Minutes of Discussions
on
Basic Design Study
on
The Project for Construction of King Hussein Bridge and Sheikh Hussein Bridge
in
the Hashemite Kingdom of Jordan

In response to a request from the Government of the Hashemite Kingdom of Jordan, the Government of Japan decided to conduct a Basic Design Study on the Project for Construction of King Hussein Bridge and Sheikh Hussein Bridge (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Hashemite Kingdom of Jordan a Basic Design Study Team (hereinafter referred to as "the Team") headed by Mr. Takahiro SASAKI, Deputy Director, Second Basic Design Study Division, Grant Aid Study & Design Department, JICA, which is scheduled to stay in the country from January 6 to February 16, 1996.

The Team held discussions with the concerned officials of the Hashemite Kingdom of Jordan and conducted a field survey at the Project sites.

As a result of discussions and field survey, both sides agreed to recommend the main items described in the attached sheets to the respective governments.

Amman, January 18, 1996

Yasuyuki Mori
Resident Representative at Amman
Japan International Cooperation Agency

Bashir Jaghbeer
Secretary General
Ministry of Public Works & Housing

Salem O. Ghawi
Assistant Secretary General
Ministry of Planning

ATTACHMENT

1 OBJECTIVE

The objective of the Project is to construct the bridges which have been destroyed by the war, now being built with temporary bailey bridges, and are hindering the safe transportation among the Project area. By constructing the new bridges, access will be provided to ensure basic transportation in the Project area with the assurance of the travelers comfort and safety. And in the long term, socioeconomic activities will be encouraged hence to contribute to the development of the Project area. This Project will accommodate the expected traffic demand that will result from the implementation of the peace treaty.

2 PROJECT IMPLEMENTING AGENCY

The Ministry of Public Works and Housing is responsible for the administration and execution of the Project.

3. PROJECT SITES

The sites of the Project are shown in Annex-1

4. MAJOR ITEMS REQUESTED BY THE JORDANIAN SIDE

As a result of a series of discussions, the bridges listed in Annex-2 are finally requested by the Jordanian side. However, the items to be covered by the Project will be finalized on the basis of further study.

5. JAPAN'S GRANT AID SCHEME

The Jordanian side has understood the system of Japan's Grant Aid explained in Annex 3.

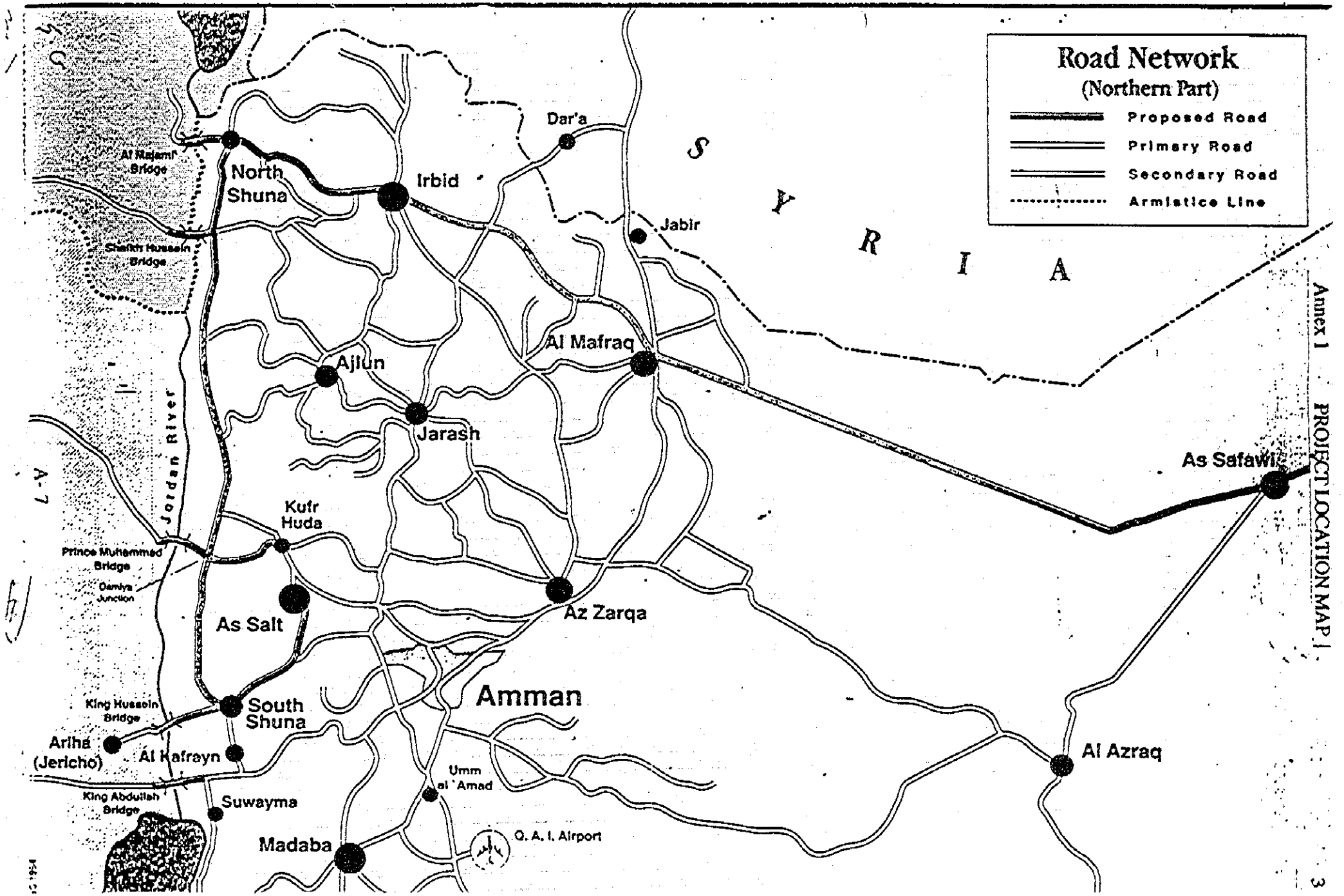
6. NECESSARY MEASURES TO BE TAKEN BY THE JORDANIAN SIDE

The Jordanian side will take necessary measures described in Annex-4 for smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

7. FURTHER SCHEDULE OF THE STUDY

1) The Team will proceed to further studies in Jordan until February 16, 1996.

2) Based on the results of studies, JICA will prepare a Basic Design Report and dispatch a team in April 1996 in order to explain its contents.



Annex 1 PROJECT LOCATION MAP

Annex 2

COMPONENTS OF THE PROJECT

The components of the Project requested by the recipient country are as follows:

A. KING HUSSEIN BRIDGE

A.1. King Hussein Bridge

To construct a 4 lane prestressed concrete bridge to meet the future traffic volume for the target year 2027

A.2. Improvement and Reconstruction of Access Road

To improve and reconstruct the 2 lane road section, from the centerline of the existing right of way for the existing road with a length 8.5 km starting at South Shuna Intersection on the National Valley Highway and ending at the bridge abutment on the Jordan side to meet the future traffic volume for the target year 2007.

B. SHEIKH HUSSEIN BRIDGE

B.1 Sheikh Hussein Bridge

To construct a 2 lane prestressed concrete bridge to meet the future truck volume for the target year 2027.

B.2 Construction of Access Road

To construct a 3 km long 2 lane road, from the border facilities to the existing national highway (Valley Road) to meet the future traffic volume for the target year 2007.

B.3 Construction of Basic Border Facilities

To construct the basic border facilities to meet the traffic demands for the target year 2007. The Team considers at present the following as the basic facilities:

1 Passenger terminal (Main Building)

2 Arriving and Departing Checking Areas for vehicles and passengers including necessary approach lanes

3 Parking Areas for passenger vehicles

The Jordanian side will develop a Master Plan for the border facilities in coordination with the Japanese Consultant during their stay in Jordan.

Annex-3

Japan's Grant Aid Scheme

1 Grant Aid Procedures

1) Japan's Grant Aid Program is executed though the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Government of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm (s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:

a) Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.

b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.

c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.

d) Preparation of a basic design of the Project

e) Estimation of costs of the Project

The contents of the original request are not necessary approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is (are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be repeated.

3. Japan's Grant Aid Scheme

1) What is Grant Aid'?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to team must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However the prime contractors, namely, consulting, constructing and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

6) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

(1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.

(2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.

(3) To secure buildings prior to the procurement in case the installation of the equipment.

(4) To ensure prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.

(5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.

(6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than covered by the Grant Aid.

(8) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

(9) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank") . The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

Annex 4

NECESSARY MEASURES TO BE TAKEN BY THE GOVERNMENT OF JORDAN

The following necessary measures should be taken by the Government of Jordan on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To provide data and information necessary for the Project.
2. To secure the land necessary for the execution of the Project, such as the land for roads and bridges, temporary offices, working areas, storage yards and others.
3. To clear the sites prior to the commencement of the construction, including mine and unexplored bombs.
4. To make accessible all roads and bridges leading to the Project sites before the commencement of inland transportation of materials and equipment.
5. To demolish existing bridges according to the construction schedule which will be provided in the later stage.
6. 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.
7. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in Jordan and prompt internal transportation therein of the materials and equipment for the Project purchased under the Grant Aid.
8. To exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Jordan with respect to the supply of the products and services under the verified contracts.
9. 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 Jordan and stay therein for the performance of their work.
10. To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.
11. To maintain and use properly and effectively the facilities constructed under the Project.
12. 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.

LIST OF MEMBERS PARTICIPATED IN DISCUSSIONS

Ministry of Planning

Dr. Nabil Ammari	Secretary General
Mr. Salem Ghawi	Assistant Secretary General for International Cooperation Affairs (tel. 644466)
Mr. Yousef Batshon	Director of Infrastructure Department
Dr. Mustafa Saleh	Director of Bilateral Cooperation Depart ment
Dr. Nael Al Hajaj	Head, Bilateral Cooperation Section
Ms. Wafa Dabbas	Civil Engineer
Ms. Tharwat Al Awamleh	Researcher, Bilateral Cooperation Department
Mr. Hasan Al Rafei	Transport Engineer Infrastructure Department

Ministry of Public Works and Housing

Dr. Abdel Razzaq Ennsor	Minister
Mr. Bashir Jaghbeer	Secretary General
Mr. Abdel Majeed Kabariti	Highway Studies Director (tel. 685560)
Ms. Sanaa Nazer	Building Department
Mr. Sami Halaseh	Geometric Section
Mr. Mahammad Radwan	Architecture Engineer
Ms. Muna Jahmany	Structure Section
Mr. Mahmood Ayyash	Structure Section

Ministry of Transport

Mr. Abdullah Jbour	Director of Land Transport (tel. 607111)

Sheikh Hussein Bridge

Israeli Side

Mr. Avi Zohar	Deputy Manager

Jordanian Side

Mr. Sami Al Azam	Liaison Officer

Japanese Side in Jordan

H.E. Mr. Kimura Takayuki	Ambassador , Japanese Embassy
Mr.Mori Yasuyuki	Resident Representative, JICA
Mr.Kuno Kichiro	Deputy Director, JICA

Israel Side

Ilan Baruch	M.F.A
Ruth Kahanoff	Director, North East Asia Division, M.F.A
David Tans	M.F.A
Tjipola Rimon	Economic Department, M.F.A
Ilana Mittelman	Jordanian Div. M.F.A.
Samlik Bass	North East Asia Div., M.F.A
Reuven Azar	M.F.A.
Herim Eilam	Public Works Depertment, M.C.H
M. Kenigsberg	Public Works Deptartment, M.C.H
Baruch Spregel	General, I.D.F.
Shiklosh Gideon	Manager, Airport Terminal
O. Rafawel	I.D.F (Ministry of Defence)
Efrain Hanok	I.D.F
Co Moti	Aloma LHC
Avi Borger	Colonel, District Brigade Commander, I.D.F

Safade Amer	Coordinator Officer of Allenby Bridge, I.D.F
Zvi Eckenling	Israel Airport Authority

Japanese Embassy In Israel

Mr.Saito Mitsugiu	Counsellor , Japanese Embassy
Mr. Matahiro Yamaguchi	First Secretary, Japanese Embassy
Mr.Shoji Katsuo	First Secretary, Japanese Embassy
Mr.Tsurusaki Tsuneo	Project Formulation Advisor, Japanese Embassy

Basic Design Study Team

Mr.Sasaki Takahiro	Team Leader, JICA
Mr.Endo Kazuya	Grant Aid Program, MOFA
Mr.Abe Toshiya	Coordinator, JICA
Mr.Matsuzawa Katsufumi	Consultant Chief / Bridge Designer,
Mr.Matsuda Katsuyoshi	Transport Planner
Mr.Kawakami Toru	Engineering Surveyor
Mr.Yamazaki Kiyohito	Construction Planner / Cost Estimator

Costs Required for Undertakings by Jordanian Government

Description	Q'ty	Approximate Cost	
Land acquisition & compensation for trees & housing		JD600,000.00	
Connection of electricity and telephone lines to the sites		JD5,000.00	
Banking arrangements and Authorization-to-Pay		JD71,500.00	0.7 % of total cost from Japanese Government
Construction of truck terminal, parking lots, sheltered facility, housing, etc.		JD7,000,000.00	
Exemption of Customs Duty		JD80,000.00	
Exemption of VAT (Value Added Tax)		JD330,000.00	10 % of material cost being purchased in Jordan
MPWH's coordination & management	40 M/M	JD40,000.00	Including allowance, transport and telecommunication costs
TOTAL		JD8,126,500.00	

6. Other Relevant Data

6-1 Traffic Survey

Table A1-1 Vehicle OD, Vehicle Type = Passenger Car & Bus

LOCATION: AT AR RAMTHA CUSTOMS OFFICE
UNIT: AADT

1995 After Expansion

	JORDAN	P.N.A.	ISRAEL	LEBANON	SYRIA	IRAQ	SA. ARAB.	EGYPT	TURKEY	U.A.E	OTHERS	TOTAL
JORDAN		0	0	30	1048	0	0	0	0	3	0	1080
P.N.A.	0		0	0	1	0	0	0	0	0	0	1
ISRAEL	0	0		0	0	0	0	0	0	0	0	0
LEBANON	0	0	0		0	3	5	0	0	0	1	9
SYRIA	30	0	0	0		4	155	1	0	25	78	263
IRAQ	0	0	0	0	0		0	0	0	0	0	0
SA. ARAB.	0	0	0	0	0	0		0	6	0	0	6
EGYPT	0	0	0	0	0	0	0		0	0	0	0
TURKEY	0	0	0	0	0	0	0	0		0	0	0
U.A.E.	0	0	0	0	0	0	0	0	0		0	0
OTHERS	0	0	0	0	0	0	0	0	0	0		0
TOTAL	30	1	0	30	1049	7	160	1	6	28	79	1360

Table A1-2 Vehicle OD, Vehicle Type = Truck

1995 After Expansion LOCATION: AT AR RAMTHA CUSTOMS OFFICE

UNIT: AADT

	JORDAN	P.N.A.	ISRAEL	LEBANON	SYRIA	IRAQ	SA. ARAB.	EGYPT	TURKEY	U.A.E	OTHERS	TOTAL
JORDAN		0	0	126	130	0	0	0	13	0	4	272
P.N.A.			0	0	0	0	0	0	0	0	0	0
ISRAEL				0	0	0	0	0	0	0	0	0
LEBANON					0	0	46	0	0	13	21	80
SYRIA						0	50	0	0	13	59	122
IRAQ							0	0	0	0	0	0
SA. ARAB.								0	67	0	0	67
EGYPT									0	0	0	0
TURKEY										13	17	29
U.A.E.											0	0
OTHERS												0
TOTAL												570

Table A1-3 Vehicle OD, Vehicle Type = Total

1995 After Expansion LOCATION: AT AR RAMTHA CUSTOMS OFFICE

UNIT: AADT

	JORDAN	P.N.A.	ISRAEL	LEBANON	SYRIA	IRAQ	SA. ARAB.	EGYPT	TURKEY	U.A.E	OTHERS	TOTAL
JORDAN		0	0	155	1178	0	0	0	15	0	4	1353
P.N.A.			0	0	1	0	0	0	0	0	0	1
ISRAEL				0	0	0	0	0	0	0	0	0
LEBANON					0	3	51	0	0	13	22	89
SYRIA						4	205	1	0	38	137	384
IRAQ							0	0	0	0	0	0
SA. ARAB.								0	73	0	0	73
EGYPT									0	0	0	0
TURKEY										13	17	29
U.A.E.											0	0
OTHERS												0
TOTAL												1930

Table A2-1 Prospect of Future Socio-Economic Activities *

GDP
UNIT: US MILLION DOLLARS (CONSTANT PRICE)

	Present		FUTURE				GROWTH RATE (-2000)
	1992	1995	2000	2007	2017	2027	
JORDAN	4790	5721	7692	10824	17631	28719	6.10%
JORDAN (N)							
JORDAN (S)							
P.N.A. (West Bank)	1880	2468	3886	5468	8906	14507	9.55%
Gaza	640	871	1454	2046	3332	5428	10.80%
P.N.A. Total							
ISRAEL	65590	75260	94713	133271	217085	353608	4.70%
LEBANON	5550	7944	14444	20324	33106	53926	12.70%
SYRIA	13690	15667	19618	27605	44965	73243	4.60%
IRAQ	* 70290	81369	103850	146128	238027	387721	5.00%
SA.ARAB.	118550	140397	186117	261886	426584	694861	5.80%
EGYPT	33480	35540	39239	55213	89936	146497	2.00%
TURKEY	* 86130	99706	127253	179058	291667	475094	5.00%
U.A.E.	* 28550	33050	42181	59353	96680	157482	5.00%
OTHERS							

*Estimated value
**Following past trend up to 2000 and 5% of annual growth rate is assumed after 2000.

Table A3-1 International Road Distance (Minimum Route)

THROUGH AR RAMTHA CUSTOMS OFFICE — UNIT:KM

	JORDAN	P.N.A.	ISRAEL	LEBANON	SYRIA	IRAQ	SA. ARAB.	EGYPT	TURKEY	U.A.E	OTHERS
JORDAN				320	210				1900	2000	
P.N.A.											
ISRAEL											
LEBANON						1320	1920			2220	
SYRIA						1210	1810			2110	
IRAQ											
SA. ARAB.									3500		
EGYPT											
TURKEY										3900	
U.A.E.											
OTHERS											

Table A3-2 International Road Distance (Minimum Route)

THROUGH KING HUSSEIN OR SHEIKH HUSSEIN CUSTOMS OFFICE

UNIT: KM

	JORDAN	P.N.A.	GAZA	ISRAEL	LEBANON	SYRIA	IRAQ	SA. ARAB.	EGYPT	TURKEY	U.A.E	OTHERS
JORDAN		60	220	170								
P.N.A.							1060	2460			2060	
GAZA							1220	2620			2220	
ISRAEL							1170	2570			2170	
LEBANON												
SYRIA												
IRAQ												
SA. ARAB.												
EGYPT												
TURKEY												
U.A.E.												
OTHERS												

Amman-Bagdad: 1000km
Amman-Liyad:2400km
Amman-Abdabi: 2000km

Amman-Hayfa: 170km
Amman-Jelico: 60km
Jelico-Gaza: 160km

Table A3-3 International Travel Time (Minimum Route)

THROUGH AR RAMTHA CUSTOMS OFFICE

UNIT:HOUR

	JORDAN	P.N.A.	ISRAEL	LEBANON	SYRIA	IRAQ	SA. ARAB.	EGYPT	TURKEY	U.A.E	OTHERS
JORDAN				7.3	4.5				33.7	35.3	
P.N.A.											
ISRAEL											
LEBANON						25.0	35.0			41.0	
SYRIA						22.2	32.2			38.2	
IRAQ											
SA. ARAB.									61.3		
EGYPT											
TURKEY										69.0	
U.A.E.											
OTHERS											

*Include 1 hour of waiting time at each customs office

*Average vehicle speed of 60 km/h is assumed

Table A3-4 International Travel Time(Minimum Route)

THROUGH KING HUSSEIN OR SHEIKH HUSSEIN CUSTOMS OFFICE

UNIT: HOUR

	JORDAN	P.N.A.	GAZA	ISRAEL	LEBANON	SYRIA	IRAQ	SA. ARAB.	EGYPT	TURKEY	U.A.E	OTHERS
JORDAN		1.5	5.2	3.3								
P.N.A.							19.0	42.5			36.8	
GAZA							22.8	46.2			40.5	
ISRAEL							21.0	44.3			38.7	
LEBANON												
SYRIA												
IRAQ												
SA. ARAB.												
EGYPT												
TURKEY												
U.A.E.												
OTHERS												

*Include 1 hour of waiting time at each customs office
except for King Hussein and Shaykh Hussein customs office
where half an hour of waiting time is assumed.
*Average vehicle speed of 60 km/h is assumed.

Table A4-1 Induced Traffic on Sheikh Hussein and King Hussein Bridges

VEHICLE TYPE: PASSENGER CAR & BUS UNIT: AADT

	TRAFFIC VOLUME				
O-D PAIR	1995	2000	2007	2017	2027
J-P	3365	5483	8914	17848	35736
J-G	75	125	203	406	814
J-I*	1689	2502	4069	8147	16312
P-IQ	7	11	19	37	75
P-SA	3	2	3	5	11
P-UAE	1	1	2	4	9
G-IQ	1	3	4	9	17
G-SA	0	0	1	2	3
G-UAE	0	0	1	1	2
I-IQ*	153	213	347	695	1391
I-SA*	26	36	59	118	236
I-UAE*	20	28	45	91	182
SHAYKH HUSSEIN TOTAL	1887	2780	4520	9050	18120
KING HUSSEIN TOTAL	3450	5625	9146	18313	36667
GRAND TOTAL	5338	8405	13666	27363	54787

*Probable Sheikh Hussein bridge users

Table A4-2 Induced Traffic on Sheikh Hussein and King Hussein Bridges

VEHICLE TYPE: TRUCK UNIT: AADT

	T(I,J)				
O-D PAIR	1995	2000	2007	2017	2027
J-P	827	1513	2685	6087	13803
J-G	30	56	100	226	513
J-I*	1588	2495	4426	10036	22757
P-IQ	18	33	59	134	303
P-SA	5	9	16	36	82
P-UAE	2	4	8	18	41
G-IQ	4	8	15	34	77
G-SA	3	3	5	11	26
G-UAE	1	1	2	5	12
I-IQ*	442	656	1164	2640	5986
I-SA*	132	201	357	810	1838
I-UAE*	66	98	174	394	894
SHAYKH HUSSEIN TOTAL	2229	3451	6121	13880	31474
KING HUSSEIN TOTAL	888	1629	2890	6552	14858
GRAND TOTAL	3117	5080	9011	20433	46332

*Probable Sheikh Hussein bridge users

Table A4-3 Export from Aqaba Port *1

PAST ACHIEVEMENT*2 UNIT: TON/YEAR

REGION	1989	1990	1991	1992	1993	1994	TOTAL
TOTAL EXP.	9985974	8871857	7677470	7361798	6381181	6648377	46926657
JORDAN(N)	428137	1310924	1248358	1030386	716992	552505	5287301
JORDAN(S)	47571	145658	138706	114487	79666	61389	587478
JORDAN	475708	1456582	1387064	1144873	796658	613894	5874779

FUTURE ACHIEVEMENT (WITHOUT PROJECT CASE)

REGION	1995	2000	2007	2017	2027
TOTAL EXP.*3	5168156	6654606	9493256	15759880	26161704
JORDAN(N)	581416	748643	1067991	1772987	2943192
JORDAN(S)	64602	83183	118666	196999	327021
JORDAN*4	646017	831826	1186657	1969985	3270213

*1: Fertilizer, phosphate, potash and empty containers are not included.

*2: Source: Aqaba Port Yearbook

*3: Estimated based on corresponding Jordanian export which shares 12.5% of total export.

*4: Estimated applying 1989-1994 growth rate (5.2%).

Table A4-4 Import from Aqaba Port

PAST ACHIEVEMENT*1 UNIT: TON/YEAR

REGION	1989	1990	1991	1992	1993	1994	89-93 TOTAL
TOTAL IMP.	8694675	6164599	5547998	6021703	5252689	*6429518	31681664
JORDAN(N)	2116644	2640758	3620861	3535343	3626542	3182612	15540149
JORDAN(S)	235183	293418	402318	392816	402949	353624	1726683
JORDAN	2351827	2934176	4023179	3928159	4029491	3536235	17266832
IRAQ	6087125	3154394	1439541	1959465	1088361	*2764693	13728886

FUTURE ACHIEVEMENT (WITHOUT PROJECT CASE)

REGION	1995	2000	2007	2017	2027
TOTAL IMP.*2	6731706	8467675	11682435	18491302	29267167
JORDAN(N)	3332194	4191499	5782805	9153191	14487248
JORDAN(S)	370244	465722	642534	1017021	1609694
JORDAN*3	3702438	4657221	6425339	10170212	16096942
IRAQ*4	2894634	3641100	5023447	7951260	12584882

* Estimated

*1: Source: Aqaba Port Yearbook

*2: Estimated based on corresponding Jordanin import which shares 55% of total import.

*3: Estimared applying 1990-1994 growth rate (4.9%).

*4: Estimated based on corresponding Iraq import which shares 43% of total import.

Table A4-5 Potential Divertible Cargoes to Hayfa Port

UNIT: TON/YEAR

	1995	2000	2007	2017	2027
EXPORT					
FROM JORDAN(N)	581415	748643	1067991	1772987	2943192
(1) WEST BOUND**1	250008	321916	459236	762384	1265573
(2) EAST BOUND	331407	426727	608755	1010603	1677619
IMPORT					
TO JORDAN(N)	3332194	4199499	5782805	9153191	14487248
TO IRAQ	2894634	3641100	5023447	7951260	12584882
SUBTOTAL	6226828	7840599	10806252	17104451	27072130
(3) WEST BOUND**2	4732389	5958655	8212752	12999383	20574819
(4) EAST BOUND	1494439	1881744	2593500	4105068	6497311

**1: Share of 43 % is assumed on the basis of achievement during1989-93

**2: Share of 76 % is assumed on the basis of achievement during1989-93

Table A4-6 Probable Diverted Trucks from Aqaba to Hayfa

(EXPORT)

	1995	2000	2007	2017	2027
POTENTIAL EXPORT CARGOES DIVERTED FROM AQABA PORT (TON/YEAR)	250008	321916	459236	762384	1265573
POTENTIAL EXPORT CARGOES DIVERTED FROM AQABA PORT (TON/DAY)	685	882	1258	2089	3467
POTENTIAL EXPORT CARGOES DIVERTED FROM AQABA PORT (VEHICLE/DAY)**1	612	787	1123	1865	3096
POSSIBILITY OF SELECTING HAYFA PORT	0.5	0.5	0.5	0.5	0.5
PROBABLE NUMBER OF VEHICLES ON THE PROJECT BRIDGE(VEHICLE/DAY)	306	394	562	932	1548

**1: Average loading factor of 1.12 ton/vehicle is applyed on the basis of the record at Ar Ramtha customs office.

Table A4-7 Probable Diverted Trucks from Aqaba to Hayfa

(IMPORT)

	1995	2000	2007	2017	2027
POTENTIAL IMPORT CARGOES DIVERTED FROM AQABA PORT (TON/YEAR)	4732389	5958855	8212752	12999383	20574819
POTENTIAL IMPORT CARGOES DIVERTED FROM AQABA PORT (TON/DAY)	12965	16326	22501	35615	56369
POTENTIAL IMPORT CARGOES DIVERTED FROM AQABA PORT (VEHICLE/DAY)**2	3715	4678	6447	10205	16152
POSSIBILITY OF SELECTING HAYFA PORT	0.5	0.5	0.5	0.5	0.5
PROBABLE NUMBER OF VEHICLES ON THE PROJECT BRIDGE	1858	2339	3224	5102	8076

**1: Average loading factor of 3.49 ton/vehicle is applyed on the basis of the record at Ar Ramtha customs office.

Table A4-8 Probable Diverted Trucks from Aqaba to Hayfa

UNIT: VEHICLE/DAY

	1995	2000	2007	2017	2027
TO HYFA (EXPORT)	306	394	562	932	1548
FROM HYFA (IMPORT)	1858	2339	3224	5102	8076
TOTAL	2164	2733	3786	6034	9624

Table A5-1 Result of Traffic Demand Forecast: Sheikh Hussein Potential Traffic Demand

VEHICLE TYPE: PASSENGER VEHICLE AND BUS UNIT: AADT

	1998	2000	2007	2017	2027
INDUCED TRAFFIC	2384	2780	4520	9050	18120
DIVERTED PORT TRAFFIC FROM AQABA	0	0	0	0	0
SUBTOTAL	2384	2780	4520	9050	18120

Table A5-2 Result of Traffic Demand Forecast: Sheikh Hussein Potential Traffic Demand

VEHICLE TYPE: TRUCK UNIT: AADT

	1998	2000	2007	2017	2027
INDUCED TRAFFIC	2895	3451	6121	13880	31474
DIVERTED PORT TRAFFIC FROM AQABA	2491	2733	3786	6034	9624
SUBTOTAL	5386	6184	9907	19914	41098

Table A5-3 Result of Traffic Demand Forecast: Sheikh Hussein Potential Traffic Demand

VEHICLE TYPE: TOTAL UNIT: AADT

	1998	2000	2007	2017	2027
INDUCED TRAFFIC	5279	6231	10641	22930	49594
DIVERTED PORT TRAFFIC FROM AQABA	2491	2733	3786	6034	9624
TOTAL	7770	8964	14427	28964	59218

Table A5-4 Result of Traffic Demand Forecast: King Hussein Potential Traffic Demand

VEHICLE TYPE: PASSENGER VEHICLE AND BUS UNIT: AADT

	1998	2000	2007	2017	2027
INDUCED TRAFFIC	4630	5626	9146	18313	36667
DIVERTED PORT TRAFFIC FROM AQABA	0	0	0	0	0
SUBTOTAL	4630	5626	9146	18313	36667

Table A5-5 Result of Traffic Demand Forecast: King Hussein Potential Traffic Demand

VEHICLE TYPE: TRUCK UNIT: AADT

	1998	2000	2007	2017	2027
INDUCED TRAFFIC	1278	1629	2890	6552	14858
DIVERTED PORT TRAFFIC FROM AQABA	0	0	0	0	0
SUBTOTAL	1278	1629	2890	6552	14858

Table A5-6 Result of Traffic Demand Forecast: King Hussein Potential Traffic Demand

VEHICLE TYPE: TOTAL UNIT: AADT

	1998	2000	2007	2017	2027
INDUCED TRAFFIC	5908	7255	12036	24865	51525
DIVERTED PORT TRAFFIC FROM AQABA	0	0	0	0	0
TOTAL	5908	7255	12036	24865	51525

6-2 Hydrographic Study for Determination of Bridge Length of the King Hussein Bridge

1 General

The existing King Hussein Bridge has the 30 m bridge length, which is relatively shorter than those of other bridges over the Jordan River; the bridge lengths of the Prince Mohammad Bridge about 10 km upstream and King Abdullah Bridge about 10 km downstream of the King Hussein Bridge are 90 m and 120 m respectively. As the King Hussein Bridge has inadequate bridge length and vertical clearance, it is sometimes inundated in the past floods, approximately every 5 years.

The bridge length discussed hereinafter is determined on the basis of the following:

1) Longitudinal profile of the bridge
2) Vertical clearance of at-least 60 cm above the high water level for the return period of 50 years

2 Design Discharge for 50 Year Probability

As no significant data is available for the area, the unit hydrograph is assumed in the following:

(1) Peak Runoff

a. Longitudinal profile of the bridge was tentatively determined to keep 2 m vertical clearance above the flood level in January 1995, which was at RL - 377.7 m based on the LANDSAT TM-data analysis as well as interview survey at the site.

b. The calculation of uniform flow is made to obtain the peak runoff corresponding to the above mentioned flood. As a result, the peak runoff of 1,740 m3/sec is obtained on the assumption that the roughness coefficient n is 0.035 and slope is 1/520 (average slope from Tiberias Lake to the King Hussein Bridge). The results of the uniform flow calculation are shown in Table A6-1.

c. The 50 year probable peak runoff of 1,300 m3/sec was calculated by Israel Consultant for the Sheikh Hussein Bridge, which has an approximate catchment area of 10,800 km2 while the King Hussein has 14,300 km2. As such, the peak runoff of 1,720 m3/sec for the King Hussein Bridge is obtained as the equivalence by multiplying the peak runoff for the Sheikh Hussein Bridge with the fraction of the respective catchment areas.

d. Accordingly, the peak runoff of 1,740 m3/sec estimated by uniform flow calculation, which corresponds to the flood taken place in January 1995, seems to be for the 50 year probability.

(2) Concentration Time of Flood

The time of flood concentration is calculated by way of Kraven's formula.

I	1/100 or more	1/100 to 1/200	1/200 or less
W	3.5 m/sec	3.0 m/sec	2.1 m/sec

$T = L/W$

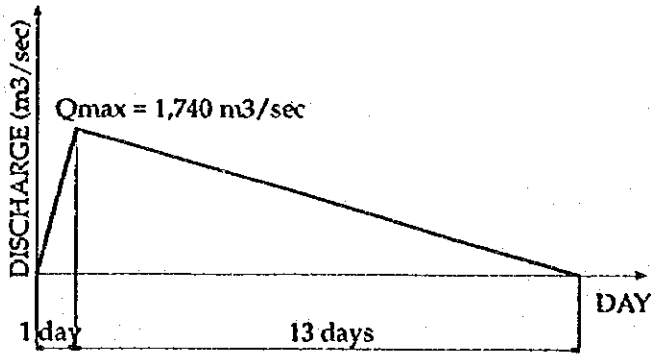
Where, I: Slope of river channel = 1/520
W: Velocity of flood = 2.1 m/sec
L: Length of river channel = 170,000 m
T: Time of flood concentration

Hence, the Time of flood concentration is obtained below.

T = 22.5 hr, say 24 hours

(3) Unit Hydrograph

Assumed unit hydrograph of the flood at the King Hussein Bridge is shown in the following figure, which is obtained based on the above calculations as well as interview survey in the area.



Assumed Unit Hydrograph

3 Bridge Length

High water level of the upstream side of the bridge can be calculated by means of reservoir formula along with the above hydrograph.

(1) Storage Reservoir Formula

$$1/2\,(I_t + I_{t+1}) = 1/2\,(O_t + O_{t+1}) + (V_{t+1} - V_t)$$

Where, I_t : Inflow at time t
I_{t+1} : Inflow at time t+1
O_t : Outflow at time t
O_{t+1} : Outflow at time t+1
V_t : Storage volume at time t
V_{t+1} : Storage volume at time t+1

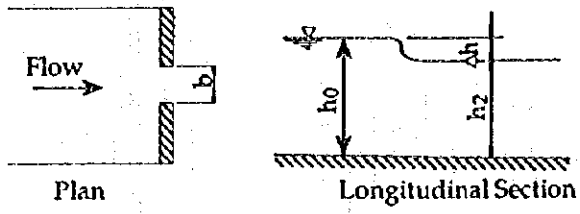
(2) Outflow of Bridge Opening

Discharge of the bridge opening is calculated as follows:

$$Q = 0.75\, b\, h_2 \sqrt{2\, g\, \Delta h}$$

Where, b : Bridge length

h_0	:	Water depth of the upstream of the bridge
h_2	:	Water depth of the downstream of the bridge
Δh	:	Deference of water depths of the upstream and downstream of the bridge



High water level of the upstream side of the bridge is estimated based on the H-V and H - Q curves shown in Figure A6-2 and Table A6-2.

Relationship between bridge length and upstream water depth is obtained by varying the bridge lengths from 30m (existing one) to 150m at 20m intervals. The assumption is made that no rising of water level occurs if the bridge length of 500 m is applied which represents more less the existing topography.

The relation among the bridge lengths, upstream water depth and vertical clearances is shown in Table A6-3, the relation between bridge length and vertical clearance is in Figure A6-3, and relation between bridge length and upstream water depth in Figure A6-4.

A bridge length of 102m is obtained to maintain 60 cm vertical clearance above the 50 year probable flood. Subsequently, the bridge length is determined at 110 m taking into consideration the allowances, in which about 1 m vertical clearance can be maintained even above the rising water level where the opening is reduced from 500 m to 110 m.

Table A6-1 Present Discharge Capacity at King Hussein Bridge Site

Water Level (EL.m)	Water Depth (m)	Section Area (m2)	Wetted Perimeter (m)	Hydraulic Mean Depth (m)	Volocity (m/s)	Discharge (m3/s)
-387	0	0	0	0.000	0.000	0.000
-386.5	0.5	1.781	7.196	0.247	0.493	0.878
-386.0	1.0	6.870	12.010	0.572	0.863	5.929
-385.5	1.5	12.899	13.252	0.973	1.230	15.866
-385.0	2.0	19.296	14.493	1.331	1.516	29.253
-384.5	2.5	26.059	15.735	1.656	1.754	45.707
-384.0	3.0	33.189	16.977	1.955	1.959	65.017
-383.5	3.5	40.692	18.324	2.221	2.133	86.796
-383.0	4.0	48.794	20.096	2.428	2.264	110.470
-382.5	4.5	58.617	25.707	2.280	2.171	127.258
-382.0	5.0	71.172	31.317	2.273	2.167	154.230
-381.5	5.5	88.461	36.927	2.396	2.244	198.506
-381.0	6.0	104.481	42.537	2.456	2.281	238.321
-380.5	6.5	143.953	131.918	1.091	1.328	191.170
-380.0	7.0	218.812	167.238	1.308	1.499	327.999
-379.5	7.5	306.586	192.162	1.595	1.711	524.569
-379.0	8.0	406.734	217.086	1.874	1.905	774.828
-378.5	8.5	517.734	235.858	2.195	2.117	1,096.043
-378.0	9.0	638.117	254.630	2.506	2.312	1,475.327
-377.5	9.5	767.883	273.401	2.809	2.495	1,915.868
-377.0	10.0	907.008	292.173	3.104	2.667	2,418.990
-376.5	10.5	1,055.508	310.945	3.395	2.831	2,988.143
-376.0	11.0	1,213.383	329.717	3.680	2.988	3,625.588
-375.5	11.5	1,380.625	348.488	3.962	3.139	4,333.782
-375.0	12.0	1,557.234	367.260	4.240	3.284	5,113.956
-374.0	13.0	1,938.562	404.803	4.789	3.562	6,905.158
-373.0	14.0	2,357.375	442.347	5.329	3.825	9,016.959
-372.0	15.0	2,813.672	479.890	5.863	4.076	11,468.527
-371.0	16.0	3,307.453	517.434	6.392	4.318	14,281.582
-370.0	17.0	3,838.688	554.977	6.917	4.552	17,473.708
-369.0	18.0	4,461.688	700.991	6.365	4.306	19,212.029
-368.0	19.0	5,230.688	847.004	6.176	4.220	22,073.503
-367.0	20.0	6,145.688	993.018	6.189	4.226	25,971.677
-366.0	21.0	7,206.688	1,139.032	6.327	4.289	30,909.485
-365.0	22.0	8,413.750	1,285.045	6.547	4.388	36,919.535
-364.0	23.0	9,766.750	1,431.059	6.825	4.511	44,057.809
-363.0	24.0	11,265.750	1,577.073	7.143	4.650	52,385.738
-362.0	25.0	12,910.750	1,723.087	7.493	4.801	61,984.511
-361.0	26.0	14,701.750	1,869.100	7.866	4.959	72,905.978
-360.0	27.0	16,638.750	2,015.114	8.257	5.122	85,223.678

Table A6-2 H-Q Curve

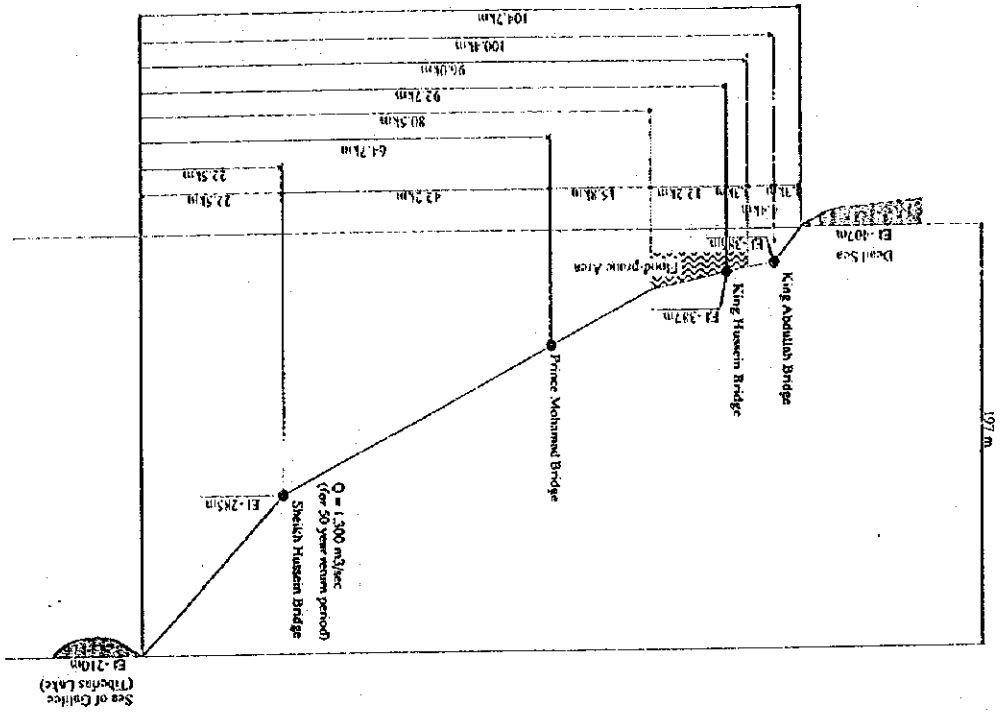
(Unit: m3/s)

Water Level	Water Depth	Bridge Length (m)							
(EL.m)	(m)	30	50	70	90	110	130	150	500
-387.0	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-386.0	1	5.930	5.930	5.930	5.930	5.930	5.930	5.930	5.931
-385.0	2.0	29.259	29.259	29.259	29.259	29.259	29.259	29.259	29.259
-384.0	3.0	65.015	65.015	65.015	65.015	65.015	65.015	65.015	65.016
-383.0	4.0	110.437	110.441	110.441	110.441	110.441	110.441	110.441	110.443
-382.0	5.0	162.097	154.868	154.145	154.145	154.145	154.145	154.145	154.144
-381.0	6.0	253.769	240.988	238.314	238.314	238.314	238.314	238.314	238.314
-380.0	7.0	363.111	385.514	349.025	335.230	331.918	333.797	338.803	327.965
-379.0	8.0	494.233	510.038	543.718	593.324	647.149	702.904	759.873	774.509
-378.0	9.0	641.842	741.449	850.263	974.282	1,101.232	1,229.371	1,358.261	1,475.112
-377.0	10.0	798.505	999.134	1,201.840	1,419.558	1,639.152	1,859.358	2,079.954	2,418.365
-376.0	11.0	962.720	1,279.362	1,592.577	1,921.190	2,250.888	2,580.791	2,910.829	3,623.816
-375.0	12.0	1,133.318	1,579.192	2,017.885	2,473.016	2,928.761	3,384.506	3,840.257	5,111.377
-374.0	13.0	1,309.367	1,896.244	2,474.042	3,070.171	3,666.595	4,263.166	4,859.764	6,900.818
-373.0	14.0	1,490.115	2,228.552	2,957.956	3,708.171	4,459.259	5,210.688	5,962.342	9,011.619
-372.0	15.0	1,674.946	2,574.467	3,467.008	4,383.839	5,302.392	6,221.902	7,142.042	
-371.0	16.0	1,863.349	2,932.589	3,998.949	5,094.027	6,192.220	7,292.336	8,393.715	
-370.0	17.0	2,054.898	3,301.717	4,551.829	5,836.082	7,125.440	8,418.067	9,712.843	
-369.0	18.0	2,249.231	3,680.812	5,123.937	6,607.668	8,099.128	9,595.612		
-368.0	19.0	2,446.043	4,068.970	5,713.765	7,406.708	9,110.672			
-367.0	20.0	2,645.071	4,465.399	6,319.972	8,231.341				

Table A6-3 Relation between Bridge Length and Vertical Clearance

Existing Ground Level (EL.m) -380.8

Bridge Length (m)	Upstream Water Depth (m)	Downstream Water Depth (m)	Upstream Water Level (EL.m)	Downstream Water Level (EL.m)	Flood Water Level (m)	Clearance (m)
30	16.082	14.84	-370.918	-372.16	-370.918	-4.912
50	13.046	12.362	-373.954	-374.638	-373.954	-1.876
70	11.697	11.27	-375.303	-375.73	-375.303	-0.527
90	10.893	10.597	-376.107	-376.403	-376.107	0.277
110	10.353	10.136	-376.647	-376.864	-376.647	0.817
130	9.921	9.756	-377.079	-377.244	-377.079	1.249
150	9.643	9.509	-377.357	-377.491	-377.357	1.527
500	9.414	9.275	-377.586	-377.725	-377.586	1.756



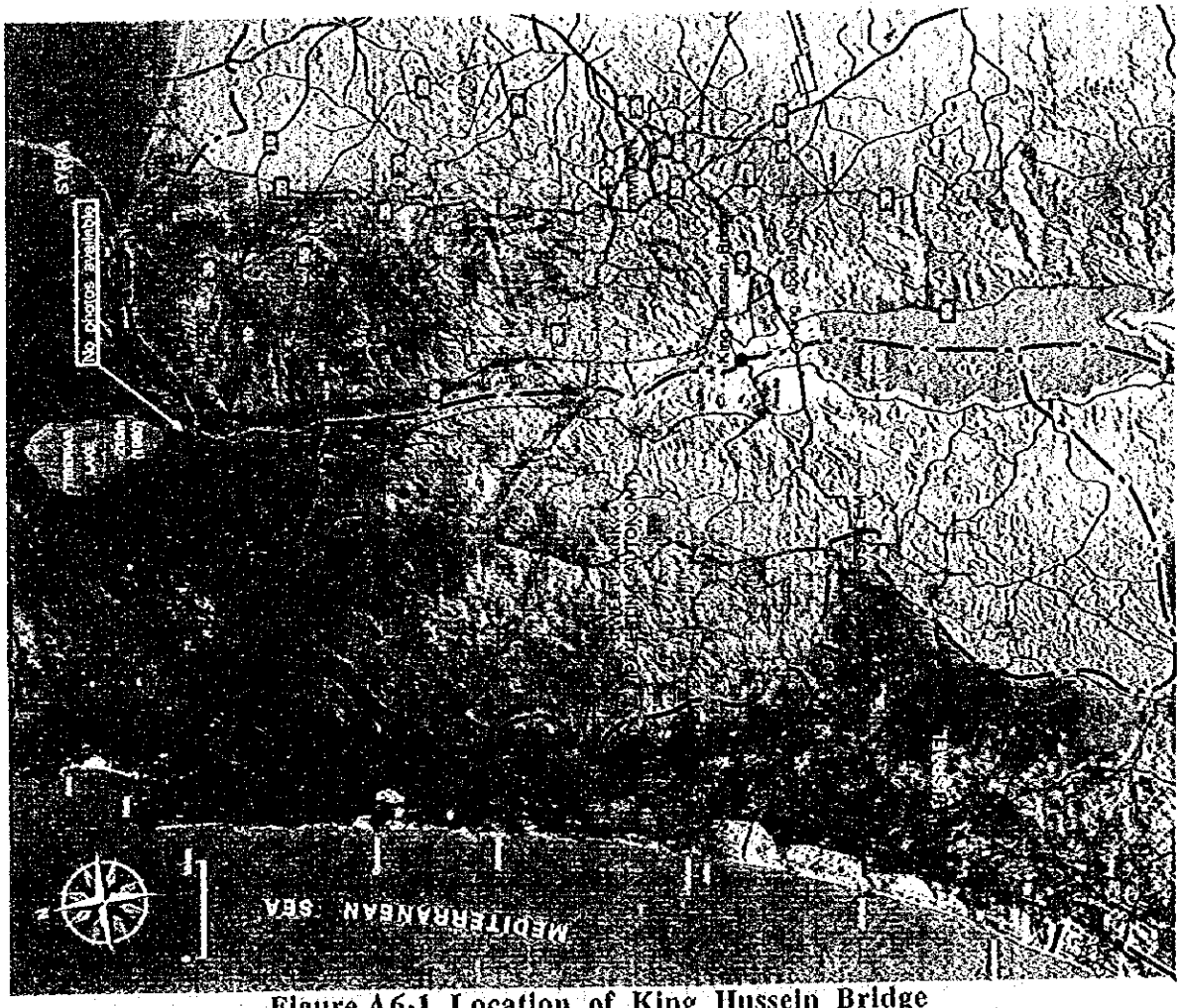
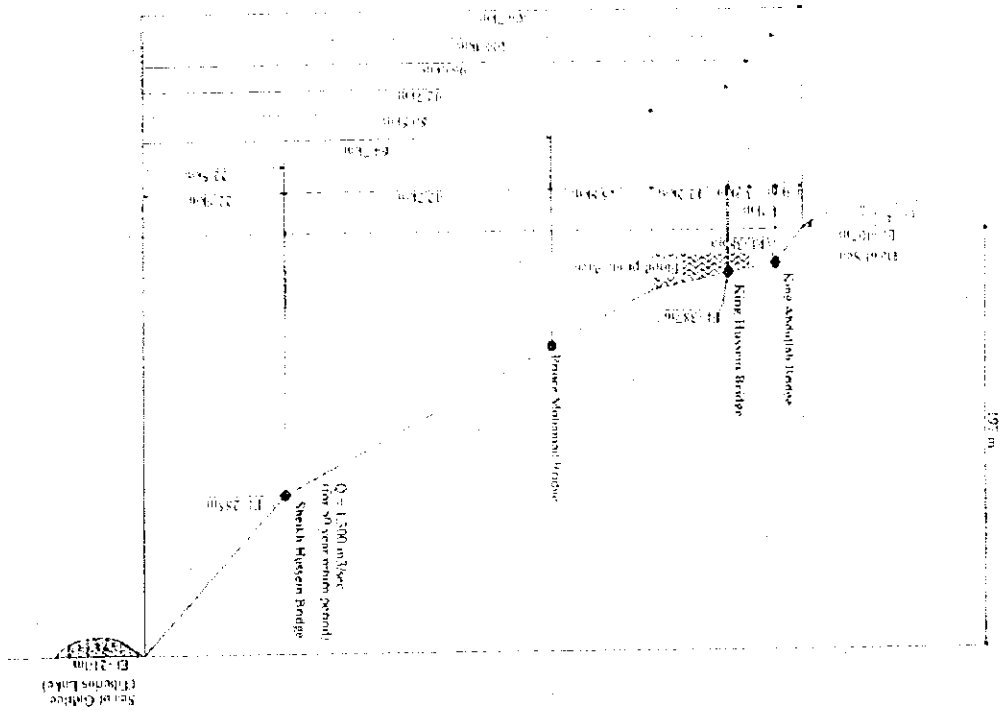


Figure A6-1 Location of King Hussein Bridge



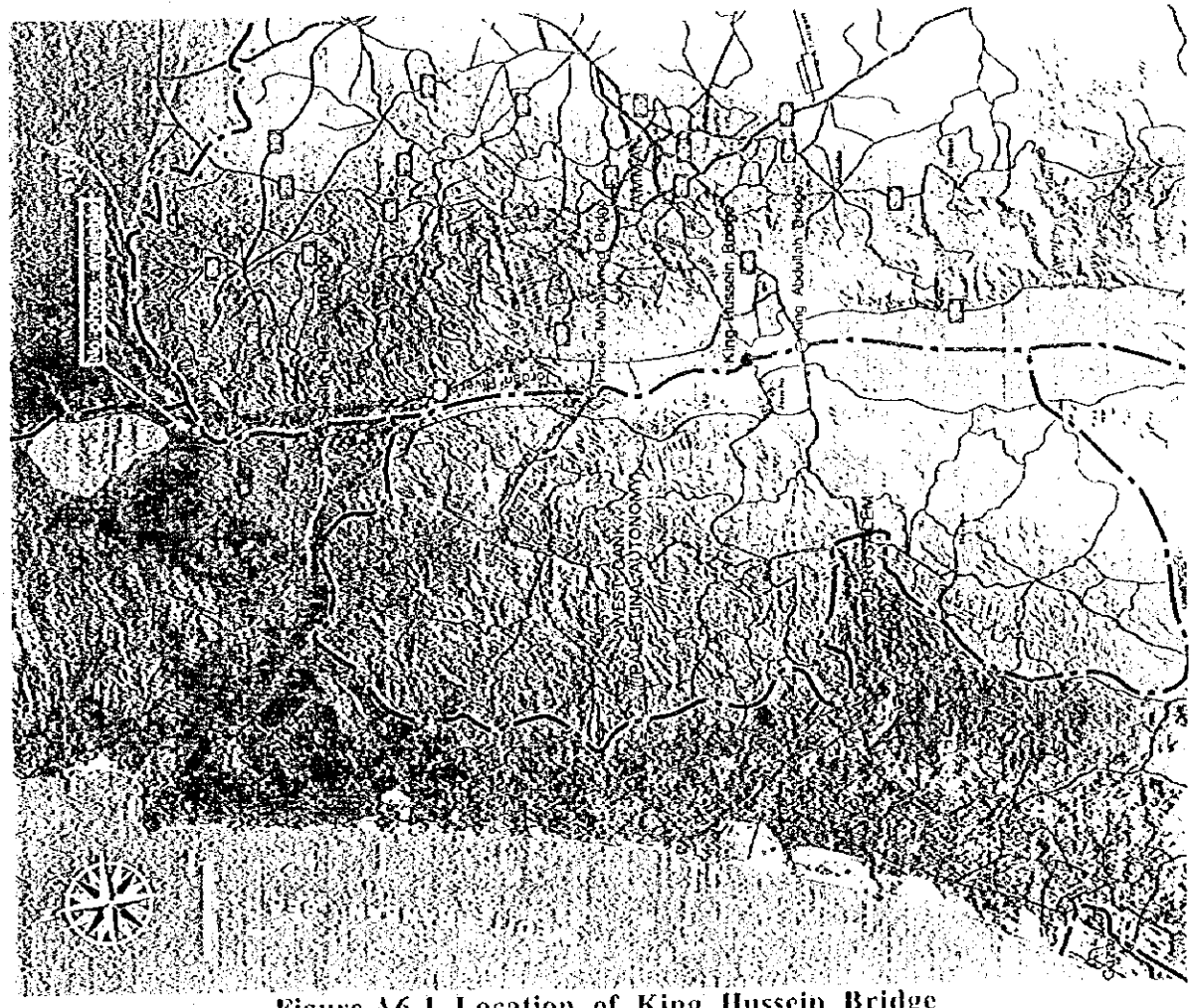


Figure A6-1 Location of King Hussein Bridge

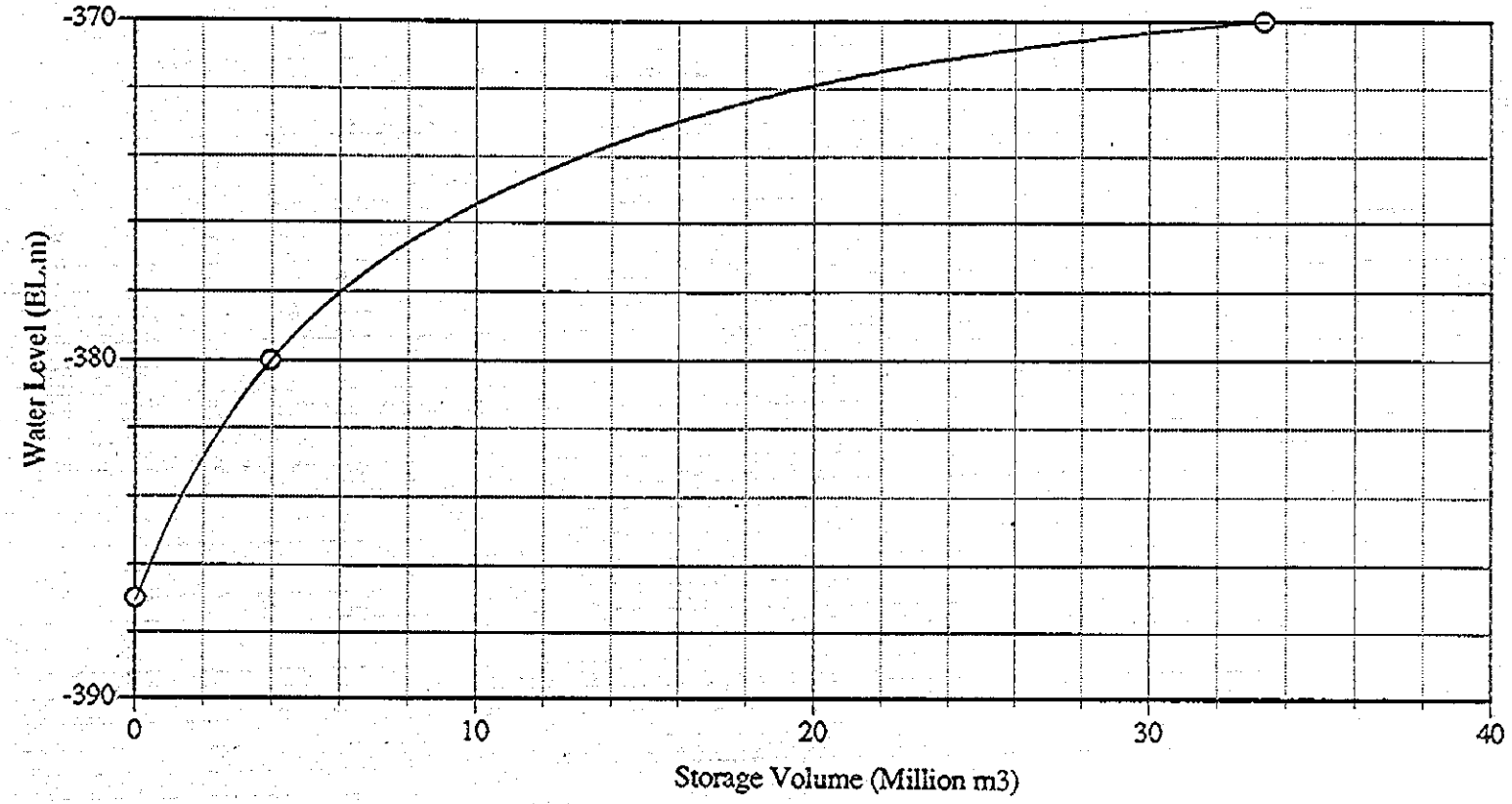


Figure A6-2 Relation between Water Level and Storage Volume

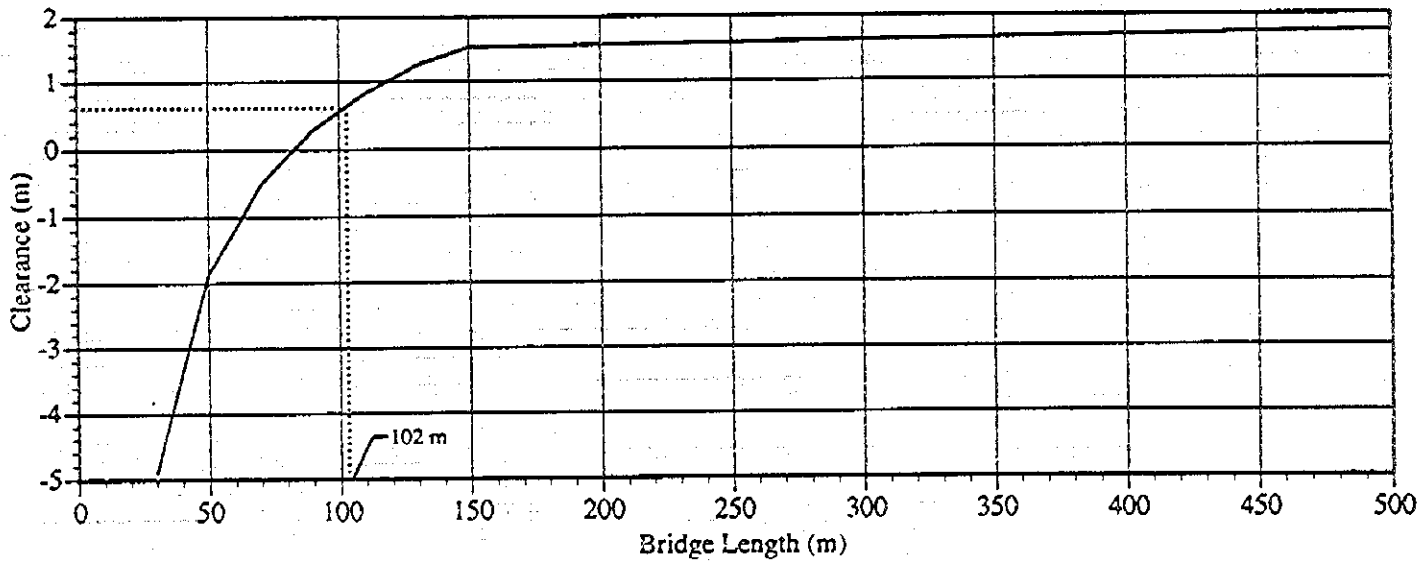


Figure A6-3 Relation between Bridge Length and Vertical Clearance

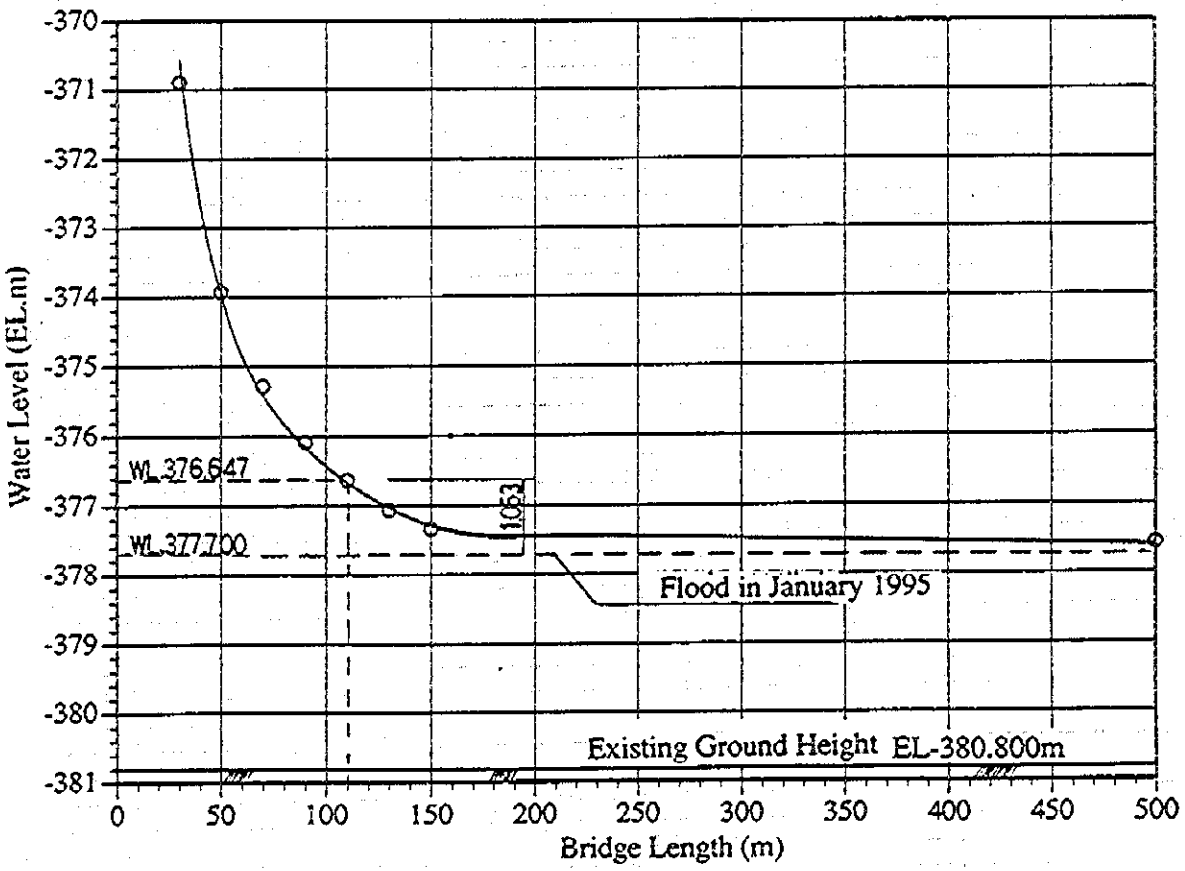
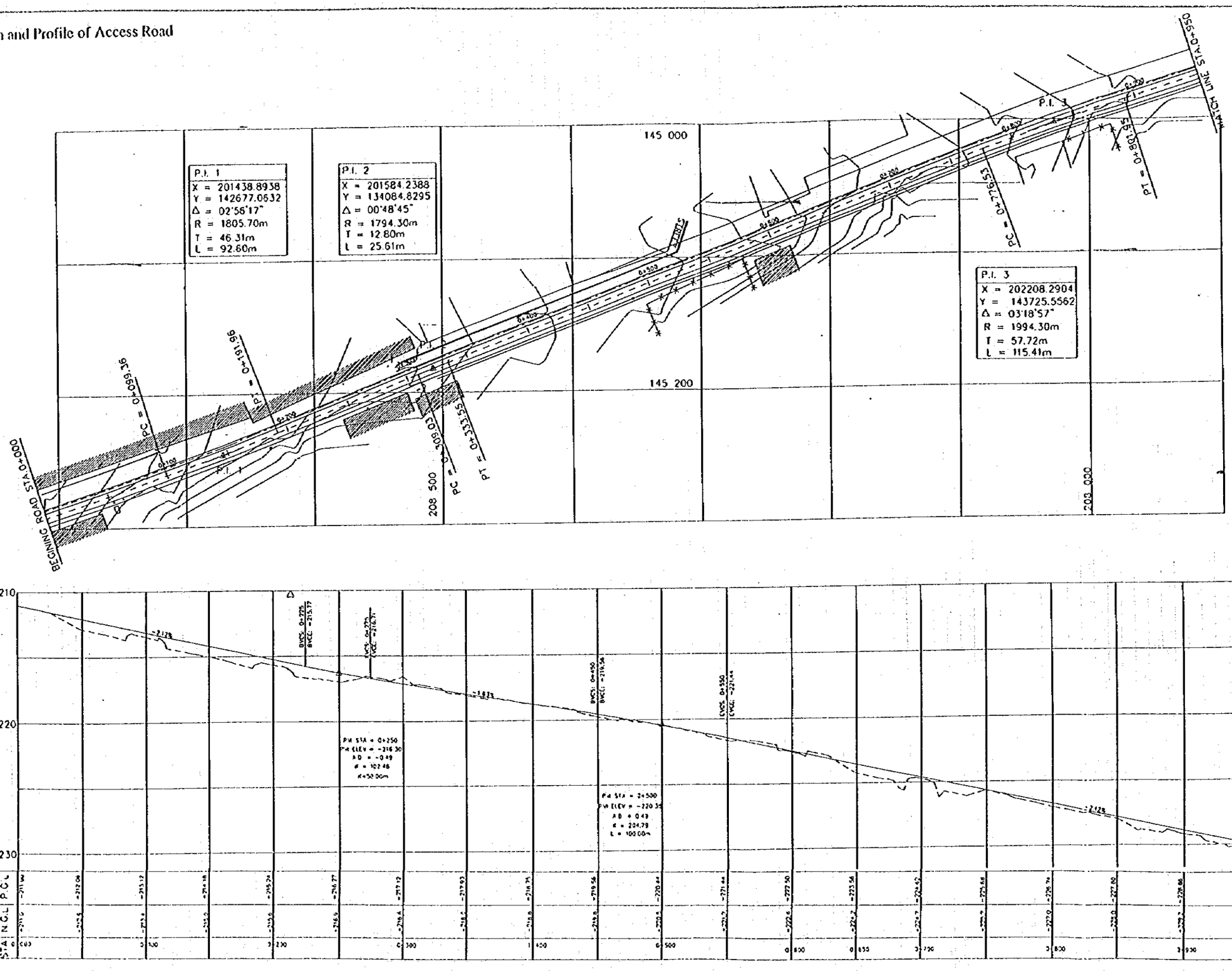
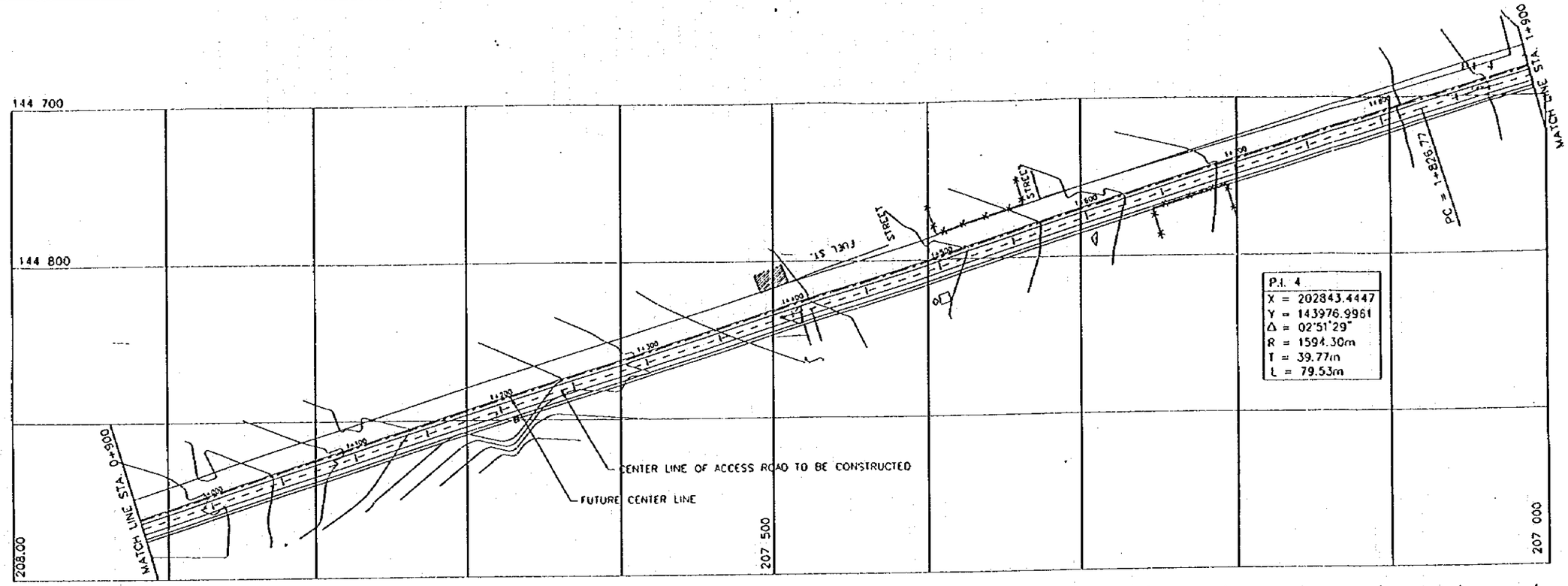


Figure A6-4 Relation between Bridge Length and Upstream Water Level

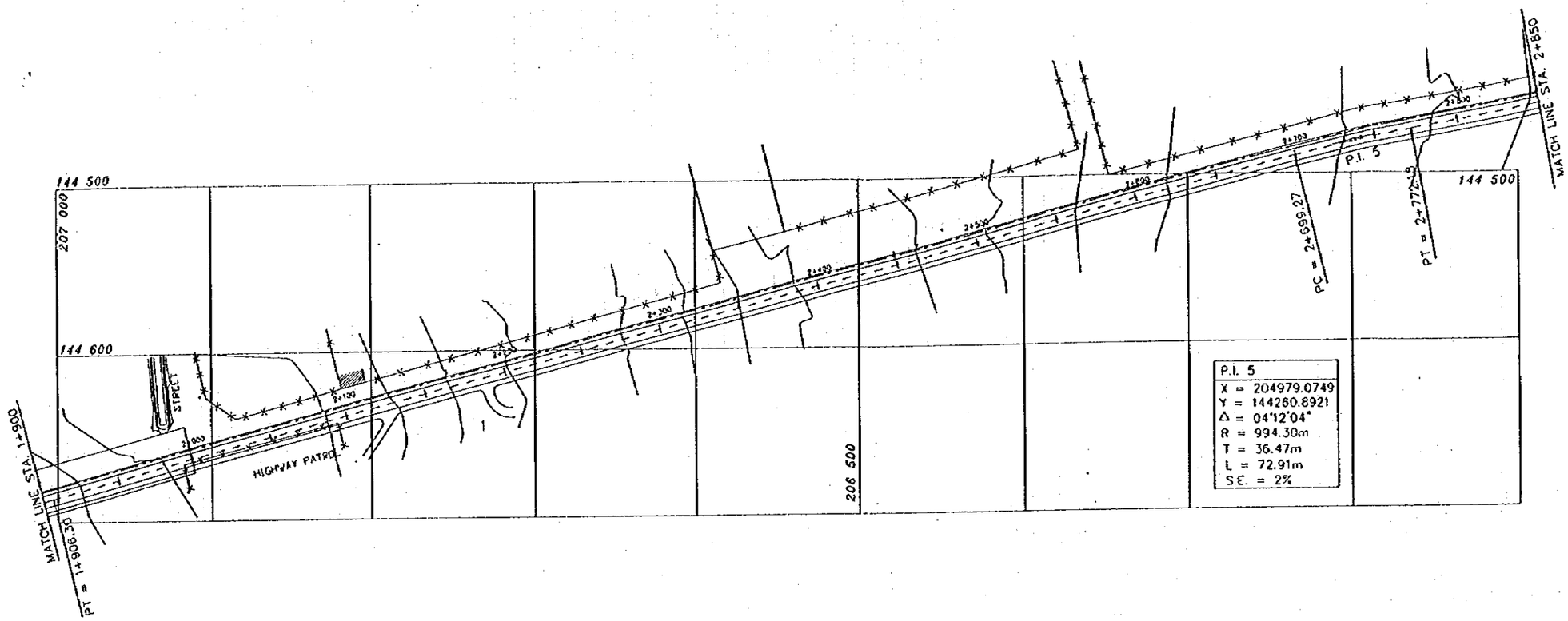
6-3 Plan and Profile of Access Road

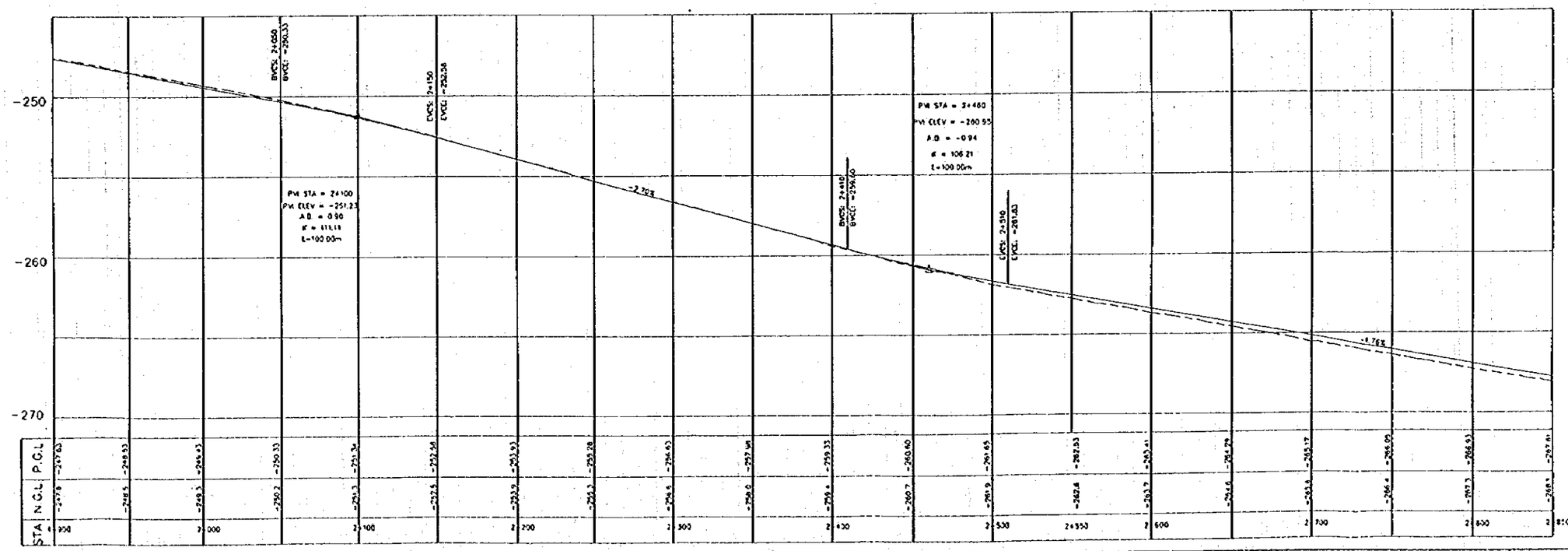


Ministry of Public Works & Housing the Hashemite Kingdom of Jordan	BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION OF KING HUSSEIN BRIDGE AND SHEIKH HUSSEIN BRIDGE	Japan International Cooperation Agency Nippon Koei Co., Ltd.	Drawing Title: King Hussein: Plan & Profile of Access Road No. 1	Scale: N.A.	March 1996

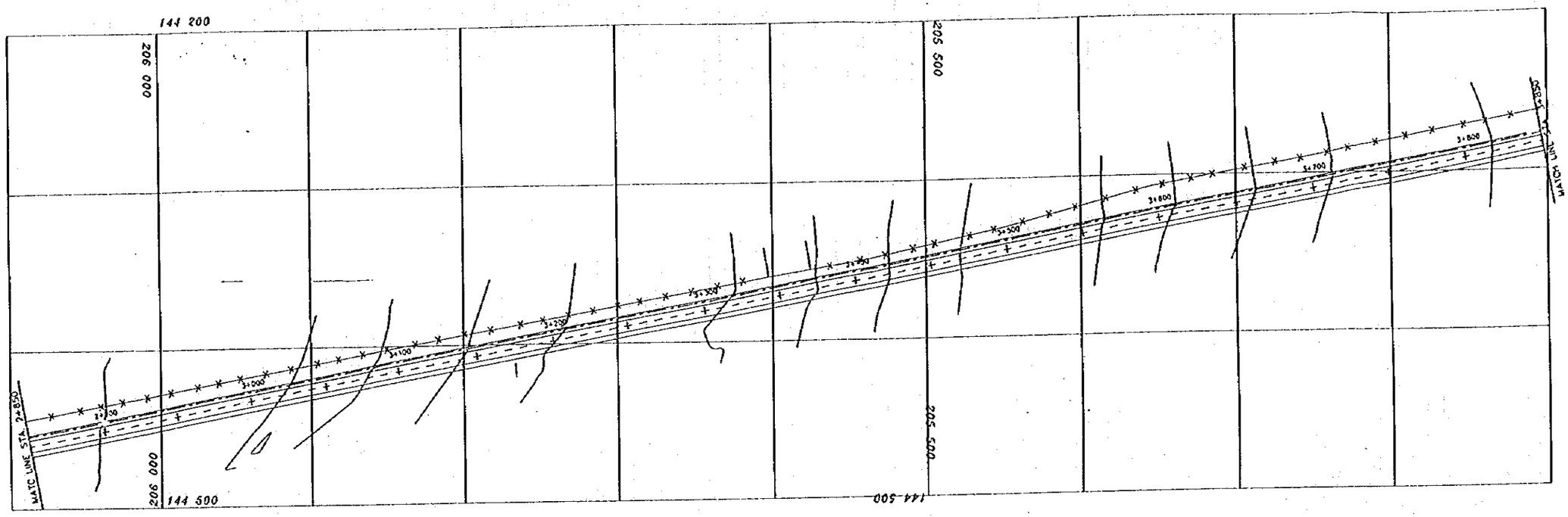


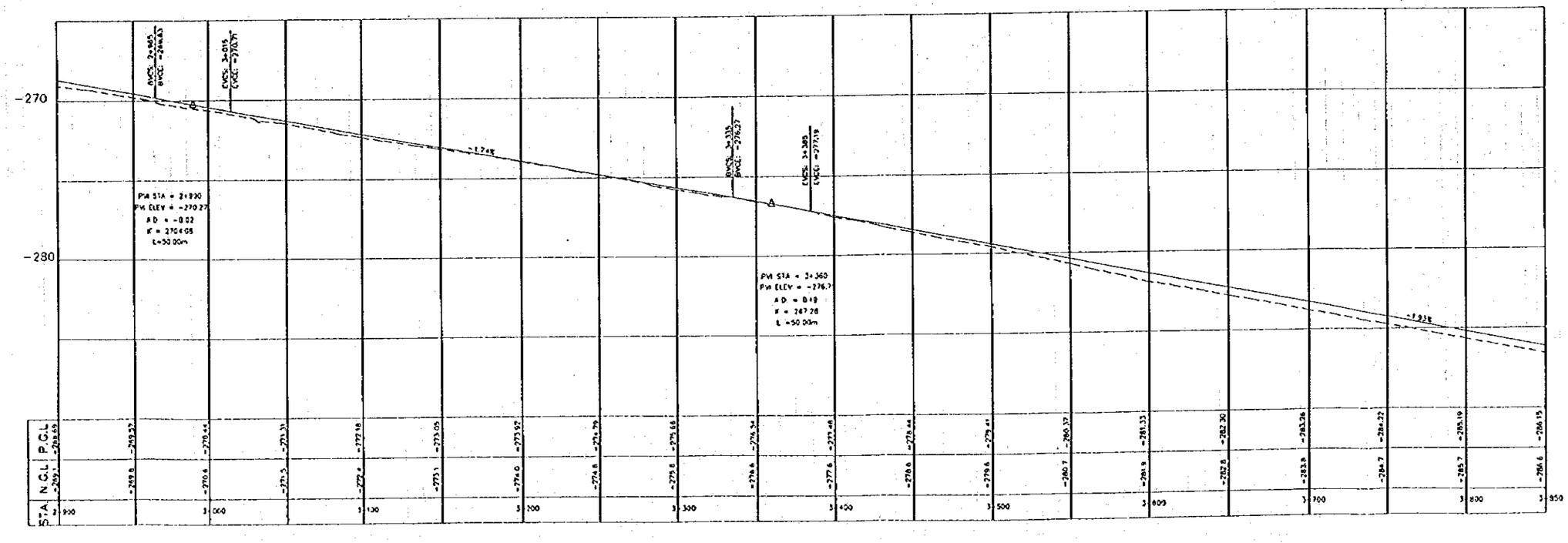
Ministry of Public Works & Housing the Hashemite Kingdom of Jordan	**BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION OF KING HUSSEIN BRIDGE AND SHEIKH HUSSEIN BRIDGE**	Japan International Cooperation Agency Nippon Koei Co., Ltd.	Drawing Title: **King Hussein: Plan & Profile of Access Road No. 2**	Scale: N.A.	March 1996



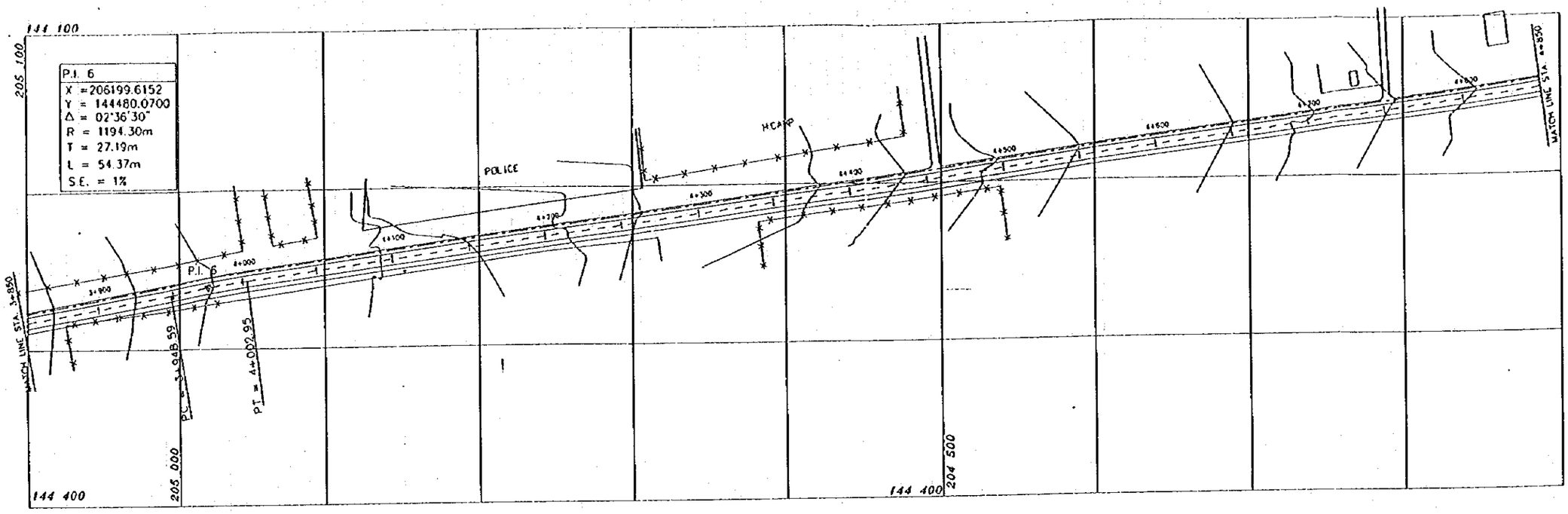


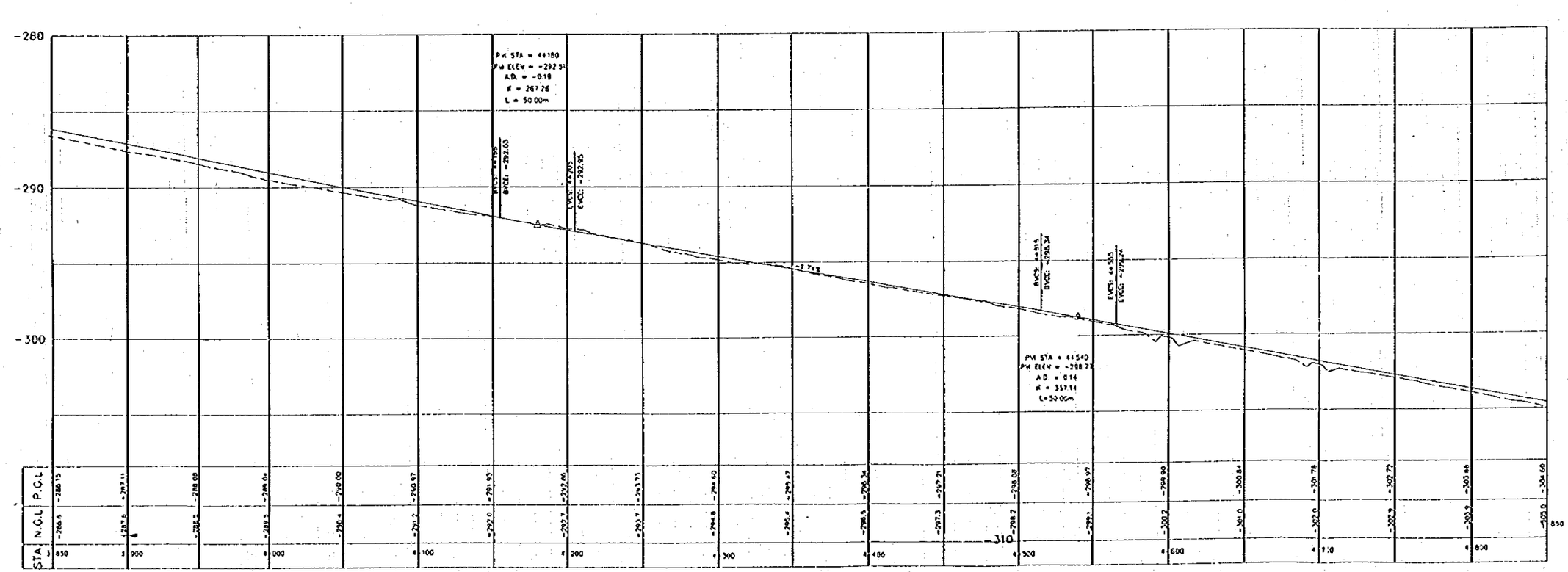
Ministry of Public Works & Housing the Hashemite Kingdom of Jordan	**BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION OF KING HUSSEIN BRIDGE AND SHEIKH HUSSEIN BRIDGE**	Japan International Cooperation Agency Nippon Koei Co., Ltd.	Drawing Title **King Hussein: Plan & Profile of Access Road No. 3**	Scale N.A.	March 1996



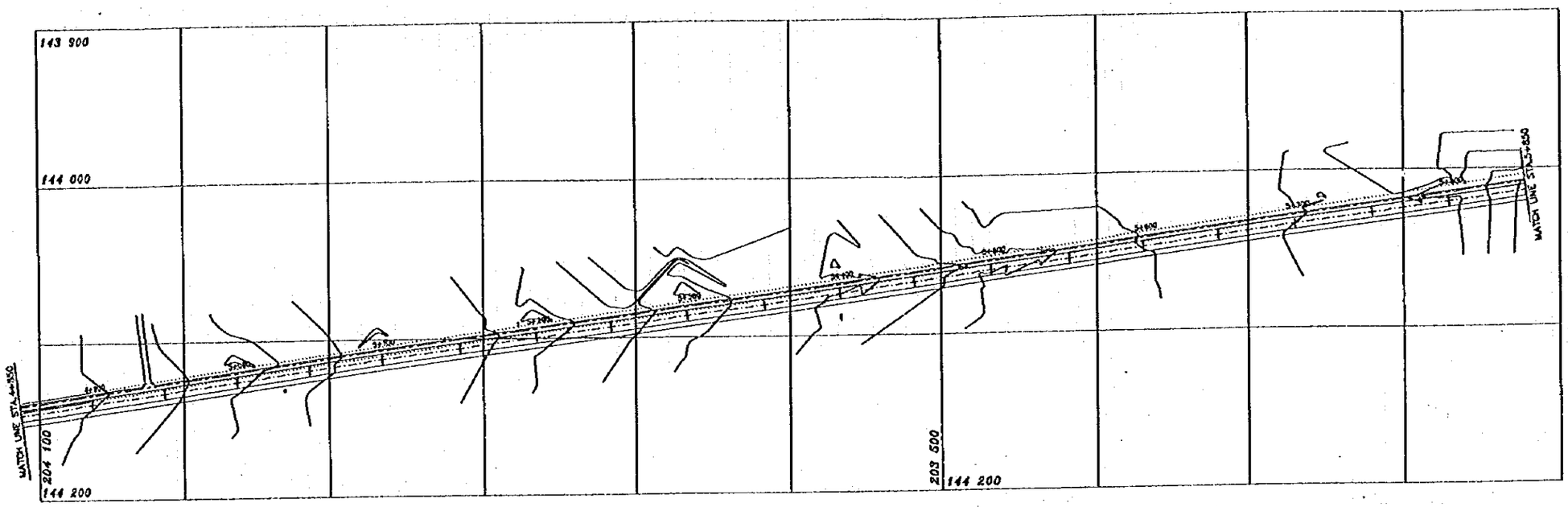


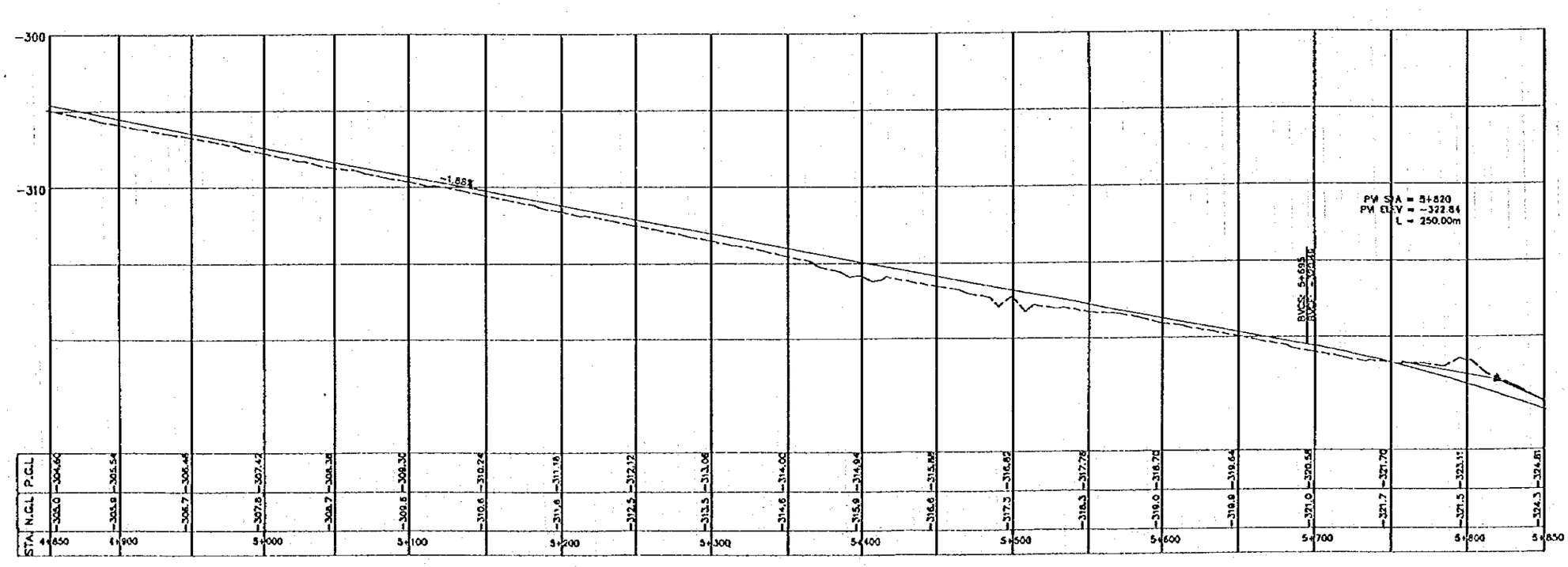
Ministry of Public Works & Housing the Hashemite Kingdom of Jordan	**BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION OF KING HUSSEIN BRIDGE AND SHEIKH HUSSEIN BRIDGE**	Japan International Cooperation Agency Nippon Koei Co., Ltd.	Drawing Title: **King Hussein: Plan & Profile of Access Road No. 4**	Scale: N.A.	March 1996



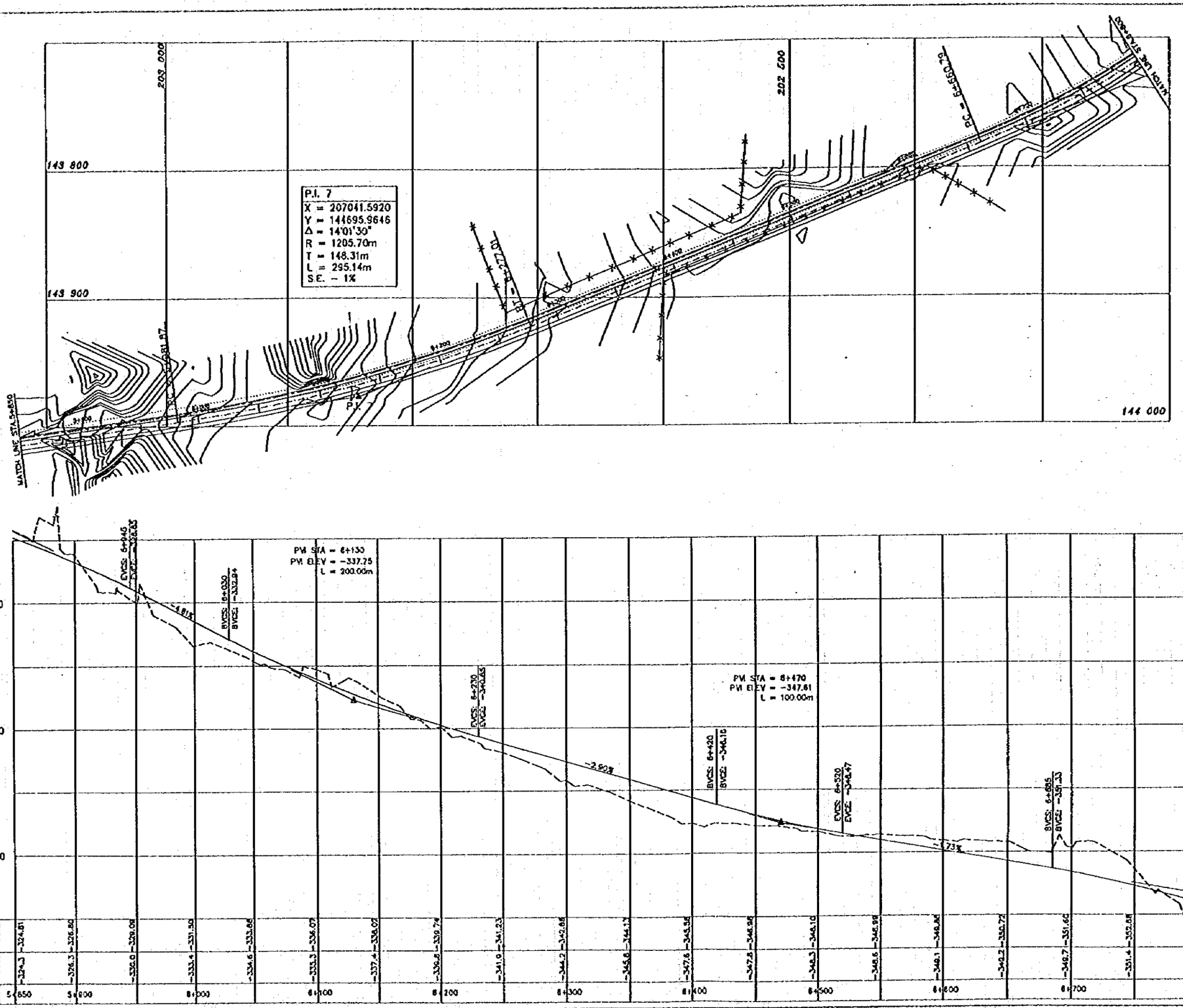


Ministry of Public Works & Housing the Hashemite Kingdom of Jordan	**BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION OF KING HUSSEIN BRIDGE AND SHEIKH HUSSEIN BRIDGE**	Japan International Cooperation Agency Nippon Koei Co., Ltd.	Drawing Title: **King Hussein: Plan & Profile of Access Road No. 5**	Scale: H=1:3,000 V=1:300	March 1996

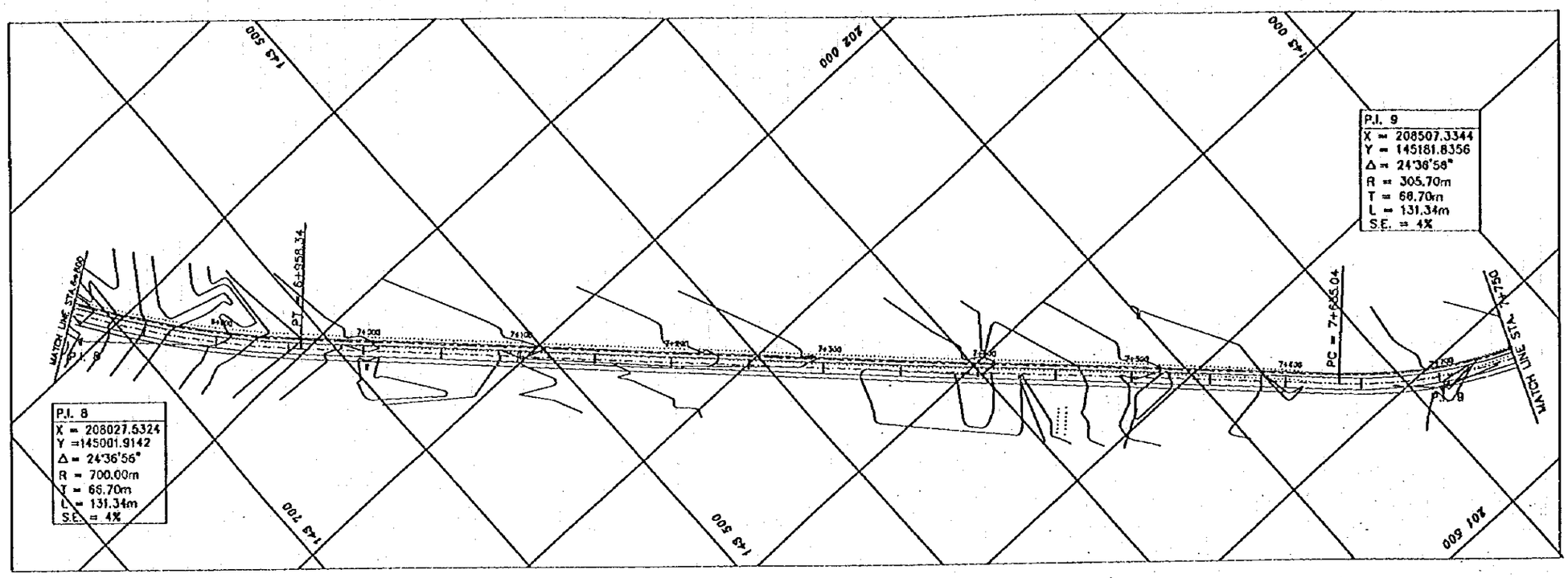


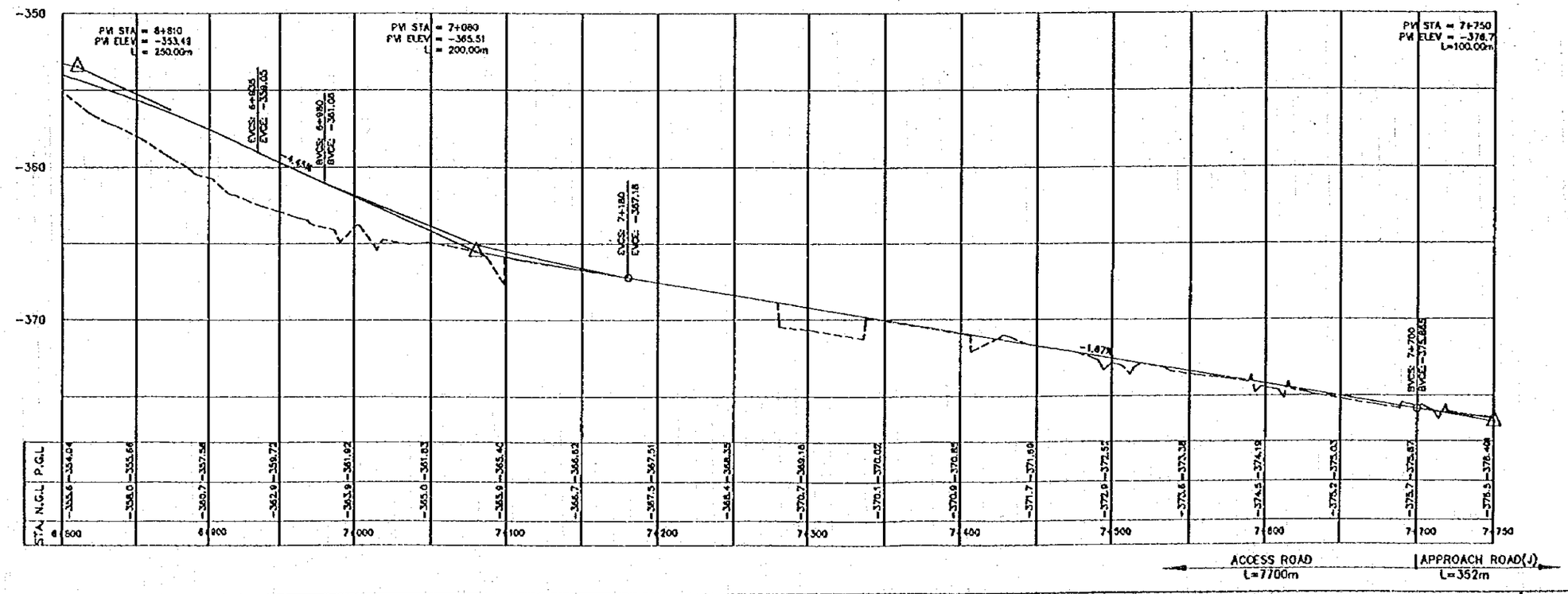


Ministry of Public Works & Housing the Hashemite Kingdom of Jordan	**BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION OF KING HUSSEIN BRIDGE AND SHEIKH HUSSEIN BRIDGE**	Japan International Cooperation Agency Nippon Koei Co., Ltd.	Drawing Title: King Hussein: Plan & Profile of Access Road No. 6	Scale: H=1:3,000 V=1:300	March 1996

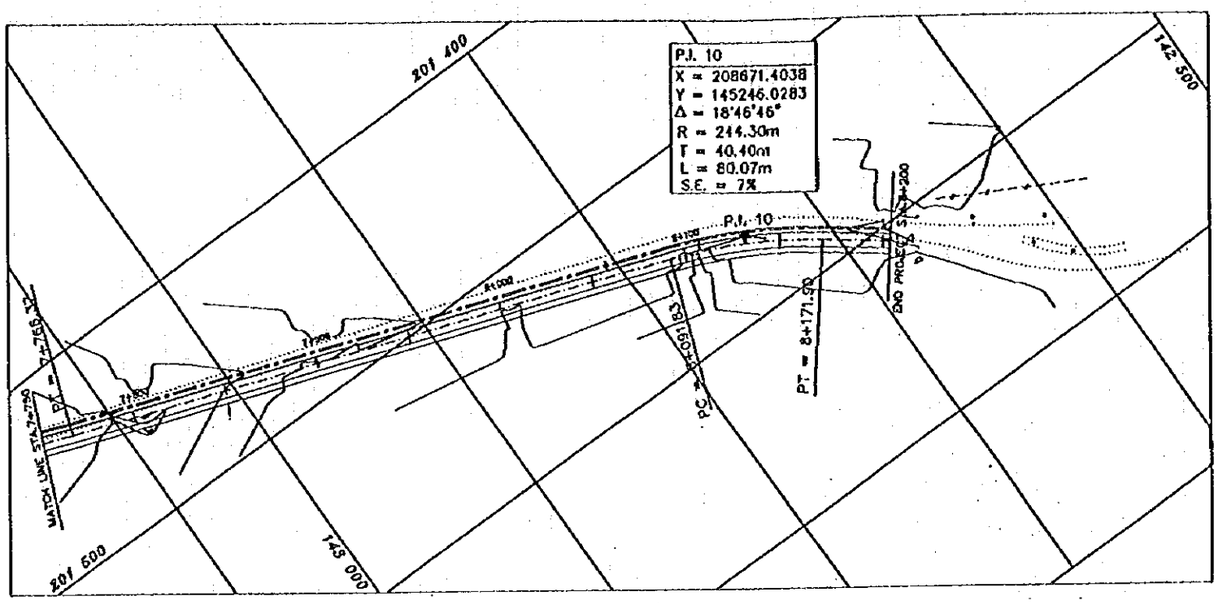


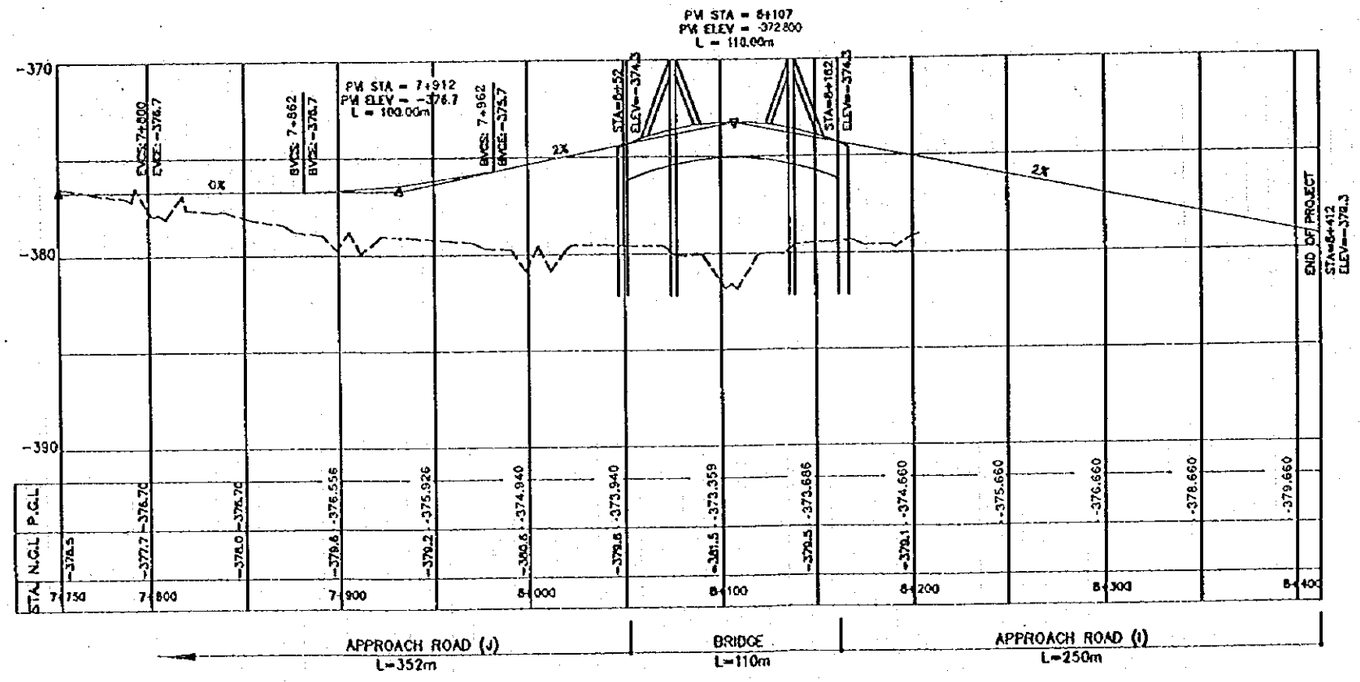
Ministry of Public Works & Housing the Hashemite Kingdom of Jordan	**BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION OF KING HUSSEIN BRIDGE AND SHEIKH HUSSEIN BRIDGE**	Japan International Cooperation Agency Nippon Koei Co., Ltd.	Drawing Title: **King Hussein: Plan & Profile of Access Road No. 7**	Scale: H=1:3,000 V=1:300 — March 1996



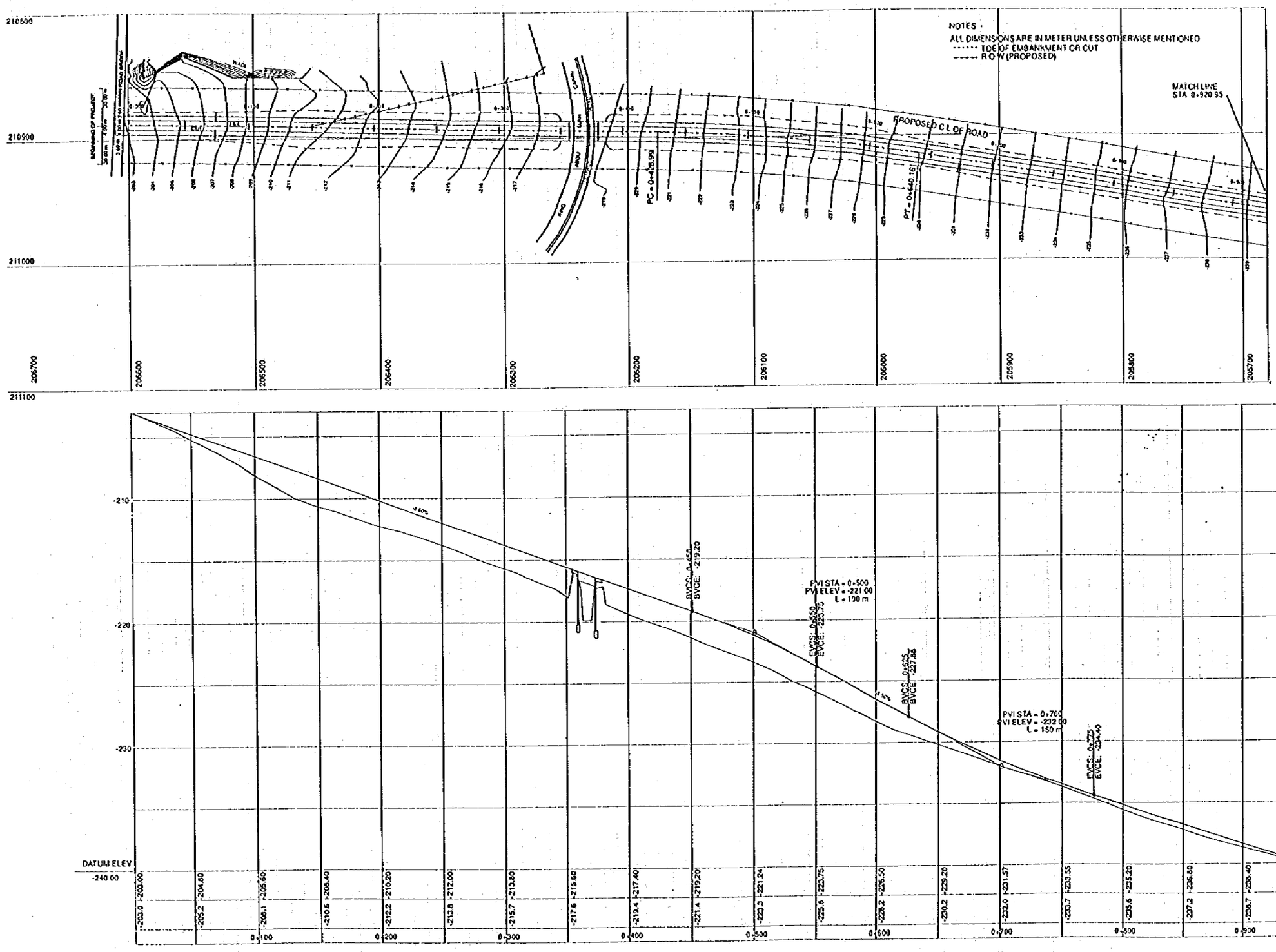


Ministry of Public Works & Housing the Hashemite Kingdom of Jordan	**BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION OF KING HUSSEIN BRIDGE AND SHEIKH HUSSEIN BRIDGE**	Japan International Cooperation Agency Nippon Koei Co., Ltd.	Drawing Title: **King Hussein: Plan & Profile of Access Road No. 8**	Scale: H=1:3,000 V=1:300	March 1996





Ministry of Public Works & Housing the Hashemite Kingdom of Jordan	**BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION OF KING HUSSEIN BRIDGE AND SHEIKH HUSSEIN BRIDGE**	Japan International Cooperation Agency Nippon Koei Co., Ltd.	Drawing Title **King Hussein: Plan & Profile of Access Road No. 9**	Scale H=1:3,000 V=1:300	March 1996



Ministry of Public Works & Housing the Hashemite Kingdom of Jordan	**BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION OF KING HUSSEIN BRIDGE AND SHEIKH HUSSEIN BRIDGE**	Japan International Cooperation Agency Nippon Koei Co., Ltd.	Drawing Title: **Sheikh Hussein: Plan & Profile of Access Road No. 1**	Scale: H=1:3,000 V=1:300	March 1996

Notes :
ALL DIMENSIONS ARE IN METER UNLESS OTHERWISE MENTIONED
..... TOE OF EMBANKMENT OR CUT
----- R.O.W (PROPOSED)

MATCH LINE STA. 1+550

MATCH LINE STA. 1+550

PC = 1+151.82

PROPOSED BOX CULVERT

PVI STA = 1+200
PVI ELEV = -248.00
L = 200.00 m

EVCS : 1+100
EVCE : -244.80

EVCS : 1+300
EVCE : -253.60

EVCS : 1+506
EVCE : -264.72

LOW POINT ELEV = -269.56
LOW PNT STA = 1+580
PVI STA = 1+600
PVI ELEV = -270.00
L = 192.00 m

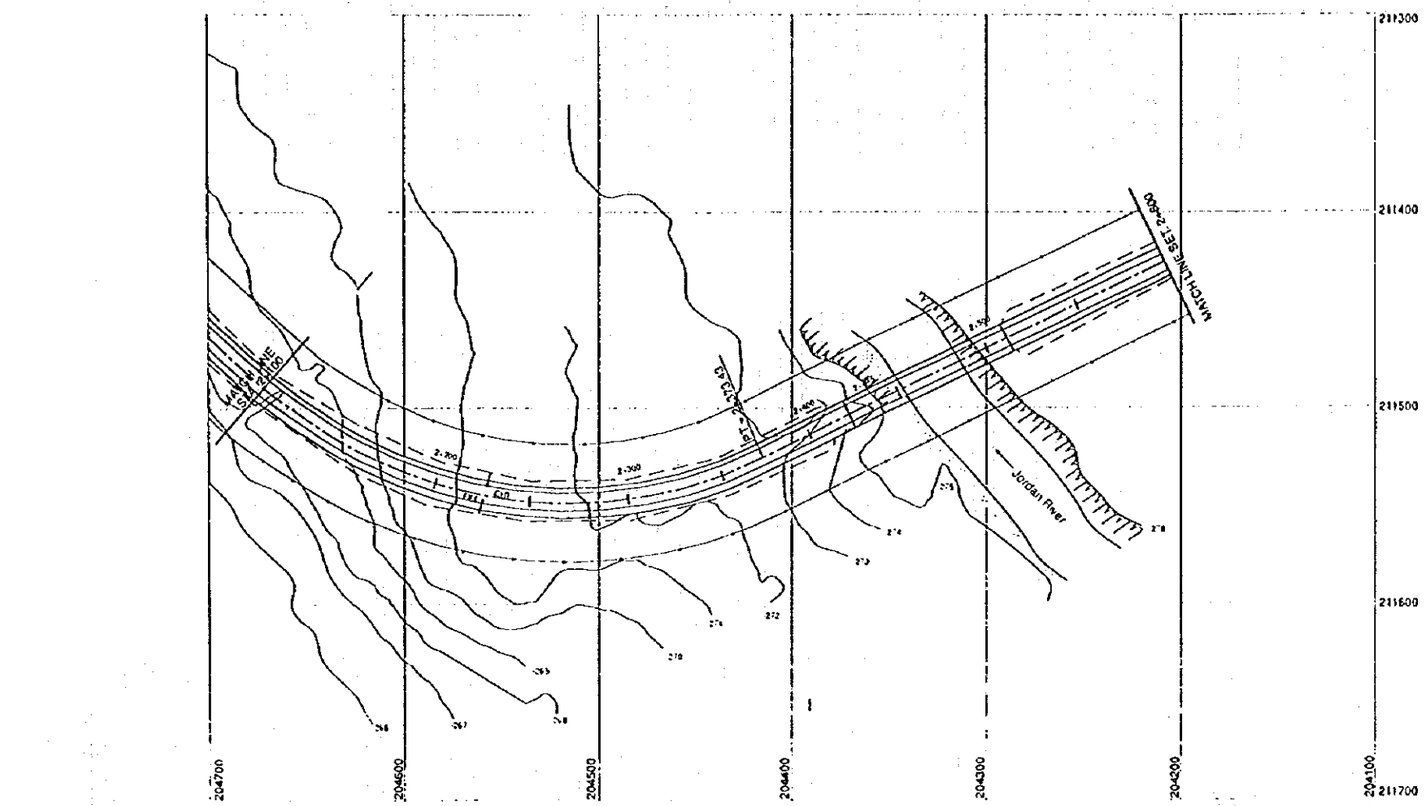
EVCS : 1+696
EVCE : -269.52

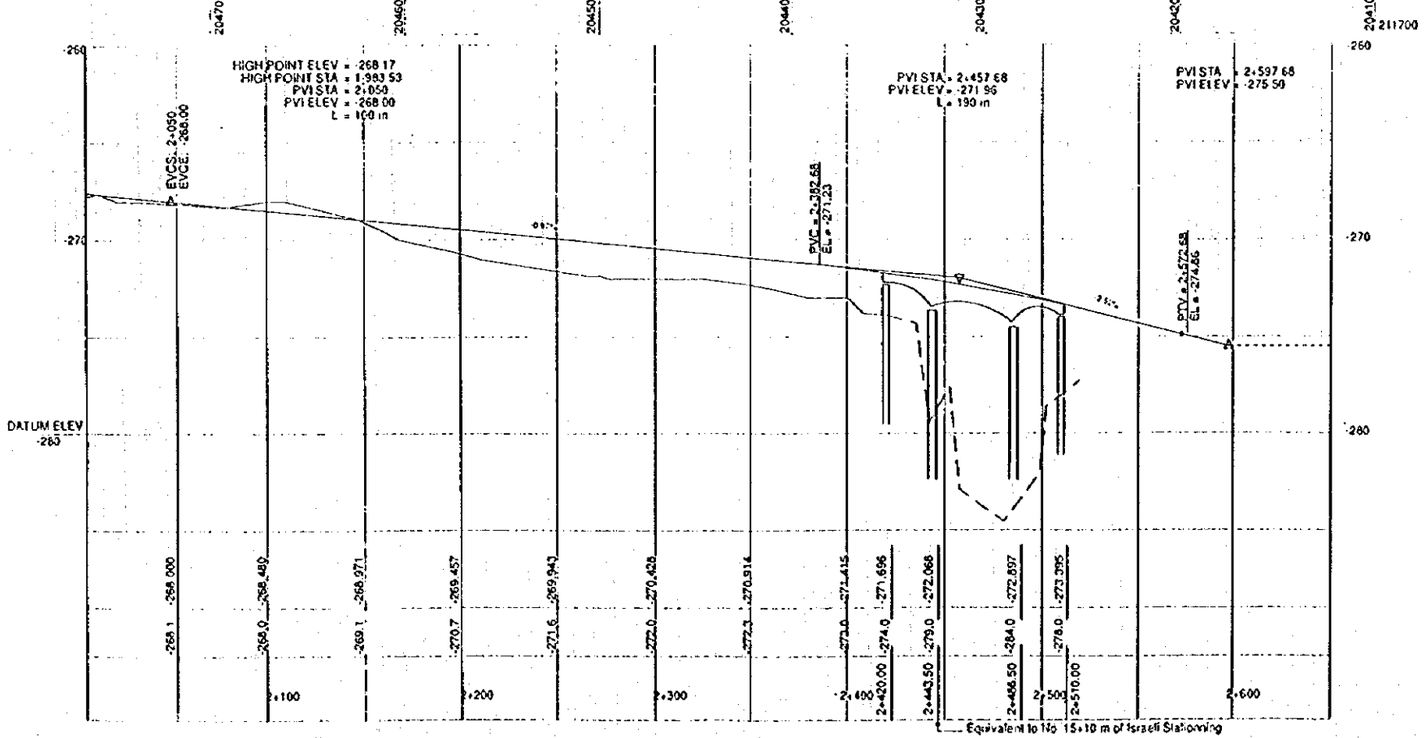
EVCS : 1+850
EVCE : -268.25

DATUM ELEV
270

Ministry of Public Works & Housing the Hashemite Kingdom of Jordan	BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION OF KING HUSSEIN BRIDGE AND SHEIKH HUSSEIN BRIDGE	Japan International Cooperation Agency Nippon Koei Co., Ltd.	Drawing Title: Sheikh Hussein: Plan & Profile of Access Road No. 2	Scale: H=1:3,000 V=1:300	March 1996

NOTES :
ALL DIMENSIONS ARE IN METER UNLESS OTHERWISE MENTIONED
------ TOE OF EMBANKMENT OR CUT
- - - - - R.O.W (PROPOSED)





Ministry of Public Works & Housing the Hashemite Kingdom of Jordan	**BASIC DESIGN STUDY ON THE PROJECT FOR CONSTRUCTION OF KING HUSSEIN BRIDGE AND SHEIKH HUSSEIN BRIDGE**	Japan International Cooperation Agency Nippon Koei Co., Ltd.	Drawing Title: **Sheikh Hussein: Plan & Profile of Access Road No. 3**	Scale: H=1:3,000 V=1:300	March 1996

BOREHOLE LOG DATA SHEET

PROJECT : King Hussein Bridge (Jordan side)
TYPE & SIZE OF DRILLING : Hollow Stem Auger (7 inches)
BOREHOLE NO.: BH1
DATE : February 1996

DEPTH (m)	DESCRIPTION	REC (%)	RQD (%)	SPT "N"	MC (%)	LL	PI	(γ) g/cm3	Sample No.
1.				14		39.0	19.0		
2.									
3.	Dark brown sandy silty clay, stiff to very stiff.			20					
4.						44.6	23.4		
5.				22					
6.				23		42.5	21.9		
7.									
8.				24		61.5	33.5		
9.				26					
10.				51					
11.									
12.				27		63.6	35.1		
13.	WT								
14.				27					
15.				29		61.6	34.2		
16.									
17.				30					
18.						58.3	31.3		
19.				32					
20.				31		60.8	34.0		
21.	Greyish, greenish very stiff to very hard silty clay interbedded with thin layers of sand and gravels.			33					
22.									
23.	Sand and gravels layers between			33					
24.	7.3 - 7.70 m					64.8	35.8		
25.	9.6 - 10.00			34					
26.	11.4 - 11.65								
27.	34.5 - 34.75			38					
28.	38.2 - 38.90								
29.	40.3 - 41.00			37		66.5	37.0		
30.				41					
31.									
32.				44					
33.				50		66.7	34.7		
34.				62					
35.									
36.				63					
37.				66		63.8	35.1		
38.									
39.				67					
40.									
41.				67					

PROJECT : King Hussein Bridge (West Bank side)
TYPE & SIZE OF DRILLING : Hollow Stem Auger (7 inches)
BOREHOLE NO.: BH2
DATE : February 1996

DEPTH (m)	DESCRIPTION	REC (%)	RQD (%)	SPT "N"	MC (%)	LL	PI	(γ) g/cm3	Sample No.
1.									
2.				13					
3.	Dark brownish sandy silty clay, stiff to very stiff.			19					
4.						45.2	22.6		
5.				21					
6.				22					
7.				27					
8.						44.2	22.7		
9.				26					
10.				28					
11.									
12.	WT			23					
13.									
14.				26					
15.				26		50.8	30.2		
16.									
17.				29					
18.				34					
19.									
20.	Greyish, greenish silty clay intercalated with thin bands of sand, very stiff to hard.			36					
21.				38		61.8	32.2		
22.									
23.				38					
24.						64.6	35.0		
25.				41					
26.				40					
27.						66.8	35.6		
28.				39					
29.				42					
30.				43					
31.									
32.									
33.									
34.									
35.									
36.									
37.									
38.									
39.									
40.									
41.									

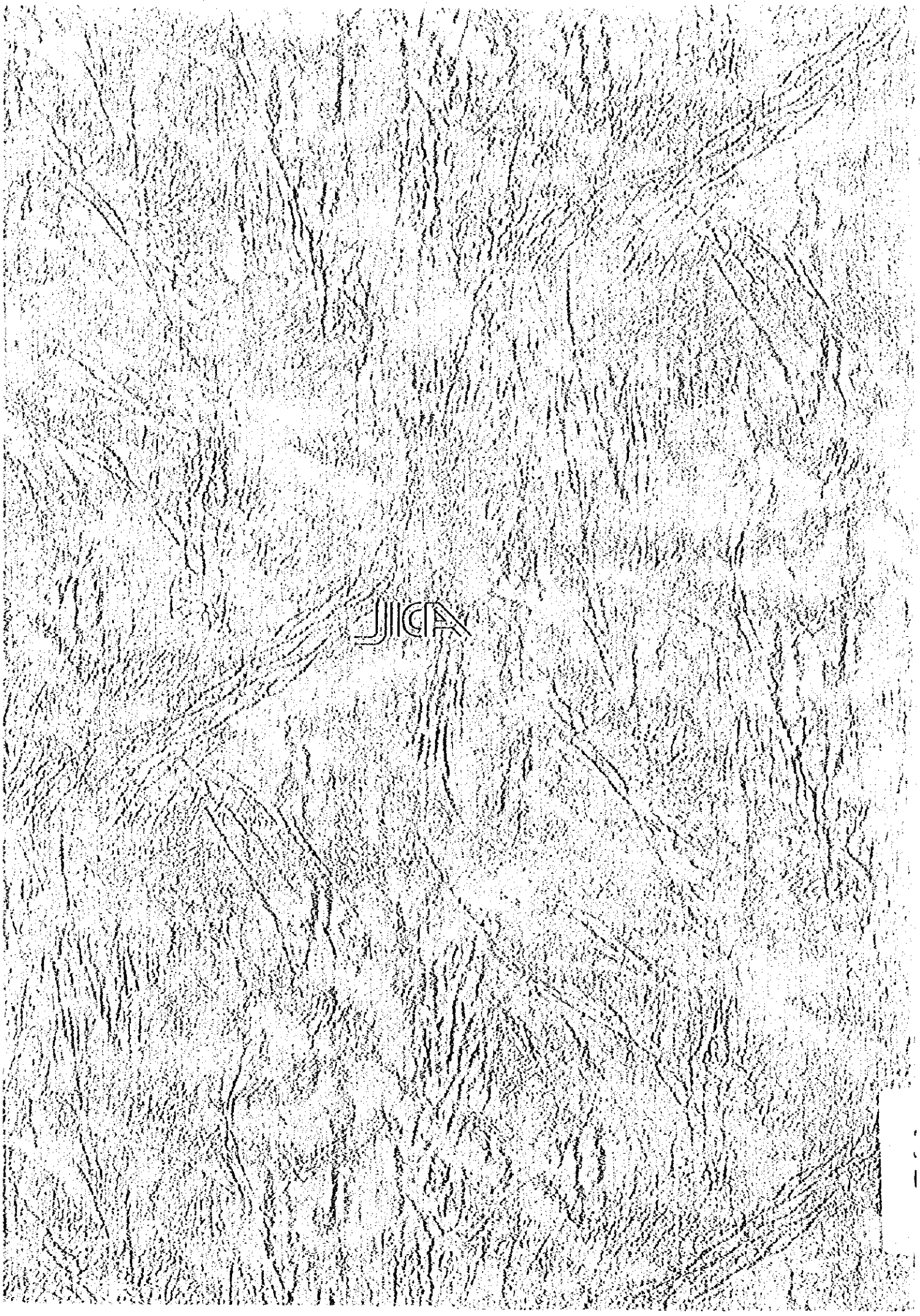
BOREHOLE LOG DATA SHEET

PROJECT : Sheikh Hussein Bridge (Jordan side)
TYPE & SIZE OF DRILLING : Hollow Stem Auger (7 inches)
BOREHOLE NO.: BH1
DATE : January 1996

DEPTH (m)	LOG	DESCRIPTION	REC (%)	RQD (%)	SPT "N"	MC (%)	LL	PI	(γ) g/cm3	Sample No.
1.		Fine to coarse gravels and sandy silty clay.			16		50.0	28.0		
2.										
3.		Dark brownish sandy silty clay, very stiff to hard.			21					
4.										
5.					25		45.2	24.0		
6.		▽ WT			46					
7.		Fine to coarse gravels and sandy silty clay.			31					
8.										
9.					31		44.8	22.7		
10.					30					
11.										
12.		Dense, fine to coarse sand, and silt, intercalated with layers of hard clay.			32					
13.					32					
14.										
15.					63					
16.										
17.					51					
18.					67					
19.										
20.					63					
21.		Intercalation of dense to very dense, fine to coarse, and, silt and clay, the clay is hard.								
22.					42					
23.										
24.					61					
25.					68					
26.							42.0	20.0		
27.					62					
28.					70					
29.										
30.					61					
31.					60					
32.										
33.					46					
34.					72					
35.										
36.					51					
37.					73					
38.										
39.					77					
40.										
41.										

PROJECT : Sheikh Hussein Bridge (Israel side)
TYPE & SIZE OF DRILLING : Hollow Stem Auger (7 inches)
BOREHOLE NO.: BH2
DATE : February 1996

DEPTH (m)	LOG	DESCRIPTION	REC (%)	RQD (%)	SPT "N"	MC (%)	LL	PI	(γ) g/cm3	Sample No.
1.										
2.		Dark brownish, greyish silty clay, with some sand, stiff to very stiff.			14					
3.					18					
4.										
5.					21					
6.		▽ WT			17		58.2	32.2		
7.										
8.					19					
9.					26					
10.										
11.					20					
12.					29					
13.							61.6	34.6		
14.					29					
15.					31					
16.										
17.					38					
18.					43					
19.							62.8	35.1		
20.		Greyish, greenish silty clay intercalated with thin bands of sand, very stiff to hard.			47					
21.					50					
22.										
23.					37					
24.					40					
25.										
26.					41					
27.					51		64.7	36.2		
28.										
29.					48					
30.					59					
31.										
32.										
33.										
34.										
35.										
36.										
37.										
38.										
39.										
40.										
41.										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