

(4) Toll Plaza Lighting

The illumination level for the toll plazas is a minimum 20 lux as mentioned before.

Flood lighting luminaires of 13 meter height or 25m high-mast poles, with high pressure sodium lamps will be used to light the toll plaza.

This lamp has been selected instead of the low pressure sodium lamp because of its better colour rendering for the following reasons:-

- The area is rather hazardous since drivers are required to manoeuvre vehicles (i.e. change of lane, deceleration for the stop at the booth acceleration, etc.)
- Easier identification of the vehicle classes by toll collectors and staff and
- Easier identification of paper money

(5) Toll Building Lighting

The toll building will be provided with fluorescent lighting with illumination levels similar to existing toll buildings.

(6) Lighting Facilities for Traffic Signs

The signboards are planned to be lighted based on road user visibility requirements.

Light sources recommended for the signboards are fluorescent lamps.

The lighting fixtures for the signboards will be fixed on a mounting pole or gantry frame.

5.8.4 Landscaping and Safety

The appearance of the highway and its impact on the environment has been constantly in focus throughout the design process.

The grassed areas along the project roads, because they are relatively small in size and are an important part of the landscape effect, will require considerable effort in the construction of curbs and drainage structures to make them attractive. While grass is widely used for preventing erosion the utilization of trees and shrubs are also considered.

Coordination of slope grading, drainage and planting (i.e. planting of trees, shrubs, vines, ground cover, or other vegetation) were considered in the design of all roadways and structures, not only to enhance the appearance of the area and safety, but also to keep construction and maintenance costs to a minimum.

Although detailed instructions are not described in the general specifications or drawings, the following must be taken into account in the execution of landscaping development:

- (i) Dense shrub masses, by their slower decelerating effect, mitigate damage and injury to car and driver, however, they require about 2 years to become firmly rooted and well grown. In medians, multiple rows of dense shrubs are effective.
- (ii) The highway engineer expands considerable effort in the provision of adequate sight distance, and it is essential that this visual safety element be preserved indefinitely. It is obvious that planting tall trees or shrubs on the inside of horizontal curves will adversely affect sight distance.
- (iii) Even low-lying ground cover can seriously shorten vertical sight distance on curved ramps.
- (iv) The end of approach noses may be planted with low-growing shrubs that will be seen from a considerable distance and directs the driver's attention to the necessity for turning. These shrubs should not be of the type that cause vehicle damage on impact, nor should they ever obscure signs or warning devices (i.e. flashing light on a post).
- (v) It is considered undesirable from a safety standpoint for trees that will ultimately grow high or greater than 10cm diameter to be planted in the median as such trees will create a high collision hazard. Planting of slow growing small shrubs or "BONSAI" trees well set back from the edge of curbs is recommended as these will screen headlight glare and the planting, if properly placed, can soften the rather harsh appearance of steel guardrails.

- (vi) In special locations where it is desired to minimize headlight glare, slow growing low-hedge or shrub-type plants can be used.
- (vii) On arterial and frontage roads where numerous turn offs are provided at private driveways, trees along the edge of the curb line are undesirable as they restrict the line of sight for motorists entering the street from driveways. Proper sight distance should always be provided and only low-growing shrubs, about 0.5 meter high, or ground cover should be used.
- (viii) Low growing vines and ground cover may be used to considerable advantage on narrow separations and on approach noses and merging ends. Such growth offers definite contrast with the pavement and shrubs, and tends to emphasize travel lanes both at day and night; it also eliminate mowing.

5.8.5 Traffic Barriers

Traffic barriers are classified into basic groups of longitudinal and crash cushions according to functions. Longitudinal traffic barriers perform by redirecting errant vehicles away from the roadside hazard. Crash cushion barriers function primarily by decelerating errant vehicles to a stop. This Study only considers longitudinal traffic barriers.

There are three types of traffic barrier systems. These are rigid barriers, semi-rigid barriers and flexible barriers as shown in Figure 5.8.4. Rigid barriers are normally used where lateral deflections are not permitted and at location with narrow medians. Semi-rigid barriers are used where small or moderate lateral deflection is acceptable and flexible barriers rely on large dynamic deflections to redirect errant vehicles gradually.

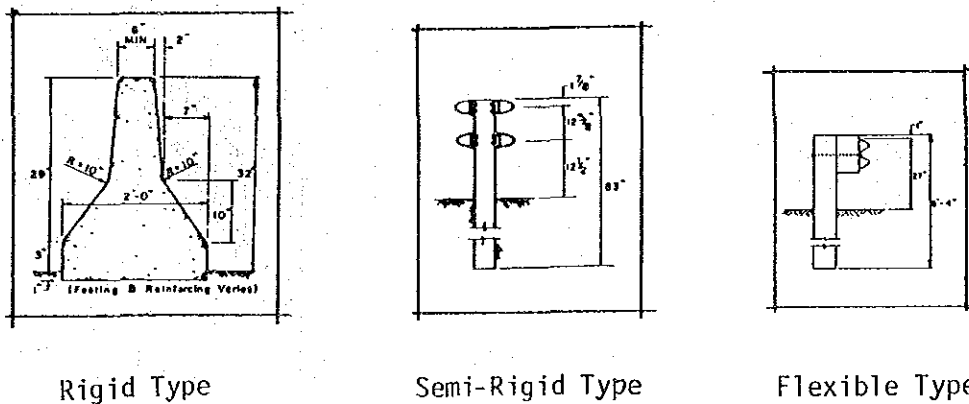
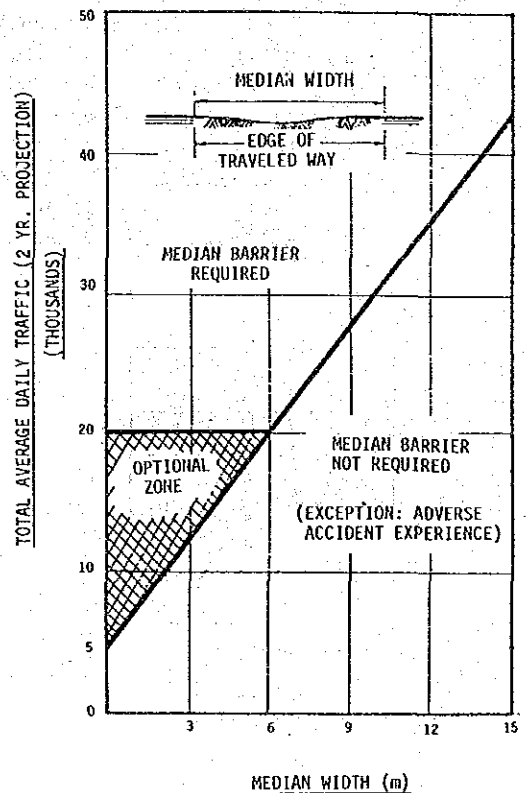
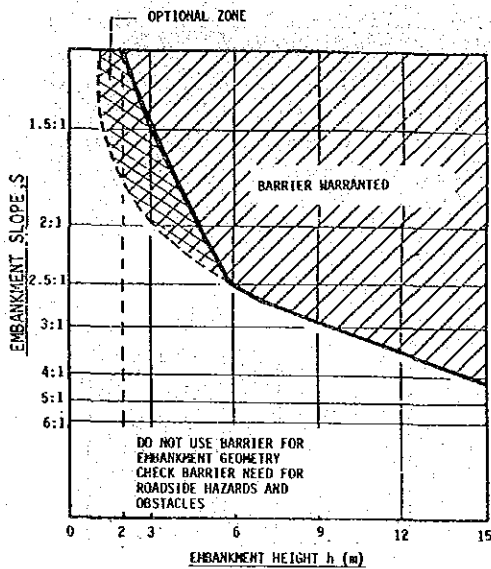


Figure 5.8.4 : Types of Traffic Barrier Systems

Traffic barrier warrants are delineated in terms of geometry and location of roadside features and for the case of median barriers traffic volume is also a usual decision factor. The three principal features are slopes embankment, roadside obstacles and opposing traffic.

Height and slope of roadway embankments are basic features in determining traffic barrier needs for embankment. Figure 5.8.5 shows barrier requirement for embankment geometry. For being clear of roadside obstacles such as bridge piers or permanent buildings, a 10m clearance adjacent to the travelled way is recommended as the minimum. Narrow medians also warrant a longitudinal traffic barrier to prevent vehicles from crossing the median and head-on collision between vehicles in opposing traffic. Figures 5.8.6 shows median barrier requirements suggested by JKR.



Source: JKR Standard

Figure 5.8.5: Barrier Requirement for Embankment Geometry

Figure 5.8.6: Median Barrier Requirements

Note:

- - Mandatory requirement for installation of guardrail
- ▨ - Optional zone requirement depend on site condition and accident severity

5.8.6 Toll Gate

In the planning and design of the toll gate, considerations have to be made regarding the road, topographical and other conditions as well as the system for the control and operation of the road. That is, in determining the type of interchange for a toll road, the system of toll collection has to be studied at the same time. The following items are studied based on the "Design Manual, Volume 4 of Japan Expressway Public Corporation" and "LLM (Malaysia Highway Authority) Standard".

(1) Toll Levy System

The toll levy system for a tollway may be generally divided into flat or zone tariff and distance proportional tariff.

(2) Determination of the Number of Traffic Lanes to a Toll Gate

The number of traffic lanes to be provided at a toll gate is determined from the traffic volume (interval of arrival), the service time per vehicle and the service level provided (planned length of queue).

The above factors are decided according to the following standard.

(a) Basic Hourly Traffic Volume

The basic traffic volume used is the design hourly traffic volume (DHV) which is calculated from the average daily traffic volume (ADT) by the following formula:-

$$DHV = ADT \times K \times D$$

In the above formula, the coefficient K (peak hour rate) is taken as 8% and D (single direction concentration of traffic) is taken as 60%.

(b) Service Time per Vehicle

The service time is assumed at 6 seconds for one entry and 14 seconds for one exit in the case of distance proportional tariff system and 8 seconds for all vehicles in the case of flat or zone tariff system for the purpose of calculating the required traffic lane at toll gate.

(c) Service Level

The service level is expressed in term of the length of the queue, namely the average number of waiting car.

Table 5.8.2 shows hourly traffic volume in case of number of waiting car $Q = 3$.

(3) Geometric Structure Standard at Toll Plaza

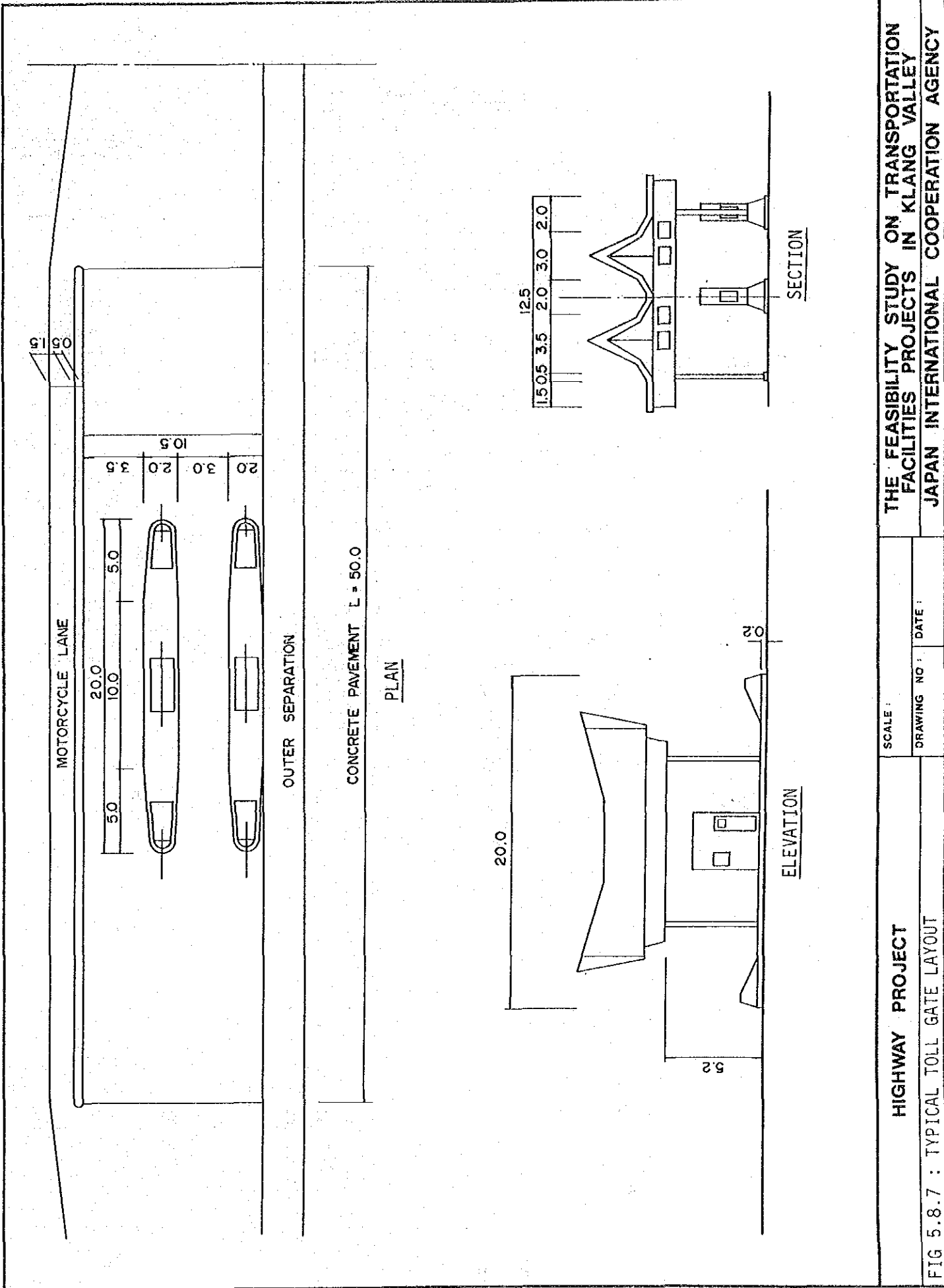
(a) The width composition of a toll lane is as shown in Figure 5.8.7.

(b) Even if only one lane is required from calculation, two lanes will be provided with the left lane serving as reserve lane.

(c) The size of toll island will be 20.0m in length, 2.0m in width and 0.2m in height.

(d) The horizontal alignment at the portion where the toll plaza is to be provided will in principle conform with that for the main route and the minimum curvature radius at an interchange toll gate is 200m.

(e) The vertical curve of the portion where toll plaza is to be provided will be based on the criteria for the main route and that for the interchange toll gate will be more than 8,000m in principle and more than 7,000 for exceptions.



THE FEASIBILITY STUDY ON TRANSPORTATION
 FACILITIES PROJECTS IN KLANG VALLEY
 JAPAN INTERNATIONAL COOPERATION AGENCY

SCALE :
 DRAWING NO :
 DATE :

HIGHWAY PROJECT
 TYPICAL TOLL GATE LAYOUT

FIG 5.8.7 : TYPICAL TOLL GATE LAYOUT

Table 5.8.2 : Hourly Traffic Volume by Service Time and Number of Booth

SERVICE TIME (SEC) NUMBER OF BOOTH	NUMBER OF WAITING CAR Q= 3																			
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
1	540	450	386	337	300	270	245	225	208	193	180	169	159	150	142	135				
2	1,247	1,039	891	779	693	624	567	520	480	445	416	390	367	346	328	312				
3	1,961	1,634	1,400	1,225	1,089	980	891	817	754	700	654	613	577	545	516	490				
4	2,676	2,230	1,912	1,673	1,487	1,338	1,217	1,115	1,029	956	892	836	787	743	704	669				
5	3,394	2,828	2,424	2,121	1,835	1,697	1,543	1,414	1,305	1,212	1,131	1,060	998	943	893	848				
6	4,111	3,426	2,937	2,570	2,284	2,056	1,869	1,713	1,581	1,463	1,370	1,285	1,209	1,142	1,082	1,028				
7	4,829	4,024	3,450	3,018	2,683	2,415	2,195	2,012	1,857	1,725	1,610	1,509	1,420	1,341	1,271	1,207				
8	5,548	4,623	3,963	3,467	3,082	2,774	2,522	2,312	2,134	1,981	1,849	1,734	1,632	1,541	1,480	1,387				
9	6,267	5,222	4,476	3,917	3,481	3,133	2,848	2,611	2,410	2,238	2,089	1,958	1,843	1,741	1,649	1,567				
10	6,985	5,821	4,990	4,366	3,881	3,493	3,175	2,911	2,687	2,495	2,328	2,183	2,055	1,940	1,838	1,746				
11	7,704	6,420	5,503	4,815	4,280	3,852	3,502	3,210	2,963	2,752	2,568	2,408	2,266	2,140	2,027	1,926				
12	8,424	7,020	6,017	5,265	4,680	4,212	3,829	3,510	3,240	3,008	2,808	2,632	2,478	2,340	2,217	2,106				
13	9,143	7,619	6,531	5,714	5,079	4,571	4,156	3,810	3,516	3,252	3,048	2,857	2,689	2,540	2,406	2,286				
14	9,862	8,218	7,044	6,164	5,479	4,931	4,483	4,109	3,793	3,522	3,287	3,082	2,901	2,739	2,595	2,466				
15	10,582	8,818	7,558	6,613	5,879	5,291	4,810	4,409	4,070	3,779	3,527	3,307	3,112	2,939	2,785	2,645				
16	11,301	9,417	8,072	7,063	6,278	5,650	5,137	4,709	4,347	4,036	3,767	3,532	3,324	3,139	2,974	2,825				
17	12,020	10,017	8,586	7,513	6,678	6,010	5,464	5,009	4,623	4,293	4,007	3,756	3,535	3,339	3,163	3,005				
18	12,740	10,617	9,100	7,962	7,073	6,370	5,791	5,308	4,900	4,550	4,247	3,991	3,747	3,539	3,353	3,185				
19	13,460	11,216	9,614	8,412	7,477	6,730	6,118	5,608	5,177	4,807	4,486	4,206	3,959	3,739	3,542	3,365				
20	14,179	11,816	10,128	8,862	7,877	7,090	6,445	5,908	5,453	5,064	4,726	4,431	4,170	3,939	3,731	3,545				

Unit: veh/hr

- (f) The vertical gradient for a toll gate area is below 2% in principle or below 3 for exceptions. The range to be governed by this standard will be 100m on both sides of the gate in the case of toll barrier gate on the main route and 50m on both sides in the case of interchange toll gate.
- (g) The standard crossfall at a toll gate is 1.5% and the maximum is 2.0%.
- (h) The toll gate portion will be of cement concrete pavement and the range is 50m on both sides of a gate for main route toll gate and 25m on both sides of a gate for interchange toll gate.
- (i) The cement concrete portion will be of the same width as that required at the toll gate centre line and the standard easement at both ends will be as shown in Figure 5.8.8, but particular attention will be paid to the aesthetical effect. As shown in Figure 5.8.8, the easement rate of S/L will be less 1/3 and will be so planned as to enable smooth traffic flow.
- (j) As an interchange toll gate, the distance from the centre line of the toll gate to the diverging point of the ramp should be over 75m.

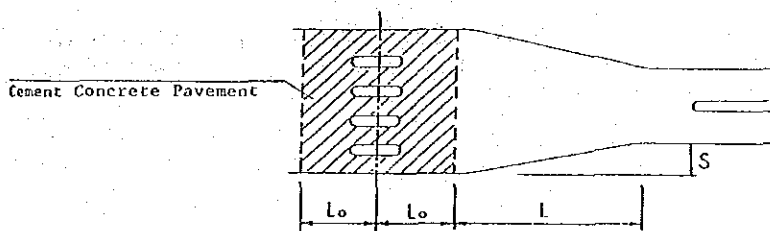


Figure 5.8.8 : Easement at Toll Gate

5.8.7 Emergency Telephone

The proposed communications system must be suitable for transmitting information between pre-established point located at regular intervals along the expressway and the operations centre, employing a two-way communications system. It is necessary that the emergency assistance personnel be able to communicate and receive between the call point and the operations centre, in such a way as to be able to exchange further and more detailed information on the emergency so as to be able to take necessary steps immediately.

The use of the equipment and its maintenance must be simple, and it should be easily understandable to the user. So that telephone system is recommended as emergency communications system for project roads.

In installation of telephone posts along the project roads the following criteria must be considered:-

- (i) The telephone posts must be located at roughly 2km intervals along the expressway, and be connected with an operations centre which functions at all times.
- (ii) The telephone posts must be recognizable in shape and colour, so as to attract the attention of the users.
- (iii) The shape and dimensions of the telephone posts must be kept uniform along the whole length of the road.

- (iv) The telephone post must be at least 1.50m in height and orange in colour. On one side should be written "Talipon Kecemasan" in white letters on a red reflecting background.
- (v) Telephone posts must be provided on both carriageways, opposite one another so that the user will not be tempted to cross the carriageways on foot, located on the verge and protected by a safety fence.
- (vi) There must be a light to illuminate the inside of the telephone post at night to identify the signal buttons, or else reflecting equipment and lettering should be adopted.
- (vii) The points where the telephone posts are installed must be easily accessible and safe.
- (viii) Installation of telephone posts on the acceleration and deceleration lanes must be avoided.
- (x) Call posts should not be installed on bridges.

APPENDIX TO CHAPTER 6
Project Cost Estimates

TABLE 6.1 : TOTAL ESTIMATED PROJECT COST OF SHAH ALAM HIGHWAY/MRR-II

PRICE IN JUNE 1988 UNIT : RINGGIT

CONSTRUCTION SECTION	SECTION				TOTAL
	SECTION 1	SECTION 2	SECTION 3	SECTION 4	
	NORTH KLANG STRAITS BYPASS JLN LANGAT	JLN LANGAT JLN HICOM-SHAH ALAM	JLN HICOM-SHAH ALAM KL-SEREMBAN EXP'WAY JLN CHERAS	KL-SEREMBAN EXP'WAY	
1. DIRECT CONSTRUCTION COST	138,386,891	82,622,284	139,001,431	129,376,173	489,386,778
2. LAND ACQUISITION AND COMPENSATION COST	31,010,000	37,120,000	22,260,000	5,500,000	95,890,000
3. PHYSICAL CONTINGENCY	13,838,689	8,262,228	13,900,143	12,937,617	48,938,678
4. TOTAL OF (1), (2), AND (3)	183,235,580	128,004,512	175,161,574	147,813,790	634,215,456
5. SUPERVISORY COST	4,151,607	2,478,669	4,170,043	3,881,285	14,681,603
6. FINAL ENGINEERING COST	6,919,345	4,131,114	6,950,072	6,468,809	24,469,339
GRAND TOTAL	194,306,531	134,614,295	186,281,688	158,163,884	673,366,398
SECTION LENGTH (THROUGHWAY) (M)	9,600	13,360	19,475	6,065	48,500
BRIDGE LENGTH (M)	1,918	756	4,097	2,685	9,456
BRIDGE AREA (M)	33,109	19,628	68,257	64,710	185,704

PARITY RATES : RINGGIT 2.60 = US\$ 1.00 = YEN 125

TABLE 6.2 : TOTAL ESTIMATED PROJECT COST OF NORTH-SOUTH EXPRESSWAY LINK

CONSTRUCTION SECTION	PRICE IN JUNE 1988		TOTAL
	SECTION 1	SECTION 2	
	NEW KLANG VALLEY EXPRESSWAY - SHAH ALAM HIGHWAY/ MRR-11	SHAH ALAM HIGHWAY/ MRR-11 - KL-SEREMBAN EXP'WAY	
1. DIRECT CONSTRUCTION COST	87,433,672	172,799,535	260,233,207
2. LAND ACQUISITION AND COMPENSATION COST	4,060,000	47,430,000	51,490,000
3. PHYSICAL CONTINGENCY	8,743,367	17,279,954	26,023,321
4. TOTAL OF (1), (2), AND (3)	100,237,039	237,509,489	337,746,528
5. SUPERVISORY COST	2,623,010	5,183,986	7,806,996
6. FINAL ENGINEERING COST	4,371,684	8,639,977	13,011,661
GRAND TOTAL	107,231,733	251,333,452	358,565,185
SECTION LENGTH (THROUGHWAY) (M)	4,880	29,120	34,000
BRIDGE LENGTH (M)	2,318	2,386	4,704
BRIDGE AREA (M ²)	23,420	33,259	56,679

PARITY RATES : RINGGIT 2.60 = US\$ 1.00 = YEN 125

SHAH ALAM HIGHWAY

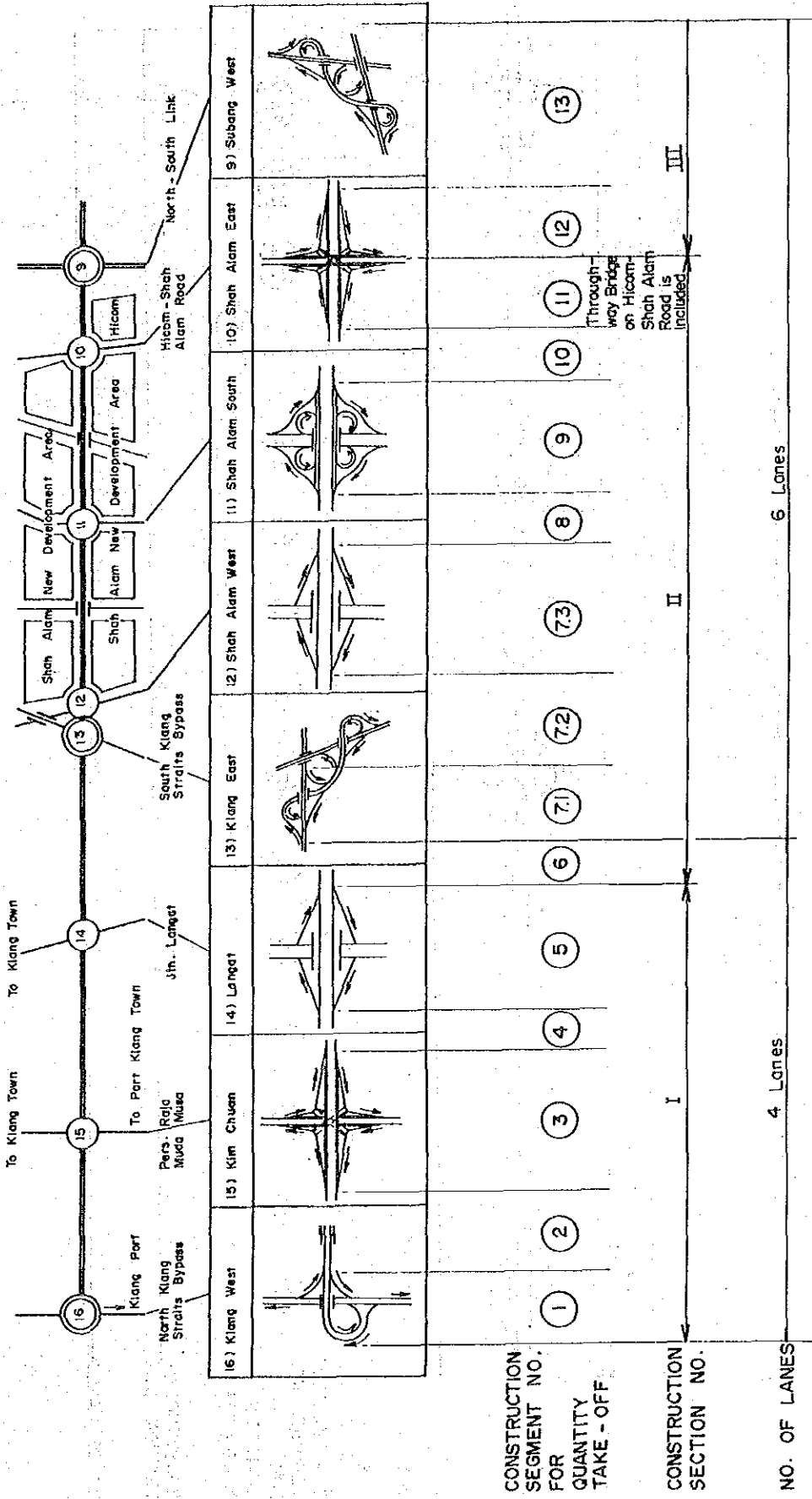


FIG. 6.1 : CONSTRUCTION SECTION & SEGMENT
 THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

LEGEND: SYSTEM INTERCHANGE B SERVICE INTERCHANGE

SCALE:

SHAH ALAM HIGHWAY

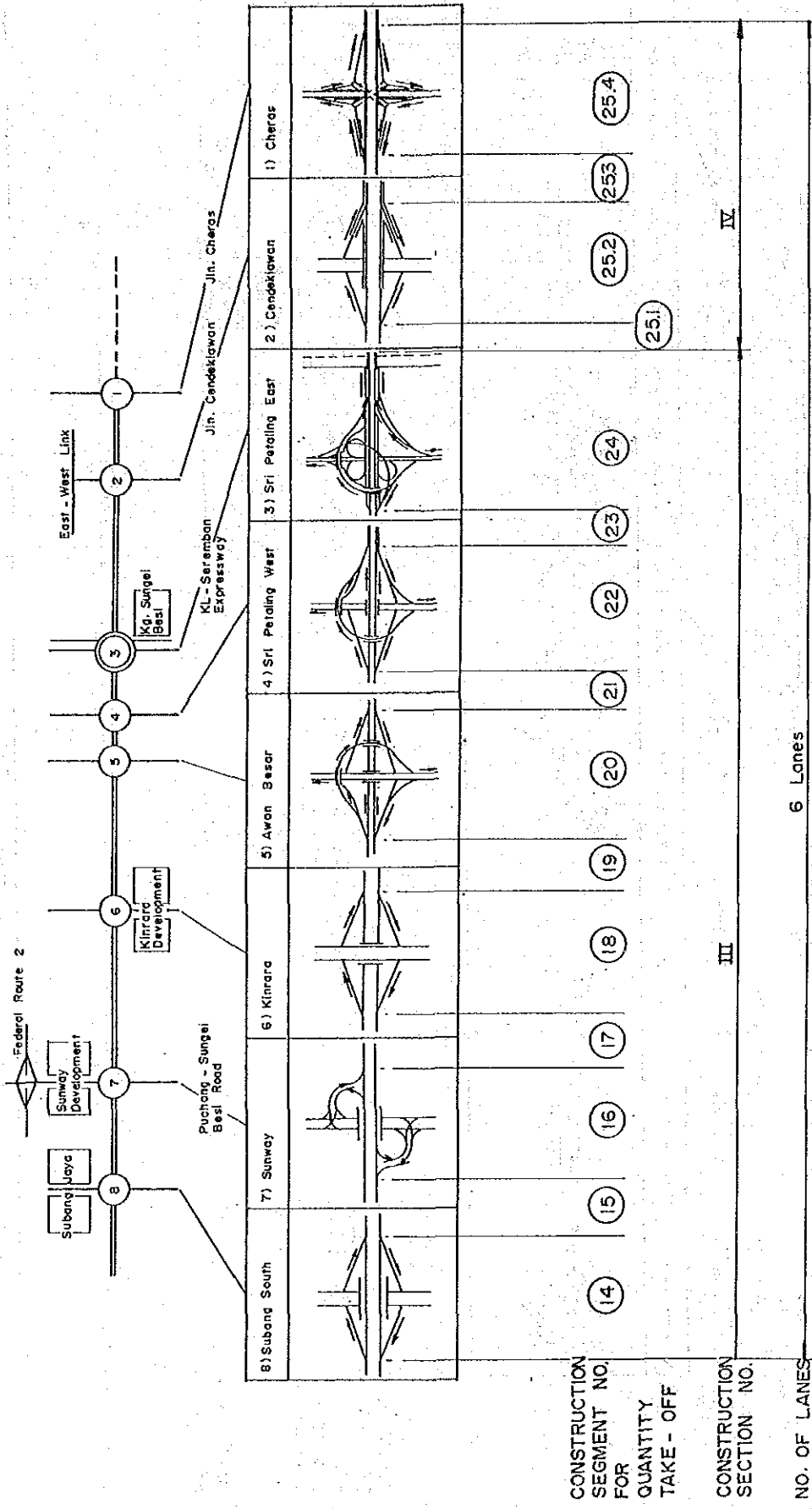


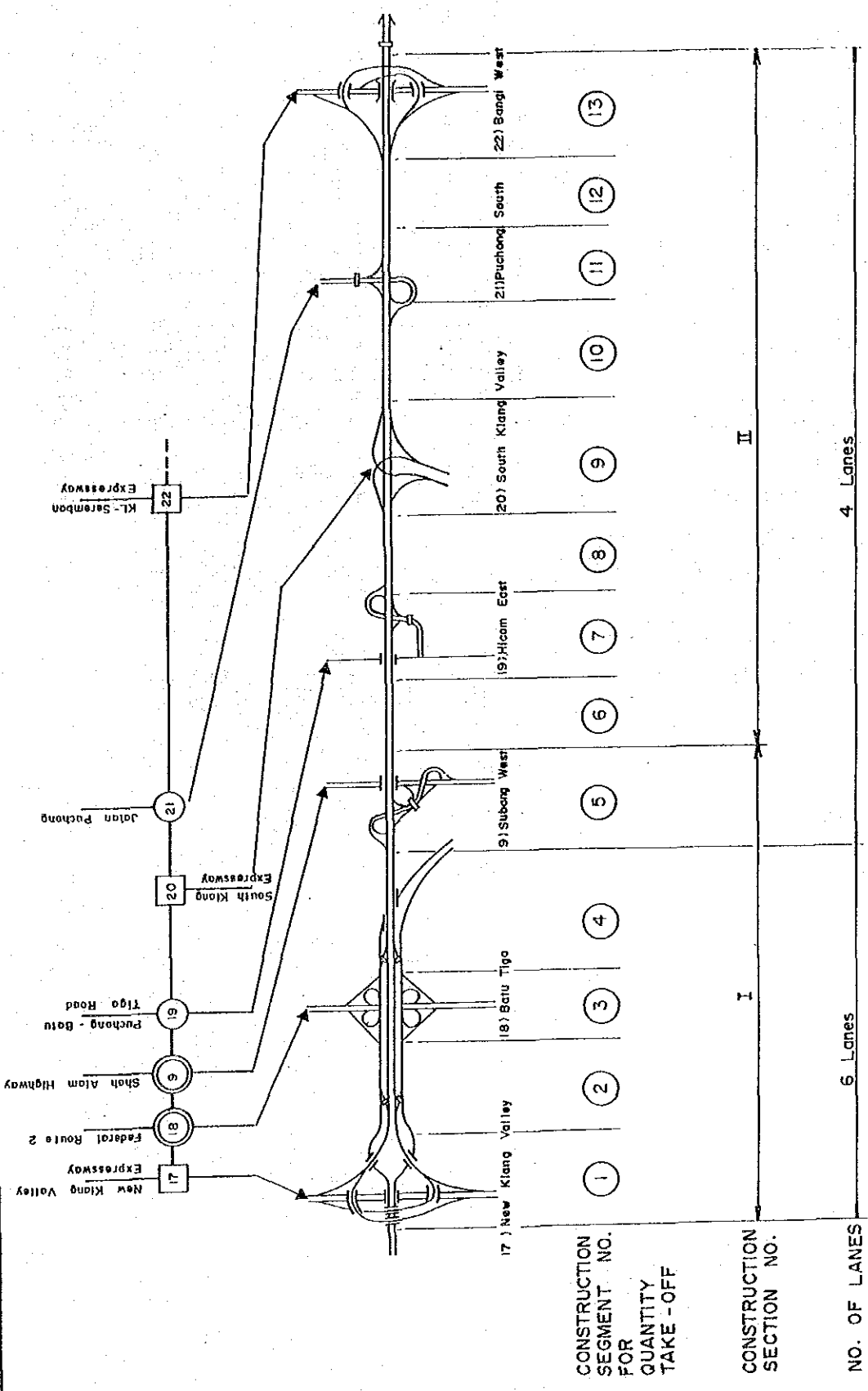
FIG. 6.2 : CONSTRUCTION SECTION & SEGMENT

THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

LEGEND: SYSTEM INTERCHANGE B SERVICE INTERCHANGE

SCALE:

N-S LINK



CONSTRUCTION
SEGMENT NO.
FOR
QUANTITY
TAKE - OFF

CONSTRUCTION
SECTION NO.

NO. OF LANES

SCALE :

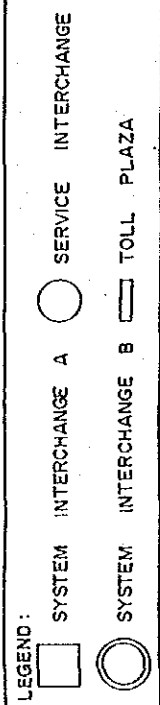


FIG. 6.3 : CONSTRUCTION SECTION & SEGMENT

THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

TABLE 6.3 : SUMMARY OF ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
SHAH ALAM HIGHWAY/MRR-11 SECTION 1 (SEG.1-5)

ITEM NO.	DESCRIPTION	FOREIGN COST TTL (RINGGIT)	LOCAL COST TTL (RINGGIT)	TOTAL (RINGGIT)	PROP. (%)
1.	GENERAL	2,331,302	4,264,819	6,596,121	4.77
2.	SITE CLEARING	620,460	729,677	1,350,137	0.98
3.	DEMOLITION	13,156	114,900	128,056	0.09
4.	ROAD EARTHWORK	7,867,227	9,304,257	17,171,484	12.41
5.	STRUCTURE EXCAVATION	657,316	670,814	1,328,130	0.96
6.	DRAINAGE	516,956	4,191,551	4,708,508	3.40
7.	SUBGRADE	102,108	156,461	258,569	0.19
8.	SUBBASE	1,672,152	2,253,947	3,926,099	2.84
9.	BITUMINOUS PAVEMENT	6,267,178	4,560,301	10,827,480	7.82
10.	CONCRETE STRUCTURE	42,363,608	40,513,184	82,876,792	59.89
11.	BRIDGE STEEL WORK	0	0	0	0.00
12.	MISCELLANEOUS	5,417,750	3,797,766	9,215,516	6.66
	DIRECT CONSTRUCTION COST	67,829,212	70,557,678	138,386,891	100.00
13.	LAND ACQUISITION \$ COMPENSATION	0	31,010,000	31,010,000	
14.	CONTINGENCY, PHYSICAL	6,782,921	7,055,768	13,838,689	
	SUB TOTAL	74,612,134	108,623,446	183,235,580	
15.	CONSULTING SUPERVISORY SERVICES	2,034,876	2,116,730	4,151,607	
16.	FINAL ENGINEERING SERVICES	3,391,461	3,527,884	6,919,345	
	GRAND TOTAL	80,038,471	114,268,060	194,306,531	

SECTION LENGTH (THROUGHWAY) : 9600 M

BRIDGE LENGTH : 1918 M

BRIDGE AREA : 33109 M2

TABLE 6.4 : ESTIMATED PROJECT COST

CONSTRUCTION SECTION :

SHAH ALAM HIGHWAY/MRR-11 SECTION 1 (SEG.1-5)

EXCHANGE RATES : US\$ 1 = YEN 125 = M\$ 2.6

NO	DESCRIPTION	UNIT	TTLQTY	UNIT PRICE		CONSTRUCTION COST			PROP. (%)
				FOREIGN (M\$)	LOCAL (M\$)	FOREIGN (M\$)	LOCAL (M\$)	TOTAL (M\$)	
1.01	MAINTENANCE & PROTECTION OF TRAFFIC	L.S.				663586	1052160	1715746	1.43
1.02	MOBILIZATION/DEMOBILIZATION	L.S.				1349047	2648638	3997686	3.32
1.03	WORK IN OR DEARING WITH EXIST. WATER	L.S.				14585	7740	22325	0.02
2.01	SITE CLEARING	M2	576820	0.94	1.10	539530	634502	1174032	0.98
3.01	REMOVAL OF MASONRY OR CONC. STRUCTURE	M3	1062	10.77	94.08	11440	99913	111353	0.09
4.01	COMMON EXCAVATION	M3	12168	3.25	3.01	39522	36626	76148	0.06
4.02	BORROW MATERIAL	M3	517514	5.76	7.39	2978817	3824427	6803244	5.65
4.03	FREE DRAINING MATERIAL	M3	0	13.81	19.85	0	0	0	0.00
4.04	PERMEABLE BACKFILL	M3	18305	15.38	31.26	281464	572199	853663	0.71
4.05	SAND DRAIN	M	731481	4.84	5.00	3541263	3657407	7198670	5.98
5.01	STRUCTURE EXCAVATION UPTO 2 M	M3	48062	2.64	6.18	126060	297022	423983	0.35
5.02	STRUCTURE EXCAVATION OVER 2 M	M3	4466	99.55	64.10	444619	286294	730914	0.61
6.01	R.C. PIPE, TYPE-A, D = 60 CM	M	2692	37.53	183.18	101031	493157	594188	0.49
6.02	R.C. PIPE, TYPE-A, D =100 CM	M	2538	60.21	339.01	152840	860529	1013369	0.84
6.03	U-DITCH, 0.3#0.6M	M	10033	5.01	71.10	50221	713338	763559	0.63
6.04	U-DITCH 1.0#(0.6-2.0M)	M	5227	21.52	226.55	112512	1184277	1296789	1.08
6.05	CATCH BASIN	EACH	131	79.92	501.41	10450	65566	76017	0.06
6.06	MORTARED RUBBLE PAVED WATERWAY	M2	18220	1.23	18.00	22473	327960	350433	0.29
7.01	SUBGRADE PREPARATION	M2	215957	0.41	0.63	88789	136053	224842	0.19
8.01	SUBBASE	M3	66665	21.81	29.40	1454045	1959954	3413999	2.84
9.01	BITUMINOUS PRIME COAT	KG	569021	0.69	0.23	391865	130875	522740	0.43
9.02	ASPHALT TREATED BASE COURSE	TON	57587	45.02	32.25	2592563	1857167	4449730	3.70
9.03	ASPHALT CONCRETE SURFACE COURSE	TON	47307	52.11	41.80	2465292	1977438	4442730	3.69
9.04	CONCRETE PAVEMENT	M2	0	10.47	53.48	0	0	0	0.00
10.01	STRUCTURE CONCRETE CLASS A	M3	8440	431.63	309.70	3643070	2613953	6257023	5.20
10.02	STRUCTURE CONCRETE CLASS B	M3	4135	132.86	237.25	549418	981095	1530513	1.27
10.03	STRUCTURE CONCRETE CLASS C	M3	37633	55.50	211.20	2088787	7948047	10036834	8.34
10.04	STRUCTURE CONCRETE CLASS D	M3	1915	46.06	208.89	88202	400024	488226	0.41
10.05	REINFORCING STEEL	KG	4879141	0.03	1.46	150452	7123546	7273999	6.04
10.06	PC PRECAST I-BEAM(SPAN 25M) CONCRETE	M3	9629	920.36	824.05	8861970	7934654	16796624	13.96
10.07	PC CABLE	KG	272943	4.56	1.54	1245631	420333	1665964	1.38
10.08	FURNISH AND DRIVE RC PILE 35CM#35CM	M	86794	17.19	72.52	1491622	6294283	7785904	6.47
10.09	FURNISH AND DRIVE PC PILE D=45CM	M	0	151.92	50.46	0	0	0	0.00
10.10	FURNISH AND DRIVE STEEL PILE D=61CM	M	62401	283.60	21.32	17696728	1330389	19027117	15.81
10.11	EXPANSION JOINT	M	737	364.60	56.12	268530	41332	309862	0.26
10.12	BEARING PAD WITH ACCESSORIES	EACH	5705	39.09	20.57	223006	117352	340358	0.28
10.13	DRAIN PIPE, 25CM DIAMETER	M	7452	71.19	3.20	530505	23846	554352	0.46
11.01	STRUCTURAL STEEL	TON	0	3495	200	0	0	0	0.00
12.01	SOLID SODDING	M2	154910	0.04	1.61	6369	249405	255774	0.21
12.02	GUARDRAIL	M	5100	1.19	123.40	6081	629340	635421	0.53
12.03	SEPARATOR FENCE	M	15384	52.26	6.81	803912	104765	908677	0.76
12.04	DRY RIPRAP SLOPE PROTECTION	M2	3492	2.76	14.65	9654	51152	60806	0.05
12.05	REGULATORY & WARNING SIGN	EACH	411	115.46	124.99	47419	51333	98753	0.08
12.06	GUIDE SIGN	EACH	18	8386	708	150956	12737	163693	0.14
12.07	ROAD MARKING	M2	7515	27.79	0.47	208866	3532	212398	0.18
12.08	STREET LIGHTING	EACH	724	4128	1222	2986513	883831	3870344	3.22
12.09	TRAFFIC SIGNAL WITH CONTROL PANEL	EACH	2	154672	1755	309345	3510	312855	0.26
12.10	STREET TREE PLANTING	L.S.				20982	51034	72016	0.06
12.11	CONCRETE CURB	M	31244	4.87	23.88	152223	746107	898329	0.75
12.12	INTERLOCKING CONCRETE PAVING	M2	12360	0.71	41.72	8766	515659	524425	0.44
12.13	TOLL GATE	EACH	0	25696	15000	0	0	0	0.00
TOTAL DIRECT COST (M\$)						58981924	61354503	120336427	100
TOTAL DIRECT COST + OVERHEAD & PROFIT (M\$)						67829212	70557678	138386891	

TABLE 6.5 : SUMMARY OF ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 SHAH ALAM HIGHWAY/MRR-11 SECTION 2 (SEG.6-11) EXCLUDING KLANG EAST IC

ITEM NO.	DESCRIPTION	FOREIGN COST TTL (RINGGIT)	LOCAL COST TTL (RINGGIT)	TOTAL (RINGGIT)	PROP. (%)
1.	GENERAL	2,185,618	4,255,072	6,440,690	7.80
2.	SITE CLEARING	928,226	1,091,619	2,019,845	2.44
3.	DEMOLITION	11,694	102,133	113,827	0.14
4.	ROAD EARTHWORK	3,517,315	4,534,493	8,051,808	9.75
5.	STRUCTURE EXCAVATION	164,059	119,658	283,717	0.34
6.	DRAINAGE	775,045	6,218,193	6,993,238	8.46
7.	SUBGRADE	178,776	273,940	452,716	0.55
8.	SUBBASE	2,623,411	3,536,179	6,159,590	7.46
9.	BITUMINOUS PAVEMENT	11,254,605	8,427,345	19,681,949	23.82
10.	CONCRETE STRUCTURE	9,580,886	9,931,621	19,512,507	23.62
11.	BRIDGE STEEL WORK	0	0	0	0.00
12.	MISCELLANEOUS	8,003,582	4,908,806	12,912,388	15.63
	DIRECT CONSTRUCTION COST	39,223,225	43,399,059	82,622,284	100.00
13.	LAND ACQUISITION & COMPENSATION	0	37,120,000	37,120,000	
14.	CONTINGENCY, PHYSICAL	3,922,322	4,339,906	8,262,228	
	SUB TOTAL	43,145,547	84,858,965	128,004,512	
15.	CONSULTING SUPERVISORY SERVICES	1,176,697	1,301,972	2,478,669	
16.	FINAL ENGINEERING SERVICES	1,961,161	2,169,953	4,131,114	
	GRAND TOTAL	46,283,405	88,330,890	134,614,295	

SECTION LENGTH (THROUGHWAY) : 13360 M

BRIDGE LENGTH : 756 M

BRIDGE AREA : 19628 M2

TABLE 6.6 : ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 SHAH ALAN HIGHWAY/MRR-11 SECTION 2 (SEG.6-11) EXCLUDING KLANG EAST IC
 EXCHANGE RATES : US\$ 1 = MYR 125 = M\$ 2.6

NO	DESCRIPTION	UNIT	TTLQTY	UNIT PRICE		CONSTRUCTION COST			PROP. (%)
				FOREIGN (M\$)	LOCAL (M\$)	FOREIGN (M\$)	LOCAL (M\$)	TOTAL (M\$)	
1.01	MAINTENANCE & PROTECTION OF TRAFFIC	L.S.	0.200	276494	438400	55299	87680	142979	0.20
1.02	MOBILIZATION/DENOBILIZATION	L.S.	12.800	143592	281920	1837946	3608512	5446458	7.58
1.03	WORK IN OR DEARING WITH EXIST. WATER	L.S.	0.300	24309	12900	7293	3870	11163	0.02
2.01	SITE CLEARING	M2	862940	0.94	1.10	807153	949234	1756387	2.44
3.01	REMOVAL OF MASONRY OR CONC. STRUCTURE	M3	944	10.77	94.08	10169	88812	98980	0.14
4.01	COMMON EXCAVATION	M3	24336	3.25	3.01	79044	73251	152296	0.21
4.02	BORROW MATERIAL	M3	507311	5.76	7.39	2920090	3749028	6669118	9.28
4.03	FREE DRAINING MATERIAL	M3	0	13.81	19.85	0	0	0	0.00
4.04	PERMEABLE BACKFILL	M3	3863	15.38	31.26	59401	120757	180158	0.25
4.05	SAND DRAIN	M	0	4.84	5.00	0	0	0	0.00
5.01	STRUCTURE EXCAVATION UPTO 2 M	M3	2722	2.64	6.18	7190	16820	24010	0.03
5.02	STRUCTURE EXCAVATION OVER 2 M	M3	1361	99.55	64.10	135470	87230	222700	0.31
6.01	R.C. PIPE, TYPE-A, D = 60 CM	M	4406	37.53	183.18	165350	807119	972469	1.35
6.02	R.C. PIPE, TYPE-A, D =100 CM	M	4154	60.21	339.01	250143	1408373	1658516	2.31
6.03	U-DITCH, 0.3+0.6M	M	15547	5.01	71.10	77823	1105389	1183212	1.65
6.04	U-DITCH 1.0+(0.6-2.0M)	M	4655	21.52	226.55	100196	1054636	1154831	1.61
6.05	CATCH BASIN	EACH	214	79.92	501.41	17103	107308	124411	0.17
6.06	MORTARED RUBBLE PAVED WATERWAY	M2	51350	1.23	18.00	63337	924300	987637	1.37
7.01	SUBGRADE PREPARATION	M2	378109	0.41	0.63	155457	238209	393666	0.55
8.01	SUBBASE	M3	104590	21.81	29.40	2281227	3074939	5356165	7.46
9.01	BITUMINOUS PRIME COAT	KG	973696	0.69	0.23	670551	223950	894501	1.25
9.02	ASPHALT TREATED BASE COURSE	TON	113388	45.02	32.25	5104749	3656757	8761506	12.19
9.03	ASPHALT CONCRETE SURFACE COURSE	TON	75949	52.11	41.80	3957895	3174671	7132566	9.93
9.04	CONCRETE PAVEMENT	M2	5100	10.47	53.48	53417	272748	326165	0.45
10.01	STRUCTURE CONCRETE CLASS A	M3	0	431.63	309.70	0	0	0	0.00
10.02	STRUCTURE CONCRETE CLASS B	M3	3337	132.86	237.25	443326	791646	1234972	1.72
10.03	STRUCTURE CONCRETE CLASS C	M3	7407	55.50	211.20	411121	1564356	1975476	2.75
10.04	STRUCTURE CONCRETE CLASS D	M3	0	46.06	208.89	0	0	0	0.00
10.05	REINFORCING STEEL	KG	741811	0.03	1.46	22874	1083044	1105919	1.54
10.06	PC PRECAST I-BEAM(SPAN 25M) CONCRETE	M3	5023	920.36	824.05	4623311	4139528	8762838	12.20
10.07	PC CABLE	KG	0	4.56	1.54	0	0	0	0.00
10.08	FURNISH AND DRIVE RC PILE 35CM*35CM	M	3301	17.19	72.52	56735	239408	296142	0.41
10.09	FURNISH AND DRIVE PC PILE D=45CM	M	12735	151.92	50.46	1934705	642619	2577324	3.59
10.10	FURNISH AND DRIVE STEEL PILE D=61CM	M	0	283.60	21.32	0	0	0	0.00
10.11	EXPANSION JOINT	M	1176	364.60	56.12	428773	65997	494770	0.69
10.12	BEARING PAD WITH ACCESSORIES	EACH	4845	39.09	20.57	189389	99662	289050	0.40
10.13	DRAIN PIPE, 25CM DIAMETER	M	3104	71.19	3.20	220972	9933	230905	0.32
11.01	STRUCTURAL STEEL	TON	0	3495	200	0	0	0	0.00
12.01	SOLID SODDING	M2	395350	0.04	1.61	16255	636514	652768	0.91
12.02	GUARDRAIL	M	5900	1.19	123.40	7035	728060	735095	1.02
12.03	SEPARATOR FENCE	M	25178	52.26	6.81	1315712	171462	1487174	2.07
12.04	DRY RIPRAP SLOPE PROTECTION	M2	7785	2.76	14.65	21526	114056	135582	0.19
12.05	REGULATORY & WARNING SIGN	EACH	538	115.46	124.99	62132	67260	129392	0.18
12.06	GUIDE SIGN	EACH	15	8386	708	125797	10614	136411	0.19
12.07	ROAD MARKING	M2	11631	27.79	0.47	323266	5467	328733	0.46
12.08	STREET LIGHTING	EACH	1045	4128	1222	4314983	1276979	5591962	7.78
12.09	TRAFFIC SIGNAL WITH CONTROL PANEL	EACH	2	154672	1755	309345	3510	312855	0.44
12.10	STREET TREE PLANTING	L.S.	13	2755	6700	34678	84346	119025	0.17
12.11	CONCRETE CURB	M	34618	4.87	23.88	168661	826678	995339	1.39
12.12	INTERLOCKING CONCRETE PAVING	M2	4640	0.71	41.72	3291	193581	196872	0.27
12.13	TOLL GATE	EACH	10	25696	15000	256965	150000	406965	0.57
TOTAL DIRECT COST (M\$)						34107152	37738312	71845464	100
TOTAL DIRECT COST + OVERHEAD & PROFIT (M\$)						39223225	43399059	82622284	

TABLE 6.7 : SUMMARY OF ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 SHAH ALAM HIGHWAY/MRR-11 SECTION 3 (SEG.12-23: INCLUDING FRONTAGE ROAD OF SEG.24)

ITEM NO.	DESCRIPTION	FOREIGN COST TTL (RINGGIT)	LOCAL COST TTL (RINGGIT)	TOTAL (RINGGIT)	PROP. (%)
1.	GENERAL	3,708,594	6,924,838	10,633,432	7.65
2.	SITE CLEARING	1,354,885	1,593,381	2,948,266	2.12
3.	DEMOLITION	10,232	89,367	99,599	0.07
4.	ROAD EARTHWORK	7,990,238	9,033,755	17,023,994	12.25
5.	STRUCTURE EXCAVATION	323,124	298,939	622,064	0.45
6.	DRAINAGE	1,103,420	8,565,229	9,668,648	6.96
7.	SUBGRADE	283,510	434,426	717,936	0.52
8.	SUBBASE	4,037,285	5,441,986	9,479,271	6.82
9.	BITUMINOUS PAVEMENT	18,870,486	14,359,987	33,230,473	23.91
10.	CONCRETE STRUCTURE	13,555,771	20,352,983	33,908,754	24.39
11.	BRIDGE STEEL WORK	0	0	0	0.00
12.	MISCELLANEOUS	12,733,887	7,935,108	20,668,995	14.87
	DIRECT CONSTRUCTION COST	63,971,432	75,029,998	139,001,431	100.00
13.	LAND ACQUISITION \$ COMPENSATION	0	22,260,000	22,260,000	
14.	CONTINGENCY, PHYSICAL	6,397,143	7,503,000	13,900,143	
	SUB TOTAL	70,368,575	104,792,998	175,161,574	
15.	CONSULTING SUPERVISORY SERVICES	1,919,143	2,250,900	4,170,043	
16.	FINAL ENGINEERING SERVICES	3,198,572	3,751,500	6,950,072	
	GRAND TOTAL	75,486,290	110,795,398	186,281,688	

SECTION LENGTH (THROUGHWAY) : 19475 M

BRIDGE LENGTH : 4097 M

BRIDGE AREA : 68257 M2

TABLE 6.8 : ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 SHAH ALAM HIGHWAY/MRR-11 SECTION 3 (SEG.12-23; INCLUDING FRONTAGE ROAD OF SEG.24)
 EXCHANGE RATES : US\$ 1 = YEN 125 = M\$ 2.6

NO	DESCRIPTION	UNIT	TTLQTY	UNIT PRICE		CONSTRUCTION COST			PROP. (%)
				FOREIGN (M\$)	LOCAL (M\$)	FOREIGN (M\$)	LOCAL (M\$)	TOTAL (M\$)	
1.01	MAINTENANCE & PROTECTION OF TRAFFIC	L.S.				497690	789120	1286810	1.06
1.02	MOBILIZATION/DEMobilIZATION	L.S.				2642093	5187328	7829421	6.48
1.03	WORK IN OR DEARING WITH EXIST. WATER	L.S.				85081	45150	130231	0.11
2.01	SITE CLEARING	M2	1259590	0.94	1.10	1178161	1385549	2563710	2.12
3.01	REMOVAL OF MASONRY OR CONC. STRUCTURE	M3	826	10.77	94.08	8898	77710	86608	0.07
4.01	COMMON EXCAVATION	M3	1091505	3.25	3.01	3545249	3285430	6830679	5.65
4.02	BORROW MATERIAL	M3	544491	5.76	7.39	3134098	4023788	7157886	5.92
4.03	FREE DRAINING MATERIAL	M3	0	13.81	19.85	0	0	0	0.00
4.04	PERMEABLE BACKFILL	M3	17474	15.38	31.26	268686	546222	814908	0.67
4.05	SAND DRAIN	M	0	4.84	5.00	0	0	0	0.00
5.01	STRUCTURE EXCAVATION UPTO 2 M	M3	17643	2.64	6.18	46605	109033	155638	0.13
5.02	STRUCTURE EXCAVATION OVER 2 M	M3	2354	99.55	64.10	234372	150914	385287	0.32
6.01	R.C. PIPE, TYPE-A, D = 60 CM	M	6161	37.53	183.18	231220	1128645	1359865	1.13
6.02	R.C. PIPE, TYPE-A, D =100 CM	M	5809	60.21	339.01	349791	1969418	2319209	1.92
6.03	U-DITCH, 0.3x0.6M	M	25245	5.01	71.10	126368	1794917	1921285	1.59
6.04	U-DITCH 1.0x(0.6-2.0M)	M	10568	21.52	226.55	227460	2394189	2621649	2.17
6.05	CATCH BASIN	EACH	299	79.92	501.41	23916	150056	173972	0.14
6.06	MORTARED RUBBLE PAVED WATERWAY	M2	600	1.23	18.00	740	10800	11540	0.01
7.01	SUBGRADE PREPARATION	M2	599622	0.41	0.63	246531	377762	624292	0.52
8.01	SUBBASE	M3	160958	21.81	29.40	3510682	4732162	8242844	6.82
9.01	BITUMINOUS PRIME COAT	KG	1557275	0.69	0.23	1072442	358173	1430615	1.18
9.02	ASPHALT TREATED BASE COURSE	TON	193641	45.02	32.25	8717788	6244936	14962724	12.38
9.03	ASPHALT CONCRETE SURFACE COURSE	TON	124449	52.11	41.80	6485346	5201966	11687312	9.67
9.04	CONCRETE PAVEMENT	M2	12750	10.47	53.48	133542	681870	815412	0.67
10.01	STRUCTURE CONCRETE CLASS A	M3	0	431.63	309.70	0	0	0	0.00
10.02	STRUCTURE CONCRETE CLASS B	M3	4234	132.86	237.25	562489	1004436	1566925	1.30
10.03	STRUCTURE CONCRETE CLASS C	M3	22513	55.50	211.20	1249594	4754830	6004424	4.97
10.04	STRUCTURE CONCRETE CLASS D	M3	1690	46.06	208.89	77839	353024	430863	0.36
10.05	REINFORCING STEEL	KG	2186446	0.03	1.46	67421	3192211	3259632	2.70
10.06	PC PRECAST I-BEAM(SPAN 25M) CONCRETE	M3	7147	920.36	824.05	6577976	5889657	12467633	10.31
10.07	PC CABLE	KG	0	4.56	1.54	0	0	0	0.00
10.08	FURNISH AND DRIVE RC PILE 35CMx35CM	M	29650	17.19	72.52	509560	2150222	2659782	2.20
10.09	FURNISH AND DRIVE PC PILE D=45CM	M	0	151.92	50.46	0	0	0	0.00
10.10	FURNISH AND DRIVE STEEL PILE D=61CM	M	5791	283.60	21.32	1642380	123469	1765849	1.46
10.11	EXPANSION JOINT	M	1578	364.60	56.12	575343	88557	663900	0.55
10.12	BEARING PAD WITH ACCESSORIES	EACH	6285	39.09	20.57	245678	129282	374960	0.31
10.13	DRAIN PIPE, 25CM DIAMETER	M	3924	71.19	3.20	279348	12557	291905	0.24
11.01	STRUCTURAL STEEL	TON	0	3495	200	0	0	0	0.00
12.01	SOLID SODDING	M2	596220	0.04	1.61	24513	959914	984427	0.81
12.02	GUARDRAIL	M	7550	1.19	123.40	9002	931670	940672	0.78
12.03	SEPARATOR FENCE	M	35208	52.26	6.81	1839843	239766	2079610	1.72
12.04	DRY RIPRAP SLOPE PROTECTION	M2	11710	2.76	14.65	32376	171546	203922	0.17
12.05	REGULATORY & WARNING SIGN	EACH	753	115.46	124.99	86950	94127	181077	0.15
12.06	GUIDE SIGN	EACH	39	8386	708	327072	27597	354669	0.29
12.07	ROAD MARKING	M2	19320	27.79	0.47	536960	9080	546041	0.45
12.08	STREET LIGHTING	EACH	1598	4128	1222	6595990	1952022	8548013	7.07
12.09	TRAFFIC SIGNAL WITH CONTROL PANEL	EACH	4	154672	1755	618689	7020	625709	0.52
12.10	STREET TREE PLANTING	L.S.				48493	117947	166440	0.14
12.11	CONCRETE CURB	M	61888	4.87	23.88	301522	1477885	1779407	1.47
12.12	INTERLOCKING CONCRETE PAVING	M2	12860	0.71	41.72	9121	536519	545640	0.45
12.13	TOLL GATE	EACH	25	25696	15000	642412	375000	1017412	0.84
TOTAL DIRECT COST (M\$)						55627332	65243477	120870809	100
TOTAL DIRECT COST + OVERHEAD & PROFIT (M\$)						63971432	75029998	139001431	

TABLE 6.9 : SUMMARY OF ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 SHAH ALAM HIGHWAY/MRR-11 SECTION 4 (SEG.24-25.4; EXCLUDING FRONTAGE ROAD OF SEG.24)

ITEM NO.	DESCRIPTION	FOREIGN COST TTL (RINGGIT)	LOCAL COST TTL (RINGGIT)	TOTAL (RINGGIT)	PROP. (%)
1.	GENERAL	1,359,020	2,484,023	3,843,043	2.97
2.	SITE CLEARING	251,811	296,137	547,947	0.42
3.	DEMOLITION	22,803	199,160	221,963	0.17
4.	ROAD EARTHWORK	1,420,811	1,516,835	2,937,646	2.27
5.	STRUCTURE EXCAVATION	1,042,097	898,382	1,940,479	1.50
6.	DRAINAGE	228,910	1,965,478	2,194,388	1.70
7.	SUBGRADE	50,589	77,518	128,107	0.10
8.	SUBBASE	722,681	974,125	1,696,807	1.31
9.	BITUMINOUS PAVEMENT	4,172,849	3,066,671	7,239,520	5.60
10.	CONCRETE STRUCTURE	45,080,940	57,872,986	102,953,926	79.58
11.	BRIDGE STEEL WORK	0	0	0	0.00
12.	MISCELLANEOUS	3,394,251	2,278,096	5,672,347	4.38
	DIRECT CONSTRUCTION COST	57,746,763	71,629,410	129,376,173	100.00
13.	LAND ACQUISITION \$ COMPENSATION	0	5,500,000	5,500,000	
14.	CONTINGENCY, PHYSICAL	5,774,676	7,162,941	12,937,617	
	SUB TOTAL	63,521,439	84,292,351	147,813,790	
15.	CONSULTING SUPERVISORY SERVICES	1,732,403	2,148,882	3,881,285	
16.	FINAL ENGINEERING SERVICES	2,887,338	3,581,470	6,468,809	
	GRAND TOTAL	68,141,181	90,022,703	158,163,884	

SECTION LENGTH (THROUGHWAY) : 6065 M
 BRIDGE LENGTH : 2685 M
 BRIDGE AREA : 64710 M2

TABLE 6.10 : ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 SHAH ALAM HIGHWAY/MRR-11 SECTION 4 (SEG.24-25.4: EXCLUDING FRONTAGE ROAD OF SEG.24)
 EXCHANGE RATES : US\$ 1 = YEN 125 = M\$ 2.6

NO	DESCRIPTION	UNIT	TTLQTY	UNIT PRICE		CONSTRUCTION COST		TOTAL (M\$)	PROP. (%)
				FOREIGN (M\$)	LOCAL (M\$)	FOREIGN (M\$)	LOCAL (M\$)		
1.01	MAINTENANCE & PROTECTION OF TRAFFIC	L.S.				331793	526080	857873	0.76
1.02	MOBILIZATION/DEMobilIZATION	L.S.				825654	1621040	2446694	2.17
1.03	WORK IN OR DEARING WITH EXIST. WATER	L.S.				24309	12900	37209	0.03
2.01	SITE CLEARING	M2	234100	0.94	1.10	218966	257510	476476	0.42
3.01	REMOVAL OF MASONRY OR CONC. STRUCTURE	M3	1841	10.77	94.08	19829	173182	193012	0.17
4.01	COMMON EXCAVATION	M3	331941	3.25	3.01	1078157	999142	2077299	1.85
4.02	BORROW MATERIAL	M3	0	5.76	7.39	0	0	0	0.00
4.03	FREE DRAINING MATERIAL	M3	0	13.81	19.85	0	0	0	0.00
4.04	PERMEABLE BACKFILL	M3	10232	15.38	31.26	157331	319845	477176	0.42
4.05	SAND DRAIN	M	0	4.84	5.00	0	0	0	0.00
5.01	STRUCTURE EXCAVATION UPTO 2 M	M3	44141	2.64	6.18	116603	272792	389394	0.35
5.02	STRUCTURE EXCAVATION OVER 2 M	M3	7932	99.55	64.10	789568	508410	1297978	1.15
6.01	R.C. PIPE, TYPE-A, D = 60 CM	M	1045	37.53	183.18	39207	191377	230584	0.20
6.02	R.C. PIPE, TYPE-A, D =100 CM	M	985	60.21	339.01	59312	333942	393254	0.35
6.03	U-DITCH, 0.3*0.6M	M	4706	5.01	71.10	23557	334597	358153	0.32
6.04	U-DITCH 1.0*(0.6-2.0M)	M	2746	21.52	226.55	59108	622152	681259	0.61
6.05	CATCH BASIN	EACH	51	79.92	501.41	4055	25444	29499	0.03
6.06	MORTARED RUBBLE PAVED WATERWAY	M2	11200	1.23	18.00	13814	201600	215414	0.19
7.01	SUBGRADE PREPARATION	M2	106995	0.41	0.63	43990	67407	111397	0.10
8.01	SUBBASE	M3	28812	21.81	29.40	628418	847065	1475484	1.31
9.01	BITUMINOUS PRIME COAT	KG	344236	0.69	0.23	237063	79174	316238	0.28
9.02	ASPHALT TREATED BASE COURSE	TON	34410	45.02	32.25	1549130	1109710	2658840	2.36
9.03	ASPHALT CONCRETE SURFACE COURSE	TON	35354	52.11	41.80	1842371	1477786	3320157	2.95
9.04	CONCRETE PAVEMENT	M2	0	10.47	53.48	0	0	0	0.00
10.01	STRUCTURE CONCRETE CLASS A	M3	41553	431.63	309.70	17935522	12868988	30804509	27.38
10.02	STRUCTURE CONCRETE CLASS B	M3	4998	132.86	237.25	664032	1185760	1849792	1.64
10.03	STRUCTURE CONCRETE CLASS C	M3	42542	55.50	211.20	2361265	8984852	11346117	10.09
10.04	STRUCTURE CONCRETE CLASS D	M3	1355	46.06	208.89	62409	283046	345455	0.31
10.05	REINFORCING STEEL	KG	7714548	0.03	1.46	237884	11263240	11501124	10.22
10.06	PC PRECAST I-BEAM(SPAN 25M) CONCRETE	M3	7923	920.36	824.05	7291858	6528838	13820695	12.28
10.07	PC CABLE	KG	1392382	4.56	1.54	6354409	2144268	8498677	7.55
10.08	FURNISH AND DRIVE RC PILE 35CM*35CM	M	89990	17.19	72.52	1546560	6526109	8072669	7.18
10.09	FURNISH AND DRIVE PC PILE D=45CM	M	0	151.92	50.46	0	0	0	0.00
10.10	FURNISH AND DRIVE STEEL PILE D=61CM	M	0	283.60	21.32	0	0	0	0.00
10.11	EXPANSION JOINT	M	1714	384.60	56.12	624929	96190	721118	0.64
10.12	BEARING PAD WITH ACCESSORIES	EACH	18480	39.09	20.57	722374	380134	1102508	0.98
10.13	DRAIN PIPE, 25CM DIAMETER	M	19660	71.19	3.20	1399576	62912	1462488	1.30
11.01	STRUCTURAL STEEL	TON	0	3495	200	0	0	0	0.00
12.01	SOLID SODDING	M2	124500	0.04	1.61	5119	200445	205564	0.18
12.02	GUARDRAIL	M	730	1.19	123.40	870	90082	90952	0.08
12.03	SEPARATOR FENCE	M	5470	52.26	6.81	285842	37251	323093	0.29
12.04	DRY RIPRAP SLOPE PROTECTION	M2	5207	2.76	14.65	14398	76287	90685	0.08
12.05	REGULATORY & WARNING SIGN	EACH	219	115.46	124.99	25251	27335	52586	0.05
12.06	GUIDE SIGN	EACH	24	3386	708	201275	16983	218258	0.19
12.07	ROAD MARKING	M2	5717	27.79	0.47	158881	2687	161568	0.14
12.08	STREET LIGHTING	EACH	491	4128	1222	2028042	600180	2628223	2.34
12.09	TRAFFIC SIGNAL WITH CONTROL PANEL	EACH	1	154672	1755	154672	1755	156427	0.14
12.10	STREET TREE PLANTING	L.S.				7534	18325	25859	0.02
12.11	CONCRETE CURB	M	12130	4.87	23.88	59098	289664	348762	0.31
12.12	INTERLOCKING CONCRETE PAVING	M2	14860	0.71	41.72	10539	619959	630498	0.56
12.13	TOLL GATE	EACH	0	25696	15000	0	0	0	0.00
TOTAL DIRECT COST (M\$)						50214577	62286443	112501020	100
TOTAL DIRECT COST + OVERHEAD & PROFIT (M\$)						57746763	71629410	129376173	

TABLE 6.11 : SUMMARY OF ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
NORTH - SOUTH EXPRESSWAY LINK SECTION 1 (SEG.1-5)

ITEM NO.	DESCRIPTION	FOREIGN COST TTL (RINGGIT)	LOCAL COST TTL (RINGGIT)	TOTAL (RINGGIT)	PROP. (%)
1.	GENERAL	832,718	1,574,849	2,407,567	2.75
2.	SITE CLEARING	659,398	775,470	1,434,869	1.64
3.	DEMOLITION	1,462	12,767	14,228	0.02
4.	ROAD EARTHWORK	8,491,046	10,132,658	18,623,704	21.30
5.	STRUCTURE EXCAVATION	299,917	229,896	529,813	0.61
6.	DRAINAGE	311,046	2,766,122	3,077,168	3.52
7.	SUBGRADE	107,102	164,114	271,216	0.31
8.	SUBBASE	1,526,695	2,057,882	3,584,577	4.10
9.	BITUMINOUS PAVEMENT	7,528,822	5,881,515	13,410,337	15.34
10.	CONCRETE STRUCTURE	15,743,405	15,148,147	30,891,551	35.33
11.	BRIDGE STEEL WORK	0	0	0	0.00
12.	MISCELLANEOUS	7,474,769	5,713,872	13,188,641	15.08
	DIRECT CONSTRUCTION COST	42,976,381	44,457,290	87,433,672	100.00
13.	LAND ACQUISITION \$ COMPENSATION	0	4,060,000	4,060,000	
14.	CONTINGENCY, PHYSICAL	4,297,638	4,445,729	8,743,367	
	SUB TOTAL	47,274,020	52,963,019	100,237,039	
15.	CONSULTING SUPERVISORY SERVICES	1,289,291	1,333,719	2,623,010	
16.	FINAL ENGINEERING SERVICES	2,148,819	2,222,865	4,371,684	
	GRAND TOTAL	50,712,130	56,519,603	107,231,733	

SECTION LENGTH (THROUGHWAY) : 4880 M

BRIDGE LENGTH : 2318 M

BRIDGE AREA : 23420 M2

TABLE 6.12 : ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 NORTH - SOUTH EXPRESSWAY LINK SECTION 1 (SENORTH - SOUTH LINK (1-5)
 EXCHANGE RATES : US\$ 1 = YEN 125 = M\$ 2.6

NO	DESCRIPTION	UNIT	TTLQTY	UNIT PRICE		CONSTRUCTION COST		TOTAL (M\$)	PROP. (%)
				FOREIGN (M\$)	LOCAL (M\$)	FOREIGN (M\$)	LOCAL (M\$)		
1.01	MAINTENANCE & PROTECTION OF TRAFFIC	L.S.				138247	219200	357447	0.47
1.02	MOBILIZATION/DENOBILIZATION	L.S.				585855	1150234	1736089	2.28
1.03	WORK IN OR DEARING WITH EXIST. WATER	L.S.				0	0	0	0.00
2.01	SITE CLEARING	M2	613020	0.94	1.10	573390	674322	1247712	1.64
3.01	REMOVAL OF MASONRY OR CONC. STRUCTURE	M3	118	10.77	94.08	1271	11101	12373	0.02
4.01	COMMON EXCAVATION	M3	160998	3.25	3.01	522928	484604	1007531	1.33
4.02	BORROW MATERIAL	M3	795164	5.76	7.39	4576977	5876263	10453240	13.75
4.03	FREE DRAINING MATERIAL	M3	0	13.81	19.85	0	0	0	0.00
4.04	PERMEABLE BACKFILL	M3	5958	15.38	31.26	91617	186251	277868	0.37
4.05	SAND DRAIN	M	452778	4.84	5.00	2191997	2263889	4455886	5.86
5.01	STRUCTURE EXCAVATION UPTO 2 M	M3	7140	2.64	6.18	18861	44124	62985	0.08
5.02	STRUCTURE EXCAVATION OVER 2 M	M3	2430	99.55	64.10	241937	155785	397723	0.52
6.01	R.C. PIPE, TYPE-A, D = 60 CM	M	1336	37.53	183.18	50134	244719	294854	0.39
6.02	R.C. PIPE, TYPE-A, D = 100 CM	M	1260	60.21	339.01	75844	427020	502864	0.66
6.03	U-DITCH, 0.3*0.6M	M	12583	5.01	71.10	62989	894685	957674	1.26
6.04	U-DITCH 1.0*(0.6-2.0M)	M	3512	21.52	226.55	75582	795562	871144	1.15
6.05	CATCH BASIN	EACH	65	79.92	501.41	5186	32536	37722	0.05
6.06	MORTARED RUBBLE PAVED WATERWAY	M2	600	1.23	18.00	740	10800	11540	0.02
7.01	SUBGRADE PREPARATION	M2	226520	0.41	0.63	93132	142708	235840	0.31
8.01	SUBBASE	M3	60866	21.81	29.40	1327561	1789462	3117023	4.10
9.01	BITUMINOUS PRIME COAT	KG	623086	0.69	0.23	429098	143310	572408	0.75
9.02	ASPHALT TREATED BASE COURSE	TON	72743	45.02	32.25	3274898	2345954	5620852	7.39
9.03	ASPHALT CONCRETE SURFACE COURSE	TON	53014	52.11	41.80	2762680	2215975	4978655	6.55
9.04	CONCRETE PAVEMENT	M2	7650	10.47	53.48	80125	409122	489247	0.64
10.01	STRUCTURE CONCRETE CLASS A	M3	6851	431.63	309.70	2957194	2121828	5079021	6.68
10.02	STRUCTURE CONCRETE CLASS B	M3	2617	132.86	237.25	347726	620934	968661	1.27
10.03	STRUCTURE CONCRETE CLASS C	M3	10624	55.50	211.20	589685	2243813	2833498	3.73
10.04	STRUCTURE CONCRETE CLASS D	M3	330	46.06	208.89	15199	68934	84133	0.11
10.05	REINFORCING STEEL	KG	1586198	0.03	1.46	48912	2315850	2364761	3.11
10.06	PC PRECAST I-BEAM(SPAN 25M) CONCRETE	M3	4539	920.36	824.05	4177405	3740281	7917686	10.41
10.07	PC CABLE	KG	176175	4.56	1.54	804008	271309	1075317	1.41
10.08	FURNISH AND DRIVE RC PILE 35CM*35CM	M	6383	17.19	72.52	109694	462883	572577	0.75
10.09	FURNISH AND DRIVE PC PILE D=45CM	M	21876	151.92	50.46	3323417	1103885	4427302	5.82
10.10	FURNISH AND DRIVE STEEL PILE D=61CM	M	0	283.60	21.32	0	0	0	0.00
10.11	EXPANSION JOINT	M	1124	364.60	56.12	409904	63093	472997	0.62
10.12	BEARING PAD WITH ACCESSORIES	EACH	6311	39.09	20.57	246704	129822	376526	0.50
10.13	DRAIN PIPE, 25CM DIAMETER	M	9272	71.19	3.20	660069	29670	689739	0.91
11.01	STRUCTURAL STEEL	TON	0	3495	200	0	0	0	0.00
12.01	SOLID SODDING	M2	41265	0.04	1.61	1697	66437	68133	0.09
12.02	GUARDRAIL	M	10524	1.19	123.40	12548	1298662	1311210	1.72
12.03	SEPARATOR FENCE	M	7634	52.26	6.81	398925	51988	450913	0.59
12.04	DRY RIPRAP SLOPE PROTECTION	M2	15338	2.76	14.65	42408	224697	267105	0.35
12.05	REGULATORY & WARNING SIGN	EACH	405	115.46	124.99	46787	50649	97436	0.13
12.06	GUIDE SIGN	EACH	36	8386	708	301913	25474	327387	0.43
12.07	ROAD MARKING	M2	8374	27.79	0.47	232735	3936	236671	0.31
12.08	STREET LIGHTING	EACH	1077	4128	1222	4447150	1316093	5763243	7.58
12.09	TRAFFIC SIGNAL WITH CONTROL PANEL	EACH	1	154672	1755	154672	1755	156427	0.21
12.10	STREET TREE PLANTING	L.S.				10515	25574	36088	0.05
12.11	CONCRETE CURB	M	40764	4.87	23.88	198604	973444	1172049	1.54
12.12	INTERLOCKING CONCRETE PAVING	M2	13300	0.71	41.72	9433	554876	564309	0.74
12.13	TOLL GATE	EACH	25	25696	15000	642412	375000	1017412	1.34
TOTAL DIRECT COST (M\$)						37370766	38658513	76029280	100
TOTAL DIRECT COST + OVERHEAD & PROFIT (M\$)						42976381	44457290	87433672	

TABLE 6.13 : SUMMARY OF ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
NORTH-SOUTH EXPRESSWAY LINK SECTION 2 (SEG.6-13)

ITEM NO.	DESCRIPTION	FOREIGN COST TTL (RINGGIT)	LOCAL COST TTL (RINGGIT)	TOTAL (RINGGIT)	PROP. (%)
1.	GENERAL	4,893,742	9,552,016	14,445,758	8.36
2.	SITE CLEARING	2,065,495	2,429,078	4,494,573	2.60
3.	DEMOLITION	0	0	0	0.00
4.	ROAD EARTHWORK	16,528,102	17,025,281	33,553,383	19.42
5.	STRUCTURE EXCAVATION	565,856	493,177	1,059,033	0.61
6.	DRAINAGE	1,234,286	7,509,611	8,743,897	5.06
7.	SUBGRADE	323,031	494,983	818,014	0.47
8.	SUBBASE	5,316,406	7,166,155	12,482,561	7.22
9.	BITUMINOUS PAVEMENT	18,814,601	13,933,212	32,747,813	18.95
10.	CONCRETE STRUCTURE	19,515,352	27,569,582	47,084,934	27.25
11.	BRIDGE STEEL WORK	0	0	0	0.00
12.	MISCELLANEOUS	9,164,036	8,205,533	17,369,569	10.05
DIRECT CONSTRUCTION COST		78,420,906	94,378,629	172,799,535	100.00
13.	LAND ACQUISITION \$ COMPENSATION	0	47,430,000	47,430,000	
14.	CONTINGENCY, PHYSICAL	7,842,091	9,437,863	17,279,954	
SUB TOTAL		86,262,997	151,246,492	237,509,489	
15.	CONSULTING SUPERVISORY SERVICES	2,352,627	2,831,359	5,183,986	
16.	FINAL ENGINEERING SERVICES	3,921,045	4,718,931	8,639,977	
GRAND TOTAL		92,536,670	158,796,782	251,333,452	

SECTION LENGTH (THROUGHWAY) : 29120 M

BRIDGE LENGTH : 2386 M

BRIDGE AREA : 33259 M2

TABLE 6.14 : ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 NORTH-SOUTH EXPRESSWAY LINK SECTION 2 (SEG. 8-13)
 EXCHANGE RATES : US\$ 1 = YEN 125 = M\$ 2.6

NO	DESCRIPTION	UNIT	TTLQTY	UNIT PRICE		CONSTRUCTION COST			PROP. (%)
				FOREIGN (M\$)	LOCAL (M\$)	FOREIGN (M\$)	LOCAL (M\$)	TOTAL (M\$)	
1.01	MAINTENANCE & PROTECTION OF TRAFFIC	L.S.				55299	87680	142979	0.10
1.02	MOBILIZATION/DEMOBILIZATION	L.S.				4180682	8208101	12388783	8.24
1.03	WORK IN OR DEARING WITH EXIST. WATER	L.S.				19447	10320	29767	0.02
2.01	SITE CLEARING	M2	1920220	0.94	1.10	1796083	2112242	3908325	2.60
3.01	REMOVAL OF MASONRY OR CONC. STRUCTURE	M3	0	10.77	94.08	0	0	0	0.00
4.01	COMMON EXCAVATION	M3	3367143	3.25	3.01	10936606	10135100	21071707	14.02
4.02	BORROW MATERIAL	M3	536917	5.76	7.39	3090502	3967816	7058319	4.70
4.03	FREE DRAINING MATERIAL	M3	0	13.81	19.85	0	0	0	0.00
4.04	PERMEABLE BACKFILL	M3	22446	15.38	31.26	345154	701676	1046830	0.70
4.05	SAND DRAIN	M	0	4.84	5.00	0	0	0	0.00
5.01	STRUCTURE EXCAVATION UPTO 2 M	M3	25009	2.64	6.18	66063	154554	220617	0.15
5.02	STRUCTURE EXCAVATION OVER 2 M	M3	4279	99.55	64.10	425985	274296	700281	0.47
6.01	R.C. PIPE, TYPE-A, D = 60 CM	M	9788	37.53	183.18	367333	1793048	2160381	1.44
6.02	R.C. PIPE, TYPE-A, D = 100 CM	M	9229	60.21	339.01	555703	3128761	3684464	2.45
6.03	U-DITCH, 0.3x0.6M	M	8133	5.01	71.10	40710	578242	618952	0.41
6.04	U-DITCH 1.0x(0.6-2.0M)	M	2884	21.52	226.55	62078	653416	715493	0.48
6.05	CATCH BASIN	EACH	475	79.92	501.41	37995	238390	276385	0.18
6.06	MORTARED RUBBLE PAVED WATERWAY	M2	7680	1.23	18.00	9473	138240	147713	0.10
7.01	SUBGRADE PREPARATION	M2	683207	0.41	0.63	280896	430420	711316	0.47
8.01	SUBBASE	M3	211954	21.81	29.40	4622962	6231439	10854401	7.22
9.01	BITUMINOUS PRIME COAT	KG	1712701	0.69	0.23	1179479	393921	1573400	1.05
9.02	ASPHALT TREATED BASE COURSE	TON	182133	45.02	32.25	8199657	5873776	14073433	9.37
9.03	ASPHALT CONCRETE SURFACE COURSE	TON	132861	52.11	41.80	6923696	5553572	12477268	8.30
9.04	CONCRETE PAVEMENT	M2	5508	10.47	53.48	57690	294568	352258	0.23
10.01	STRUCTURE CONCRETE CLASS A	M3	3032	431.63	309.70	1308736	939037	2247773	1.50
10.02	STRUCTURE CONCRETE CLASS B	M3	4606	132.86	237.25	612001	1092849	1704851	1.13
10.03	STRUCTURE CONCRETE CLASS C	M3	27491	55.50	211.20	1525881	5806132	7332013	4.88
10.04	STRUCTURE CONCRETE CLASS D	M3	4120	46.06	208.89	189761	860627	1050387	0.70
10.05	REINFORCING STEEL	KG	3063052	0.03	1.46	94452	4472056	4566507	3.04
10.06	PC PRECAST I-BEAM(SPAN 25M) CONCRETE	M3	8544	920.36	824.05	7863169	7040367	14903536	9.92
10.07	PC CABLE	KG	93284	4.56	1.54	425722	143658	569380	0.38
10.08	FURNISH AND DRIVE RC PILE 35CMx35CM	M	43491	17.19	72.52	747425	3153951	3901376	2.60
10.09	FURNISH AND DRIVE PC PILE D=45CM	M	0	151.92	50.46	0	0	0	0.00
10.10	FURNISH AND DRIVE STEEL PILE D=61CM	M	9869	283.60	21.32	2798857	210410	3009267	2.00
10.11	EXPANSION JOINT	M	1603	364.60	56.12	584458	89960	674418	0.45
10.12	BEARING PAD WITH ACCESSORIES	EACH	6786	39.09	20.57	265271	139593	404864	0.27
10.13	DRAIN PIPE, 25CM DIAMETER	M	7784	71.19	3.20	554139	24909	579048	0.39
11.01	STRUCTURAL STEEL	TON	0	3495	200	0	0	0	0.00
12.01	SOLID SODDING	M2	501410	0.04	1.61	20615	807270	827885	0.55
12.02	GUARDRAIL	M	20130	1.19	123.40	24001	2484042	2508043	1.67
12.03	SEPARATOR FENCE	M	54584	52.26	6.81	2852363	371717	3224080	2.15
12.04	DRY RIPRAP SLOPE PROTECTION	M2	13896	2.76	14.65	38423	203582	242005	0.16
12.05	REGULATORY & WARNING SIGN	EACH	1023	115.46	124.99	118150	127902	246052	0.16
12.06	GUIDE SIGN	EACH	21	8386	708	176116	14860	190976	0.13
12.07	ROAD MARKING	M2	20653	27.79	0.47	574008	9707	583715	0.39
12.08	STREET LIGHTING	EACH	715	4128	1222	2953085	873938	3827023	2.55
12.09	TRAFFIC SIGNAL WITH CONTROL PANEL	EACH	2	154672	1755	309345	3510	312855	0.21
12.10	STREET TREE PLANTING	L.S.				76268	185503	261771	0.17
12.11	CONCRETE CURB	M	74674	4.87	23.88	363816	1783215	2147031	1.43
12.12	INTERLOCKING CONCRETE PAVING	M2	0	0.71	41.72	0	0	0	0.00
12.13	TOLL GATE	EACH	18	25696	15000	462537	270000	732537	0.49
TOTAL DIRECT COST (M\$)						68192093	82068373	150260466	100
TOTAL DIRECT COST + OVERHEAD & PROFIT (M\$)						78420906	94378629	172799535	

TABLE 6.15 : SUMMARY OF ESTIMATED PROJECT COST

SUMMARY OF ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
SHAH ALAM HIGHWAY/MRR-11 SECTION 2 (SEG.6-11) SCHEME B 2-LANE

ITEM NO.	DESCRIPTION	FOREIGN COST TTL (RINGGIT)	LOCAL COST TTL (RINGGIT)	TOTAL (RINGGIT)	PROP. (%)
1.	GENERAL	1,372,146	2,657,950	4,030,097	7.77
2.	SITE CLEARING	1,074,515	1,263,659	2,338,174	4.51
3.	DEMOLITION	11,694	102,133	113,827	0.22
4.	ROAD EARTHWORK	2,723,083	3,513,003	6,236,086	12.03
5.	STRUCTURE EXCAVATION	99,630	72,667	172,297	0.33
6.	DRAINAGE	439,958	3,859,695	4,299,652	8.29
7.	SUBGRADE	100,112	153,403	253,515	0.49
8.	SUBBASE	1,580,133	2,129,912	3,710,044	7.15
9.	BITUMINOUS PAVEMENT	5,485,617	4,229,819	9,715,437	18.74
10.	CONCRETE STRUCTURE	5,962,151	6,278,921	12,241,072	23.61
11.	BRIDGE STEEL WORK	0	0	0	0.00
12.	MISCELLANEOUS	4,413,051	4,333,516	8,746,566	16.87
	DIRECT CONSTRUCTION COST	23,262,091	28,594,677	51,856,768	100.00
13.	LAND ACQUISITION \$ COMPENSATION	0	0	0	
14.	CONTINGENCY, PHYSICAL	2,326,209	2,859,468	5,185,677	
	SUB TOTAL	25,588,300	31,454,145	57,042,445	
15.	CONSULTING SUPERVISORY SERVICES	697,863	857,840	1,555,703	
16.	FINAL ENGINEERING SERVICES	1,163,105	1,429,734	2,592,838	
	GRAND TOTAL	27,449,267	33,741,719	61,190,986	

SECTION LENGTH (THROUGHWAY) : 13360 M
 BRIDGE LENGTH : 876 M
 BRIDGE AREA : 12015 M2

TABLE 6.16 : ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 SHAH ALAM HIGHWAY/NRR-11 SECTION 2 (SEG.G-11) SCHEME B 2-LANE
 EXCHANGE RATES : US\$ 1 = YEN 125 = M\$ 2.6

NO	DESCRIPTION	UNIT	TTLQTY	UNIT PRICE		CONSTRUCTION COST			PROP. (%)
				FOREIGN (M\$)	LOCAL (M\$)	FOREIGN (M\$)	LOCAL (M\$)	TOTAL (M\$)	
1.01	MAINTENANCE & PROTECTION OF TRAFFIC	L.S.				55299	87680	142979	0.32
1.02	MOBILIZATION/DEMobilIZATION	L.S.				1130579	2219711	3350290	7.43
1.03	WORK IN OR DEARING WITH EXIST. WATER	L.S.				7293	3870	11163	0.02
2.01	SITE CLEARING	M2	998940	0.94	1.10	934361	1098834	2033195	4.51
3.01	REMOVAL OF MASONRY OR CONC. STRUCTURE	M3	944	10.77	94.08	10169	88812	98980	0.22
4.01	COMMON EXCAVATION	M3	17035	3.25	3.01	55331	51276	106607	0.24
4.02	BORROW MATERIAL	M3	393772	5.76	7.39	2266559	2909977	5176535	11.48
4.03	FREE DRAINING MATERIAL	M3	0	13.81	19.85	0	0	0	0.00
4.04	PERMEABLE BACKFILL	M3	2992	15.38	31.26	46009	93533	139541	0.31
4.05	SAND DRAIN	M	0	4.84	5.00	0	0	0	0.00
5.01	STRUCTURE EXCAVATION UPTO 2.M	M3	1653	2.64	6.18	4366	10215	14581	0.03
5.02	STRUCTURE EXCAVATION OVER 2.M	M3	826	99.55	64.10	82269	52974	135243	0.30
6.01	R.C. PIPE, TYPE-A, D = 60 CM	M	2203	37.53	183.18	82675	403559	486234	1.08
6.02	R.C. PIPE, TYPE-A, D = 100 CM	M	2077	60.21	339.01	125072	704186	829258	1.84
6.03	U-DITCH, 0.3*0.6M	M	10160	5.01	71.10	50859	722396	773255	1.71
6.04	U-DITCH 1.0*(0.6-2.0M)	M	2420	21.52	226.55	52078	548160	600238	1.33
6.05	CATCH BASIN	EACH	107	79.92	501.41	8552	53654	62206	0.14
6.06	MORTARED RUBBLE PAVED WATERWAY	M2	51350	1.23	18.00	63337	924300	987637	2.19
7.01	SUBGRADE PREPARATION	M2	211736	0.41	0.63	87054	133394	220448	0.49
8.01	SUBBASE	M3	62997	21.81	29.40	1374028	1852097	3226126	7.15
9.01	BITUMINOUS PRIME COAT	KG	501761	0.69	0.23	345546	115405	460951	1.02
9.02	ASPHALT TREATED BASE COURSE	TON	55989	45.02	32.25	2520645	1805649	4326295	9.59
9.03	ASPHALT CONCRETE SURFACE COURSE	TON	35510	52.11	41.80	1850494	1484301	3334796	7.40
9.04	CONCRETE PAVEMENT	M2	5100	10.47	53.48	53417	272748	326165	0.72
10.01	STRUCTURE CONCRETE CLASS A	M3	0	431.63	309.70	0	0	0	0.00
10.02	STRUCTURE CONCRETE CLASS B	M3	2043	132.86	237.25	271374	484592	755966	1.68
10.03	STRUCTURE CONCRETE CLASS C	M3	5243	55.50	211.20	290991	1107250	1398241	3.10
10.04	STRUCTURE CONCRETE CLASS D	M3	0	46.06	208.89	0	0	0	0.00
10.05	REINFORCING STEEL	KG	510471	0.03	1.46	15741	745287	761028	1.69
10.06	PC PRECAST I-BEAM(SPAN 25M) CONCRETE	M3	3000	920.36	824.05	2761158	2472230	5233388	11.61
10.07	PC CABLE	KG	0	4.56	1.54	0	0	0	0.00
10.08	FURNISH AND DRIVE RC PILE 35CM*35CM	M	1592	17.19	72.52	27354	115429	142783	0.32
10.09	FURNISH AND DRIVE PC PILE D=45CM	M	8271	151.92	50.46	1256559	417370	1673929	3.71
10.10	FURNISH AND DRIVE STEEL PILE D=61CM	M	0	283.60	21.32	0	0	0	0.00
10.11	EXPANSION JOINT	M	798	364.60	56.12	291057	44800	335857	0.74
10.12	BEARING PAD WITH ACCESSORIES	EACH	3233	39.09	20.57	126381	66505	192887	0.43
10.13	DRAIN PIPE, 25CM DIAMETER	M	2021	71.19	3.20	143864	6467	150331	0.33
11.01	STRUCTURAL STEEL	TON	0	3494.72	200.00	0	0	0	0.00
12.01	SOLID SODDING	M2	395350	0.04	1.61	16255	636514	652768	1.45
12.02	GUARDRAIL	M	8400	1.19	123.40	10015	1036560	1046575	2.32
12.03	SEPARATOR FENCE	M	25178	52.26	6.81	1315712	171462	1487174	3.30
12.04	DRY RIPRAP SLOPE PROTECTION	M2	6106	2.76	14.65	16882	89451	106333	0.24
12.05	REGULATORY & WARNING SIGN	EACH	573	115.46	124.99	66202	71666	137868	0.31
12.06	GUIDE SIGN	EACH	21	8386.46	707.61	176116	14860	190976	0.42
12.07	ROAD MARKING	M2	5607	27.79	0.47	155831	2635	158466	0.35
12.08	STREET LIGHTING	EACH	312	4128	1222	1285754	380507	1666261	3.70
12.09	TRAFFIC SIGNAL WITH CONTROL PANEL	EACH	2	154672	1755	309345	3510	312855	0.69
12.10	STREET TREE PLANTING	L.S.				34678	84346	119025	0.26
12.11	CONCRETE CURB	M	39078	4.87	23.88	190390	933183	1123573	2.49
12.12	INTERLOCKING CONCRETE PAVING	M2	4640	0.71	41.72	3291	193581	196872	0.44
12.13	TOLL GATE	EACH	10	25696	15000	256965	150000	406965	0.90
TOTAL DIRECT COST (M\$)						20227905	24864937	45092842	100
TOTAL DIRECT COST + OVERHEAD & PROFIT (M\$)						23262091	28594677	51856768	

TABLE 6.17 : SUMMARY OF ESTIMATED PROJECT COST

SUMMARY OF ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 SHAH ALAM HIGHWAY/MRR-11 SECTION 2 (SEG.6-11)
 SCHEME B 4-LANE

ITEM NO.	DESCRIPTION	FOREIGN COST TTL (RINGGIT)	LOCAL COST TTL (RINGGIT)	TOTAL (RINGGIT)	PROP. (%)
1.	GENERAL	1,812,880	3,523,262	5,336,142	7.60
2.	SITE CLEARING	1,074,515	1,263,659	2,338,174	3.33
3.	DEMOLITION	11,694	102,133	113,827	0.16
4.	ROAD EARTHWORK	3,305,887	4,264,337	7,570,223	10.78
5.	STRUCTURE EXCAVATION	138,115	100,736	238,850	0.34
6.	DRAINAGE	553,879	4,677,466	5,231,344	7.45
7.	SUBGRADE	141,778	217,248	359,026	0.51
8.	SUBBASE	2,132,727	2,874,771	5,007,498	7.13
9.	BITUMINOUS PAVEMENT	8,547,717	6,458,118	15,005,835	21.36
10.	CONCRETE STRUCTURE	8,183,313	8,485,680	16,668,993	23.73
11.	BRIDGE STEEL WORK	0	0	0	0.00
12.	MISCELLANEOUS	7,215,237	5,161,363	12,376,600	17.62
	DIRECT CONSTRUCTION COST	33,117,742	37,128,771	70,246,513	100.00
13.	LAND ACQUISITION \$ COMPENSATION	0	0	0	
14.	CONTINGENCY, PHYSICAL	3,311,774	3,712,877	7,024,651	
	SUB TOTAL	36,429,516	40,841,648	77,271,164	
15.	CONSULTING SUPERVISORY SERVICES	993,532	1,113,863	2,107,395	
16.	FINAL ENGINEERING SERVICES	1,655,887	1,856,439	3,512,326	
	GRAND TOTAL	39,078,935	43,811,950	82,890,885	

SECTION LENGTH (THROUGHWAY) : 13360 M

BRIDGE LENGTH : 876 M

BRIDGE AREA : 16622 M2

TABLE 6.18 : ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 SHAH ALAM HIGHWAY/NRR-II SECTION 2 (SEG.6-11) SCHEME B 4-LANE
 EXCHANGE RATES : US\$ 1 = YEN 125 = M\$ 2.6

NO	DESCRIPTION	UNIT	TTLQTY	UNIT PRICE		CONSTRUCTION COST		TOTAL (M\$)	PROP. (%)
				FOREIGN (M\$)	LOCAL (M\$)	FOREIGN (M\$)	LOCAL (M\$)		
1.01	MAINTENANCE & PROTECTION OF TRAFFIC	L.S.				55299	87680	142979	0.23
1.02	MOBILIZATION/DENOBILIZATION	L.S.				1513826	2972156	4485982	7.34
1.03	WORK IN OR DEARING WITH EXIST. WATER	L.S.				7293	3870	11163	0.02
2.01	SITE CLEARING	M2	998940	0.94	1.10	934361	1098834	2033195	3.33
3.01	REMOVAL OF MASONRY OR CONC. STRUCTURE	M3	944	10.77	94.08	10169	88812	98980	0.16
4.01	COMMON EXCAVATION	M3	20686	3.25	3.01	67188	62264	129451	0.21
4.02	BORROW MATERIAL	M3	478152	5.76	7.39	2752250	3533543	6285793	10.29
4.03	FREE DRAINING MATERIAL	M3	0	13.81	19.85	0	0	0	0.00
4.04	PERMEABLE BACKFILL	M3	3593	15.38	31.26	55246	112312	167558	0.27
4.05	SAND DRAIN	M	0	4.84	5.00	0	0	0	0.00
5.01	STRUCTURE EXCAVATION UPTO 2 M	M3	2291	2.64	6.18	6053	14160	20213	0.03
5.02	STRUCTURE EXCAVATION OVER 2 M	M3	1146	99.55	64.10	114047	73436	187483	0.31
6.01	R.C. PIPE, TYPE-A, D = 60 CM	M	2937	37.53	183.18	110234	538079	648313	1.06
6.02	R.C. PIPE, TYPE-A, D = 100 CM	M	2770	60.21	339.01	166762	938915	1105677	1.81
6.03	U-DITCH, 0.3*0.6M	M	12342	5.01	71.10	61782	877543	939325	1.54
6.04	U-DITCH 1.0*(0.6-2.0M)	M	3165	21.52	226.55	68117	716985	785103	1.29
6.05	CATCH BASIN	EACH	143	79.92	501.41	11402	71539	82941	0.14
6.06	MORTARED RUBBLE PAVED WATERWAY	M2	51350	1.23	18.00	63337	924300	987637	1.62
7.01	SUBGRADE PREPARATION	M2	299859	0.41	0.63	123285	188911	312196	0.51
8.01	SUBBASE	M3	85027	21.81	29.40	1854545	2499801	4354346	7.13
9.01	BITUMINOUS PRIME COAT	KG	752191	0.69	0.23	518008	173004	691012	1.13
9.02	ASPHALT TREATED BASE COURSE	TON	86392	45.02	32.25	3889371	2786128	6675499	10.93
9.03	ASPHALT CONCRETE SURFACE COURSE	TON	57030	52.11	41.80	2972001	2383875	5355876	8.77
9.04	CONCRETE PAVEMENT	M2	5100	10.47	53.48	53417	272748	326165	0.53
10.01	STRUCTURE CONCRETE CLASS A	M3	0	431.63	309.70	0	0	0	0.00
10.02	STRUCTURE CONCRETE CLASS B	M3	2826	132.86	237.25	375430	670404	1045833	1.71
10.03	STRUCTURE CONCRETE CLASS C	M3	6658	55.50	211.20	369565	1406232	1775797	2.91
10.04	STRUCTURE CONCRETE CLASS D	M3	0	46.06	208.89	0	0	0	0.00
10.05	REINFORCING STEEL	KG	653437	0.03	1.46	20149	954018	974167	1.59
10.06	PC PRECAST I-BEAM(SPAN 25M) CONCRETE	M3	4186	920.36	824.05	3852293	3449189	7301482	11.95
10.07	PC CABLE	KG	0	4.56	1.54	0	0	0	0.00
10.08	FURNISH AND DRIVE RC PILE 35CM*35CM	M	2417	17.19	72.52	41538	175281	216819	0.35
10.09	FURNISH AND DRIVE PC PILE D=45CM	M	11211	151.92	50.46	1703160	565711	2268870	3.71
10.10	FURNISH AND DRIVE STEEL PILE D=61CM	M	0	283.60	21.32	0	0	0	0.00
10.11	EXPANSION JOINT	M	1067	364.60	56.12	389135	59896	449031	0.74
10.12	BEARING PAD WITH ACCESSORIES	EACH	4344	39.09	20.57	169820	89364	259183	0.42
10.13	DRAIN PIPE, 25CM DIAMETER	M	2737	71.19	3.20	194836	8758	203594	0.33
11.01	STRUCTURAL STEEL	TON	0	3494.72	200.00	0	0	0	0.00
12.01	SOLID SODDING	M2	395350	0.04	1.61	16255	636514	652768	1.07
12.02	GUARDRAIL	M	8400	1.19	123.40	10015	1036560	1046575	1.71
12.03	SEPARATOR FENCE	M	25178	52.26	6.81	1315712	171462	1487174	2.43
12.04	DRY RIPRAP SLOPE PROTECTION	M2	7814	2.76	14.65	21606	114478	136084	0.22
12.05	REGULATORY & WARNING SIGN	EACH	573	115.46	124.99	66202	71666	137868	0.23
12.06	GUIDE SIGN	EACH	21	8386.46	707.61	176116	14860	190976	0.31
12.07	ROAD MARKING	M2	8814	27.79	0.47	244983	4143	249126	0.41
12.08	STREET LIGHTING	EACH	879	4128	1222	3628562	1073839	4702401	7.70
12.09	TRAFFIC SIGNAL WITH CONTROL PANEL	EACH	2	154672	1755	309345	3510	312855	0.51
12.10	STREET TREE PLANTING	L.S.				34678	84346	119025	0.19
12.11	CONCRETE CURB	M	39078	4.87	23.88	190390	933183	1123573	1.84
12.12	INTERLOCKING CONCRETE PAVING	M2	4640	0.71	41.72	3291	193581	196872	0.32
12.13	TOLL GATE	EACH	10	25696	15000	256965	150000	406965	0.67
TOTAL DIRECT COST (M\$)						28798036	32285888	61083924	100
TOTAL DIRECT COST + OVERHEAD & PROFIT (M\$)						33117742	37128771	70246513	

TABLE 6.19 : SUMMARY OF ESTIMATED PROJECT COST

SUMMARY OF ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 SHAH ALAM HIGHWAY/MRR-11 SECTION 3 (SEG.12-23 INCLUDING FRONTAGE ROAD OF SEG.24)
 SCHEME B 4-LANE

ITEM NO.	DESCRIPTION	FOREIGN COST TTL (RINGGIT)	LOCAL COST TTL (RINGGIT)	TOTAL (RINGGIT)	PROP. (%)
1.	GENERAL	3,100,912	5,731,752	8,832,665	7.97
2.	SITE CLEARING	1,354,885	1,593,381	2,948,266	2.66
3.	DEMOLITION	10,232	89,367	99,599	0.09
4.	ROAD EARTHWORK	6,764,727	7,623,851	14,388,578	12.98
5.	STRUCTURE EXCAVATION	246,190	230,712	476,902	0.43
6.	DRAINAGE	749,207	5,903,355	6,652,562	6.00
7.	SUBGRADE	221,085	338,770	559,855	0.51
8.	SUBBASE	3,209,362	4,326,002	7,535,364	6.80
9.	BITUMINOUS PAVEMENT	14,297,283	11,032,754	25,330,037	22.85
10.	CONCRETE STRUCTURE	10,305,208	15,648,974	25,954,182	23.42
11.	BRIDGE STEEL WORK	0	0	0	0.00
12.	MISCELLANEOUS	10,714,821	7,340,099	18,054,919	16.29
	DIRECT CONSTRUCTION COST	50,973,912	59,859,017	110,832,929	100.00
13.	LAND ACQUISITION & COMPENSATION	0	0	0	
14.	CONTINGENCY, PHYSICAL	5,097,391	5,985,902	11,083,293	
	SUB TOTAL	56,071,303	65,844,918	121,916,221	
15.	CONSULTING SUPERVISORY SERVICES	1,529,217	1,795,770	3,324,988	
16.	FINAL ENGINEERING SERVICES	2,548,696	2,992,951	5,541,646	
	GRAND TOTAL	60,149,216	70,633,640	130,782,856	

SECTION LENGTH (THROUGHWAY) : 19475 M
 BRIDGE LENGTH : 861 M
 BRIDGE AREA : 18358 M2

TABLE 6.20 : ESTIMATED PROJECT COST

CONSTRUCTION SECTION :

SIAM ALAM HIGHWAY/MRR-11 SECTION 3 (SEG.12-23 INCLUDING FRONTAGE ROAD OF SEG.24) SCHEME B 4-LANE

EXCHANGE RATES : US\$ 1 = YEN 125 = N\$ 2.6

NO	DESCRIPTION	UNIT	TTLQTY	UNIT PRICE		CONSTRUCTION COST			PROP. (%)
				FOREIGN (M\$)	LOCAL (M\$)	FOREIGN (M\$)	LOCAL (M\$)	TOTAL (M\$)	
1.01	MAINTENANCE & PROTECTION OF TRAFFIC	L.S.				497690	789120	1286810	1.34
1.02	MOBILIZATION/DENOBILIZATION	L.S.				2113675	4149862	6263537	6.50
1.03	WORK IN OR DEARING WITH EXIST. WATER	L.S.				85081	45150	130231	0.14
2.01	SITE CLEARING	M2	1259590	0.94	1.10	1178161	1385549	2563710	2.66
3.01	REMOVAL OF MASONRY OR CONC. STRUCTURE	M3	826	10.77	94.08	8898	77710	86608	0.09
4.01	COMMON EXCAVATION	M3	927779	3.25	3.01	3013462	2792616	5806077	6.02
4.02	BORROW MATERIAL	M3	462817	5.76	7.39	2663984	3420220	6084204	6.31
4.03	FREE DRAINING MATERIAL	M3	0	13.81	19.85	0	0	0	0.00
4.04	PERMEABLE BACKFILL	M3	13327	15.38	31.26	204925	416600	621526	0.64
4.05	SAND DRAIN	M	0	4.84	5.00	0	0	0	0.00
5.01	STRUCTURE EXCAVATION UPTO 2 M	M3	14015	2.64	6.18	37021	86610	123631	0.13
5.02	STRUCTURE EXCAVATION OVER 2 M	M3	1779	99.55	64.10	177057	114009	291066	0.30
6.01	R.C. PIPE, TYPE-A, D = 60 CM	M	4108	37.53	183.18	154147	752430	906577	0.94
6.02	R.C. PIPE, TYPE-A, D = 100 CM	M	3873	60.21	339.01	233194	1312945	1546139	1.60
6.03	U-DITCH, 0.3x0.6M	M	19142	5.01	71.10	95820	1361013	1456833	1.51
6.04	U-DITCH 1.0x(0.6-2.0M)	M	7045	21.52	226.55	151640	1596126	1747766	1.81
6.05	CATCH BASIN	EACH	200	79.92	501.41	15944	100037	115982	0.12
6.06	MORTARED RUBBLE PAVED WATERWAY	M2	600	1.23	18.00	740	10800	11540	0.01
7.01	SUBGRADE PREPARATION	M2	467592	0.41	0.63	192247	294583	486830	0.51
8.01	SUBBASE	M3	127950	21.81	29.40	2790750	3761741	6552491	6.80
9.01	BITUMINOUS PRIME COAT	KG	1183110	0.69	0.23	814768	272115	1086883	1.13
9.02	ASPHALT TREATED BASE COURSE	TON	148091	45.02	32.25	6667099	4775937	11443037	11.87
9.03	ASPHALT CONCRETE SURFACE COURSE	TON	92435	52.11	41.80	4817010	3863776	8680786	9.01
9.04	CONCRETE PAVEMENT	M2	12750	10.47	53.48	133542	681870	815412	0.85
10.01	STRUCTURE CONCRETE CLASS A	M3	0	431.63	309.70	0	0	0	0.00
10.02	STRUCTURE CONCRETE CLASS B	M3	3239	132.86	237.25	430275	768341	1198615	1.24
10.03	STRUCTURE CONCRETE CLASS C	M3	17477	55.50	211.20	970065	3691195	4661260	4.84
10.04	STRUCTURE CONCRETE CLASS D	M3	1363	46.06	208.89	62757	284622	347379	0.36
10.05	REINFORCING STEEL	KG	1665408	0.03	1.46	51354	2431495	2482849	2.58
10.06	PC PRECAST I-BEAM(SPAN 25M) CONCRETE	M3	5419	920.36	824.05	4987159	4465303	9452463	9.81
10.07	PC CABLE	KG	0	4.56	1.54	0	0	0	0.00
10.08	FURNISH AND DRIVE RC PILE 35CMx35CM	M	23412	17.19	72.52	402361	1697865	2100225	2.18
10.09	FURNISH AND DRIVE PC PILE D=45CM	M	0	151.92	50.46	0	0	0	0.00
10.10	FURNISH AND DRIVE STEEL PILE D=61CM	M	4280	283.60	21.32	1202457	90397	1292854	1.34
10.11	EXPANSTION JOINT	M	1222	364.60	56.12	445648	68595	514243	0.53
10.12	BEARING PAD WITH ACCESSORIES	EACH	4869	39.09	20.57	190341	100163	290505	0.30
10.13	DRAIN PIPE, 25CM DIAMETER	M	3071	71.19	3.20	218633	9828	228461	0.24
11.01	STRUCTURAL STEEL	TON	0	3494.72	200.00	0	0	0	0.00
12.01	SOLID SODDING	M2	596220	0.04	1.61	24513	959914	984427	1.02
12.02	GUARDRAIL	M	7550	1.19	123.40	9002	931670	940672	0.98
12.03	SEPARATOR FENCE	M	35208	52.26	6.81	1839843	239766	2079610	2.16
12.04	DRY RIPRAP SLOPE PROTECTION	M2	9173	2.76	14.65	25363	134386	159749	0.17
12.05	REGULATORY & WARNING SIGN	EACH	753	115.46	124.99	86950	94127	181077	0.19
12.06	GUIDE SIGN	EACH	39	8386.46	707.61	327072	27597	354669	0.37
12.07	ROAD MARKING	M2	14514	27.79	0.47	403389	6822	410210	0.43
12.08	STREET LIGHTING	EACH	1207	4128	1222	4980866	1474041	6454907	6.70
12.09	TRAFFIC SIGNAL WITH CONTROL PANEL	EACH	4	154672	1755	618689	7020	625709	0.65
12.10	STREET TREE PLANTING	L.S.				48493	117947	166440	0.17
12.11	CONCRETE CURB	M	61888	4.87	23.88	301522	1477885	1779407	1.85
12.12	INTERLOCKING CONCRETE PAVING	M2	12860	0.71	41.72	9121	536519	545640	0.57
12.13	TOLL GATE	EACH	25	25696	15000	642412	375000	1017412	1.06
TOTAL DIRECT COST (M\$)						44325141	52051319	96376460	100
TOTAL DIRECT COST + OVERHEAD & PROFIT (M\$)						50973912	59859017	110832929	

TABLE 6.21 : SUMMARY OF ESTIMATED PROJECT COST

SUMMARY OF ESTIMATED PROJECT COST

CONSTRUCTION SECTION :

NORTH-SOUTH EXPRESSWAY LINK SECTION 1 (SEG.1-5)

SCHEME A 2-LANE ~~***~~ THREE ICS AND CONNECTION ROAD ONLY ~~***~~

ITEM NO.	DESCRIPTION	FOREIGN COST TTL (RINGGIT)	LOCAL COST TTL (RINGGIT)	TOTAL (RINGGIT)	PROP. (%)
1.	GENERAL	484,042	950,338	1,434,380	3.44
2.	SITE CLEARING	361,743	425,420	787,162	1.89
3.	DEMOLITION	0	0	0	0.00
4.	ROAD EARTHWORK	2,649,092	2,625,437	5,274,529	12.65
5.	STRUCTURE EXCAVATION	180,288	135,294	315,583	0.76
6.	DRAINAGE	25,848	367,141	392,989	0.94
7.	SUBGRADE	29,600	45,356	74,956	0.18
8.	SUBBASE	392,570	529,158	921,729	2.21
9.	BITUMINOUS PAVEMENT	2,387,844	1,955,314	4,343,158	10.42
10.	CONCRETE STRUCTURE	11,701,983	10,604,041	22,306,023	53.49
11.	BRIDGE STEEL WORK	0	0	0	0.00
12.	MISCELLANEOUS	3,440,560	2,408,931	5,849,491	14.03
	DIRECT CONSTRUCTION COST	21,653,570	20,046,430	41,700,000	100.00
13.	LAND ACQUISITION & COMPENSATION	0	0	0	
14.	CONTINGENCY, PHYSICAL	2,165,357	2,004,643	4,170,000	
	SUB TOTAL	23,818,927	22,051,073	45,870,000	
15.	CONSULTING SUPERVISORY SERVICES	649,607	601,393	1,251,000	
16.	FINAL ENGINEERING SERVICES	1,082,678	1,002,322	2,085,000	
	GRAND TOTAL	25,551,212	23,654,788	49,206,000	

SECTION LENGTH (THROUGHWAY) : 1200 M
 BRIDGE LENGTH : 2000 M
 BRIDGE AREA : 17972 M2

TABLE 6.22 : ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 NORTH-SOUTH EXPRESSWAY LINK SECTION 1 (SEG.1-5) SCHEME A 2-LANE THREE ICS AND CONNECTION ROAD
 EXCHANGE RATES : US\$ 1 = YEN 125 = M\$ 2.6

NO	DESCRIPTION	UNIT	TTLQTY	UNIT PRICE		CONSTRUCTION COST			PROP. (%)
				FOREIGN (M\$)	LOCAL (M\$)	FOREIGN (M\$)	LOCAL (M\$)	TOTAL (M\$)	
1.01	MAINTENANCE & PROTECTION OF TRAFFIC	L.S.				0	0	0	0.00
1.02	MOBILIZATION/DEMobilIZATION	L.S.				420906	826381	1247287	3.44
1.03	WORK IN OR DEARING WITH EXIST. WATER	L.S.				0	0	0	0.00
2.01	SITE CLEARING	M2	336300	0.94	1.10	314559	369930	684489	1.89
3.01	REMOVAL OF MASONRY OR CONC. STRUCTURE	M3	0	10.77	94.08	0	0	0	0.00
4.01	COMMON EXCAVATION	M3	383000	3.25	3.01	1243998	1152830	2396828	6.61
4.02	BORROW MATERIAL	M3	0	5.76	7.39	0	0	0	0.00
4.03	FREE DRAINING MATERIAL	M3	0	13.81	19.85	0	0	0	0.00
4.04	PERMEABLE BACKFILL	M3	2331	15.38	31.26	35843	72867	108710	0.30
4.05	SAND DRAIN	M	211458	4.84	5.00	1023716	1057292	2081008	5.74
5.01	STRUCTURE EXCAVATION UPTO 2 M	M3	3728	2.64	6.18	9849	23042	32891	0.09
5.02	STRUCTURE EXCAVATION OVER 2 M	M3	1476	99.55	64.10	146924	94605	241529	0.67
6.01	R.C. PIPE, TYPE-A, D = 60 CM	M	0	37.53	183.18	0	0	0	0.00
6.02	R.C. PIPE, TYPE-A, D = 100 CM	M	0	60.21	339.01	0	0	0	0.00
6.03	U-DITCH, 0.3*0.6M	M	4490	5.01	71.10	22476	319253	341730	0.94
6.04	U-DITCH 1.0*(0.6-2.0M)	M	0	21.52	226.55	0	0	0	0.00
6.05	CATCH BASIN	EACH	0	79.92	501.41	0	0	0	0.00
6.06	MORTARED RUBBLE PAVED WATERWAY	M2	0	1.23	18.00	0	0	0	0.00
7.01	SUBGRADE PREPARATION	M2	62604	0.41	0.63	25739	39440	65180	0.18
8.01	SUBBASE	M3	15651	21.81	29.40	341366	460138	801503	2.21
9.01	BITUMINOUS PRIME COAT	KG	189668	0.69	0.23	130618	43624	174242	0.48
9.02	ASPHALT TREATED BASE COURSE	TON	21598	45.02	32.25	972361	696545	1668906	4.60
9.03	ASPHALT CONCRETE SURFACE COURSE	TON	17879	52.11	41.80	931742	747361	1679103	4.63
9.04	CONCRETE PAVEMENT	M2	3978	10.47	53.48	41665	212743	254409	0.70
10.01	STRUCTURE CONCRETE CLASS A	M3	6851	431.63	309.70	2957194	2121828	5079021	14.01
10.02	STRUCTURE CONCRETE CLASS B	M3	1496	132.86	237.25	198809	355013	553821	1.53
10.03	STRUCTURE CONCRETE CLASS C	M3	6213	55.50	211.20	344844	1312168	1657012	4.57
10.04	STRUCTURE CONCRETE CLASS D	M3	70	46.06	208.89	3224	14622	17846	0.05
10.05	REINFORCING STEEL	KG	1196147	0.03	1.46	36884	1746374	1783258	4.92
10.06	PC PRECAST I-BEAM(SPAN 25M) CONCRETE	M3	2679	920.36	824.05	2465362	2207387	4672749	12.89
10.07	PC CABLE	KG	176175	4.56	1.54	804008	271309	1075317	2.97
10.08	FURNISH AND DRIVE RC PILE 35CM*35CM	M	3783	17.19	72.52	65011	274331	339342	0.94
10.09	FURNISH AND DRIVE PC PILE D=45CM	M	15091	151.92	50.46	2292612	761499	3054111	8.42
10.10	FURNISH AND DRIVE STEEL PILE D=61CM	M	0	283.60	21.32	0	0	0	0.00
10.11	EXPANSION JOINT	M	631	364.60	56.12	230155	35426	265581	0.73
10.12	BEARING PAD WITH ACCESSORIES	EACH	4571	39.09	20.57	178688	94031	272719	0.75
10.13	DRAIN PIPE, 25CM DIAMETER	M	8412	71.19	3.20	598846	26918	625764	1.73
11.01	STRUCTURAL STEEL	TON	0	3494.72	200.00	0	0	0	0.00
12.01	SOLID SODDING	M2	0	0.04	1.61	0	0	0	0.00
12.02	GUARDRAIL	M	5100	1.19	123.40	6439	666360	672799	1.86
12.03	SEPARATOR FENCE	M	0	52.26	6.81	0	0	0	0.00
12.04	DRY RIPRAP SLOPE PROTECTION	M2	8801	2.76	14.65	24335	128936	153271	0.42
12.05	REGULATORY & WARNING SIGN	EACH	160	115.46	124.99	18419	19939	38358	0.11
12.06	GUIDE SIGN	EACH	30	8386.46	707.61	251594	21228	272822	0.75
12.07	ROAD MARKING	M2	2807	27.79	0.47	78004	1319	79323	0.22
12.08	STREET LIGHTING	EACH	532	4128	1222	2194806	649533	2844339	7.84
12.09	TRAFFIC SIGNAL WITH CONTROL PANEL	EACH	0	154672	1755	0	0	0	0.00
12.10	STREET TREE PLANTING	L.S.				0	0	0	0.00
12.11	CONCRETE CURB	M	17270	4.87	23.88	84140	412408	496548	1.37
12.12	INTERLOCKING CONCRETE PAVING	M2	0	0.71	41.72	0	0	0	0.00
12.13	TOLL GATE	EACH	13	25696	15000	334054	195000	529054	1.46
TOTAL DIRECT COST (M\$)						18829191	17431679	36260870	100
TOTAL DIRECT COST + OVERHEAD & PROFIT (M\$)						21653570	20046430	41700000	

TABLE 6.23 : SUMMARY OF ESTIMATED PROJECT COST

SUMMARY OF ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 NORTH-SOUTH EXPRESSWAY LINK SECTION 1 (SEG.1-5)
 SCHEME B 4-LANE *** THREE ICS AND CONNECTION ROAD ONLY ***

ITEM NO.	DESCRIPTION	FOREIGN COST TTL (RINGGIT)	LOCAL COST TTL (RINGGIT)	TOTAL (RINGGIT)	PROP. (%)
1.	GENERAL	723,481	1,420,440	2,143,921	4.19
2.	SITE CLEARING	447,709	526,518	974,228	1.91
3.	DEMOLITION	1,462	12,767	14,228	0.03
4.	ROAD EARTHWORK	3,312,083	3,281,145	6,593,228	12.89
5.	STRUCTURE EXCAVATION	261,449	200,736	462,185	0.90
6.	DRAINAGE	117,643	1,094,728	1,212,371	2.37
7.	SUBGRADE	43,455	66,587	110,043	0.22
8.	SUBBASE	593,033	799,368	1,392,400	2.72
9.	BITUMINOUS PAVEMENT	3,266,379	2,591,524	5,857,903	11.45
10.	CONCRETE STRUCTURE	12,975,762	12,459,179	25,434,941	49.74
11.	BRIDGE STEEL WORK	0	0	0	0.00
12.	MISCELLANEOUS	4,157,898	2,787,123	6,945,021	13.58
	DIRECT CONSTRUCTION COST	25,900,355	25,240,115	51,140,470	100.00
13.	LAND ACQUISITION & COMPENSATION	0	0	0	
14.	CONTINGENCY, PHYSICAL	2,590,036	2,524,011	5,114,047	
	SUB TOTAL	28,490,391	27,764,126	56,254,517	
15.	CONSULTING SUPERVISORY SERVICES	777,011	757,203	1,534,214	
16.	FINAL ENGINEERING SERVICES	1,295,018	1,262,006	2,557,023	
	GRAND TOTAL	30,582,419	29,783,335	60,345,754	

SECTION LENGTH (THROUGHWAY) : 1450 M
 BRIDGE LENGTH : 2118 M
 BRIDGE AREA : 19697 M2

TABLE 6.24 : ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 NORTH-SOUTH EXPRESSWAY LINK SECTION 1 (SEG.1-5) SCHEME B 4-LANE *** THREE ICS AND CONNECTION ROAD ONLY ***
 EXCHANGE RATES : US\$ 1 = YEN 125 = M\$ 2.6

NO	DESCRIPTION	UNIT	TTLQTY	UNIT PRICE		CONSTRUCTION COST			PROP. (%)
				FOREIGN (M\$)	LOCAL (M\$)	FOREIGN (M\$)	LOCAL (M\$)	TOTAL (M\$)	
1.01	MAINTENANCE & PROTECTION OF TRAFFIC	L.S.				0	0	0	0.00
1.02	MOBILIZATION/DEMobilIZATION	L.S.				629114	1235165	1864280	4.19
1.03	WORK IN OR DEARING WITH EXIST. WATER	L.S.				0	0	0	0.00
2.01	SITE CLEARING	M2	416220	0.94	1.10	389312	457842	847154	1.91
3.01	REMOVAL OF MASONRY OR CONC. STRUCTURE	M3	118	10.77	94.08	1271	11101	12373	0.03
4.01	COMMON EXCAVATION	M3	550500	3.25	3.01	1788045	1657005	3445050	7.75
4.02	BORROW MATERIAL	M3	0	5.76	7.39	0	0	0	0.00
4.03	FREE DRAINING MATERIAL	M3	0	13.81	19.85	0	0	0	0.00
4.04	PERMEABLE BACKFILL	M3	4443	15.38	31.26	68311	138873	207184	0.47
4.05	SAND DRAIN	M	211458	4.84	5.00	1023716	1057292	2081008	4.68
5.01	STRUCTURE EXCAVATION UPTO 2 M	M3	6288	2.64	6.18	16609	38858	55467	0.12
5.02	STRUCTURE EXCAVATION OVER 2 M	M3	2117	99.55	64.10	210737	135696	346433	0.78
6.01	R.C. PIPE, TYPE-A, D = 60 CM	M	466	37.53	183.18	17495	85399	102894	0.23
6.02	R.C. PIPE, TYPE-A, D = 100 CM	M	440	60.21	339.01	26467	149015	175482	0.39
6.03	U-DITCH, 0.3*0.6M	M	5875	5.01	71.10	29411	417747	447157	1.01
6.04	U-DITCH 1.0*(0.6-2.0M)	M	1225	21.52	226.55	26376	277623	303999	0.68
6.05	CATCH BASIN	EACH	23	79.92	591.41	1810	11354	13164	0.03
6.06	MORTARED RUBBLE PAVED WATERWAY	M2	600	1.23	18.00	740	10800	11540	0.03
7.01	SUBGRADE PREPARATION	M2	91908	0.41	0.63	37787	57902	95689	0.22
8.01	SUBBASE	M3	23643	21.81	29.40	515681	695102	1210783	2.72
9.01	BITUMINOUS PRIME COAT	KG	262444	0.69	0.23	180736	60362	241098	0.54
9.02	ASPHALT TREATED BASE COURSE	TON	30942	45.02	32.25	1393029	997888	2390918	5.38
9.03	ASPHALT CONCRETE SURFACE COURSE	TON	23505	52.11	41.80	1224899	982505	2207404	4.96
9.04	CONCRETE PAVEMENT	M2	3978	10.47	53.48	41665	212743	254409	0.57
10.01	STRUCTURE CONCRETE CLASS A	M3	6851	431.63	309.70	2957194	2121828	5079021	11.42
10.02	STRUCTURE CONCRETE CLASS B	M3	1812	132.86	237.25	240729	429870	670599	1.51
10.03	STRUCTURE CONCRETE CLASS C	M3	8627	55.50	211.20	478816	1821944	2300761	5.17
10.04	STRUCTURE CONCRETE CLASS D	M3	291	46.06	208.89	13403	60787	74190	0.17
10.05	REINFORCING STEEL	KG	1377817	0.03	1.46	42486	2011613	2054099	4.62
10.06	PC PRECAST I-BEAM(SPAN 25M) CONCRETE	M3	3211	920.36	824.05	2955361	2646112	5601472	12.60
10.07	PC CABLE	KG	176175	4.56	1.54	804008	271309	1075317	2.42
10.08	FURNISH AND DRIVE RC PILE 35CM*35CM	M	5993	17.19	72.52	102992	434600	537591	1.21
10.09	FURNISH AND DRIVE PC PILE D=45CM	M	17052	151.92	50.46	2590455	860429	3450884	7.76
10.10	FURNISH AND DRIVE STEEL PILE D=61CM	M	0	283.60	21.32	0	0	0	0.00
10.11	EXPANSION JOINT	M	779	364.60	56.12	284080	43726	327806	0.74
10.12	BEARING PAD WITH ACCESSORIES	EACH	5064	39.09	20.57	197959	104172	302131	0.68
10.13	DRAIN PIPE, 25CM DIAMETER	M	8650	71.19	3.20	615789	27680	643469	1.45
11.01	STRUCTURAL STEEL	TON	0	3494.72	200.00	0	0	0	0.00
12.01	SOLID SODDING	M2	16860	0.04	1.61	693	27145	27838	0.06
12.02	GUARDRAIL	M	5920	1.19	123.40	7059	730528	737587	1.66
12.03	SEPARATOR FENCE	M	2664	52.26	6.81	139211	18142	157353	0.35
12.04	DRY RIPRAP SLOPE PROTECTION	M2	10423	2.76	14.65	28819	152698	181517	0.41
12.05	REGULATORY & WARNING SIGN	EACH	203	115.46	124.99	23441	25376	48817	0.11
12.06	GUIDE SIGN	EACH	36	8386.46	707.61	301913	25474	327387	0.74
12.07	ROAD MARKING	M2	3704	27.79	0.47	102942	1741	104683	0.24
12.08	STREET LIGHTING	EACH	624	4128.00	1222	2576643	762534	3339176	7.51
12.09	TRAFFIC SIGNAL WITH CONTROL PANEL	EACH	0	154672	1755	0	0	0	0.00
12.10	STREET TREE PLANTING	L.S.				3669	8924	12594	0.03
12.11	CONCRETE CURB	M	19934	4.87	23.88	97120	476024	573143	1.29
12.12	INTERLOCKING CONCRETE PAVING	M2	0	0.71	41.72	0	0	0	0.00
12.13	TOLL GATE	EACH	13	25696	15000	334054	195000	529054	1.19
TOTAL DIRECT COST (M\$)						22522048	21947926	44469974	100
TOTAL DIRECT COST + OVERHEAD & PROFIT (M\$)						25900355	25240115	51140470	

TABLE 6.25 : SUMMARY OF ESTIMATED PROJECT COST

SUMMARY OF ESTIMATED PROJECT COST

CONSTRUCTION SECTION :

NORTH-SOUTH EXPRESSWAY LINK SECTION 1 (SEG.1-5)

SCHEME C 4-LANE *** WITH FULL WIDTH BRIDGES ***

ITEM NO.	DESCRIPTION	FOREIGN COST TTL (RINGGIT)	LOCAL COST TTL (RINGGIT)	TOTAL (RINGGIT)	PROP. (%)
1.	GENERAL	832,718	1,574,849	2,407,567	2.82
2.	SITE CLEARING	659,398	775,470	1,434,869	1.68
3.	DEMOLITION	1,462	12,767	14,228	0.02
4.	ROAD EARTHWORK	8,491,046	10,132,658	18,623,704	21.84
5.	STRUCTURE EXCAVATION	299,917	229,896	529,813	0.62
6.	DRAINAGE	311,046	2,766,122	3,077,168	3.61
7.	SUBGRADE	93,567	143,373	236,940	0.28
8.	SUBBASE	1,347,180	1,815,908	3,163,088	3.71
9.	BITUMINOUS PAVEMENT	6,550,829	5,170,631	11,721,460	13.75
10.	CONCRETE STRUCTURE	15,743,405	15,148,147	30,891,551	36.23
11.	BRIDGE STEEL WORK	0	0	0	0.00
12.	MISCELLANEOUS	7,441,463	5,713,308	13,154,772	15.43
	DIRECT CONSTRUCTION COST	41,772,032	43,483,128	85,255,160	100.00
13.	LAND ACQUISITION \$ COMPENSATION	0	4,060,000	4,060,000	
14.	CONTINGENCY, PHYSICAL	4,177,203	4,348,313	8,525,516	
	SUB TOTAL	45,949,235	51,891,440	97,840,676	
15.	CONSULTING SUPERVISORY SERVICES	1,253,161	1,304,494	2,557,655	
16.	FINAL ENGINEERING SERVICES	2,088,602	2,174,156	4,262,758	
	GRAND TOTAL	49,290,998	55,370,091	104,661,089	

SECTION LENGTH (THROUGHWAY) : 4880 M

BRIDGE LENGTH : 2553 M

BRIDGE AREA : 24207 M2

TABLE 6.26 : ESTIMATED PROJECT COST

CONSTRUCTION SECTION :
 NORTH-SOUTH EXPRESSWAY LINK SECTION I (SEG.1-5) SCHEME C 4-LANE *** WITH FULL WIDTH BRIDGES ***
 EXCHANGE RATES : US\$ 1 = YEN 125 = M\$ 2.6

NO	DESCRIPTION	UNIT	TTLQTY	UNIT PRICE		CONSTRUCTION COST			PROP. (%)
				FOREIGN (M\$)	LOCAL (M\$)	FOREIGN (M\$)	LOCAL (M\$)	TOTAL (M\$)	
1.01	MAINTENANCE & PROTECTION OF TRAFFIC	L.S.				138247	219200	357447	0.48
1.02	MOBILIZATION/DEMOBILIZATION	L.S.				585855	1150234	1736089	2.34
1.03	WORK IN OR DEARING WITH EXIST. WATER	L.S.				0	0	0	0.00
2.01	SITE CLEARING	M2	613020	0.94	1.10	573390	674322	1247712	1.68
3.01	REMOVAL OF MASONRY OR CONC. STRUCTURE	M3	118	10.77	94.08	1271	11101	12373	0.02
4.01	COMMON EXCAVATION	M3	160998	3.25	3.01	522928	484604	1007531	1.36
4.02	BORROW MATERIAL	M3	795164	5.76	7.39	4576977	5876263	10453240	14.10
4.03	FREE DRAINING MATERIAL	M3	0	13.81	19.85	0	0	0	0.00
4.04	PERMEABLE BACKFILL	M3	5958	15.38	31.26	91617	186251	277868	0.37
4.05	SAND DRAIN	M	452778	4.84	5.00	2191997	2263889	4455886	6.01
5.01	STRUCTURE EXCAVATION UPTO 2 M	M3	7140	2.64	6.18	18861	44124	62985	0.08
5.02	STRUCTURE EXCAVATION OVER 2 M	M3	2430	99.55	64.10	241937	155785	397723	0.54
6.01	R.C. PIPE, TYPE-A, D = 60 CM	M	1336	37.53	183.18	50134	244719	294854	0.40
6.02	R.C. PIPE, TYPE-A, D = 100 CM	M	1260	60.21	339.01	75844	427020	502864	0.68
6.03	U-DITCH, 0.3*0.6M	M	12583	5.01	71.10	62989	894685	957674	1.29
6.04	U-DITCH 1.0*(0.6-2.0M)	M	3512	21.52	226.55	75582	795562	871144	1.18
6.05	CATCH BASIN	EACH	65	79.92	501.41	5186	32536	37722	0.05
6.06	MORTARED RUBBLE PAVED WATERWAY	M2	600	1.23	18.00	740	10800	11540	0.02
7.01	SUBGRADE PREPARATION	M2	197893	0.41	0.63	81362	124672	206035	0.28
8.01	SUBBASE	M3	53709	21.81	29.40	1171461	1579050	2750511	3.71
9.01	BITUMINOUS PRIME COAT	KG	542929	0.69	0.23	373897	124874	498771	0.67
9.02	ASPHALT TREATED BASE COURSE	TON	62866	45.02	32.25	2830256	2027437	4857694	6.55
9.03	ASPHALT CONCRETE SURFACE COURSE	TON	46286	52.11	41.80	2412095	1934767	4346862	5.86
9.04	CONCRETE PAVEMENT	M2	7650	10.47	53.48	80125	409122	489247	0.66
10.01	STRUCTURE CONCRETE CLASS A	M3	6851	431.63	309.70	2957194	2121828	5079021	6.85
10.02	STRUCTURE CONCRETE CLASS B	M3	2617	132.86	237.25	347726	620934	968661	1.31
10.03	STRUCTURE CONCRETE CLASS C	M3	10624	55.50	211.20	589685	2243813	2833498	3.82
10.04	STRUCTURE CONCRETE CLASS D	M3	330	46.06	208.89	15199	68934	84133	0.11
10.05	REINFORCING STEEL	KG	1586198	0.03	1.46	48912	2315850	2364761	3.19
10.06	PC PRECAST I-BEAM(SPAN 25M) CONCRETE	M3	4539	920.36	824.05	4177405	3740281	7917686	10.68
10.07	PC CABLE	KG	176175	4.56	1.54	804008	271309	1075317	1.45
10.08	FURNISH AND DRIVE RC PILE 35CM*35CM	M	6383	17.19	72.52	109694	462883	572577	0.77
10.09	FURNISH AND DRIVE PC PILE D=45CM	M	21876	151.92	50.46	3323417	1103885	4427302	5.97
10.10	FURNISH AND DRIVE STEEL PILE D=61CM	M	0	283.60	21.32	0	0	0	0.00
10.11	EXPANSION JOINT	M	1124	364.60	56.12	409904	63093	472997	0.64
10.12	BEARING PAD WITH ACCESSORIES	EACH	6311	39.09	20.57	246704	129822	376526	0.51
10.13	DRAIN PIPE, 25CM DIAMETER	M	9272	71.19	3.20	660069	29670	689739	0.93
11.01	STRUCTURAL STEEL	TON	0	3495	200	0	0	0	0.00
12.01	SOLID SODDING	M2	41265	0.04	1.61	1697	66437	68133	0.09
12.02	GUARDRAIL	M	10524	1.19	123.40	12548	1298662	1311210	1.77
12.03	SEPARATOR FENCE	M	7634	52.26	6.81	398925	51988	450913	0.61
12.04	DRY RIPRAP SLOPE PROTECTION	M2	15338	2.76	14.65	42408	224697	267105	0.36
12.05	REGULATORY & WARNING SIGN	EACH	405	115.46	124.99	46787	50649	97436	0.13
12.06	GUIDE SIGN	EACH	36	8386	708	301913	25474	327387	0.44
12.07	ROAD MARKING	M2	7332	27.79	0.47	203773	3446	207219	0.28
12.08	STREET LIGHTING	EACH	1077	4128	1222	4447150	1318093	5763243	7.77
12.09	TRAFFIC SIGNAL WITH CONTROL PANEL	EACH	1	154672	1755	154672	1755	156427	0.21
12.10	STREET TREE PLANTING	L.S.				10515	25574	36088	0.05
12.11	CONCRETE CURB	M	40764	4.87	23.88	198604	973444	1172049	1.58
12.12	INTERLOCKING CONCRETE PAVING	M2	13300	0.71	41.72	9433	554876	564309	0.76
12.13	TOLL GATE	EACH	25	25696	15000	642412	375000	1017412	1.37
TOTAL DIRECT COST (M\$)						36323506	37811415	74134922	100
TOTAL DIRECT COST + OVERHEAD & PROFIT (M\$)						41772032	43483128	85255160	

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