	1849	1933	1933	1933	1933	1933	2471	2471	2471	2471	2471	2471	2471	2471	2471
MAINTENANCE COST						579	579	579	579	579	767	856	856	1130	1130	1316	1370	1370	1370	1370	1370	1696	1696	1696	1696	1696	1696	1696	1696	1696
PERSONNEL COST						235	235	235	235	235	235	329	329	348	348	348	374	374	374	374	374	510	510	510	510	510	510	510	510	510
ENERGY COST						80	80	80	80	80	80	107	107	184	184	184	169	189	189	189	189	265	265	265	265	265	265	265	265	265
DEPRECIATION						455	455	455	455	455	691	691	961	961	961	1025	1025	1025	1025	1025	1175	1175	1175	1175	1175	1175	1175	1175	1175	1175
INVESTMENT	398	817	1165	2458	6025	9930	1035	541	1131	2769	4070	46	6610	1181	2957	2073		553			3322					5673				
FOREIGN TOTAL	143			611	1653	4938	325		261	699	2160	11	4533	219	612	512		18			2512					4225				
LOCAL TOTAL	255	817	1165	1847	4372	5002	711	541	870	2069	1890	36	2077	962	2345	1561		535			810					1449				
ELECTRIFICATION				999	1666	666			342	569	228			494	824	329														
FOREIGN CURRENCY				353	588	235			114	191	76			200	333	133														
LOCAL CURRENCY				647	1078	431			227	378	151			295	491	196														
SIGNALS & TELECOM	168			390	976	585	96		221	554	332	15		37	92	55										1283				
FOREIGN CURRENCY	143			258	646	388	82		146	367	220	11		19	49	29										904				
LOCAL CURRENCY	25			132	330	197	15		75	187	112	5		17	43	26										378				
CIVIL WORK		427	852	1069	3383	3120		418	568	1644	1258		584	650	2041	1689		415												
FOREIGN CURRENCY					419	419				141	181				230	350		18												
LOCAL CURRENCY		427	852	1069	2964	2701		418	568	1503	1077		584	650	1811	1339		397												
LAND ACQ & COMP	230	390	313				141	123				31	31					138												
LOCAL CURRENCY	230	390	313				141	123				31	31					138												
CARS						4878					2252		5995								3322					4390				
FOREIGN CURRENCY						3689					1703		4533								2512					3320				
LOCAL CURRENCY						1189					549		1462								810					1070				

FOREIGN CURRENCY				353	588	235			114	191	76			200	333	135															
LOCAL CURRENCY				647	1078	431			227	378	151			295	491	196															
SIGNALS & TELECOM	168			390	976	585	96		221	554	332	15		37	92	55									1283						
FOREIGN CURRENCY	143			258	646	388	82		146	367	220	11		19	49	29									904						
LOCAL CURRENCY	25			132	330	197	15		75	187	112	5		17	43	26									378						
CIVIL WORK		427	852	1069	3383	3120		418	568	1644	1258		584	650	2041	1689		415													
FOREIGN CURRENCY					419	419				141	181				230	350		18													
LOCAL CURRENCY		427	852	1069	2964	2701		418	568	1503	1077		584	650	1811	1339		397													
LAND ACQ & COMP	230	390	313				141	123				31	31					138													
LOCAL CURRENCY	230	390	313				141	123				31	31					138													
CARS						4878					2252		5995								3322				4390						
FOREIGN CURRENCY						3689					1703		4533								2512				3320						
LOCAL CURRENCY						1189					549		1462								810				1070						
CAR DEPOT FACILITIES						691	798																								
FOREIGN CURRENCY						207	243																								
LOCAL CURRENCY						484	555																								
-SALVAGE VALUE																															21987
INT DURING CONST.	11	16	17	66	215	657	25	36	59	126	323	1	347	518	624	743															
FINANCE PROGRAM																															
FINANCE TOTAL																															
BORROWING	409	833	1182	2524	6239	10597	1060	577	1190	2893	4393	47	6957	1699	3580	2816		553			3322				5673						
REPAYMENT						10	11	13	58	182	555	578	581	602	657	824	825	1150	1199	1282	1355	1354	1354	1309	1184	979	955	953	932	877	
BALANCE	409	1242	2424	4948	11188	21774	22823	23387	24520	27231	31059	30538	36914	38011	40935	42926	42102	41505	40305	39024	40991	39637	38283	36974	35760	40485	39529	38576	37644	36768	
INTEREST							831	829	825	810	764	1110	1052	992	928	849	1579	1473	1355	1229	1284	1211	1076	944	822	1036	1045	950	856	767	
FINANCE IN FOREIGN CCY																															
BORROWING	154	16	17	677	1868	5594	349	35	320	824	2503	12	4880	737	1235	1255		18			2512				4225						
REPAYMENT						10	11	13	58	182	555	578	581	602	657	824	825	1150	1199	1282	1355	1354	1354	1309	1184	979	955	953	932	877	
BALANCE	154	170	188	864	2732	8316	8654	8677	8940	9582	11530	10964	15263	15398	15976	16407	15582	16450	13251	11969	13126	11772	10418	9110	7925	11171	10216	9263	8331	7454	
INTEREST							831	829	825	810	764	1110	1052	992	928	849	1579	1473	1355	1229	1284	1211	1076	944	822	1036	1045	950	856	767	
FINANCE IN LOCAL CCY																															
BORROWING	255	817	1165	1847	4372	5002	711	541	870	2059	1893	36	2077	962	2345	1561		535			810				1449						
REPAYMENT																															
BALANCE	255	1072	2237	4084	8456	13458	14169	14710	15580	17649	19539	19574	21651	22613	24959	26520	26520	27055	27055	27055	27865	27865	27865	27865	27865	29313	29313	29313	29313	29313	
INTEREST																															
NET CASHFLOW						-904	-882	-743	-623	-546	-843	-956	-593	-572	-155	40	-613	-689	-46	409	729	754	1424	2185	3069	3757	4531	5460	6482	7618	
CASH IN	409	833	1182	2524	6239	9703	1021	676	1459	3350	4869	779	7996	2721	5010	4529	1791	2687	2510	2920	6690	3319	3854	4438	5075	11445	6532	7363	8271	9262	
OPERATING PROFIT						-1348	-496	-356	-195	-8	-215	41	78	61	469	688	765	1109	1484	1895	2193	2145	2679	3263	3900	4597	5357	6188	7096	8087	
DEPRECIATION						455	455	455	455	455	691	691	961	961	961	1025	1025	1025	1025	1025	1175	1175	1175	1175	1175	1375	1175	1175	1175	1175	
BORROWING	409	833	1182	2524	6239	10597	1060	577	1190	2893	4393	47	6957	1699	3580	2816		553			3322					5673					
CASH OUT	409	833	1182	2524	6239	10607	1902	1419	2073	3685	5712	1735	8589	3293	5165	4469	2404	3176	2554	2510	5961	2565	2430	2252	2006	7688	2001	1993	1788	1644	
INVESTMENT	398	817	1165	2458	6025	9940	1035	541	1131	2768	4070	46	6610	1181	2957	2073		553			3322					5673					
INT DURING CONST.	11	16	17	66	215	657	25	36	59	126	323	1	347	518	624	743															
REPAYMENT						10	11	13	58	182	555	578	581	602	657	824	825	1150	1199	1282	1355	1354	1354	1309	1184	979	955	953	932	877	
INTEREST							831	829	825	810	764	1110	1052	992	928	849	1579	1473	1355	1229	1284	1211	1076	944	822	1036	1045	950	856	767	
CASHFLOW <ROI>	-398	-817	-1165	-2458	-6025	-10834	-1075	-442	-871	-2321	-3595	685	-5571	-159	-1527	-360	1791	1581	2510	2920	46	3319	3854	4438	5075	99	6532	7363	8271	31249	
FIRR <ROI>	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	4.078	
CUM OPE REVENUE						-1348	854	1847	3000	4130	5897	7920	10250	12934	16026	19588	23312	27380	31823	36676	41977	47767	54092	61001	68547	76790	85793	95627	106368	118101	
CUM OPE PROFIT						-1843	-2199	-2394	-2492	-2617	-2577	-2498	-2437	-1968	-1260	-515	594	2079	3973	6166	8311	10990	14252	18153	22759	28107	34295	41391	49478		
CUM INVESTMENT	398	1215	2380	4838	10863	20803	21839	22380	23510	26278	30348	30395	37005	38186	41143	43216	43216	43769	43769	43769	47091	47091	47091	47091	47091	52764	52764	52764	52764	52764	
CUM REPAYMENT						10	22	34	92	274	829	1407	1988	2590	3247	4071	4896	6046	7245	8527	9882	11235	12589	13898	15082	16061	17017	17970	18901	19778	
CUM INTEREST							831	1660	2485	3295	4058	5168	6220	7212	8139	8969	10567	12041	13396	14625	15903	17119	18195	19139	19961	20997	22042	22993	23849	24616	
CUM NET CASHFLOW						-904	-1786	-2529	-3152	-3593	-4541	-5497	-6090	-6662	-6817	-6777	-7390	-7879	-7923	-7514	-6785	-6030	-4606	-2421	648	4405	8936	14396	20878	28496	
	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	

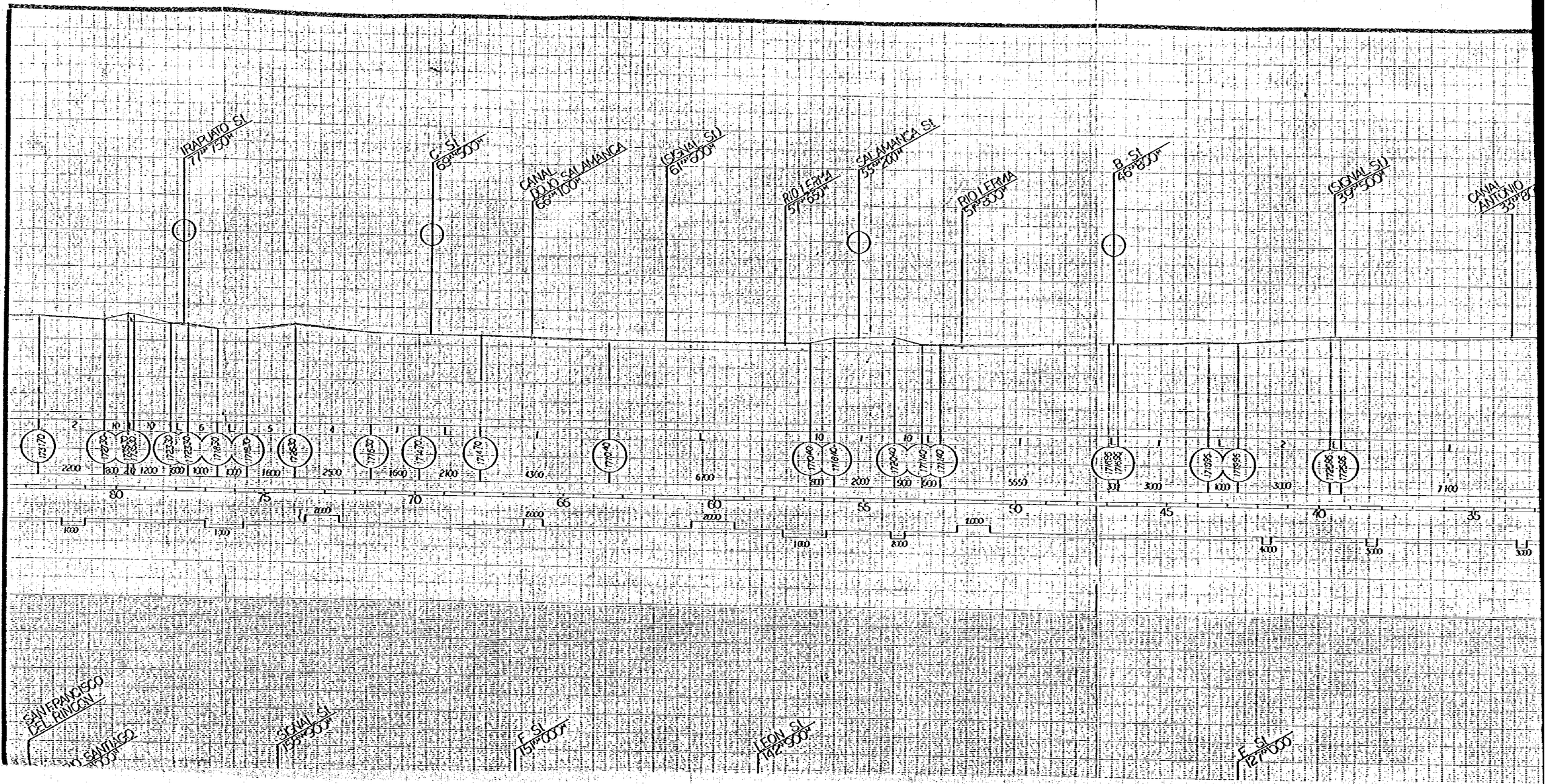
APPENDIX 10-1 FINANCIAL ANALYSIS FOR MEXICO NEW RAILWAY DEVELOPMENT PROJECT (3)

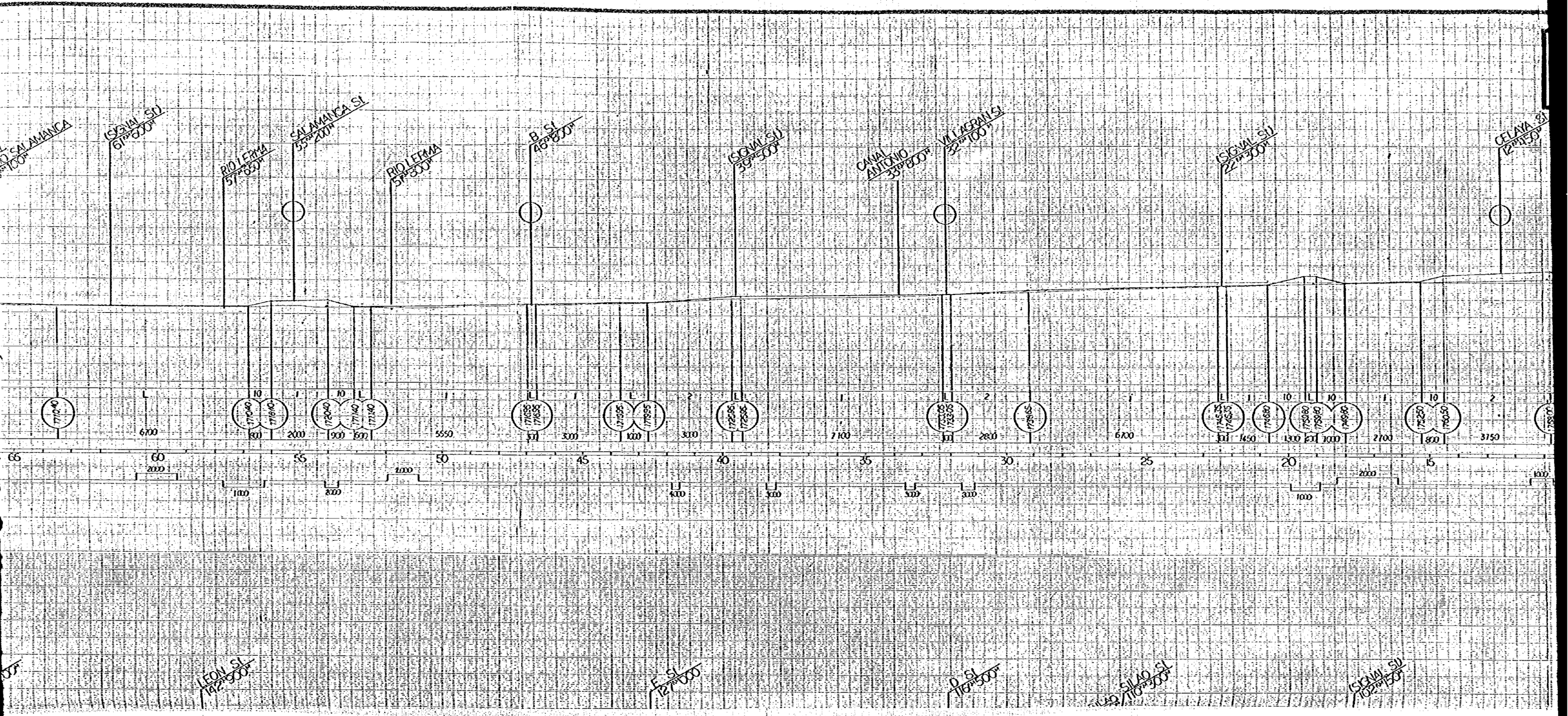
Case 3

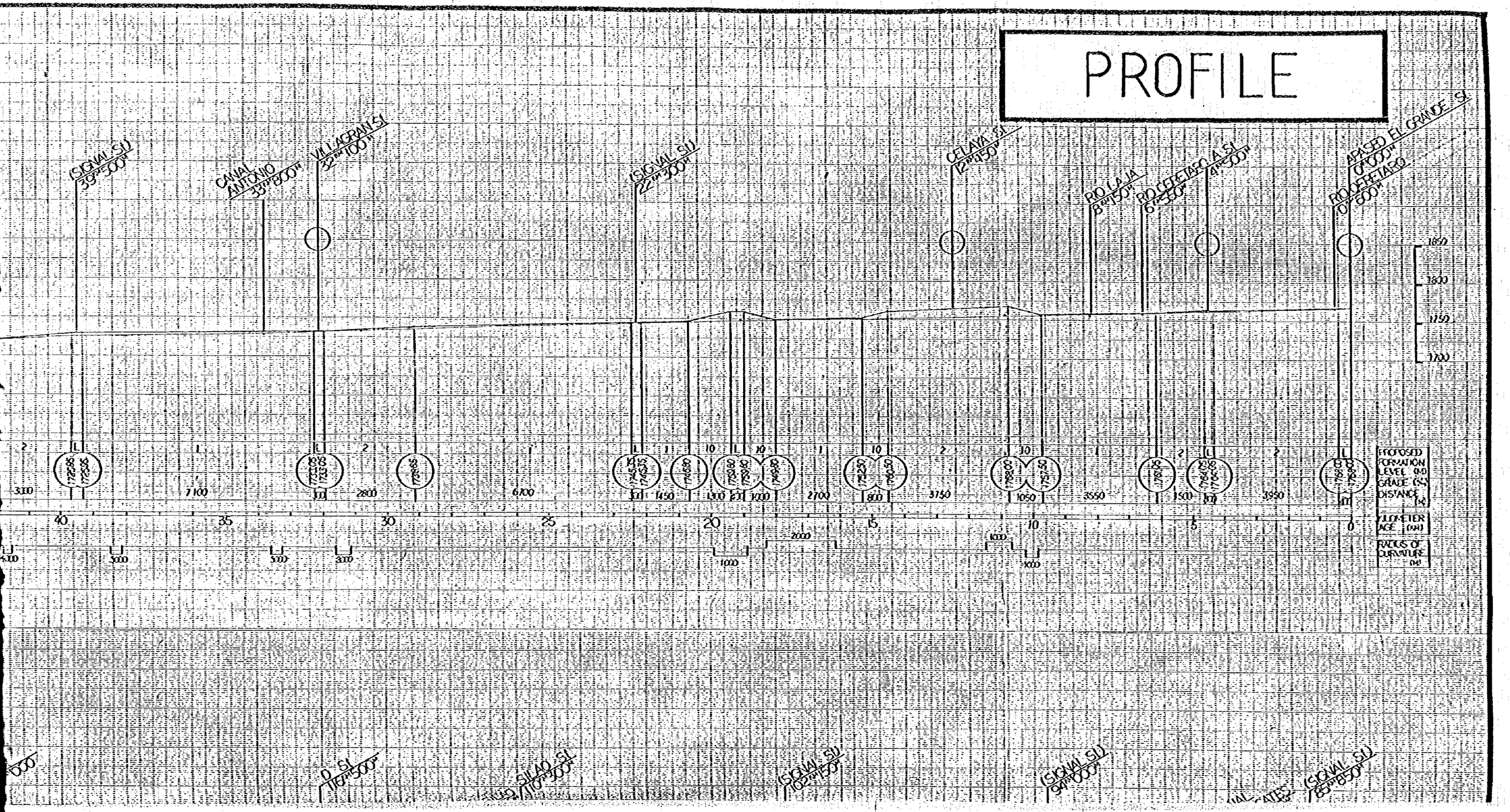
(Million pesos)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
OPERATING PROFIT											-2112	-84	-60	-116	293	454	547	891	1267	1678	1917	1841	2376	2960	3598	4295	5058	5890	6798	7790
OPERATING REVENUE												2028	2336	2690	3098	3569	3732	4976	4452	4862	5310	5800	6335	6919	7557	8253	9017	9848	10755	11748
OPERATING EXPENSE											2112	2112	2395	2806	2806	3116	3184	3184	3184	3184	3554	3959	3959	3959	3959	3959	3959	3959	3959	3959
WORKING COST											1398	1398	1398	1808	1808	2039	2107	2107	2107	2107	2107	2672	2672	2672	2672	2672	2672	2672	2672	2672
MAINTENANCE COST											922	922	922	1225	1225	1455	1469	1469	1439	1439	1439	1843	1843	1843	1843	1843	1843	1843	1843	1843
PERSONNEL COST											359	359	359	350	380	380	405	406	406	406	406	545	545	545	545	545	545	545	545	545
ENERGY COST											118	118	118	203	203	203	213	213	213	213	213	284	284	284	284	284	284	284	284	284
DEPRECIATION											714	714	997	997	997	1077	1077	1077	1077	1077	1286	1286	1286	1286	1286	1286	1286	1286	1286	1286
INVESTMENT	230	300	380	500	685	1469	2531	3022	4492	8139	10137	88	7078	1894	3857	1502		580			4652									
FOREIGN TOTAL	230	300	380	500	685	227	404	589	956	2367	6753		4804	395	965	383		18			3517									
LOCAL TOTAL						1233	2127	2433	3526	5771	3384	88	2274	1499	2892	1119		562			1135									
ELECTRIFICATION							237	474	712	2373	949			574	957	383														
FOREIGN CURRENCY							82	169	245	820	328			226	376	150														
LOCAL CURRENCY							155	310	466	1553	621			348	581	232														
SIGNALS & TELECOM						320	154	308	461	1231	923		39	91	229	139														
FOREIGN CURRENCY						227	102	205	307	818	614		33	60	149	92														
LOCAL CURRENCY						93	52	103	154	412	309		6	32	80	48														
CIVIL WORK				200	800	1140	2140	2240	3319	3493	312		729	1229	2672	980		449												
FOREIGN CURRENCY				200	800	1140	220	220	413	414				110	440	141		18												
LOCAL CURRENCY							1920	2020	2906	3079	312		729	1119	2232	839		422												
LAND ACQ & CONP	230	300	350	300	85							88						140												
LOCAL CURRENCY	230	300	380	300	85							88						140												
CARS											7506		6310								4652									
FOREIGN CURRENCY											5676		4771								3517									
LOCAL CURRENCY											1830		1539								1135									

FOREIGN CURRENCY							82	169	246	820	328			226	376	150																	
LOCAL CURRENCY							155	310	466	1553	621			348	581	232																	
SIGNALS & TELECOM						320	154	308	461	1231	923		39	91	229	139																	
FOREIGN CURRENCY						227	102	205	307	818	614		33	60	149	92																	
LOCAL CURRENCY						93	52	103	154	412	309		6	32	80	48																	
CIVIL WORK				200	800	1140	2140	2240	3319	3493	312		729	1229	2672	980	440																
FOREIGN CURRENCY							220	220	413	414				110	440	141	16																
LOCAL CURRENCY				200	800	1140	1920	2020	2906	3079	312		729	1119	2232	839	422																
LAND ACQ & COMP	230	300	380	300	85							88					140																
LOCAL CURRENCY	230	300	380	300	85							88					140																
CARS											7506		6310							4652												
FOREIGN CURRENCY											5676		4771							3517												
LOCAL CURRENCY											1830		1539							1135												
CAR DEPOT FACILITIES										1042	447																						
FOREIGN CURRENCY										315	135																						
LOCAL CURRENCY										727	312																						
-SALVAGE VALUE																																	20243
INT DURING CONST.						17	56	117	218	447	1069		366	560	701	828																	
FINANCE PROGRAM																																	
FINANCE TOTAL																																	
BORROWING	230	300	380	500	685	1478	2587	3139	4711	8565	11206	88	7445	2454	4559	2330		580				4652											
REPAYMENT											16	47	94	173	361	882	882	1227	1290	1402	1482	1482	1483	1483	1483	1702	1671	1624	1545	1357		
BALANCE	230	530	910	1410	2295	3773	6359	9499	14209	22795	33984	34025	41376	43657	47856	49304	48422	47775	46484	45083	46253	46770	45287	43803	42320	40618	38947	37323	35778	34421		
INTEREST												1318	1310	1294	1263	1188	2000	1887	1760	1623	1740	1680	1532	1383	1235	1070	903	739	583	442		
FINANCE IN FOREIGN CCY																																	
BORROWING						245	460	706	1184	2816	7822		5170	955	1666	1211		18				3517											
REPAYMENT											16	47	94	173	361	882	882	1227	1290	1402	1482	1482	1483	1483	1483	1702	1671	1624	1545	1357		
BALANCE						245	705	1411	2595	5499	13215	13168	18244	19027	20333	20661	19779	18571	17280	15879	17913	16431	14947	13464	11980	10279	8608	6984	5439	4082		
INTEREST												1318	1310	1294	1263	1188	2000	1887	1760	1623	1740	1680	1532	1383	1235	1070	903	739	583	442		
FINANCE IN LOCAL CCY																																	
BORROWING	230	300	380	500	685	1233	2127	2433	3526	5771	3384	88	2274	1499	2892	1119		562				1135											
REPAYMENT																																	
BALANCE	230	530	910	1410	2295	3528	5655	8088	11614	17386	20769	20657	23132	24631	27523	28642	28642	29204	29204	29204	30339	30339	30339	30339	30339	30339	30339	30339	30339	30339		
INTEREST																																	
NET CASHFLOW											-1415	-735	-467	-586	-334	-539	-1258	-1146	-707	-270	-20	-35	647	1379	2166	2809	3771	4813	5957	7277		
CASH IN	230	300	380	500	885	1478	2587	3139	4711	8565	9808	717	8382	3335	5849	3661	1624	2548	2344	2755	7855	3128	3662	4246	4884	5581	6345	7176	8084	9076		
OPERATING PROFIT											-2112	-84	-60	-116	293	454	547	891	1267	1678	1917	1841	2376	2960	3598	4295	5058	5890	6798	7799		
DEPRECIATION											714	714	997	997	997	1077	1077	1077	1077	1077	1286	1286	1286	1286	1286	1286	1286	1286	1286	1286		
BORROWING	230	300	380	500	885	1478	2587	3139	4711	8565	11206	88	7445	2454	4559	2330		580			4652											
CASH OUT	230	300	380	500	885	1478	2587	3139	4711	8565	11222	1453	8849	3922	6183	4400	2882	3694	3051	3024	7875	3162	3015	2867	2719	2772	2574	2363	2127	1799		
INVESTMENT	230	300	380	500	885	1460	2531	3022	4492	8139	10137	88	7078	1899	3857	1502		580			4652											
INT DURING CONST.						17	56	117	218	447	1069		366	560	701	828																	
REPAYMENT											16	47	94	173	361	882	882	1227	1290	1402	1482	1482	1483	1483	1483	1702	1671	1624	1545	1357		
INTEREST												1318	1310	1294	1263	1188	2000	1887	1760	1623	1740	1680	1532	1383	1235	1070	903	739	583	442		
CASHFLOW <ROI>	-230	-300	-380	-500	-885	-1459	-2531	-3022	-4492	-8139	-11535	541	-6141	-1013	-2567	29	1624	1368	2344	2755	-1449	3128	3662	4246	4884	5581	6345	7176	8084	29319		
FIRR <ROI>	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781	3.781		
CUM OPE REVENUE												2028	4363	7053	10152	13721	17453	21529	25980	30842	36152	41952	48287	55205	62762	71015	80032	89881	100637	112385		
CUM OPE PROFIT											-2112	-2196	-2256	-2372	-2079	-1626	-1078	-187	1080	2758	4675	6516	8892	11852	15450	19745	24803	30693	37491	45280		
CUM INVESTMENT	230	530	910	1410	2295	3755	6286	9308	13801	21939	32076	32164	39243	41137	44994	46496	46496	47076	47076	47076	51728	51728	51728	51728	51728	51728	51728	51728	51728	51728		
CUM REPAYMENT											16	63	157	330	691	1573	2455	3682	4972	6374	7856	9339	10822	12306	13789	15491	17162	18786	20331	21688		
CUM INTEREST												1318	2628	3922	5185	6373	8373	10260	12021	13644	15384	17064	18596	19979	21215	22285	23188	23927	24509	24951		
CUM NET CASHFLOW											-1415	-2150	-2617	-3202	-3536	-4075	-5333	-6479	-7185	-7455	-7475	-7510	-6863	-5483	-3317	-508	3263	8076	14033	21309		
	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		


IRAPUATO SI
11ª 750m
C. SI
69ª 900m
CANAL DOJO SALAMANCA
66ª 100m
(SIGNAL SI)
61ª 900m
RIO LERMA
51ª 650m
SALAMANCA SI
55ª 200m
RIO LERMA
51ª 300m
B. SI
46ª 800m
(SIGNAL SI)
39ª 500m
CANAL ANTONIO
33ª 80
SAN FRANCISCO DEL RINCON
SIGNAL SI
19ª 900m
F. SI
15ª 000m
LEON SI
142ª 900m
F. SI
127ª 000
80
75
70
66
60
55
50
45
40
35


SALAMANCA
(SIGNAL SU)
61ᵐ 900ᵐ
RIO LEMA
51ᵐ 850ᵐ
SALAMANCA SI
55ᵐ 200ᵐ
RIO LEMA
51ᵐ 300ᵐ
B SI
46ᵐ 800ᵐ
(SIGNAL SU)
39ᵐ 500ᵐ
CANAL ANTONIO
35ᵐ 800ᵐ
VILLAGRAN SI
32ᵐ 100ᵐ
(SIGNAL SU)
22ᵐ 300ᵐ
CELAYA SI
12ᵐ 450ᵐ
LEON SI
142ᵐ 900ᵐ
F SI
127ᵐ 000ᵐ
D SI
116ᵐ 500ᵐ
SILAO SI
110ᵐ 300ᵐ
(SIGNAL SU)
102ᵐ 150ᵐ


PROFILE
(SIGNAL SJ)
39m500m
CANAL ANTONIO
33m800m
VILLAGRAN SJ
32m100m
(SIGNAL SJ)
22m300m
CELAYA SJ
12m950m
RIO LAJA
8m150m
RIO CERRITOS
6m350m
A SJ
4m600m
APASEO EL GRANDE SJ
0m000m
RIO LERMA
0m000m
PROPOSED FORMATION LEVEL (m.s.l.)
GRADE (%)
DISTANCE (m)
KILOMETERAGE (km)
RADIUS OF CURVATURE (m)
(SIGNAL SJ)
0m000m
(SIGNAL SJ)
102m850m
(SIGNAL SJ)
94m100m
(SIGNAL SJ)
85m850m