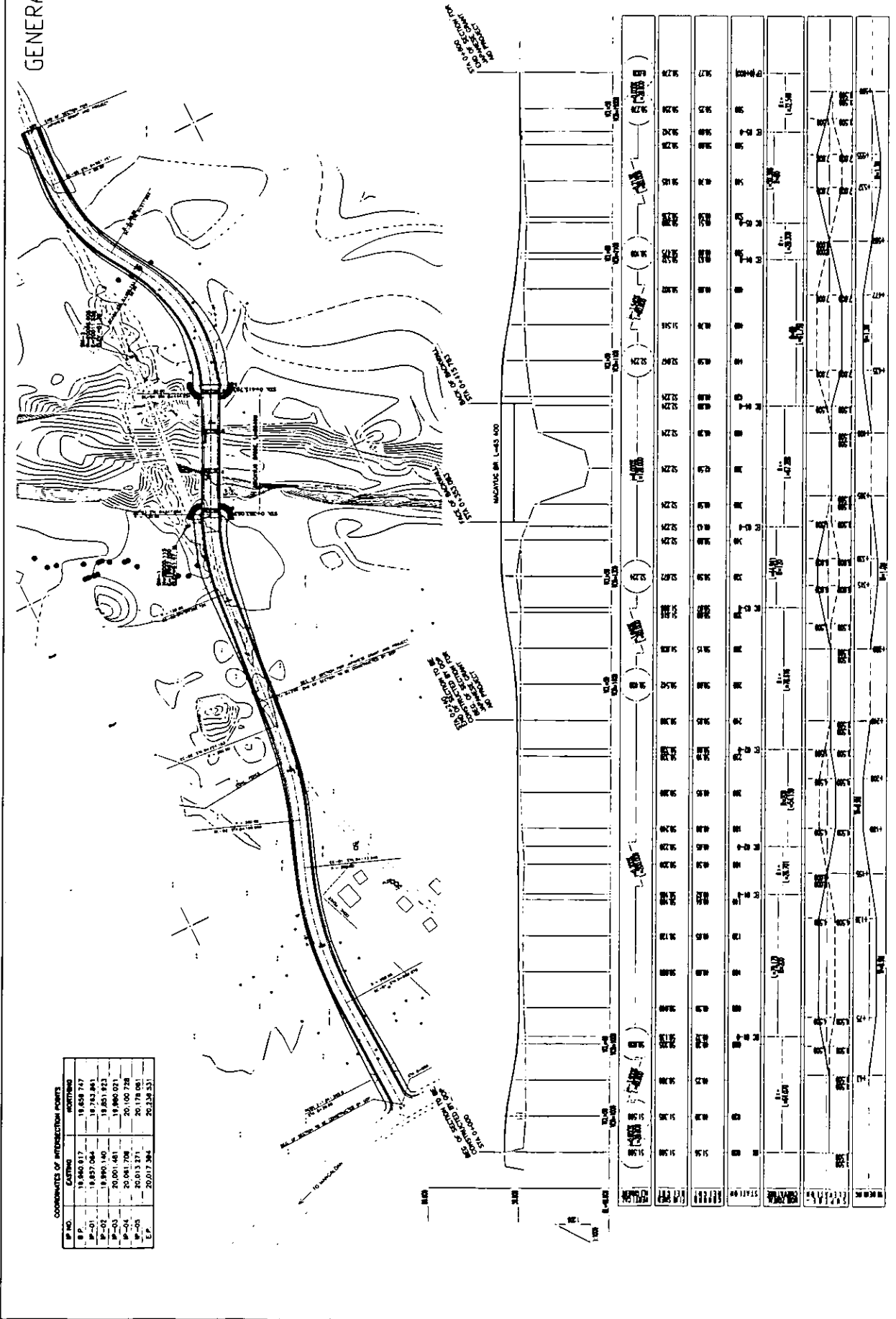


2.2.4.2 Group 2 Bridges

The basic design drawings are listed as follows:

- Figure 2.2.4.2-1 : 01-04-04 Macayug Bridge, Approach Road Plan & Profile
- Figure 2.2.4.2-2 : 01-04-04 Macayug Bridge, General View
- Figure 2.2.4.2-3 : 02-01-02 Capissayan Bridge, Approach Road Plan & Profile
- Figure 2.2.4.2-4 : 02-01-02 Capissayan Bridge, General View
- Figure 2.2.4.2-5 : 02-02-01 Abuan Bridge, Approach Road Plan & Profile
- Figure 2.2.4.2-6 : 02-02-01 Abuan Bridge, General View
- Figure 2.2.4.2-7 : CA-01-01 Abas Bridge, Approach Road Plan & Profile
- Figure 2.2.4.2-8 : CA-01-01 Abas Bridge, General View
- Figure 2.2.4.2-9 : CA-02-01 Amburayan I Bridge, Approach Road Plan & Profile
- Figure 2.2.4.2-10 : CA-02-01 Amburayan I Bridge, General View
- Figure 2.2.4.2-11 : CA-02-08 Mambolo Bridge, Approach Road Plan & Profile
- Figure 2.2.4.2-12 : CA-02-08 Mambolo Bridge, General View
- Figure 2.2.4.2-13 : CA-05-03 Bananao Bridge, Approach Road Plan & Profile
- Figure 2.2.4.2-14 : CA-05-03 Bananao Bridge, General View
- Figure 2.2.4.2-15 : Typical Cross Sections of Approach Roads
- Figure 2.2.4.2-16 : Standard Structures (Ditches)
- Figure 2.2.4.2-17 : Standard Structures (Revetments)

GENERAL VIEW



COORDINATES OF INTERSECTION POINTS

# NO.	EASTING	NORTHING
1	18 843.917	19 810.317
2	18 857.054	19 783.864
3	18 890.140	19 851.811
4	20 001.481	18 860.031
5	20 041.708	20 100.728
6	20 013.371	20 178.084
7	20 017.384	20 238.331

FIGURE 2.2.4.2-1 01-04-04 MACAYUG BRIDGE APPROACH ROAD PLAN & PROFILE

GENERAL VIEW

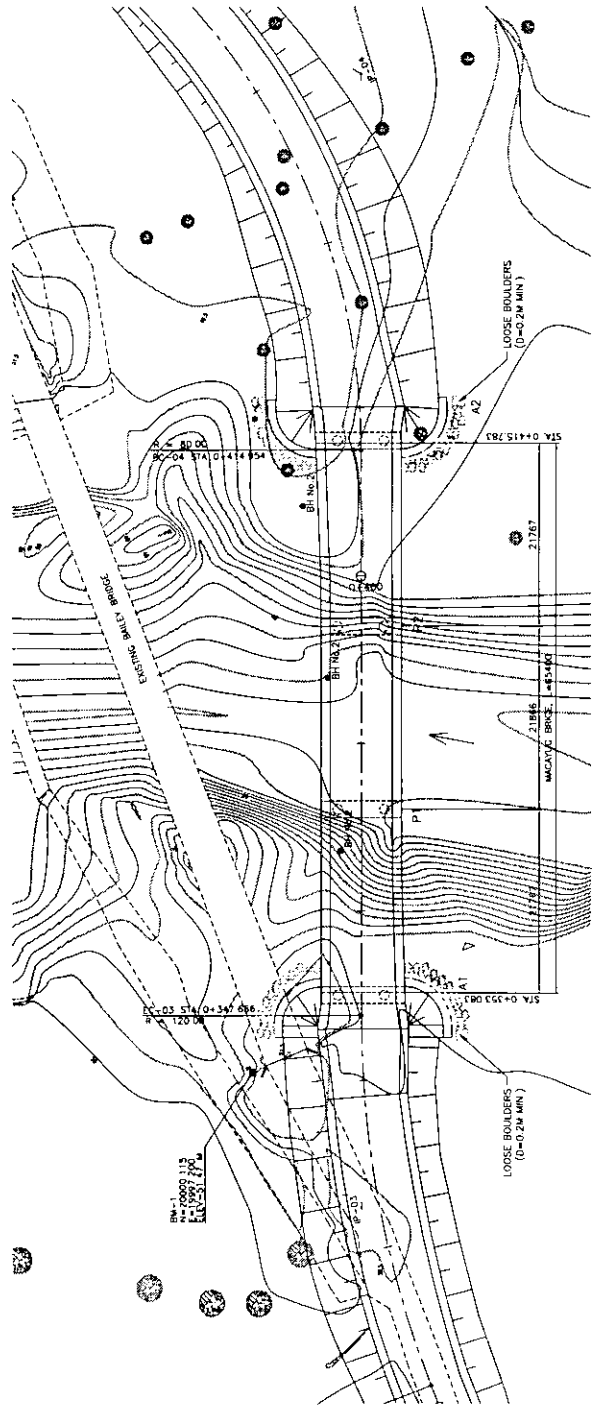
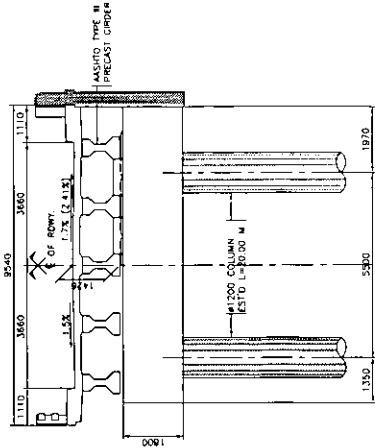
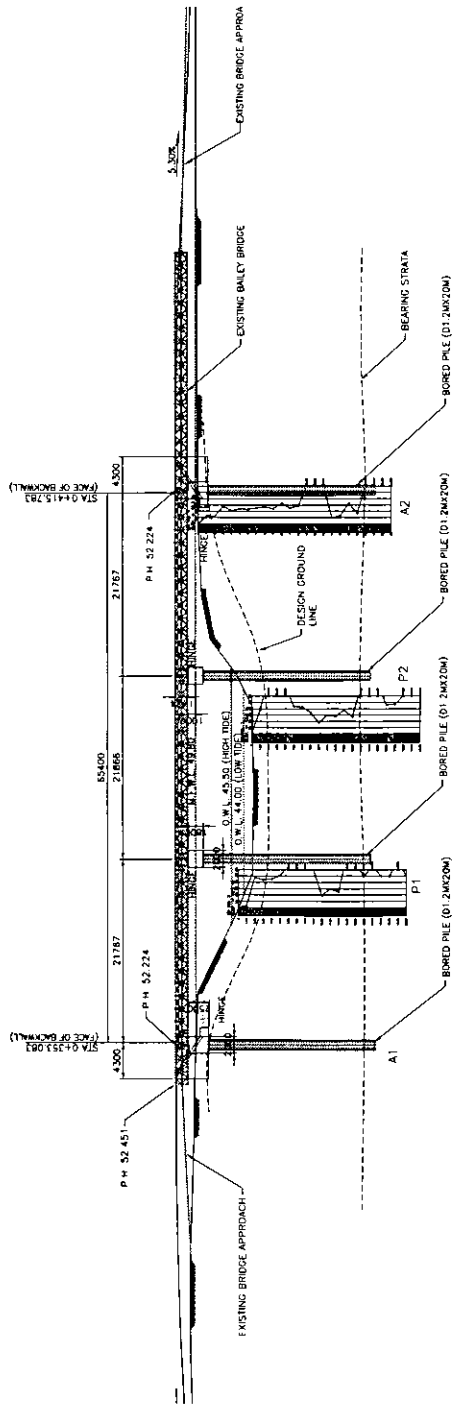
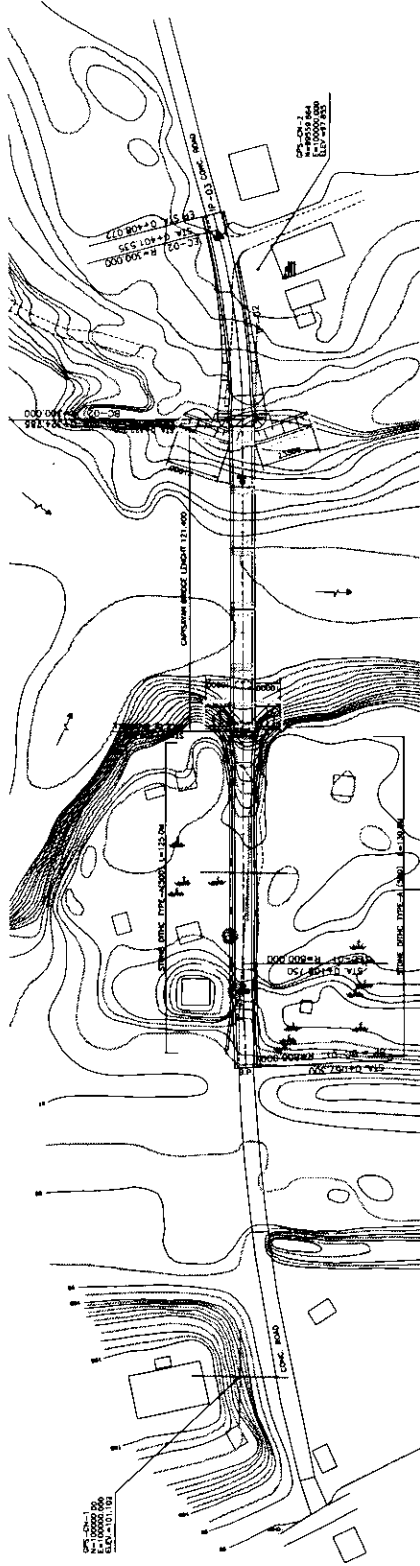


FIGURE 2.2.4.2-2 01-04-04 MACAYUG BRIDGE GENERAL VIEW

GENERAL VIEW



SP NO.	EASTING	NORTHING
B.P.	99877.4089	99939.70334
P-01	99852.7283	100001.123
P-02	99851.4136	100005.7283
P-03	99537.92557	100017.8646

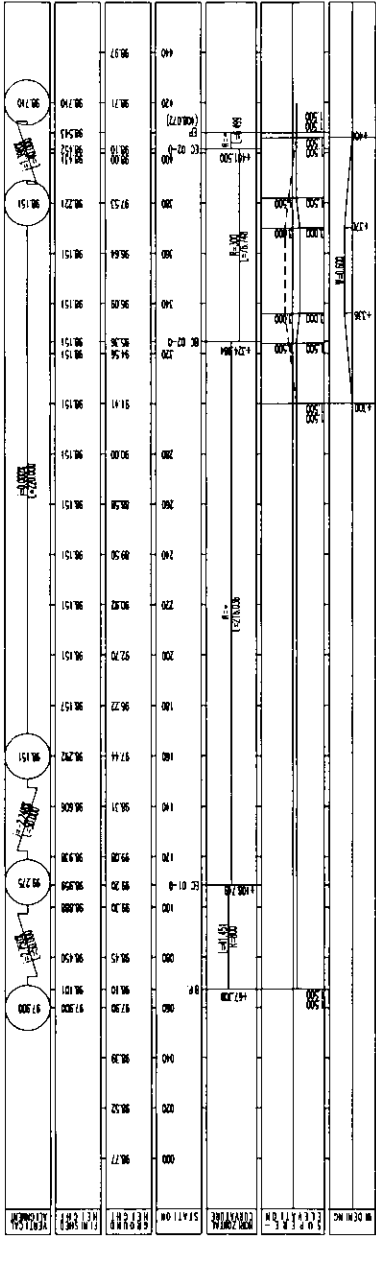
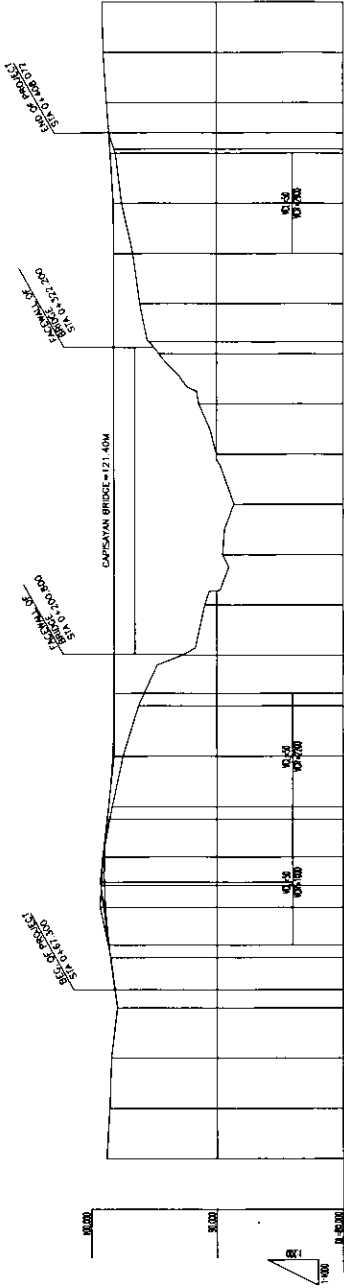


FIGURE 2. 4. 2-3 02-01-02 CAPISSAYAN BRIDGE APPROACH ROAD PLAN & PROFILE

GENERAL VIEW

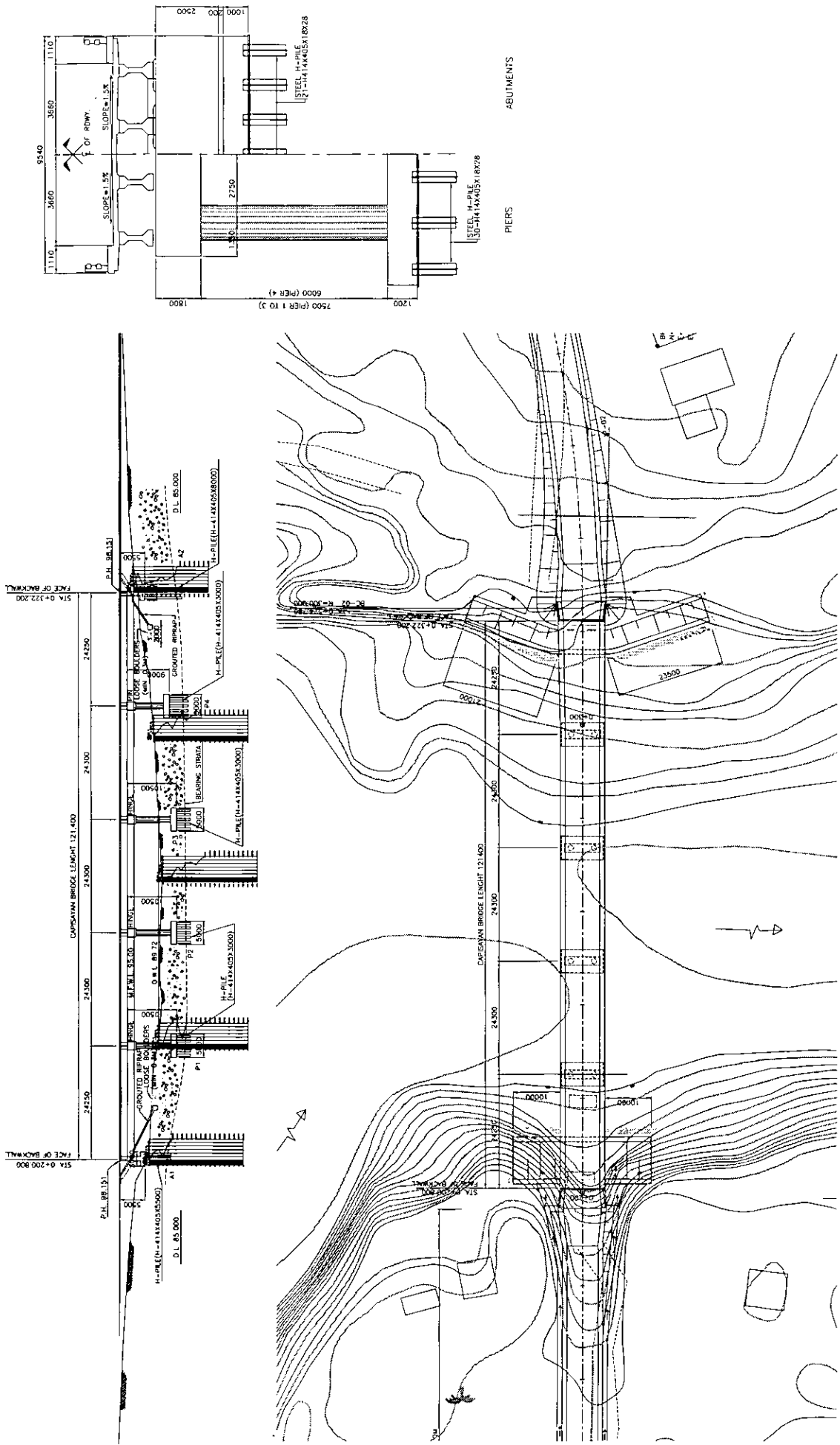
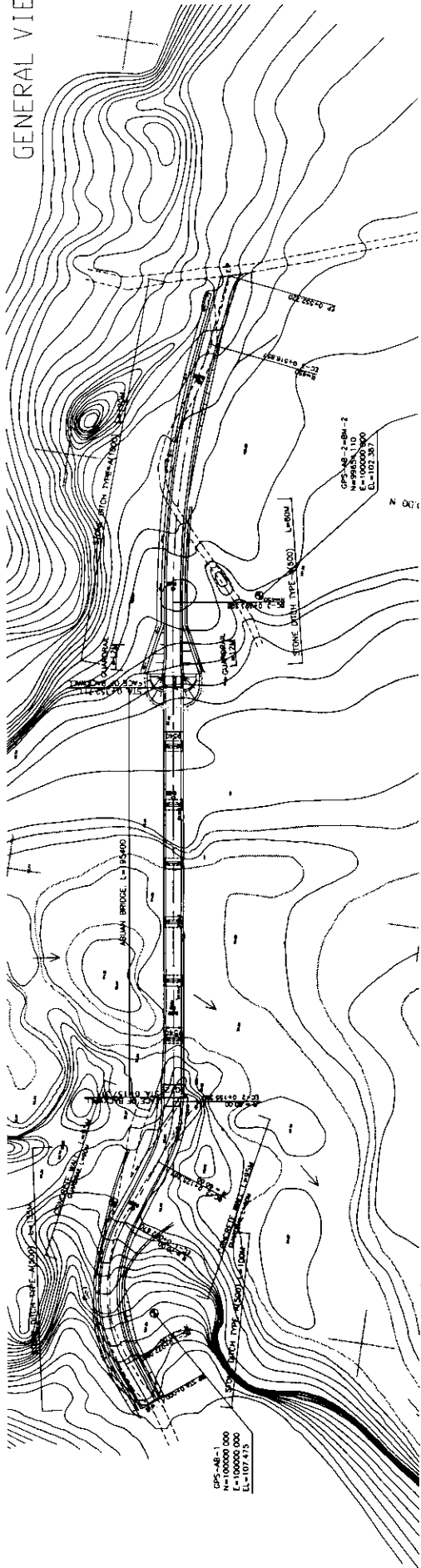


FIGURE 2.2.4.2-4 02-01-02 CAPISSAN BRIDGE GENERAL VIEW

GENERAL VIEW

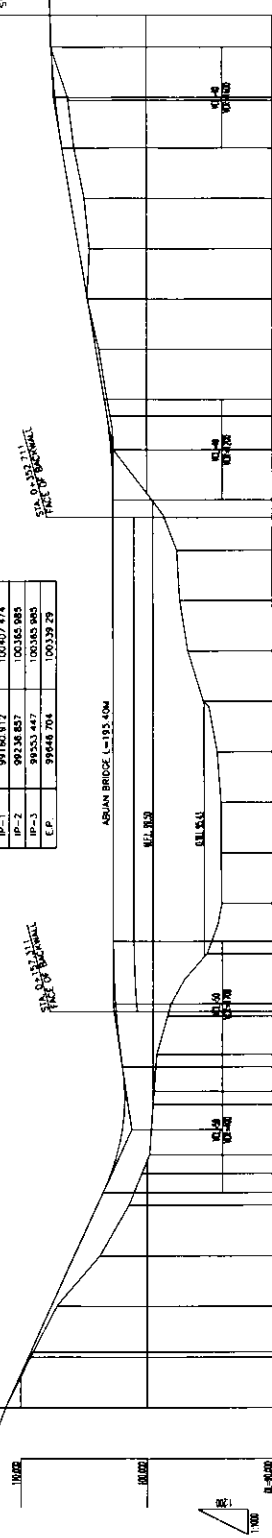


COORDINATES OF INTERSECTION POINTS

IP NO.	EASTING	NORTHING
B.P.	99107.681	100377.826
IP-1	99186.812	100407.474
IP-2	99238.887	100365.985
IP-3	99253.447	100365.985
E.P.	99846.704	100359.29

BEST OF PROJECT
Sta. 0+300

END OF PROJECT
Sta. 0+250.710



STATION	ELEVATION	GROUND	PROPOSED	VERTICAL CURVE DATA
0+00	111.00	111.00	111.00	VERT. CURVE DATA L=100.00 GRADE 1: -1.00% GRADE 2: 1.00% GRADE 3: 0.50% GRADE 4: -0.50% GRADE 5: 0.50% GRADE 6: -0.50% GRADE 7: 0.50% GRADE 8: -0.50% GRADE 9: 0.50% GRADE 10: -0.50%
0+10	111.00	111.00	111.00	
0+20	111.00	111.00	111.00	
0+30	111.00	111.00	111.00	
0+40	111.00	111.00	111.00	
0+50	111.00	111.00	111.00	
0+60	111.00	111.00	111.00	
0+70	111.00	111.00	111.00	
0+80	111.00	111.00	111.00	
0+90	111.00	111.00	111.00	
0+100	111.00	111.00	111.00	
0+110	111.00	111.00	111.00	
0+120	111.00	111.00	111.00	
0+130	111.00	111.00	111.00	
0+140	111.00	111.00	111.00	
0+150	111.00	111.00	111.00	
0+160	111.00	111.00	111.00	
0+170	111.00	111.00	111.00	
0+180	111.00	111.00	111.00	
0+190	111.00	111.00	111.00	
0+200	111.00	111.00	111.00	
0+210	111.00	111.00	111.00	
0+220	111.00	111.00	111.00	
0+230	111.00	111.00	111.00	
0+240	111.00	111.00	111.00	
0+250	111.00	111.00	111.00	
0+260	111.00	111.00	111.00	
0+270	111.00	111.00	111.00	
0+280	111.00	111.00	111.00	
0+290	111.00	111.00	111.00	
0+300	111.00	111.00	111.00	

FIGURE 2.2.4.2-5 02-02-01 ABUAN BRIDGE APPROACH ROAD PLAN & PROFILE

GENERAL VIEW

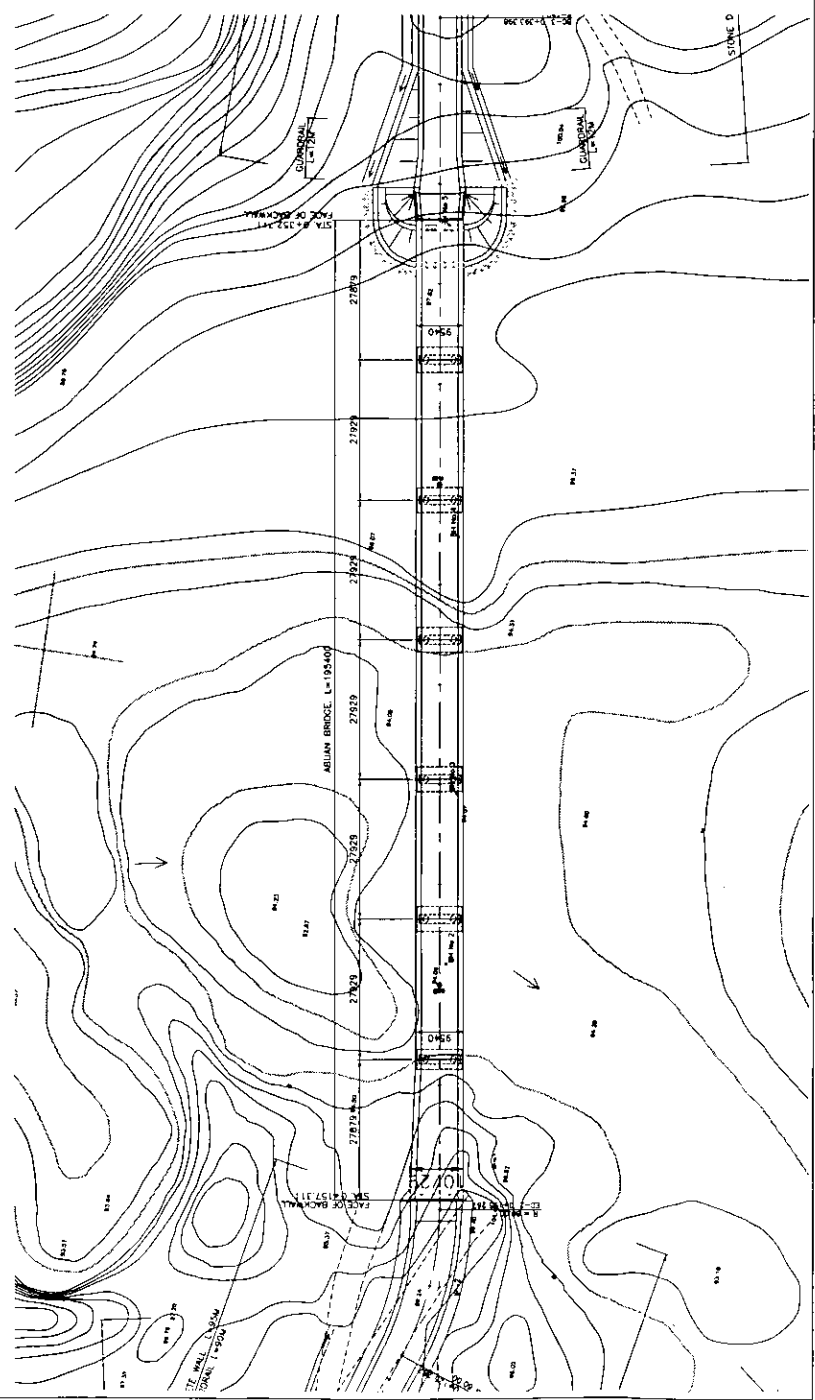
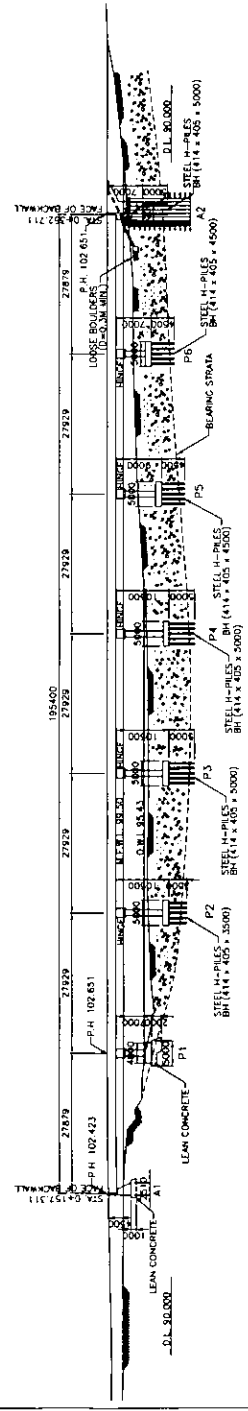
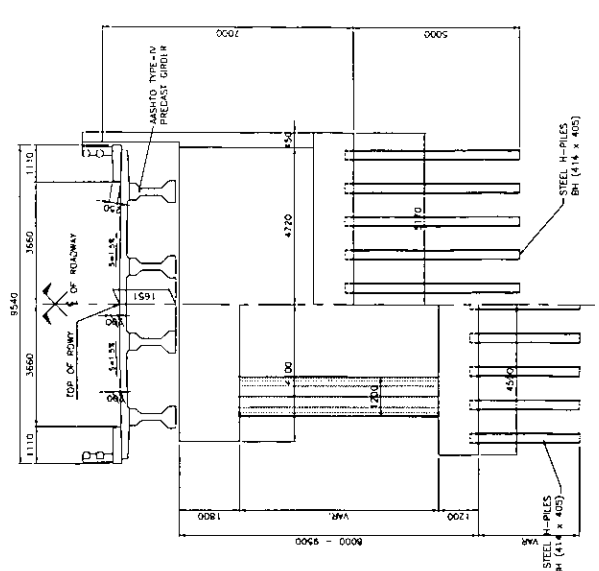
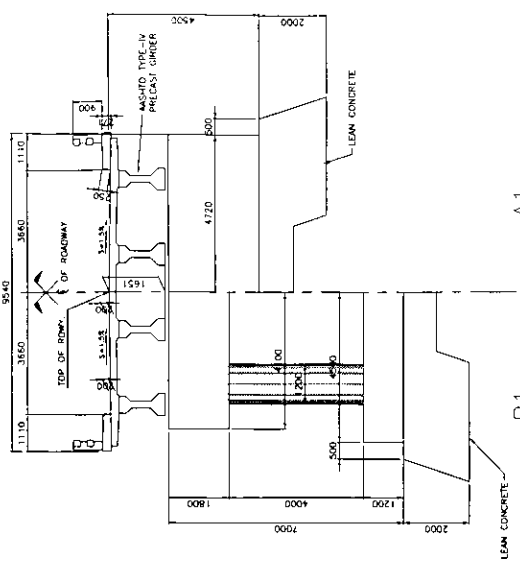


FIGURE 2.2.4.2-6 02-02-01 ABUAN BRIDGE GENERAL VIEW

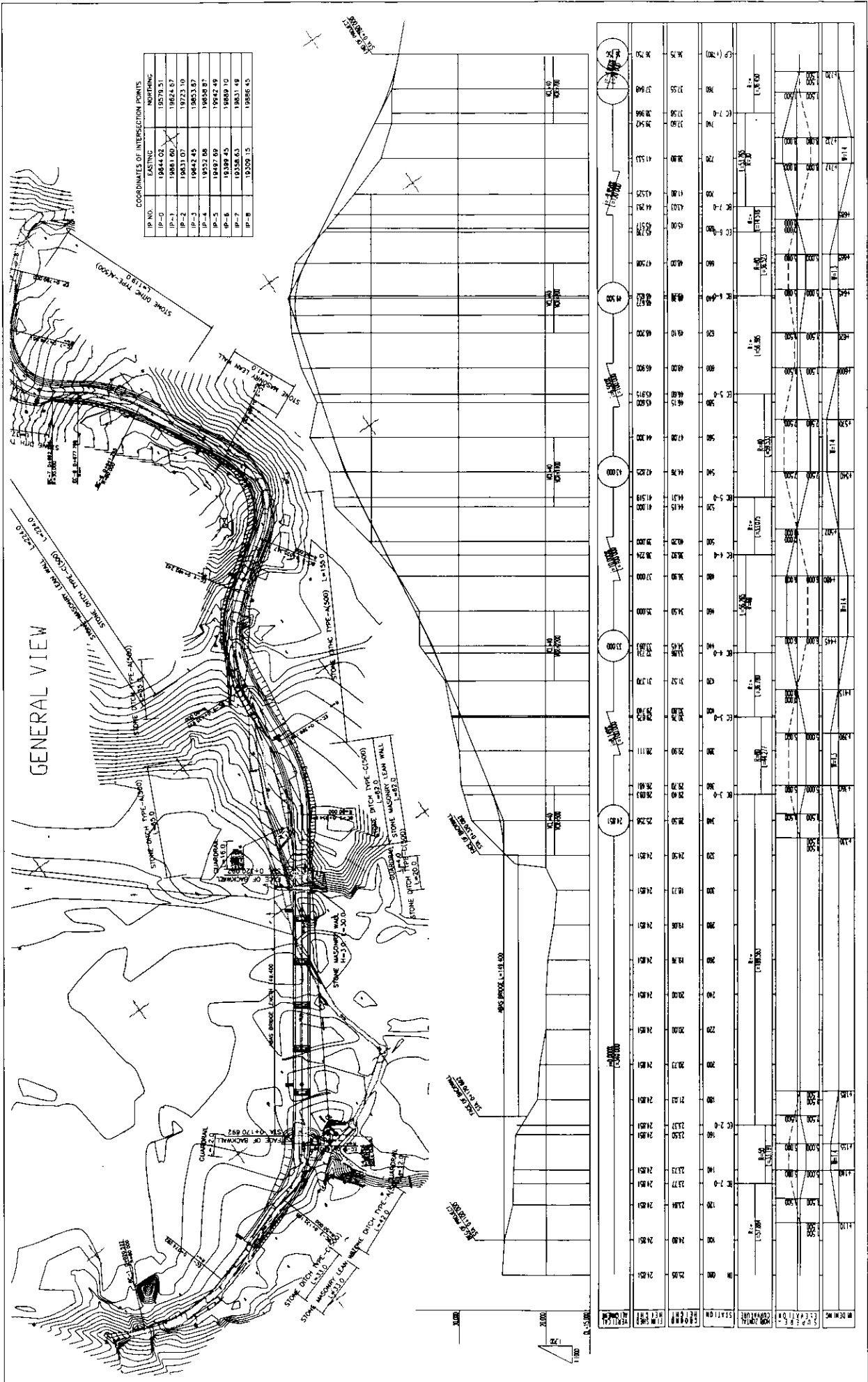
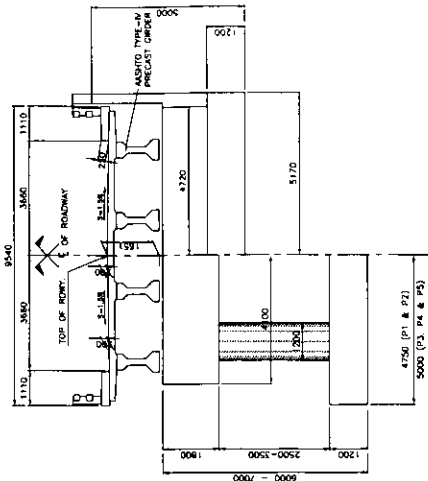
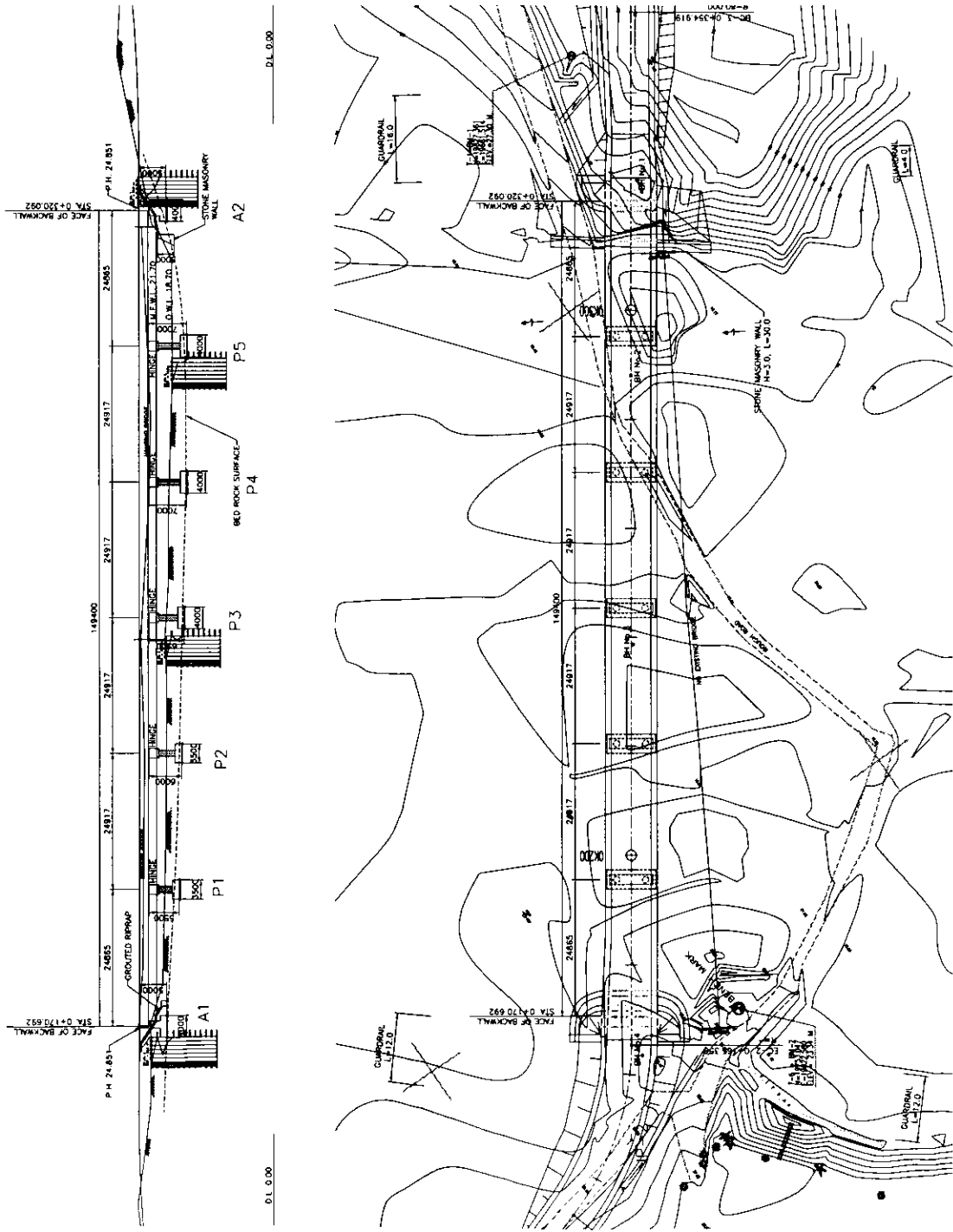


FIGURE 2.2.4.2-7 CA-01-01 ABAS BRIDGE APPROACH ROAD PLAN & PROFILE

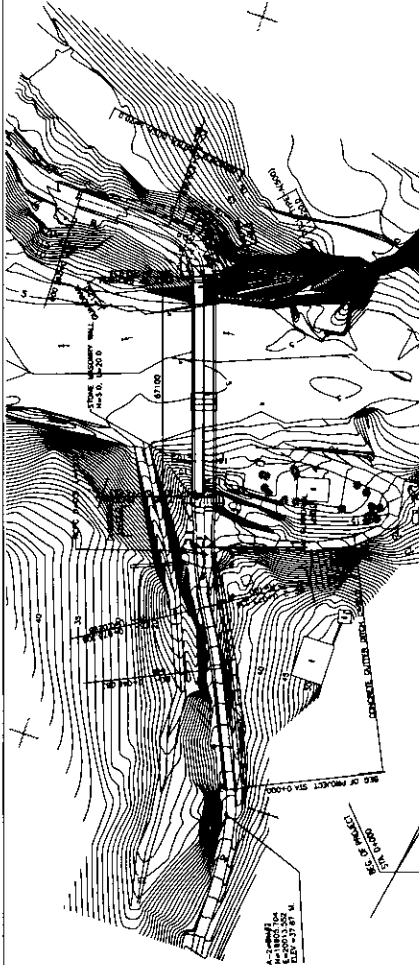
GENERAL VIEW



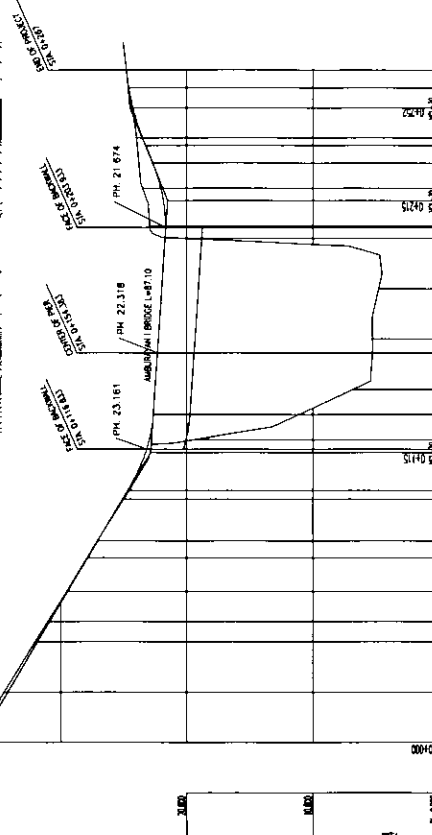
P1 - P5 A1 , A2

FIGURE 2.2.4.2-8 CA-01-01 ABAS BRIDGE GENERAL VIEW

GENERAL VIEW



IP NO.	EASTING	NORTHING
B.P.	20001.3 605	19894.503
IP-01	20002.6 835	19892.748
IP-02	20005.1 615	19818.552
IP-03	20009.4 032	19880.983
IP-04	20014.6 042	19881.198



STATION	ELEVATION	VERTICAL CURVE DATA	GRADE (%)	VERTICAL CLEARANCE
26.00	26.50		0.00	
26.25	26.25		0.00	
26.50	26.00		0.00	
26.75	25.75		0.00	
27.00	25.50		0.00	
27.25	25.25		0.00	
27.50	25.00		0.00	
27.75	24.75		0.00	
28.00	24.50		0.00	
28.25	24.25		0.00	
28.50	24.00		0.00	
28.75	23.75		0.00	
29.00	23.50		0.00	
29.25	23.25		0.00	
29.50	23.00		0.00	
29.75	22.75		0.00	
30.00	22.50		0.00	
30.25	22.25		0.00	
30.50	22.00		0.00	
30.75	21.75		0.00	
31.00	21.50		0.00	
31.25	21.25		0.00	
31.50	21.00		0.00	
31.75	20.75		0.00	
32.00	20.50		0.00	
32.25	20.25		0.00	
32.50	20.00		0.00	
32.75	19.75		0.00	
33.00	19.50		0.00	
33.25	19.25		0.00	
33.50	19.00		0.00	
33.75	18.75		0.00	
34.00	18.50		0.00	
34.25	18.25		0.00	
34.50	18.00		0.00	
34.75	17.75		0.00	
35.00	17.50		0.00	
35.25	17.25		0.00	
35.50	17.00		0.00	
35.75	16.75		0.00	
36.00	16.50		0.00	
36.25	16.25		0.00	
36.50	16.00		0.00	
36.75	15.75		0.00	
37.00	15.50		0.00	
37.25	15.25		0.00	
37.50	15.00		0.00	
37.75	14.75		0.00	
38.00	14.50		0.00	
38.25	14.25		0.00	
38.50	14.00		0.00	
38.75	13.75		0.00	
39.00	13.50		0.00	
39.25	13.25		0.00	
39.50	13.00		0.00	
39.75	12.75		0.00	
40.00	12.50		0.00	
40.25	12.25		0.00	
40.50	12.00		0.00	
40.75	11.75		0.00	
41.00	11.50		0.00	
41.25	11.25		0.00	
41.50	11.00		0.00	
41.75	10.75		0.00	
42.00	10.50		0.00	
42.25	10.25		0.00	
42.50	10.00		0.00	
42.75	9.75		0.00	
43.00	9.50		0.00	
43.25	9.25		0.00	
43.50	9.00		0.00	
43.75	8.75		0.00	
44.00	8.50		0.00	
44.25	8.25		0.00	
44.50	8.00		0.00	
44.75	7.75		0.00	
45.00	7.50		0.00	
45.25	7.25		0.00	
45.50	7.00		0.00	
45.75	6.75		0.00	
46.00	6.50		0.00	
46.25	6.25		0.00	
46.50	6.00		0.00	
46.75	5.75		0.00	
47.00	5.50		0.00	
47.25	5.25		0.00	
47.50	5.00		0.00	
47.75	4.75		0.00	
48.00	4.50		0.00	
48.25	4.25		0.00	
48.50	4.00		0.00	
48.75	3.75		0.00	
49.00	3.50		0.00	
49.25	3.25		0.00	
49.50	3.00		0.00	
49.75	2.75		0.00	
50.00	2.50		0.00	
50.25	2.25		0.00	
50.50	2.00		0.00	
50.75	1.75		0.00	
51.00	1.50		0.00	
51.25	1.25		0.00	
51.50	1.00		0.00	
51.75	0.75		0.00	
52.00	0.50		0.00	
52.25	0.25		0.00	
52.50	0.00		0.00	
52.75	-0.25		0.00	
53.00	-0.50		0.00	
53.25	-0.75		0.00	
53.50	-1.00		0.00	
53.75	-1.25		0.00	
54.00	-1.50		0.00	
54.25	-1.75		0.00	
54.50	-2.00		0.00	
54.75	-2.25		0.00	
55.00	-2.50		0.00	
55.25	-2.75		0.00	
55.50	-3.00		0.00	
55.75	-3.25		0.00	
56.00	-3.50		0.00	
56.25	-3.75		0.00	
56.50	-4.00		0.00	
56.75	-4.25		0.00	
57.00	-4.50		0.00	
57.25	-4.75		0.00	
57.50	-5.00		0.00	
57.75	-5.25		0.00	
58.00	-5.50		0.00	
58.25	-5.75		0.00	
58.50	-6.00		0.00	
58.75	-6.25		0.00	
59.00	-6.50		0.00	
59.25	-6.75		0.00	
59.50	-7.00		0.00	
59.75	-7.25		0.00	
60.00	-7.50		0.00	
60.25	-7.75		0.00	
60.50	-8.00		0.00	
60.75	-8.25		0.00	
61.00	-8.50		0.00	
61.25	-8.75		0.00	
61.50	-9.00		0.00	
61.75	-9.25		0.00	
62.00	-9.50		0.00	
62.25	-9.75		0.00	
62.50	-10.00		0.00	
62.75	-10.25		0.00	
63.00	-10.50		0.00	
63.25	-10.75		0.00	
63.50	-11.00		0.00	
63.75	-11.25		0.00	
64.00	-11.50		0.00	
64.25	-11.75		0.00	
64.50	-12.00		0.00	
64.75	-12.25		0.00	
65.00	-12.50		0.00	
65.25	-12.75		0.00	
65.50	-13.00		0.00	
65.75	-13.25		0.00	
66.00	-13.50		0.00	
66.25	-13.75		0.00	
66.50	-14.00		0.00	
66.75	-14.25		0.00	
67.00	-14.50		0.00	
67.25	-14.75		0.00	
67.50	-15.00		0.00	
67.75	-15.25		0.00	
68.00	-15.50		0.00	
68.25	-15.75		0.00	
68.50	-16.00		0.00	
68.75	-16.25		0.00	
69.00	-16.50		0.00	
69.25	-16.75		0.00	
69.50	-17.00		0.00	
69.75	-17.25		0.00	
70.00	-17.50		0.00	

FIGURE 2.2.4.2-9 CA-02-01 AMBURAYAN I BRIDGE APPROACH ROAD PLAN & PROFILE

GENERAL VIEW

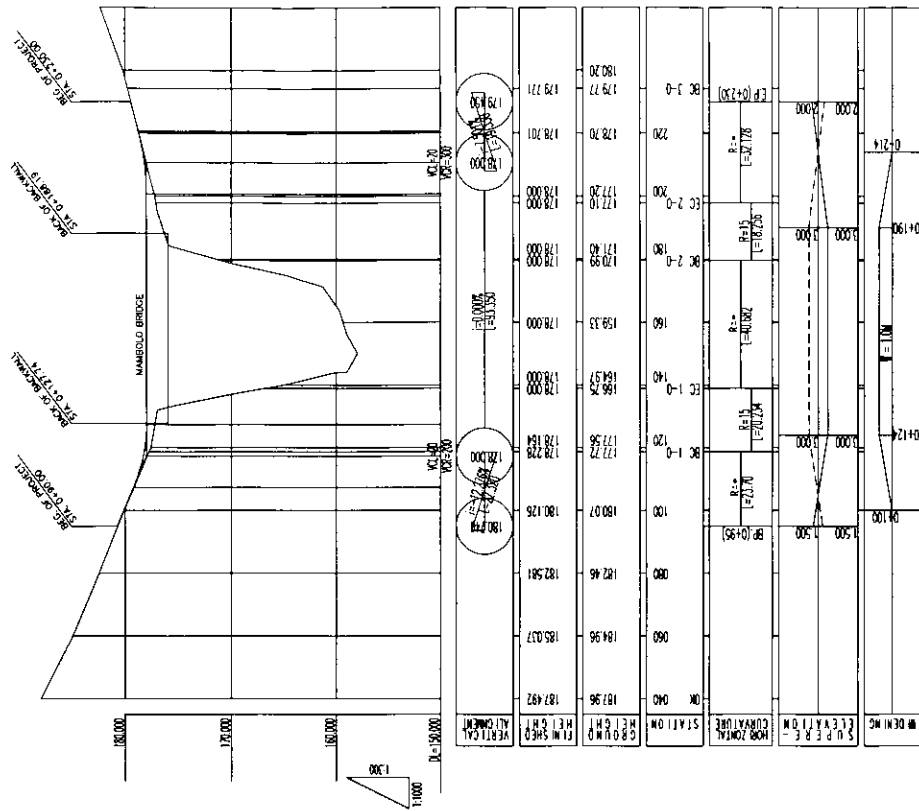
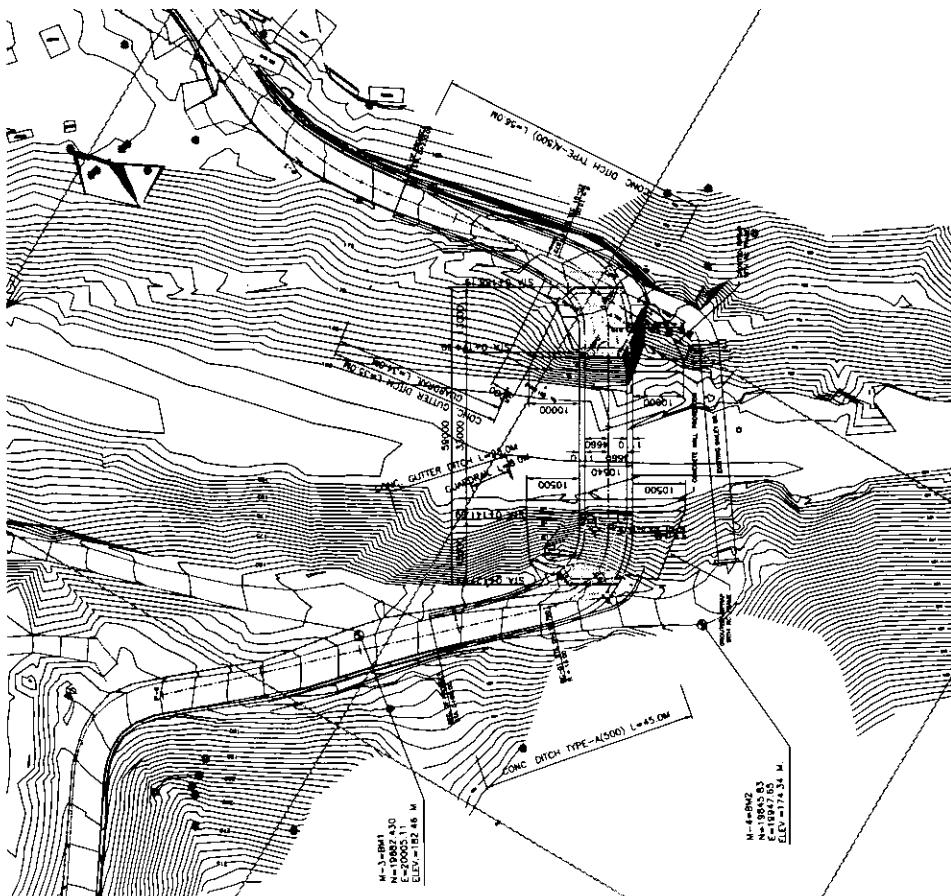


FIGURE 2.2.4.2-11 CA-02-08 MAMBO BRIDGE APPROACH ROAD PLAN & PROFILE

GENERAL VIEW

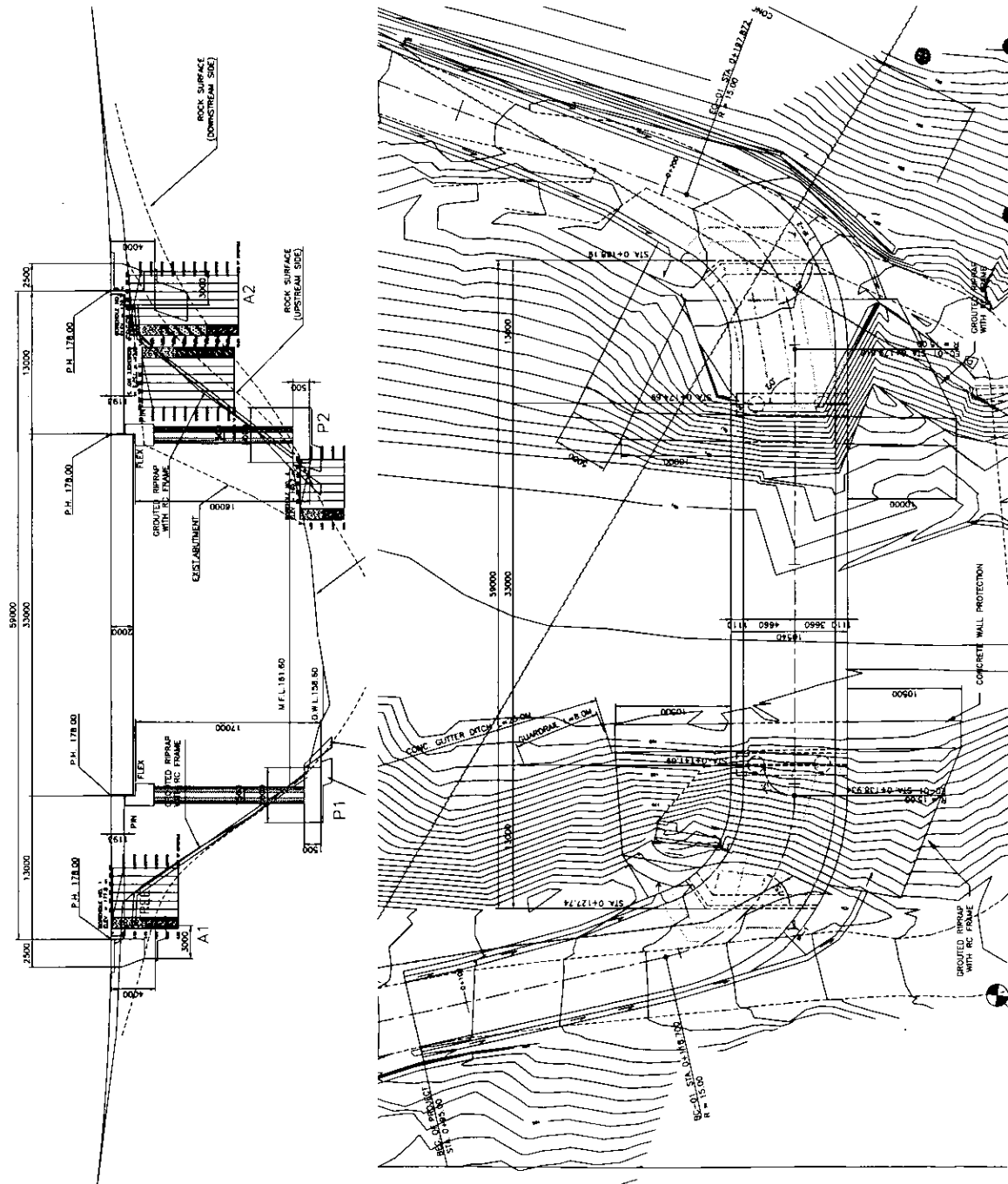
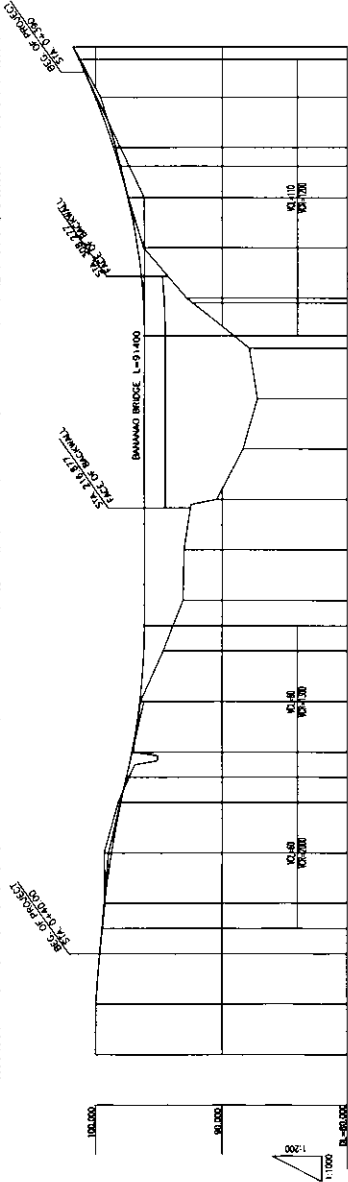
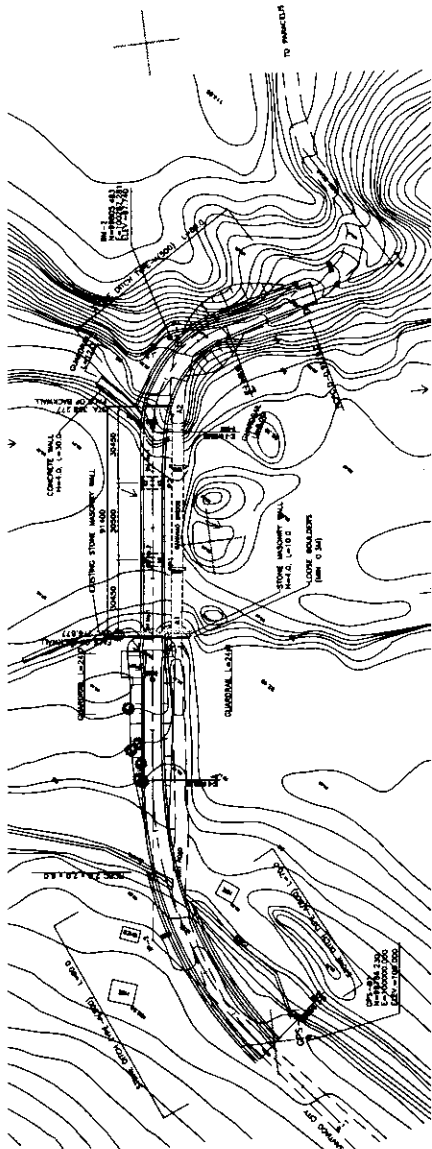


FIGURE 2.2.4.2-12 CA-02-08 MAMOLO BRIDGE GENERAL VIEW

GENERAL VIEW



STATION	FINISHED ELEVATION	GROUND ELEVATION	STATION	FINISHED ELEVATION	GROUND ELEVATION
0+00	100.200	100.200	10+29	100.200	100.200
0+10	100.200	100.200	10+20	100.200	100.200
0+20	100.200	100.200	10+10	100.200	100.200
0+30	100.200	100.200	10+00	100.200	100.200
0+40	100.200	100.200	9+50	100.200	100.200
0+50	100.200	100.200	9+40	100.200	100.200
0+60	100.200	100.200	9+30	100.200	100.200
0+70	100.200	100.200	9+20	100.200	100.200
0+80	100.200	100.200	9+10	100.200	100.200
0+90	100.200	100.200	9+00	100.200	100.200
1+00	100.200	100.200	8+90	100.200	100.200
1+10	100.200	100.200	8+80	100.200	100.200
1+20	100.200	100.200	8+70	100.200	100.200
1+30	100.200	100.200	8+60	100.200	100.200
1+40	100.200	100.200	8+50	100.200	100.200
1+50	100.200	100.200	8+40	100.200	100.200
1+60	100.200	100.200	8+30	100.200	100.200
1+70	100.200	100.200	8+20	100.200	100.200
1+80	100.200	100.200	8+10	100.200	100.200
1+90	100.200	100.200	8+00	100.200	100.200
2+00	100.200	100.200	7+90	100.200	100.200
2+10	100.200	100.200	7+80	100.200	100.200
2+20	100.200	100.200	7+70	100.200	100.200
2+30	100.200	100.200	7+60	100.200	100.200
2+40	100.200	100.200	7+50	100.200	100.200
2+50	100.200	100.200	7+40	100.200	100.200
2+60	100.200	100.200	7+30	100.200	100.200
2+70	100.200	100.200	7+20	100.200	100.200
2+80	100.200	100.200	7+10	100.200	100.200
2+90	100.200	100.200	7+00	100.200	100.200
3+00	100.200	100.200	6+90	100.200	100.200
3+10	100.200	100.200	6+80	100.200	100.200
3+20	100.200	100.200	6+70	100.200	100.200
3+30	100.200	100.200	6+60	100.200	100.200
3+40	100.200	100.200	6+50	100.200	100.200
3+50	100.200	100.200	6+40	100.200	100.200
3+60	100.200	100.200	6+30	100.200	100.200
3+70	100.200	100.200	6+20	100.200	100.200
3+80	100.200	100.200	6+10	100.200	100.200
3+90	100.200	100.200	6+00	100.200	100.200
4+00	100.200	100.200	5+90	100.200	100.200
4+10	100.200	100.200	5+80	100.200	100.200
4+20	100.200	100.200	5+70	100.200	100.200
4+30	100.200	100.200	5+60	100.200	100.200
4+40	100.200	100.200	5+50	100.200	100.200
4+50	100.200	100.200	5+40	100.200	100.200
4+60	100.200	100.200	5+30	100.200	100.200
4+70	100.200	100.200	5+20	100.200	100.200
4+80	100.200	100.200	5+10	100.200	100.200
4+90	100.200	100.200	5+00	100.200	100.200
5+00	100.200	100.200	4+90	100.200	100.200
5+10	100.200	100.200	4+80	100.200	100.200
5+20	100.200	100.200	4+70	100.200	100.200
5+30	100.200	100.200	4+60	100.200	100.200
5+40	100.200	100.200	4+50	100.200	100.200
5+50	100.200	100.200	4+40	100.200	100.200
5+60	100.200	100.200	4+30	100.200	100.200
5+70	100.200	100.200	4+20	100.200	100.200
5+80	100.200	100.200	4+10	100.200	100.200
5+90	100.200	100.200	4+00	100.200	100.200
6+00	100.200	100.200	3+90	100.200	100.200
6+10	100.200	100.200	3+80	100.200	100.200
6+20	100.200	100.200	3+70	100.200	100.200
6+30	100.200	100.200	3+60	100.200	100.200
6+40	100.200	100.200	3+50	100.200	100.200
6+50	100.200	100.200	3+40	100.200	100.200
6+60	100.200	100.200	3+30	100.200	100.200
6+70	100.200	100.200	3+20	100.200	100.200
6+80	100.200	100.200	3+10	100.200	100.200
6+90	100.200	100.200	3+00	100.200	100.200
7+00	100.200	100.200	2+90	100.200	100.200
7+10	100.200	100.200	2+80	100.200	100.200
7+20	100.200	100.200	2+70	100.200	100.200
7+30	100.200	100.200	2+60	100.200	100.200
7+40	100.200	100.200	2+50	100.200	100.200
7+50	100.200	100.200	2+40	100.200	100.200
7+60	100.200	100.200	2+30	100.200	100.200
7+70	100.200	100.200	2+20	100.200	100.200
7+80	100.200	100.200	2+10	100.200	100.200
7+90	100.200	100.200	2+00	100.200	100.200
8+00	100.200	100.200	1+90	100.200	100.200
8+10	100.200	100.200	1+80	100.200	100.200
8+20	100.200	100.200	1+70	100.200	100.200
8+30	100.200	100.200	1+60	100.200	100.200
8+40	100.200	100.200	1+50	100.200	100.200
8+50	100.200	100.200	1+40	100.200	100.200
8+60	100.200	100.200	1+30	100.200	100.200
8+70	100.200	100.200	1+20	100.200	100.200
8+80	100.200	100.200	1+10	100.200	100.200
8+90	100.200	100.200	1+00	100.200	100.200
9+00	100.200	100.200	0+90	100.200	100.200
9+10	100.200	100.200	0+80	100.200	100.200
9+20	100.200	100.200	0+70	100.200	100.200
9+30	100.200	100.200	0+60	100.200	100.200
9+40	100.200	100.200	0+50	100.200	100.200
9+50	100.200	100.200	0+40	100.200	100.200
9+60	100.200	100.200	0+30	100.200	100.200
9+70	100.200	100.200	0+20	100.200	100.200
9+80	100.200	100.200	0+10	100.200	100.200
9+90	100.200	100.200	0+00	100.200	100.200

FIGURE 2.2.4.2-13 CA-05-03 BANANA BRIDGE APPROACH ROAD PLAN & PROFILE

GENERAL VIEW

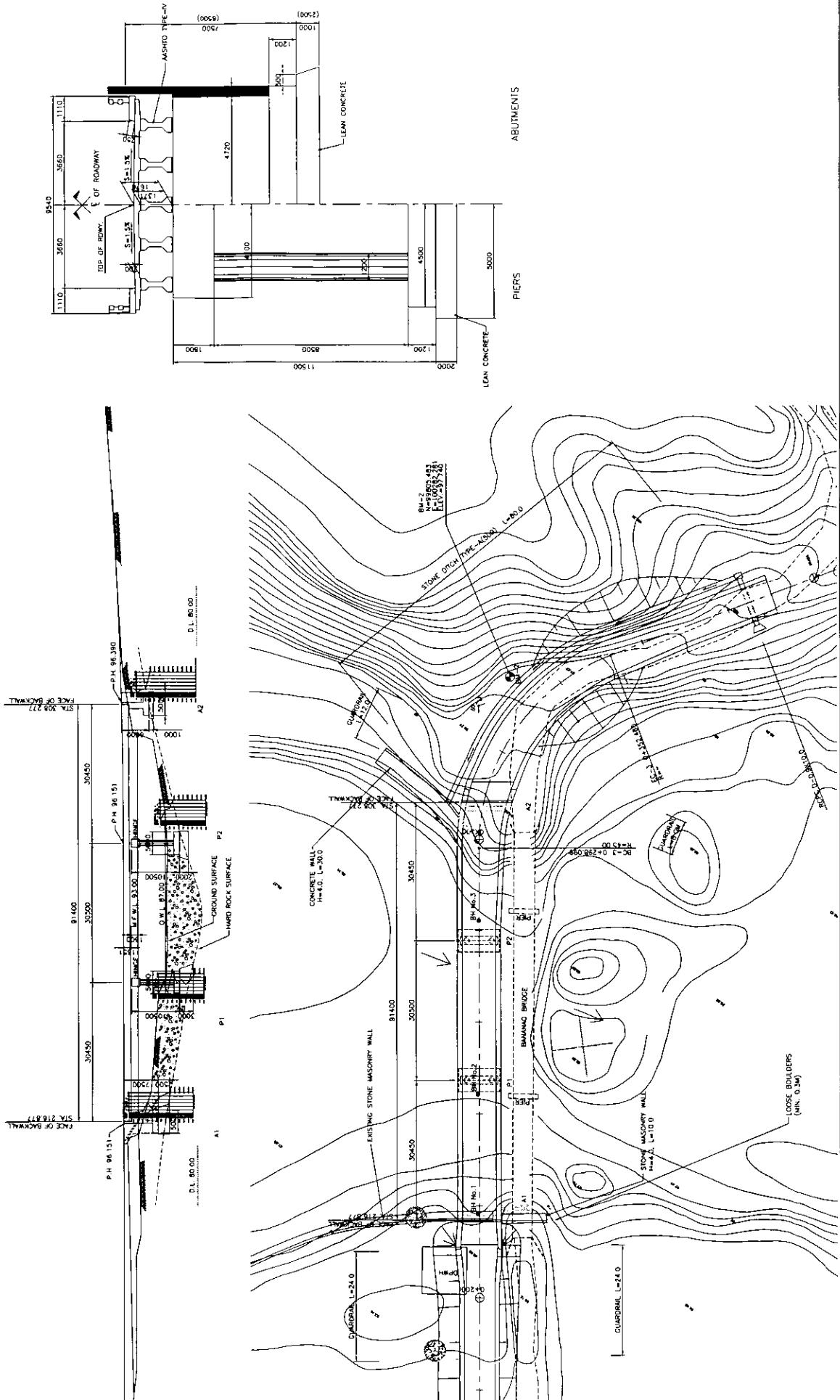


FIGURE 2.2.4.2-14 CA-05-03 BANANAO BRIDGE GENERAL VIEW

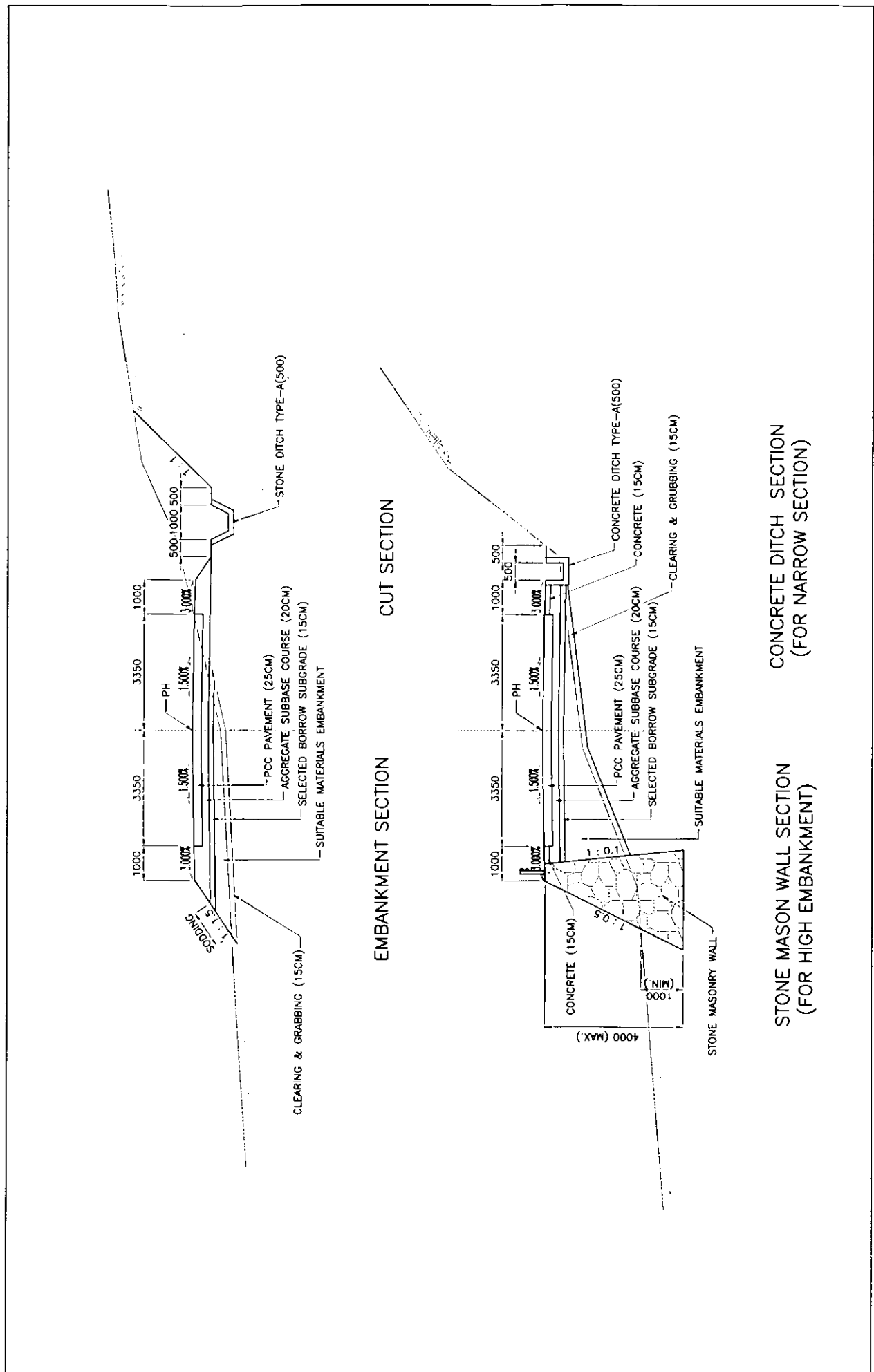


FIGURE 2.2.4.2-15 TYPICAL CROSS SECTIONS OF APPROACH ROADS

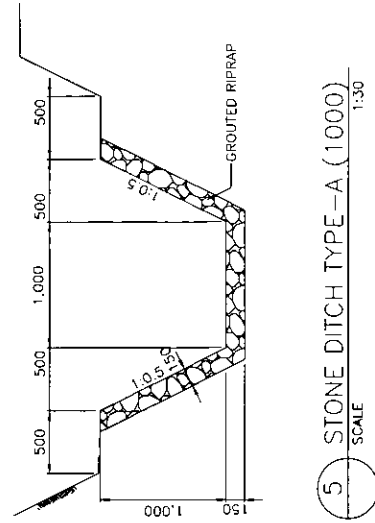
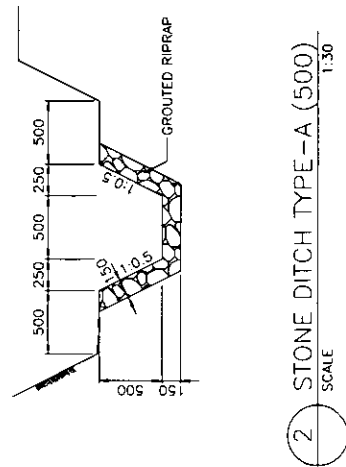
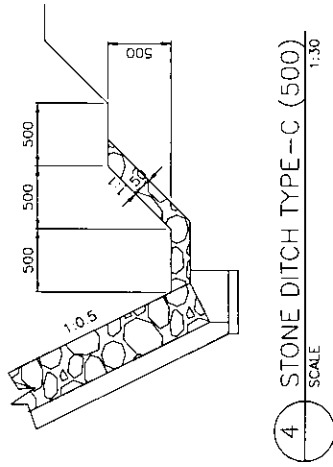
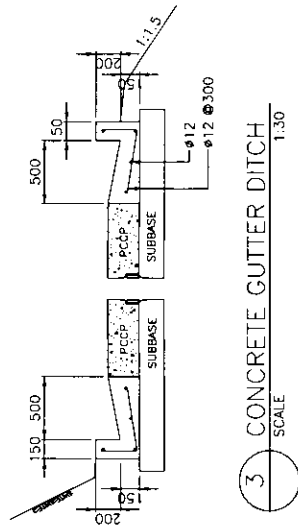
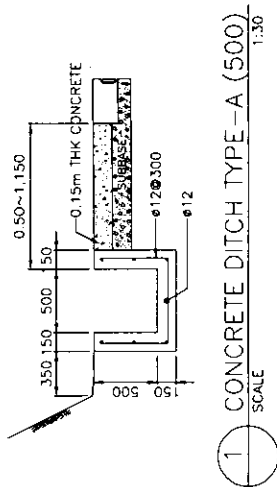


FIGURE 2.2.4.2-16 STANDARD STRUCTURES (DITCHES)

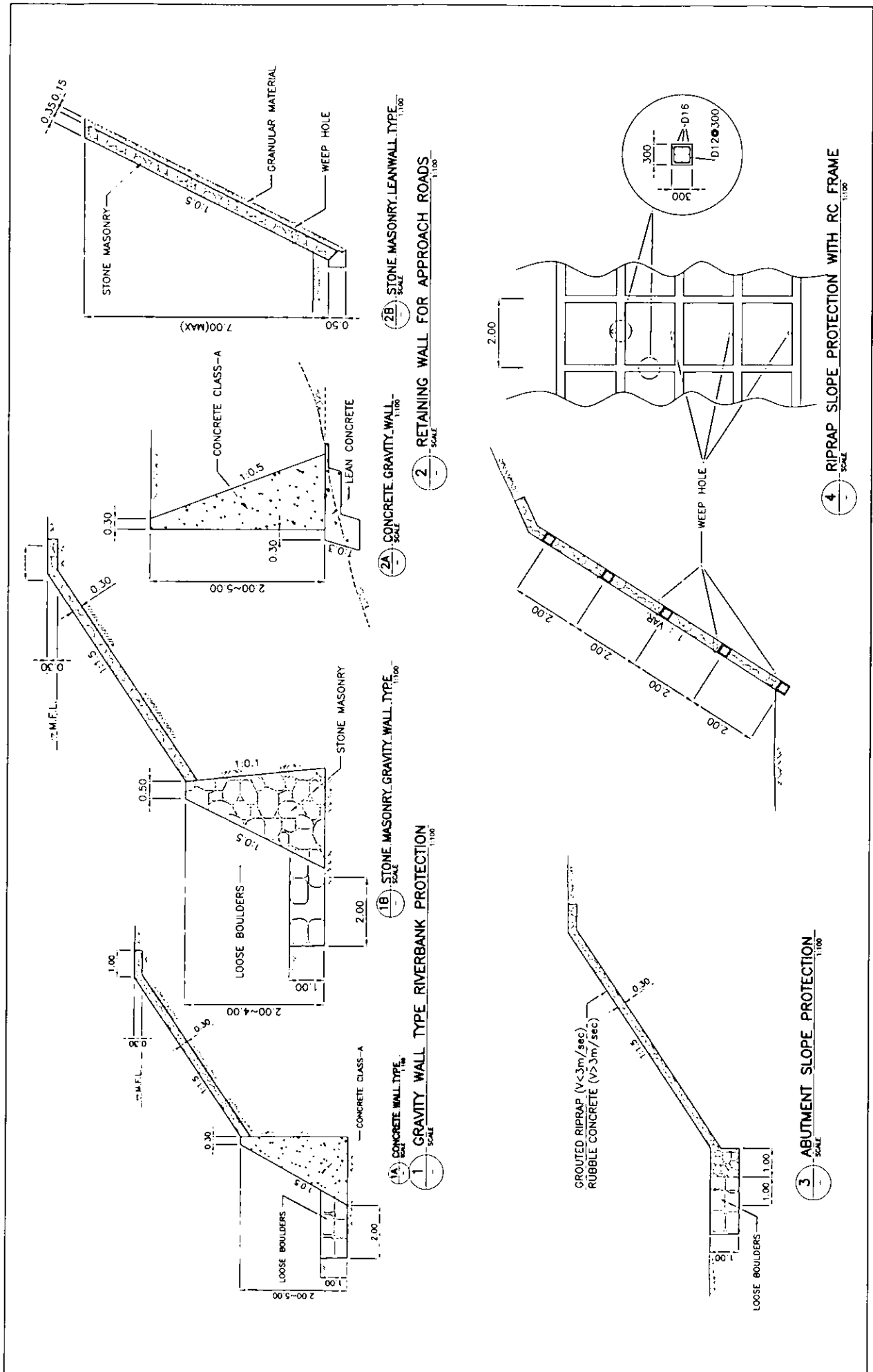


FIGURE 2.2.4.2-17 STANDARD STRUCTURES (REVETMENTS)

2.2.5 Implementation Plan

2.2.5.1 Implementation Policy

The following are the basic conditions for implementing this project:

- The project, if approved, will be implemented in accordance with the provisions of Japan's Grant Aid Program after the signing of the Exchange of Notes between the Governments of Japan and the Republic of the Philippines.
- The Japan's Grant Aid will cover the procurement of steel materials for superstructure of 33 Group 1 bridges and the total construction of 7 Group 2 bridges, while the Government of the Philippines will construct the Group 1 bridges using the materials to be procured.
- The responsible and implementing agency of the project is the Department of Public Works and Highways (DPWH).
- The detailed design, tender and construction supervision of the undertakings of the Government of Japan for the project will be undertaken by a Japanese consulting firm in accordance with a contract between the DPWH and the consultant.
- The fabrication and marine transportation of steel materials for superstructure of Group 1 bridges will be undertaken by the successful Japanese tenderer in awarding the contract with the DPWH.
- The construction of Group 2 bridges will be undertaken by the successful Japanese tenderer in awarding the contract with the DPWH.

The implementation arrangement of the DPWH for construction of Group 1 bridges is as follows:

- The Planning Service will provide the overall project management.
- The Regional Offices will undertake the detailed design of substructures, approach roads and related works and the Bureau of Design will review the design.
- The construction will be undertaken by local contractors. The Regional Offices will undertake the tender and construction supervision.

The basic concepts in the implementation plan of Group 2 bridges are as follows:

- The construction will be undertaken by the Japanese contractor under its direct management, employing personnel and leasing available equipment from local subcontractors.
- Materials, equipment and labors will be procured in the Philippines as far as available. Items which are not locally available will be procured from Japan which offer at the most economical costs on condition that the quality and supplying capacity meet the requirements.
- The construction method and schedule will be planned in due consideration of local conditions of climate, topography, geology and so on.
- Organizations for construction management by the contractor and construction supervision by the consultant will be planned properly to meet the requirements for construction management and supervision.
- Where there is an existing bridge passable for vehicles, at least one lane shall be opened to traffic during construction and necessary measures for safety shall be taken. Where there is no bridge for vehicles but pedestrian bridge or river fording way, passage means of the same level as the existing shall be secured during construction.
- Full attention shall be paid to the environmental preservation, minimizing water pollution due to construction work, properly disposing of excavated soil and so on.

2.2.5.2 Implementation Conditions

1) Group 1 Bridges

Transportation and Storage of Steel Materials for Superstructure

The materials will be transported to Manila International Port. After unloading and customs clearance, the materials will be handed over to the Government of the Philippines. Then, the materials will be transported to the DPWH Regional Offices and temporarily stored therein until they are delivered to individual construction sites according to the construction schedule.

Requirements for storage and transportation of the materials are as follows:

- In storage, the materials should be placed on the supports at least 15cm above the ground and covered with sheets.
- In transportation to the sites, roads and bridges along the transportation route should be improved as necessary for the trucks to pass.

Detour Plan during Construction

Temporary detours are needed to secure the traffic during construction as shown in Table 2.2.5.2-1.

TABLE 2.2.5.2-1 DETOUR PLAN DURING CONSTRUCTION OF GROUP 1 BRIDGES

Situation	Detour Plan	Number of Corresponding Bridges	Corresponding Bridges		
New bridge location different from the existing bridge	No detour is needed since the existing bridge can be used.	13	01-03-03, 02-02-04, CA-01-03, CA-04-02, CA-05-05	01-04-06, 02-03-03, CA-01-05, CA-04-04,	02-02-03, 02-04-02, CA-03-02, CA-04-12,
New bridge location same as the existing bridge	Provision of ford crossing for detour	10	01-01-01, 02-03-06, 02-04-10, CA-05-06	01-04-02, 02-04-01, CA-04-08	02-01-11, 02-04-06, CA-05-02,
	Provision of spillway for detour	4	01-02-04, CA-04-01	02-03-04,	CA-01-06,
	Provision of bailey bridge for detour	4	01-02-01, CA-02-07	01-04-05,	02-02-07,
	Provision of wooden bridge for detour	2	02-01-10	02-01-12	

Cofferdam Closure

Construction of substructure and revetment will be done at the time when the water depth is low. The sand bag cofferdam will be used for closure.

Girder Erection

The erection method by truck crane will be applied for girder erection. Where water depth is somewhat high, a platform will be constructed with wood such as coconut to provide a working stage for truck cranes.

2) Group 2 Bridges

Detour Plan during Construction

Where there is the existing bridge and the new bridge is constructed at the same location as the existing bridge, the temporary detour is planned to secure the traffic during construction.

Cofferdam Closure

Construction of substructure and revetment will be done at the time when the water depth is low. Where the substructure is constructed in the deep water, the sheet pile cofferdam will be used for closure.

Girder Erection

The erection method by truck crane, with or without bent, will be applied for girder erection.

Detour plan, cofferdam closure plan and girder erection plan for individual bridges are shown in Table 2.2.5.2-2.

TABLE 2.2.5.2-2 CONSTRUCTION PLAN OF GROUP 2 BRIDGES

Bridge Number	Bridge Name	Bridge Type	Bridge Length (m)	Detour Plan during Construction	Cofferdam Closure Method	Girder Erection Method
01-04-04	Macayug	PCDG	65.4	Unnecessary ¹⁾	Sheet Pile	Crane erection without bent
02-01-02	Capissayan	PCDG	121.4	Unnecessary ¹⁾	Open Cut, Sheet Pile	Crane erection without bent
02-02-01	Abuan	PCDG	195.4	Unnecessary ¹⁾	Open Cut, Sheet Pile	Crane erection without bent
CA-01-01	Abas	PCDG	149.4	Provision of ²⁾ temporary pedestrian bridge	Open Cut, Sheet Pile	Crane erection without bent
CA-02-01	Amburayan I	Welding Plate Girder	87.1	Provision of temporary bridge for vehicles	Open Cut, Sheet Pile	Crane erection with bents
CA-02-08	Mambolo	PCDG + Welding Plate Girder	58.4	Unnecessary ³⁾	Open Cut	Crane erection with bents
CA-05-03	Bananao	PCDG	91.4	Unnecessary ³⁾	Sheet Pile	Crane erection without bent

Note: 1) Existing bridge is none or washed away.
 2) Existing bridge is for pedestrians only.
 3) New bridge is constructed at the different location from the existing bridges.

2.2.5.3 Scope of Works

The undertakings of both governments, Japan and the Philippines are as listed in Table 2.2.5.3-1.

TABLE 2.2.5.3-1 UNDERTAKINGS OF BOTH GOVERNMENTS

Group	Item	Undertaken by		Remarks	
		Japan	Philippines		
Group 1 Bridges	Detailed Design	Superstructure (Girder)	○		Japanese side prepares standard design and referring thereto, Phil. side prepares detailed design.
		Superstructure (Slab)	○	○	
		Substructure		○	
		Access Road		○	
		Related Works		○	
	Fabrication and Transportation of Steel Materials for Superstructure	Fabrication	○		
		Marine Transportation	○		
		Unloading	○		
		Tax Exemption and Customs Clearance		○	
		Inland Transportation		○	
	Preparatory Works	Securing of Lands for Construction		○	Right-of-way, Site Office, Storage Yard, Plant Yard, Working Area, etc.
		Relocation/Removal of Obstacles		○	House, Power Pole, Telephone Cable, Water Pipe, etc.
		Removal of Existing Bridge		○	
		Other Preparatory Works than Above		○	
	Construction	Substructure Construction		○	
		Girder Erection		○	
		Deck Slab Construction		○	
		Access Road Construction		○	
		Related Works Construction		○	Revetment, Foot Protection
	Maintenance			○	
Group 2 Bridges	Detailed Design	Superstructure	○		
		Substructure	○		
		Access Road	○		
		Related Works	○		Revetment, Foot Protection
	Procurement and Transportation of Materials/Equipment	Procurement/Transportation	○		
		Tax Exemption and Customs Clearance		○	
		Improvement of Transportation Route		○	
	Preparatory Works	Securing of Lands for Construction		○	Right-of-way, Site Office, Storage Yard, Plant Yard, Working Area, etc.
		Relocation/Removal of Obstacles		○	House, Power Pole, Telephone Cable, Water Pipe, etc.
		Removal of Existing Bridge (In case new bridge location is the same as existing bridge)	○		
		Other Preparatory Works than Above	○		
	Construction	Substructure Construction	○		
		Superstructure Construction	○		
		Access Road Construction	○		
		Related Works Construction	○		Revetment, Foot Protection
Removal of Existing Bridge (In case new bridge location is different from existing bridge)			○		
Maintenance			○		

2.2.5.4 Consultant Services Plan

A Japanese consulting firm will enter into a contract with the DPWH and in accordance therewith, provide the following services:

1) Group 1 Bridges

Detailed Design

- Detailed design of steel materials for superstructure and standard design of deck slabs
- Preparation of specifications for fabrication of steel materials for superstructure
- Preparation of procurement plan of steel materials for superstructure and cost estimate
- Preparation of tender documents

Assistance in Tendering

- Tender publication
- Tendering
- Tender evaluation
- Contract facilitation

Construction Supervision

The following works will be undertaken on a spot basis:

- Review and approval of fabrication plan and specifications prepared by the fabricator
- Inspection of quantities prior to shipment
- Handover

2) Group 2 Bridges

Detailed Design

- Supplemental site surveys
- Detailed design of bridges, access roads and related works
- Preparation of specifications
- Preparation of construction plan and cost estimate
- Preparation of tender documents

Assistance in Tendering

- Tender publication
- Pre-qualification of interested tenderers
- Tendering
- Tender evaluation
- Contract facilitation

Construction Supervision

The following works will be undertaken, assigning a resident supervisor on a stationary basis and bridge specialists on a visiting basis:

- Inspection and approval of site surveys
- Inspection and approval of construction plan
- Quality control
- Progress control
- Measurement of work
- Inspection of safety aspects
- Final inspection and turnover

2.5.5.5 Procurement Plan

1) Group 1 Bridges

The steel materials for superstructure will be procured in Japan.

2) Group 2 Bridges

Basic considerations in materials and equipment procurement plan are as follows:

- Locally available materials are used as far as their quality, price and quantity are acceptable.
- Equipment is leased from local contractors and lease companies as far as available.
- Materials and equipment which are not locally available are procured from Japan which offer at the most economical costs on condition that the quality and supplying capacity meet the requirements.

The procurement plans of major materials and equipment are shown in Table 2.2.5.5-1 and 2.2.5.5-2 respectively.

TABLE 2.2.5.5-1 PROCUREMENT PLAN OF MAJOR MATERIALS

Item	Procured Form			Remarks
	Philippines	Japan	Third Country	
<u>Construction Materials</u>				
Crushed stone	○			Near site
Cement	○			Near site
Sand	○			Near site
Aggregate	○			Near site
Reinforcing bar: D6~D25	○			Near site
Admixture (for concrete)	○			Manila (imported)
Threaded deformed bar: D32	○			Manila (imported)
Mechanical joint: D32	○			Manila (imported)
PC Materials	○			Manila (imported)
H steel pile: H-414 x 405		○		Japan
Built-up plate girder		○		Japan
Bearing		○		Japan
Painting	○			Manila
Non-shrink motor	○			Manila (imported)
Expansion joint (for steel girder)		○		Japan
Expansion joint (for concrete girder)	○			Manila
Turf	○			Manila
Boulder	○			Near site
PV pipe: D = 50~300	○			Near site
RC pipe: D = 900	○			Manila
Guardrails	○			Manila
<u>Temporary Work Materials</u>				
RC pipe: D = 600	○			Manila
Timbers	○			Near site
Plywood: Non water proof	○			Near site
Plywood: Water proof	○			Manila
Nails	○			Near site
Log	○			Near site
Sheet piles	○			Manila (imported)
H-beams	○			Manila (imported)
Erection materials and tools		○		Japan
Sand bags	○			Near site
Welding electrode	○			Manila
Fuel	○			Near site
Oxyson, acetylene	○			Near site
Gas cutting machine	○			Near site

TABLE 2.2.5.5-2 PROCUREMENT PLAN OF MAJOR EQUIPMENT

Item	Type	Procured Form			Remarks
		Philippines	Japan	Third Country	
Back hoe	0.6 m ³	○			Manila
Bulldozer	15 t	○			Manila
Motor grader	3.1 m	○			Manila
Road roller	8 t	○			Manila
Tier roller	8-20 t	○			Manila
Concrete mixer	0.1 m ³	○			Near site
Concrete mixer	0.5 m ³	○			Manila
Concrete plant	Weight mixing	○			Manila
Water tanker	4.0 kλ	○			Manila
Dump truck	10 t	○			Manila
Truck crane	11 t	○			Manila
Crawler crane	50 t	○			Manila
Crawler crane	180 t	○			Manila
Diesel hammer	2.5 t	○			Manila
Vibro hammer	40 KW	○			Manila
Water jet			○		Japan
Generator	200 KVA	○			Manila
Generator	45 KVA	○			Manila
Generator	15 KVA	○			Near site
Water pump	150 mm	○			Manila
Water pump	100 mm	○			Near site
Compressor	5 m ³	○			Near site
Truck	2 t	○			Near site
Truck	4 t	○			Manila

2.2.5.6 Quality Control Plan

The quality control plans for concrete works and for embankment and subbase course works are shown in Tables 2.2.5.6-1 and 2.2.5.6-2 respectively.

TABLE 2.2.5.6-1 QUALITY CONTROL PLAN FOR CONCRETE WORKS

	Item	Specification	Frequency
Cement	Physical property test	AASTHO M85	One test before trial mix. One test every 10,000 bags or when the material brand is changed.
Fine Aggregate	Physical property test	AASTHO M6	One test before trial mix. One test every 1,500 m ³ or when the quarry is changed.
	Sieve analysis	AASTHO T27	Once a month
Coarse Aggregate	Physical property test	AASTHO M80	One test before trial mix. One test every 1,500 m ³ or when the quarry is changed.
	Sieve analysis	AASTHO T27	Once a month
Water	Quality test	AASTHO T26	Before trial mix.
Concrete	Slump test	AASTHO T119	Twice a day
	Air content test	AASHTO T121	Twice a day
	Compressive strength test	AASTHO T22	6 specimens for every concrete placement or every 75 m ³ when concrete volume in one placement is big (3 specimens each for 7 days strength test and 28 days strength test).
	Temperature	-	Twice a day

TABLE 2.2.5.6-2 QUALITY CONTROL PLAN FOR EMBANKMENT AND SUBBASE COURSE WORKS

	Item	Specification	Frequency
Embankment work	Material test	AASHTO T11, T89, T90	One test before embankment. One test every 1,500 m ³ or when the quarry is changed.
	Density test	AASHTO T191, T205, T224	Every 500 m ²
Subbase course work	Sieve analysis	AASHTO T89, T90	One test before placement. One test every 1,500 m ³ or when the quarry is changed.
	CBR test	AASHTO T193	One test before placement. One test every 1,500 m ³ or when the quarry is changed.
	Dry density test	AASHTO T180	One test before placement. Two tests every 1,500 m ³ or when the quarry is changed.
	Field density test	AASHTO T191	Every 500 m ²

2.2.5.7 Implementation Schedule

The project is planned to be implemented in two phases as stated in 2.2.1.2 11). The implementation schedule for undertakings of Japanese Government is shown in Table 2.2.5.7-1.

TABLE 2.2.5.7-1 IMPLEMENTATION SCHEDULE

Phase	Work Item	Month																											
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17											
Phase-1	Group 1 Bridges	Detailed Design	 (Work in the Philippines) (Work in Japan) (Finalization in the Philippines) (Total 2.5 months)																										
		Procurement	 (Fabrication)						 (Marine Transportation) (Handover)		(Total 7.5 months)																		
	Detailed Design	 (Work in the Philippines) (Work in Japan) (Finalization in the Philippines) (Total 3.0 months)																											
Phase-2	Group 2 Bridges	Construction	 Preparation Work Substructure Superstructure Revetment Approach Road Demobilization (Total 16.5 months)																										

2.3 OBLIGATIONS OF THE GOVERNMENT OF THE PHILIPPINES

The following measures should be taken by the Government of the Philippines on condition that the grant aid by the Government of Japan is extended to the project:

1) Group 1 Bridges

- To provide data and information necessary for the project.
- To prepare the detailed design of slabs, substructures, access roads and related works including revetment and foot protection.
- To make passable all roads and bridges leading to the project sites before the commencement of inland transportation of materials and equipment.
- To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in the Philippines and inland transportation of the steel materials for superstructure to be procured under the grant aid.
- To secure the land necessary for the execution of the project, such as the right-of-way, site offices, storage yards, plant yards, working areas and others.
- To relocate/remove existing obstacles such as houses, power poles, telephone cables, water pipes and others.
- To remove the existing bridges.
- To construct the bridges including access roads and related works using the steel materials to be procured under the grant aid, within two years from the date of handing-over the materials.
- To bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement, namely the advising commission of the “Authorization to Pay” and payment commission.
- To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the Philippines with respect to the supply of the products and services under the verified contract.
- To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the Philippines and stay therein for the performance of their work.
- To provide necessary permissions, licenses and other authorizations for implementing the project, if necessary.

- To take all possible measures to secure the safety of the concerned people during the implementation of the project.
- To coordinate and solve any issues related to the project which may be raised from third parties or inhabitants in the project area during implementation of the project.
- To maintain and use properly and effectively the facilities constructed under the project.
- To bear all the expenses, other than those covered by the grant aid, necessary for the project.

2) Group 2 Bridges

- To provide data and information necessary for the project.
- To make passable all roads and bridges leading to the project sites before the commencement of inland transportation of materials and equipment.
- To secure the land necessary for the execution of the project, such as the right-of-way, site offices, storage yards, plant yards, working areas and others.
- To relocate/remove existing obstacles such as houses, power poles, telephone cables, water pipes and others.
- To remove the existing bridges in case the new bridge is constructed at a different location.
- To bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement, namely the advising commission of the “Authorization to Pay” and payment commission.
- To ensure tax exemption and customs clearance of the materials/equipment for the project at the port of disembarkation in the Philippines.
- To bear the value added tax (VAT) imposed on Japanese nationals with respect to the payment carried out for and the income accruing from the supply of the products and services under verified contract.
- To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the Philippines and stay therein for the performance of their work.
- To provide necessary permissions, licenses and other authorizations for implementing the project, if necessary.

- To take all possible measures to secure the safety of the concerned people during the implementation of the project.
- To coordinate and solve any issues related to the project which may be raised from third parties or inhabitants in the project area during implementation of the project.
- To maintain and use properly and effectively the facilities constructed under the project.
- To bear all the expenses, other than those covered by the grant aid, necessary for the project.

Project Cost Estimation

The project cost born by the Government of the Philippines is estimated as follows (refer to Appendix 5):

Group 1 Bridges	:	₱ 379,500,000
Group 2 Bridges	:	₱ 45,970,000
Total		₱ 425,470,000

2.4 PROJECT OPERATION PLAN

1) Bridges on National Roads

Maintenance of the bridges to be constructed under this project will be carried out by the Department of Public Works and Highways (DPWH). The maintenance organization is as follows:

- Bureau of Maintenance provides the policy directions for maintenance program and overall planning and technical guidance.
- Equipment for maintenance work is managed by the Regional Equipment Services and the Area Equipment Services under the technical guidance of the Bureau of Equipment.
- Under the supervision of the Regional Office, the District Office undertakes the maintenance of the national roads and bridges and other infrastructures within the jurisdiction of the District.

The maintenance activities for the project bridges will include routine inspection, cleaning and repair works. Since the bridges are structurally durable and the repainting of steel materials is not required for about 15 years due to initial painting for long-term protection from rust, the repair works will be limited to partial repairs of slab, revetment, and pavement and embankment slope of approach road. The annual maintenance cost is estimated at 960,000 pesos for 40 project bridges as shown in Table 2.4-1.

TABLE 2.4-1 MAINTENANCE COST ESTIMATE

Works	Unit Cost (₱)	Times per Year	Number of Bridges	Annual Cost (₱)
Inspection	1,000	3	40	120,000
Cleaning	2,000	3	40	240,000
Repair Works	15,000	1	40	600,000
Total				960,000

The provisionally maintenance cost of 2001 in rural area in Northern Luzon (Region I, Region II and CAR) is shown as follows.

Region I : 278 million pesos
Region II : 267 million pesos
CAR : 285 million pesos
Total : 830 million pesos

The estimated maintenance cost is about 0.1% of the budget.

The maintenance system, institutional organization, technology and budget are considered to be well arranged and no problem is expected.

2) Bridges on Local Roads

The following six bridges are located on local roads.

Bridge Number	Bridge Name	Road Class
01-01-01	Gasgas	Provincial Road
01-03-03	Suyo	Provincial Road
01-04-04	Macayug	Barangay Road
02-02-04	Dalig	Barangay Road
CA-01-01	Abas	Barangay Road
CA-01-05	Naguilian	Provincial Road

These bridges will be turned over to the LGUs concerned after constructed. Maintenance of the bridges will be carried out by the LGUs. For the maintenance to be done properly, DPWH will enter into a Memorandum of Agreement (MOA) with each LGU concerned.

Since the roads where these bridges are located are the important components of the road network, it is preferable to convert them to national roads.

2.5 OTHER RELEVANT ISSUES

To smoothly implement the project and sustain the effects of the project, DPWH shall pay attention to the following:

- For early realization of the effects of the project, construction of Group 1 bridges shall be completed by the Government of the Philippines within two years from the date of handing-over the steel materials for superstructure. The works of the Government of the Philippines include detailed design, right-of-way acquisition and construction. To complete the works without delay, it is desirable to start the works as early as possible.
- In the previous Projects for Construction of Bridges along Rural Roads, the Group 1 bridges were generally well constructed. However, some bridges have minor problems caused by insufficient workmanship such as construction of slab with rough surface and inadequate embedment of revetment foundation causing damages. It is desirable to strengthen the construction supervision as well as to select the contractors of good stand.
- The construction of Group 1 bridges will be managed by the Planning Service of DPWH. It should monitor the progress of work carefully since the project bridges are distributed in wide areas.
- It is important to adequately carry out the maintenance and repair works to keep the roads and bridges in good condition and to prolong their serviceable lives. Especially, cleaning of drainage facilities and bearings and their vicinities and repair of revetment are sometimes found to be insufficient although these works are important.