APPENDIX-VII

Road Network

THE STUDY ON SABO AND FLOOD CONTROL
FOR WESTERN RIVER BASINS OF MOUNT PINATUBO
IN THE REPUBLIC OF THE PHILIPPINES

FINAL REPORT

SUPPORTING REPORT

APPENDIX VII ROAD NETWORK

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CHAPTER 1 GENERAL

1.1 Present Conditions

1.1.1 Present Road Network

The western river basins of Mount Pinatubo are located in the province of Zambales in Region III. It is bounded on the west by the South China Sea, east by Tarlac and Pampanga, south by Bataan and north by the Province of Pangasinan which belongs to Region I.

The Iba South and North Roads are the major highways in the Province of Zambales and run straight from the south to the north along the South China Sea coast.

The Botolan-Capas Road is the only highway that runs from west to east and connects with the other provinces of Central Luzon. However, this road lies at a significantly lower elevation and is not passable at present due to lahar deposits.

Several rivers cross the Iba South Road. Provincial roads along these rivers extend from the river mouth to the middle stream.

The length of the existing road network is shown in Table 1.1.1. The total length of national and provincial roads is 91.0 km and 95.0 km, respectively.

National roads serve as the main trunk line especially for transporting goods and services. Provincial roads provide the same function to supplement the national roads.

Current issues relating to the road network in Zambales are summarized as follows:

(1) In the case of a natural disaster occurring, there is no alternative route to the Iba South Road.
(2) There is no access road to residential areas in the upper stream part of Mount Pinatubo.
(3) There is no access road to the crater lake of Mount Pinatubo which is a potential tourist attraction.

1.1.2 Existing Road Development Plan

The existing road development plan is shown in Figure 1.1.1.

The Zambales-Tarlac Road commences in Iba in the Province of Zambales and runs from west to east ending in Tarlac City. This section of road is under construction and approximately 30% of the total length (at the Zambales end) is completed.

The Zambales-Pampanga Road commences in San Marcelino in the Province of Zambales and runs from west to east ending in the Province of Pampanga. Construction has not yet started.

1.1.3 Existing Bridges and Other Facilities

Measurements for the existing bridges are shown in Table 1.1.1.

There are 37 bridges that have been identified along the national roads with a total length of 2,162 m, and 30 bridges identified along provincial roads with a total length of 943 m. The average length of bridges along national roads is 60m and bridges along provincial roads have an average length of 30 m.

The Maculcol Bridge, which crosses the Sto. Tomas River, is the longest bridge with a total length of 381 m, followed by the Bucao Bridge with a length of 300 m, which is considered the second oldest bridge built in 1939. The Sta.Rosa steel bridge is the oldest bridge built in 1930.

Current issues regarding the bridge conditions are summarized as follows:

(1) The under clearance of the Bucao, Maloma and Maculcol Bridges is very small due to a significant volume of lahar deposits. No alternate or detour bridges are available for use in case of natural disaster.
(2) Bridges with minor to major damages require urgent repair.
(3) Old bridges should be removed prior to constructing new ones to allow the continuation of river flow.

1.2 Proposed Master Plan

1.2.1 Proposed Master Plan for Road Network

The traffic volume at present and estimated future traffic volume are shown in Figure 1.2.1. The present annual average daily traffic is 3,000 to 4,500 along the Iba South Road. The traffic volume at TS-01 is very high, because this site is the municipal center of San Narciso and includes local traffic volume.

The proposed master plan of the road network is shown in Figure 1.1.1.

Five road sections were considered for new construction. These are; the road along the Sto. Tomas River, access road going to the Mapanuepe Lake, the road along the Bucao River, the road along the Balin Baquero River, and the road along the Maloma River. These roads serve access roads to the residential areas on the upper river reaches of Mount Pinatubo. Another road section, which will be a tourist road, will be constructed and linked to a cable extended up to the crater lake of Mount Pinatubo.

1.2.2 Proposed Master Plan for Bridge Reconstruction

Proposed master plan for bridge reconstruction is shown in Figure 1.1.1.

Three bridges were considered for reconstruction based on the bridge prioritization and ranking criteria. General views of the three bridges are illustrated in Figure 1.2.2 to Figure 1.2.4 for Bucao, Maloma and Maculcol Bridges, respectively. These are the Bucao Bridge at km193+502 which received the highest ranking, the Maculcol Bridge at km165+363 which is ranked second, and the Maloma Bridge at km174+531 which was ranked third. All these bridges are located along the Iba South National Highway.

The details of the under clearance, finished grade, bridge length and bridge site for each proposed bridge compared to the existing bridge is shown in Table 1.2.1.

The under clearance required has been determined to be more than 1.5 m for the Bucao, Maculcol and Maloma Bridges. The finished grade of the proposed bridge is plus 2.4 m to 9.3 m against the existing bridge. The increase in bridge length from the existing bridge to the proposed bridge is plus 21 m for the Bucao Bridge, 150 m for the Maloma Bridge and 49 m for the Maculcol Bridge. The large increase for the Maloma River is because widening of the Maloma River is proposed through the improvement works.

The proposed Bucao Bridge site is downstream from the existing bridge site. This is because construction of a bridge at a new upstream site would require a longer bridge construction, and to replace the bridge at the existing location would require a long detour bridge to be constructed. The proposed Maloma Bridge will be located at the existing bridge site. Because there are many residences on the approach road to Manila, the proposed Maculcol Bridge site will be on the upstream side of the existing bridge. The risk of bridge collapse of the existing bridge is smaller than at a downstream site.

1.3 Feasibility Design

1.3.1 Feasibility Design of Reconstruction of the Bucao Bridge

The existing Bucao Bridge was constructed in 1939. The bridge length is 300 m and the main type is of steel truss. After 64 years of service, the slab is damaged severely with honeycomb and crack at present.

The clearance between soffit of girder and design flood level is about 0.5 m since July 2002 when the Maraunot Notch collapsed and a huge volume of sediment was conveyed downstream. The bridge has a risk to collapse during floods due to insufficient clearance so that there is a great need for reconstruction of the Bucao Bridge. Preliminary design of the Bucao Bridge for reconstruction is conducted as stated below.

(1) Design Condition

The new Bucao Bridge is designed under the following conditions:

(a) Hydrological Condition

1) Station of the river : 2.4 km
2) Design discharge : 4,900 m^3/s (50-year probable flood)
3) Flood water level : El. 13.50 m
4) Present Riverbed level in 2002 : El. 6.40 m
5) Estimated Riverbed in 2052 : El. 10.16 m
6) Depth of water : 3.34 m
7) Vertical clearance : 3.45 m

(b) Geometric Design Condition

1) Design speed : 50 km/h
2) Minimum horizontal radius : 80 m
3) Maximum vertical slope : 7%
4) Maximum rate of transition for super-elevation : 0.65% (1/154)

(c) Geological Design Condition

1) Bearing layer of abutment in Manila side : EL = - 10.0 m
2) Bearing layer of abutment in Iba side : EL = - 20.0 m
3) Bearing layer of pier : EL = - 20.0 m

(d) Design Condition of the Existing Bridge

1) Bridge length : 300 m
2) Bridge type : Steel Pony Truss, Steel Plate Girder, RC T Girder
3) Span : 9 span x 25 m, 1span x 21 m, 3 span (16 m + 22 m + 16 m)
4) Construction year : 1939, 1992, 1993

(e) Design Condition of Proposed Bridge for Reconstruction

a. Bridge location : Downstream side of the Existing Bridge
b. Bridge length : 321 m
c. Bridge type : Steel Plate Girder
d. Span : (46 m + 2 x 50 m), (50 m + 72 m + 53 m)
e. Width : 9.54 m (0.35 + 0.76 + 0.30 + 3.36 x 2 + 0.30 + 0.76 + 0.35)
f. Foundation type : Cast in situ pile

(f) Design Condition of Proposed Road for Reconstruction

a.	Approach road length of Manila side	:	280 m
b.	Approach Road length of Iba side	:	346 m
c.	Width of traveled way	:	6.7 m
d.	Width of shoulder	:	1.65 m x 2
e.	Actual horizontal radius	:	105 m

(2) Selection of Abutment Location for Alternative Bridges

Two bridge locations are compared, one is downstream side of the existing bridge (alternative 1), and another is upstream side (alternative 2).

The front face of abutment wall is set at the shoulder of dike as seen in Figures 1.3.1 and 1.3.2. But the abutment of upstream bridge alternative is set far from the riverside shoulder in Iba side as seen in Figure 1.3.3, because the abutment should be located at safe place to ward-off erosion due to skew flow.

(3) Selection of Bridge Location

The most suitable location for the new reconstructed bridge is near the existing bridge because the distance between both river banks is shorter than those in any other locations. If the bridge is reconstructed on the same location of the existing bridge, the construction cost is higher than those of alternative 1 and alternative 2 due to need of the bridge detour. The distance is 15 m between reconstructed bridge center line and existing bridge center line for both of the alternatives. Location, plan and vertical curvature are shown in Figures 1.3.4 to 1.3.7 for alternative 1 and 2.

Comparison table is shown in Table 1.3.1. Downstream side alternative 1 is recommended mainly for its reconstruction cost aspect and hydrological advantage.

(4) Selection of Approach Road Alignment

Applied design speed is 50 km/h according to the DPWH Standard and Olongapo-Bugallon Highway Standard. The minimum radius is 80 m and minimum curve length is 80 m in horizontal curvature. The maximum slope is 7%, and minimum radius is 80 m and minimum curve length is 40 m in vertical curvature.

Comparison table of 2 alignments for the approach road in Manila side is shown in Table 1.3.2. The alignment alternative1 is the best possible alignment for its reasonable cost and safety. It can afford the minimum stopping distance for the design speed at all points on the bridge. The alignment being coordinated with the profile provides adequate sight distance, safety and comfort to the driver.

(5) Selection of Pier Location

The pier of the reconstructed bridge must be aligned in the same upstream-downstream line with the existing pier, because blocking of water is minimized during construction of the bridge and safety of the bridge is kept. The pier location is shown in Figure 1.3.8. Average span length is 53.5 m. This span length is sufficient for passing flood discharge as shown in Figure 1.3.9.

(6) Selection of Superstructure Type

Steel plate girder (alternative1) and pre-stressed concrete box girder (alternative2) are compared as type of the reconstructed superstructure with span of 53.5 m as seen in Table 1.3.3. The steel plate girder of alternative1 is erected by truck crane with bent while the pre-stressed concrete box girder of alternative 2 is erected by extruder. Comparison table is shown in Table 1.3.4. The alternative1 of steel plate girder is recommended mainly for economic advantage. Steel material is non-paint type.

(7) Selection of Foundation Type

Cast in situ pile is selected considering the subsoil condition, bearing strata and external forces transmitted by superstructure.

(8) Removal of Existing Bridge

The existing bridge must be removed after reconstruction because the existing bridge has a risk to collapse during flood or earthquake and it might affect the new bridge.

1.3.2 Feasibility Design of Community Road

The access road is planned as a community road toward the habitation of the Aeta nation in the upper basin of the Bucao River in the north side of project area and the Sto.Tomas River in the south side of project area. The location map of community road is shown in Figure 1.3.10. A line makes the starting point near the left bank crossed the Baquilan River by the national Iba Tarlac road which is under construction. It is 48 km of road length, which connects five barangays along the river. Although the number of households which receives profits is unknown, it is assumed to be more than the same one of other routes.

B line which is a community road on the right-bank of the Sto.Tomas River is 15 km of road length, which connects four barangays, and the number of households which receives profits is 179. A barangay at the northernmost end is near the uppermost basin of the Maloma River. C line which is a community road on the left bank of the Sto.Tomas River connects 11 barangays, which is 45km of road length and is almost the same as A line. And the number of households which receives profits is 612 and is more than B line's one.

The community road is composed of 4 m road width, 2 m width of the protection shoulder at the mountain side including channel width and 2 m width of the protection shoulder at the valley side including width of guardrail installed to the required section.

It becomes unnecessary to carry out urgent rehabilitation against small-scale slope collapse by setting protection road-shoulder width to 2 m. And, it also becomes possible to widen to 2 lanes road (a road width of 6m, protection road-shoulder 1 m x 2) in the future. The existing access road to a barangay is classified into a road width of more than 3 m, less than 3 m, and sidewalk. Road plane alignment is selected considering using or improving it. Furthermore, more generating of land acquisition shall be avoided as much as possible. Therefore, design speed is set to 20 km/h, and the vertical grade is a maximum of 10%.

Pavement width is 4 m, and the pavement kind is gravel.

1.3.3 Detailed Design of the Maculcol Bridge

DPWH conducted detailed design for the Maculcol Bridge. Plan and profile for the designed Maculcol Bridge are illustrated in Figure 1.3.11 and general elevation and part plan are shown in Figure 1.3.12.

CHAPTER 2 TRAFFIC SURVEY AND ANALYSIS

2.1 Traffic Survey

2.1.1 Objective

Traffic count survey was conducted to clarify the order of priority for reconstruction of bridge. The objective of the traffic count survey is to understand present traffic magnitude, type of vehicles and flows along the San Narcino to Botolan Section.

2.1.2 Survey Location and Duration

The traffic count survey was carried out at 5 stations along primary road, which covers the following stations with corresponding frequency of observations, viz

Control Station

Location No: TS-01

Duration : 12 hours count (06:00-18:00) for Sat., Sun., Tue. and Thu.

24 hours count (00:00-24:00) for Mon., Wed. and Fri.

Coverage Station

Location No: TS-02, TS-03, TS-04 and TS-05

Duration: 12 hours (06:00-18:00) for three (3) consecutive weekdays.

Each station corresponds to municipality concerned along the road.

The locations of the traffic count survey at the project area are shown in Figure 2.1.1 and Table 2.1.1.

2.1.3 Vehicle Classification

The traffic survey was carried out using manual traffic counters to record the number of vehicles passing an observation point along a road with a 12 or 24-hour period. Classified traffic count data was collected by the vehicle types as shown in Table 2.1.2.

2.2 Analysis of Survey Results

2.2.1 Survey Results and Estimation of Annual Average Daily Traffic

The survey data was compiled at 5 locations by clock hour, by direction of travel and vehicle types. Since 4 locations are not 24-hour durations, first of all it is necessary to establish expansion factors to convert 12-hours counts to their corresponding 24-hour volume estimates. Using a result of TS-01 which is 24-hours durations, the expansion factors are calculated in Table 2.2.1.

Due to estimation of AADT (Annual Average Daily Traffic), it is necessary to calculate daily factors and seasonal factors. The daily factors were derived from the 7 days count at Control Station (TS-01), which are used to adjust any one-day or two-day count into average daily traffic for the week normally, as shown in Table 2.2.2. The seasonal factors were derived from the seasonal station of which the source data was taken from monthly traffic of the DPWH, PMO-FS in 1997, as shown in Table 2.2.3.

Using the above factors, the annual average daily traffic was estimated from the results of traffic count survey in May 2002 as shown in Figure 2.2.1 and the aggregated volumes are presented in Table 2.2.4.

2.2.2 Traffic Analysis

Based on socio-economic indices such as population and gross regional domestic product (GRDP), future traffic demand was estimated using traffic growth rates. The target year in this estimate is 2007 as opening year and 2017. The traffic growth rates were set up, as follows:

2.2.3 Traffic Growth Rates

1) Non-public Vehicles

Traffic growth rate for the non-public vehicles which include car, jeep, pickup, van and motorcycle was assumed to correspond with that of car possession number. The car possession numbers are deemed to be same growth rate of GRDP per capita in Region III.

The Philippine national economy became stagnant with a devalued currency and inactive investments due to serious financial crisis in ASEAN countries in the latter 1990s. The GRDP shows the negative economic growth during the last decade. Although the above circumstance was considered, the growth rate of the GRDP per capita in Region 3 indicated 6.65% per annum between 1995 and 2000 according to 2000 Philippine Statistical Yearbook. This study applies 6.65% as traffic growth rates for the non-public vehicles.

2) Public Vehicles

Traffic growth rate for the public vehicles which include motor–tricycle, small bus and big bus were assumed to be same as population growth rates. According to the Technical Working Group on Population Projection (TWG-PP), future population in the Philippines is projected at rate 2.8% for 1995 - 2005, 2.3% for 2005 - 2015 and 2.5% 2015 – 2020.

3) Freight Vehicles

Freight vehicles (Truck 2-axle, Truck 3-axle and Truck-Trailer/Semi-Trailer) represented agricultural traffic, because the Study Area has highly established agriculture as the mainstay of the regional economy. Therefore, traffic growth rate for the freight vehicles was deemed to be equivalent to the growth rate of agricultural products volume. This Study applies 4.37% which is average growth rates of agriculture calculated from 1995 - 2000, according to the Bureau of Agricultural Statistics Region III.

2.2.4 Future Traffic Volume

Applying the future traffic growth rates estimated above, the future traffic demand along the San Narcino to Botolan Section was estimated as shown in Figure 2.2.2.

Tables

Table 1.1.1 Measurement of Road and Bridge

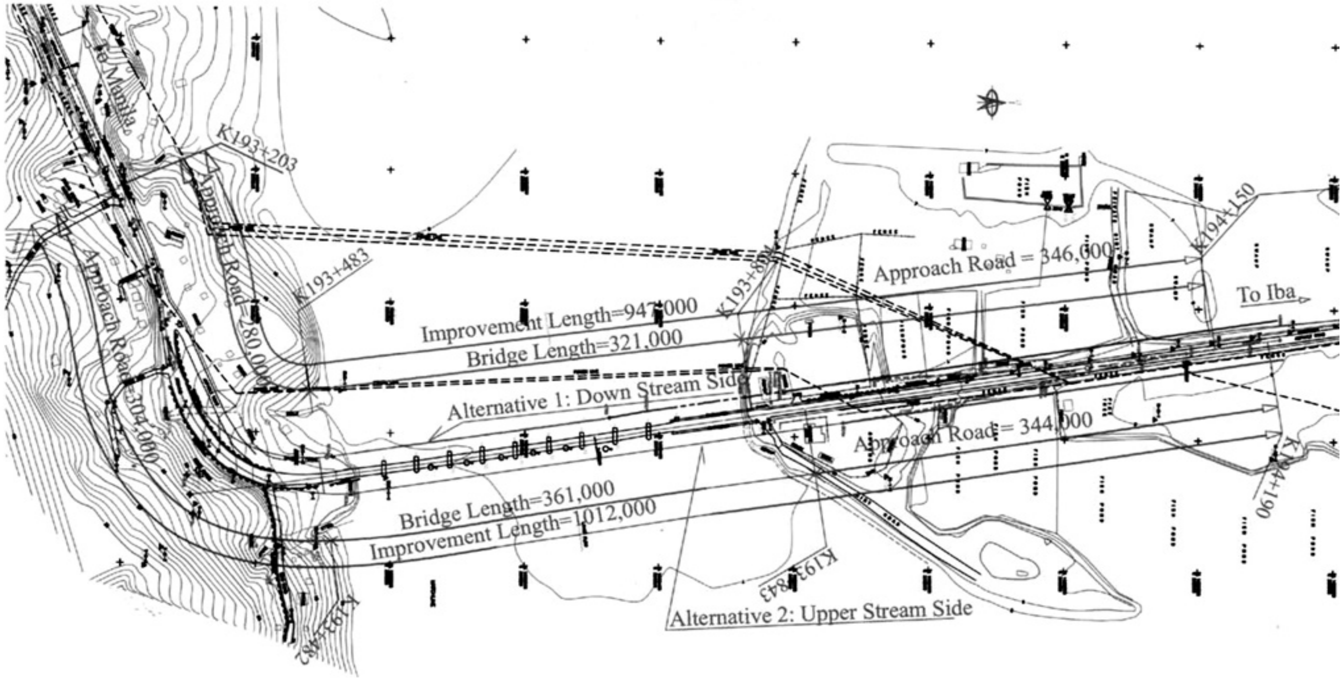
	Existing				Planned				Proposed			
	Road		Bridge		Road		Bridge		Road		Bridge	
	Section	Total Length	Number of Bridge	Total Length	Section	Total Length	Number of Bridge	Total Length	Section	Total Length	Number of Bridge	Total Length
National Road	4	91,000	37	2,162	2	65,000	0	0	2	35,000	3	1,025
average		22,750		58.4		32,500		0.0		17,500		341.7
Provincial Road	33	95,000	30	943	0	0	0	0	4	60,000	0	0
average		2,879		31.4		0.0		0.0		15,000		0.0
Total	37	186,000	67	3,105	2	65,000	0	0	6	95,000	3	1,025
average		5,027		46.3		32,500		0.0		15,833		341.7

Length Unit: m

Table 1.2.1 Measurement of Proposed Bridge against Existing Bridge

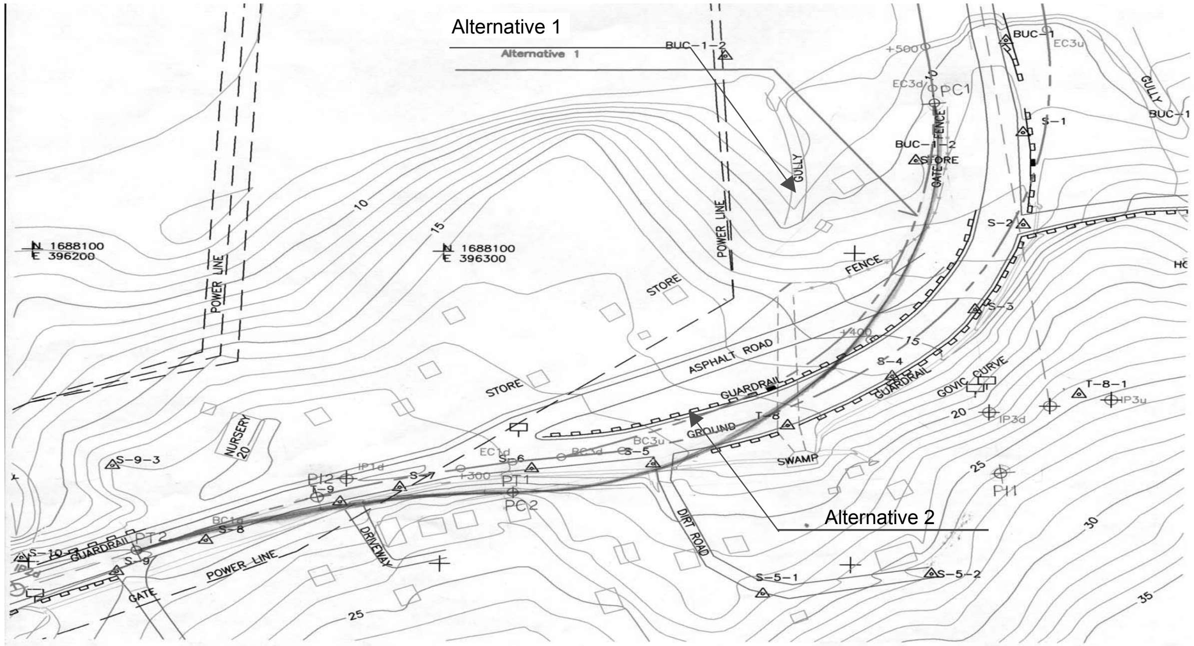
			Unit	Bucao Bridge	Maloma Bridge	Maculcol Bridge
Proposed Bridge	Bridge Length	①	m	321.000	240.000	430.000
	Finished Grade	②	m	19.968	9	12.9
	Soffit Girder Level	③	m	16.948	7.068	10.968
	Design Flood Level	④	m	13.50	5.42	9.12
	Under Clearance	⑤	m	3.448	1.648	1.848
	Bridge Site			down stream	same as existing bridge	upper stream
Existing Bridge	Bridge Length	⑥	m	300.000	90.000	381.000
	Finished Grade	⑦	m	10.680	6.600	6.200
Measurement of proposed bridge against existing bridge	Bridge Length	①−⑥	m	21.000	150.000	49.000
	Finished Grade	②−⑦	m	9.288	2.400	6.700

Table 1.3.1 Comparison Table of Bucao Bridge Location for Reconstruction of Bucao Bridge

				Alternative 1 **Down Stream Side**				Alternative 2 **Upper Stream Side**	
Profile									
Evaluation items	Construction Cost	70	70	Amount (mill.pesos)	Ratio	Balance (mill.pesos)	62	Amount (mill.pesos)	Ratio	Balance (mill.pesos)
				312	1.00	0		351	1.12	38
	Construction Period	5	5	24months			4	28months		
	Structure Aspect	5	5				5			
	Hydrological Advantage	10	10				6	Abutment at Iba side has broken risk by impact from side stream.		
	Alignment of Road	10	8	Radius=105m			10	Radius=120m		
Recommendation		100	98	Recommended			87	Not Recommended mainly from cost aspect		

		Unit	Quantities	Unit Cost (thou.pesos)	Amount (mill.pesos)	Unit	Quantities	Unit Cost (thou.pesos)	Amount (mill.pesos)
Construction Cost	Bridge	m	321	952	306	m	361	952	344
	Road	m	626	11	7	m	651	11	7
	Total	m	947		312	m	1012		351

Table 1.3.2 Comparison Table of Alignment of Approach Road in Manila Side

			Alternative 1 **Including Straight**				Alternative 2 **Excluding Straight**			
Profile										
Evaluation items	Construction Cost	70	70	Amount (mill.pesos)	Ratio	Balance (mill.pesos)	70	Amount (mill.pesos)	Ratio	Balance (mill.pesos)
				312	1.00	0		313	1.00	1
	Construction Period	5	5	24months			5	24months		
	Structure Aspect	5	5	Bridge not including horizontal curve			5	Bridge not including horizontal curve		
	Horizontal Curvature	5	5	Radius=290m-->105m			5	Radius=280m-->109m		
	Virtical Curvature	5	5	1.730%-->0.255%			5	1.730%-->0.255%		
	Land Acquisition	5	5				4	Need near K193+300		
	Enviromental Consideration	5	5				4	Great Excavation near K193+300		
Recommendation		100	100	Recommended			98	Not Recommended mainly from cost aspect		

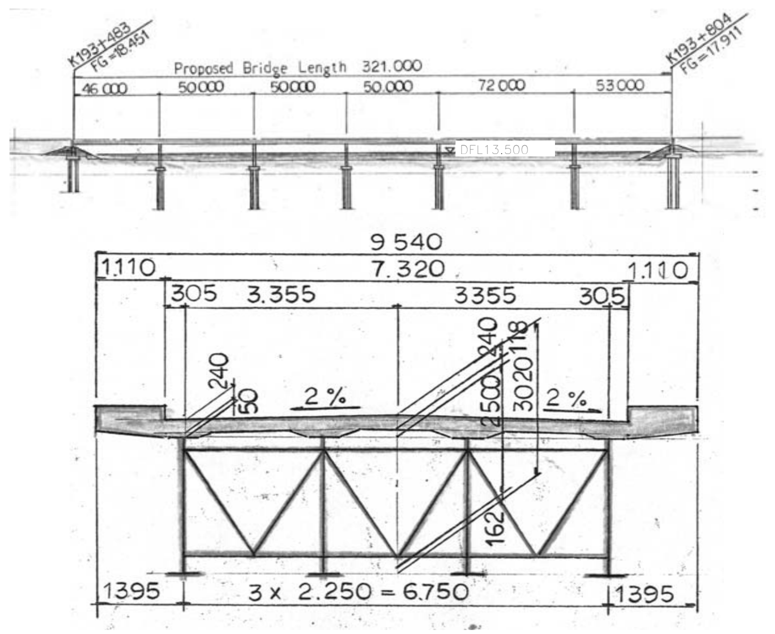
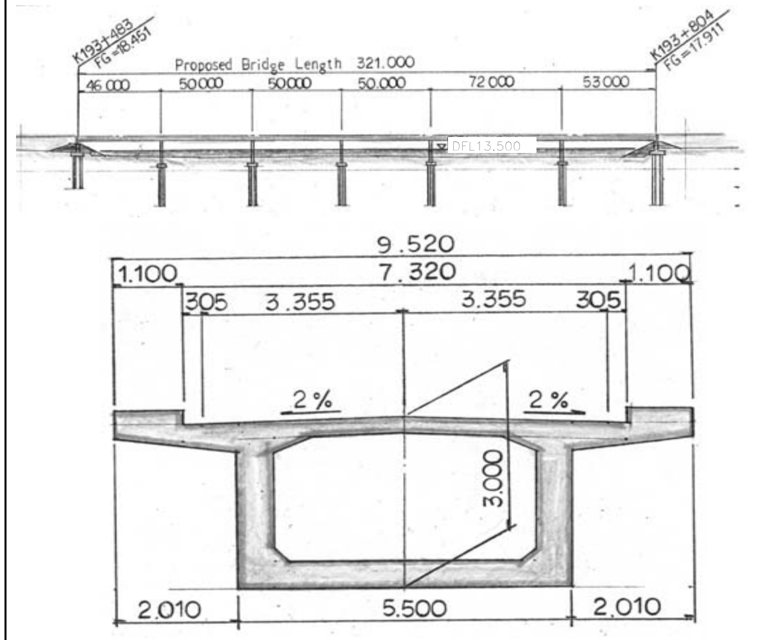
		Unit	Quantities	Unit Cost (thou.pesos)	Amount (mill.pesos)	Unit	Quantities	Unit Cost (thou.pesos)	Amount (mill.pesos)
Construction Cost	Bridge	m	321	952	306	m	321	952	306
	Road	m	626	11	7	m	620	12	8
	Total	m	947		312	m	941		313

Table 1.3.3 Applicable Span Length and Superstructure Type

Material	No	Superstructure Type	Applicable Span Length (m)							
			50	100	150	200	250	300	350	400
Steel	S1	Plate Girder								
	S2	Box Girder								
	S3	Truss								
	S4	Arch								
	S5	Cable Stayed								
	S6	Suspension								
Concrete	C1	PC I Girder								
	C2	PC Box Girder								
	C3	PC Extradosed								
	C4	PC Cable Stayed								
Hybrid	H1	Extradosed								
	H2	Cable Stayed								

Note:
Generally Applicable Length
Possible Length

Table 1.3.4 Comparison Table of Bucao Bridge Type for Reconstruction

			Alternative 1 **Steel Plate Girder**				Alternative 2 **Prestressed Concrete Box Girder**			
Profile										
Evaluation items	Construction Cost	70	70	Amount (mill.pesos)	Ratio	Balance (mill.pesos)	50	Amount (mill.pesos)	Ratio	Balance (mill.pesos)
				312	1.00	0		435	1.39	122
	Construction Period	5	5	24months			4	30months		
	Structure Aspect	5	5				5			
	Seismicity	5	5				5			
	Construction execution	5	5				4	Quality control of superstructure is required more intensively than Alt. 1		
	Hydrological Advantag	5	5				5			
	Maintenance aspect	5	5	steel material is non-paint type			5			
Recommendation		100	100	Recommended			78	Not Recommended mainly from cost aspect		

		Unit	Quantities	Unit Cost (thou.pesos)	Amount (mill.pesos)	Unit	Quantities	Unit Cost (thou.pesos)	Amount (mill.pesos)
Construction Cost	Bridge	m	321	952	306	m	321	1333	428
	Road	m	626	11	7	m	626	11	7
	Total	m	947		312	m	947		435

Table 2.1.1 Station and Municipality

Station	Municipality
TS-01	Patrocinio, San Narciso
TS-02	Alusiis, San Narciso
TS-03	Maloma, San Felipe
TS-04	Sto.Niño, Cabangan
TS-05	Bucao, Botolan

Table 2.1.2 Vehicle Classification

Vehicle Type	Vehicle Description	No. of Axle	Rear tire
(1) Car, Jeep	All private cars, taxi, sedans, sports cars, including jeepneys.	2	Single
(1) Pick-Up, Van	An open body vehicle for transport of goods or passenger with single rear tire and gross weight <3T and a closed body vehicle for transport of goods or passengers.	2	Single
(2) Jeepney	Any jeepney (public or private) >23 seats, <45 seats.	2	Single
(3) Small Bus	Public Transport Bus >23 seats, <45 seats	2	1 or 2
(4) Big Bus	Public Transport Bus >45 seats, <65 seats	2	Double
(5) Truck-2-Axle	Vehicle for transport of goods consist of one straight body having double rear tire and gross vehicle weight >3T	2	Double
(6) Truck-3-Axle	Vehicle for transport of goods consist of one straight body having double tire in a tandem axle (10 wheeler) and a gross vehicle weight >5T	3	Double
(7) Truck-Trailer/Semi-Trailer	Vehicle for transport of goods consist of two different elements includes prime mover/semi-trailer as well as truck/trailer combinations.	3-6	Double
(8) Motorcycle	2-wheel tricycles for transport of goods and passengers.	1	Single
(9) Motor-Tricycle	3-wheel motorcycles for transport of goods and passengers.	2	Single

Table 2.2.1 Expansion Factor 12 to 24-hour

Vehicle Type	Monday	Wednesday	Friday	Average
(1) Car, Jeep	1.372	1.367	1.447	1.395
(1) Pick-Up, Van	1.372	1.367	1.447	1.395
(2) Jeepney	1.303	1.220	1.232	1.252
(3) Small Bus	1.428	1.428	1.484	1.447
(4) Big Bus	1.364	1.426	1.429	1.406
(5) Truck-2-Axle	1.214	1.288	1.216	1.239
(6) Truck-3-Axle	1.727	1.549	1.618	1.631
(7) Truck-Trailer/ Semi-Trailer	1.786	2.000	1.789	1.858
(8) Motorcycle	1.340	1.163	1.297	1.267
(9) Motor-Tricycle	1.271	1.204	1.338	1.271

Table 2.2.2 Daily Factors

Vehicle Type	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
(1) Car, Jeep, Pick-Up, Van	1.079	1.079	1.062	1.056	0.883	0.856	1.043
(2) Jeepney	1.277	1.003	0.861	0.879	0.796	1.428	1.037
(3) Small Bus	0.933	1.014	0.967	0.982	0.960	1.072	1.091
(4) Big Bus	1.025	1.020	1.071	0.949	1.025	0.909	1.020
(5) Truck-2-Axle	0.977	1.031	0.945	0.882	0.922	1.034	1.311
(6) Truck-3-Axle	0.916	1.021	1.321	0.802	0.949	0.822	1.531
(7) Truck-Trailer/Semi-Trailer	1.320	1.375	0.868	1.031	0.971	0.635	1.269
(8) Motorcycle	1.224	0.956	1.055	0.833	0.720	1.356	1.074
(9) Motor-Tricycle	1.118	0.963	1.051	0.907	0.904	1.115	0.989

Table 2.2.3 Seasonal Factors

(1) Car, Jeep, Pick-Up, Van	(2) Jeepney	(3) Small Bus	(4) Big Bus	(5) Truck-2-Axle	(6) Truck-3-Axle	(7) Truck-Trailer /Semi-Trailer	(8) Motor-cycle	(9) Motor-Tricycle
0.911	0.974	1.262	1.089	0.946	0.946	0.997	0.906	0.906

Table 2.2.4 Summary of Annual Average Daily Traffic

Unit: Vehicle

	TS-01	TS-02	TS-03	TS-04	TS-05
(1) Car/Jeep/Pickup/Van	3,238 35.8%	2,367 52.4%	1,905 57.7%	2,042 43.6%	2,022 56.1%
(2) Jeepny	144 1.6%	99 2.2%	144 4.4%	172 3.7%	175 4.9%
(3) Small Bus	344 3.8%	335 7.4%	192 5.8%	224 4.8%	182 5.1%
(4) Big Bus	234 2.6%	220 4.9%	209 6.3%	216 4.6%	230 6.4%
(5) Truck 2-axle	388 4.3%	315 7.0%	272 8.3%	260 5.6%	285 7.9%
(6) Truck 3-axle	99 1.1%	100 2.2%	90 2.7%	127 2.7%	92 2.5%
(7)Truck-Trailer/Semi-Trailer	33 0.4%	32 0.7%	32 1.0%	31 0.7%	35 1.0%
(8) Motorcycle	376 4.2%	181 4.0%	122 3.7%	231 4.9%	166 4.6%
(9) Motor-tricycle	4,180 46.3%	857 19.0%	329 10.0%	1,382 29.5%	418 11.6%
(10) Others	2 0.0%	9 0.2%	6 0.2%	2 0.0%	0 0.0%
TOTAL	**9,037** 100.0%	**4,515** 100.0%	**3,302** 100.0%	**4,687** 100.0%	**3,604** 100.0%