No. BBMB/DRIP-II/BEAS/03/2020

GOVERNMENT OF INDIA

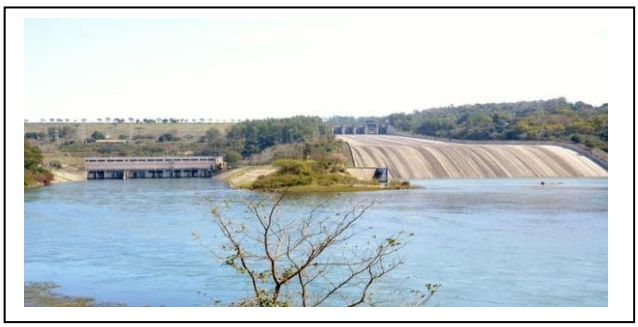
BHAKRA BEAS MANAGENEMT BOARD

DAM REHABILITATION AND IMPROVEMENT PROJECT PHASE- II

BEAS DAM

PROJECT SCREENING TEMPLATE



FEBUARAY 2020

Office of Chief Engineer

BBMB Talwara

Talwara-144216

Tel: 01883- 237131, E-mail: cebdt@bbmb.nic.in

Table of Contents

FORM-I: PROJECT DETAILS

1. Project Description:

a. Project Identification Code (PIC): HP19VH002

(As given in National Register of Large Dams, if applicable)

b. Project Name: BEAS DAM

c. River Basin: Indus

d. Sub River Basin: Beas

e. River/Stream: Beas

2. Project Location:

a. State: Himachal Pradesh

b. District: Kangra

c. Earthquake Zone: V

d. Survey of India Topo Sheet No. NA

e. Nearest City: Talwara

f. Nearest Airport: Gaggal

g. Nearest Railhead: Mukerian

h. Name of Immediate u/s Project: _Pandoh Dam

i. Name of Immediate d/s Project: Shah Nehar Barrage

j. Latitude/Longitude (in degrees, minutes, seconds):

Lat:	31º	58’	20”	N
Long:	75º	56’	52”	E

3. Project Benefits:

a. Type of Project: Multipurpose Project

b. Irrigation Benefits, in hectares (ha):

(i) Gross Command Area (GCA): Not Available

(ii) Cultivable Command Area (CCA): Not Available

(iii) Annual Irrigation Potential (AIP):(Million hectare) 1.60

c. Hydropower Benefits:

(i) Installed Capacity (MW): 396 (ii) Firm Power (MW): 72

(iii) Average Annual Energy Generation (MU): 1070.00

d. Domestic/Municipal/Industrial Water Supply: Benefits transmitted to Partner States

(i) Annual Water Supply (MCM): NA

(ii) Nos. of Population Benefitted (In Lakh): NA

e. Flood Protection: Area of Punjab along River Beas

(i) Flood Protected Area (ha): _Area of Punjab _

(ii) Details of Area Benefitted (ha): _Area of partner States _

f. Details of Tourism/Recreational Facilities: _HP State developed such facilities_

4. Project Ownership Details:

a. Dam Owning Agency: BBMB

b. Implementing Agency: BBMB

c. Details of Dam Incharge:

(i) Name: Er. R.S.Rathore _ (ii) Designation: Chief Engineer _

(iii) Phone No. (With STD Code): 01883-237131_

(iv) Fax No. 01883-237233

(v) E-mail: cebdttlw@bbmb.nic.in

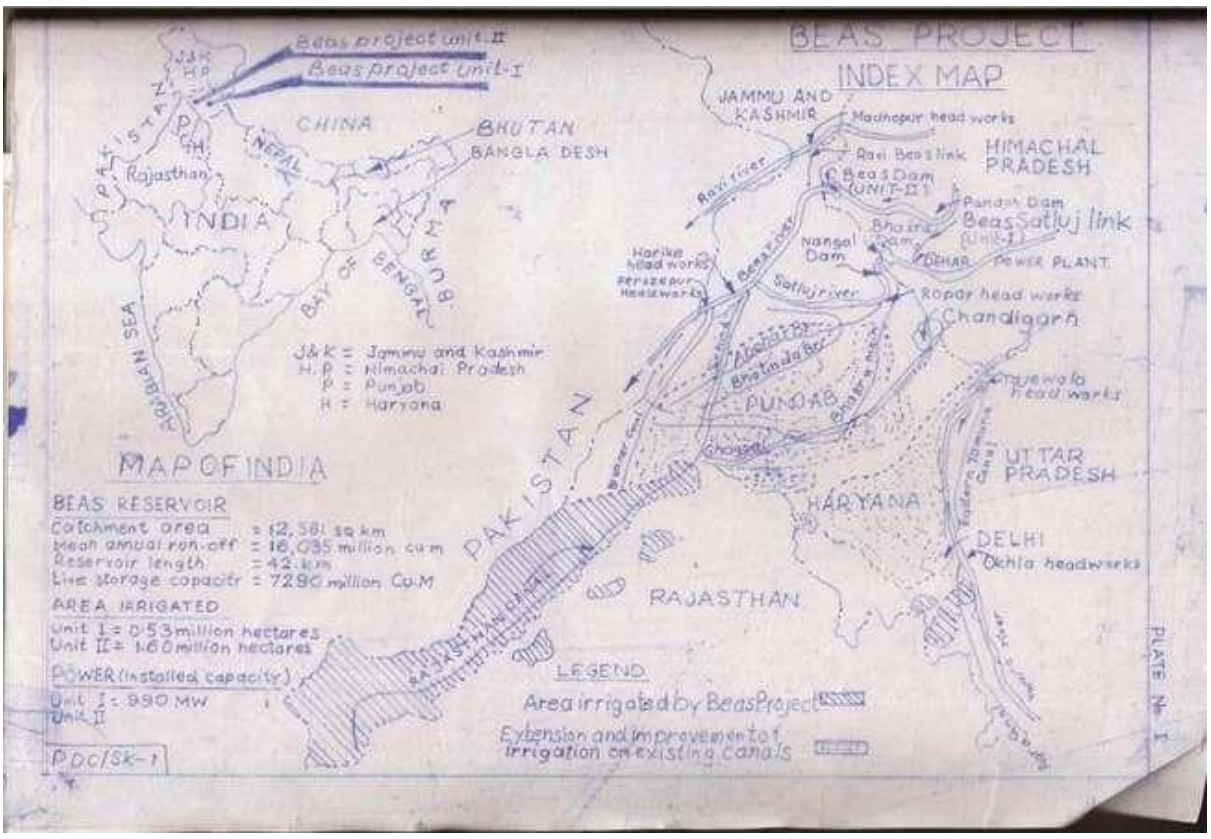
(vi) Contact Address: O/o Chief Engineer, Beas Dam, BBMB, Talwara

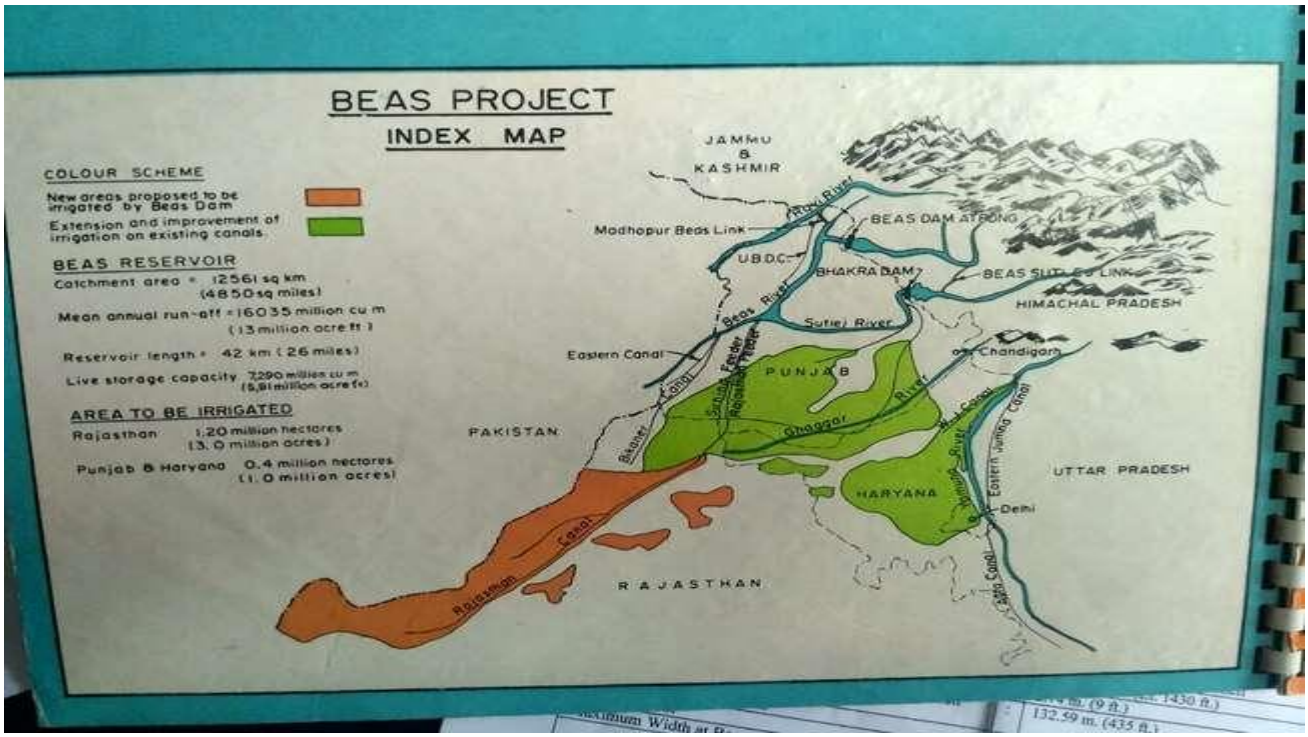
Appendix-I A

LOCATION /INDEX MAP OF PROJECT

Brief description of important features shown in map

The Beas Dam, located at Pong in District Kangra of Himachal Pradesh in the Himalayan foot hills, across Beas River, is an earth core-gravel shell dam, 132.6 m (435 ft) high from the deepest foundation level, with a crest length of about 1950 m (6400 ft). The width of the dam at the crest is 13.72 m (45 ft) and that at its base is about 610 m (2000 ft) excluding toe-weights. For passing the floods, radial-gate-controlled chute spillway has been provided on the left abutment. The spillway caters for a design flood of 33555 cumec (1185000 cusec) peak discharge and has a maximum outflow of 12375 cumec (437000 cusec). For energy dissipation, a stilling basin 99.06 m (325 ft) long and 213.4 m (700 ft) wide has been provided. The length of spillway chute is 655.62 m (2151 ft). On either side, the spillway flow is guided by reinforced concrete retaining walls with maximum height of 25.3 m (83 ft). There were five diversion tunnels. Two of these were converted into irrigation outlet tunnels while the remaining three were utilized as power penstock tunnels. The Pong Power Plant located at the downstream end of these penstock tunnels which initially had installed capacity of 6 x 60 MW i.e. 360 MW, have been further uprated to 6 x 66 MW i.e. 396 MW.




BEAS PROJECT
INDEX MAP
COLOUR SCHEME
New areas proposed to be irrigated by Beas Dam
Extension and improvement of irrigation on existing canals.
BEAS RESERVOIR
Catchment area = 12561 sq km (4850 sq miles)
Mean annual run-off = 16035 million cu m (13 million acre ft)
Reservoir length = 42 km (26 miles)
Live storage capacity 7290 millies cu m (5.91 million acre ft)
AREA TO BE IRRIGATED
Rajasthan 1.20 million hectores (3.0 million acres)
Punjab & Haryana 0.4 million hectores (1.0 million acres)
JAMMU & KASHMIR
Ravi River
Madhopur Beas Link
BEAS DAM AT PONG
UBDC
BHAKRA DAM
BEAS SUTLEJ LINK
HIMACHAL PRADESH
Beas River
Sutlej River
Eastern Canal
Chandigarh
PUNJAB
Ghaggar River
PAKISTAN
Bikaner Canal
Rajasthan Canal
HARYANA
Yamuna River
Eastern Jamna Canal
UTTAR PRADESH
Delhi
RAJASTHAN
Agra Canal

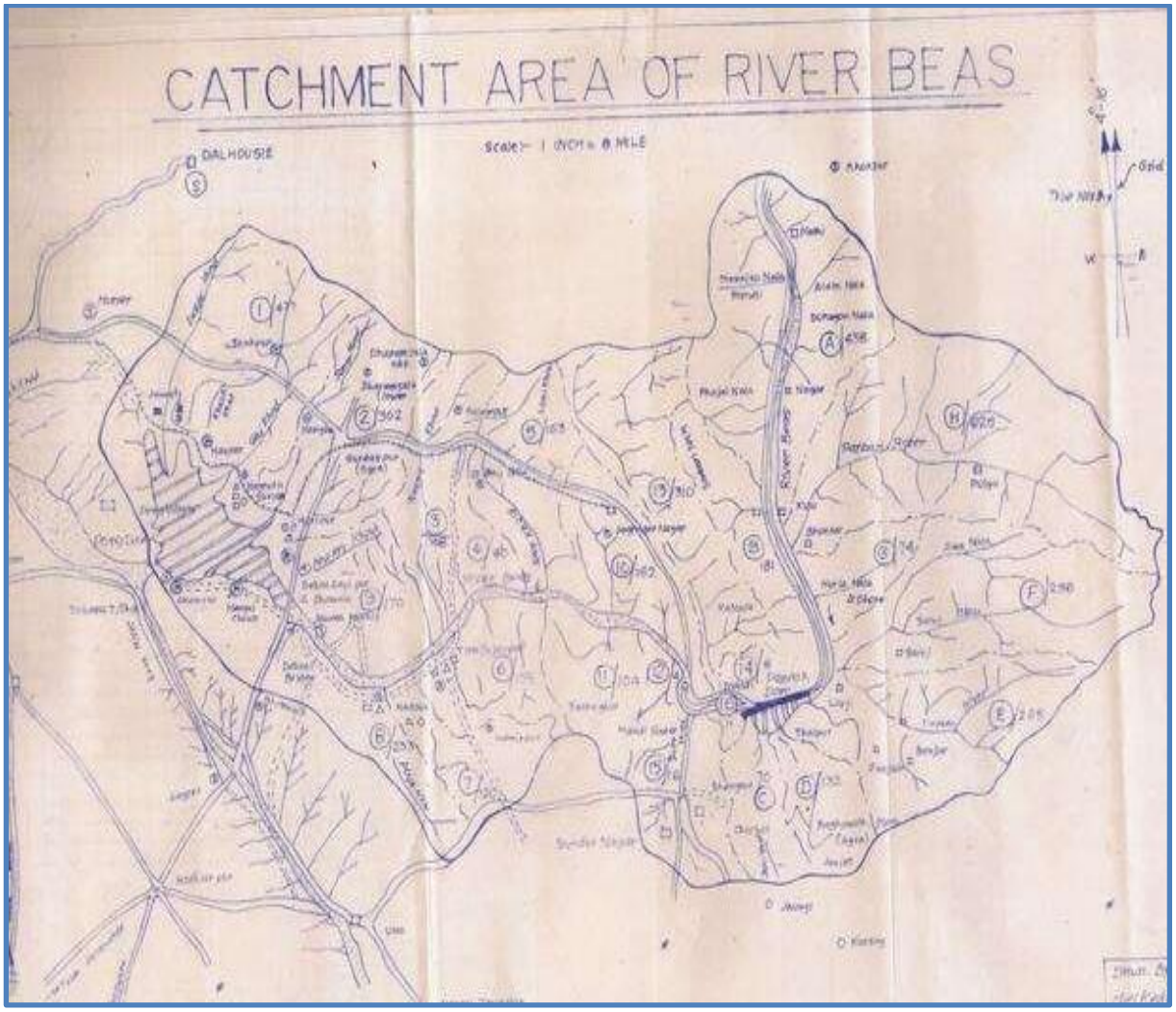
Appendix-I B

GOOGLE MAP OF DAM

Appendix-I C

CATCHMENT AREA MAP OF PROJECT

The Immediate U/S Project is Pandoh Dam in District Mandi of Himachal Pradesh. Dam is Constructed on Beas River and Parbati,Sainj,Tirthan and Bhakli River are its Major tributaries

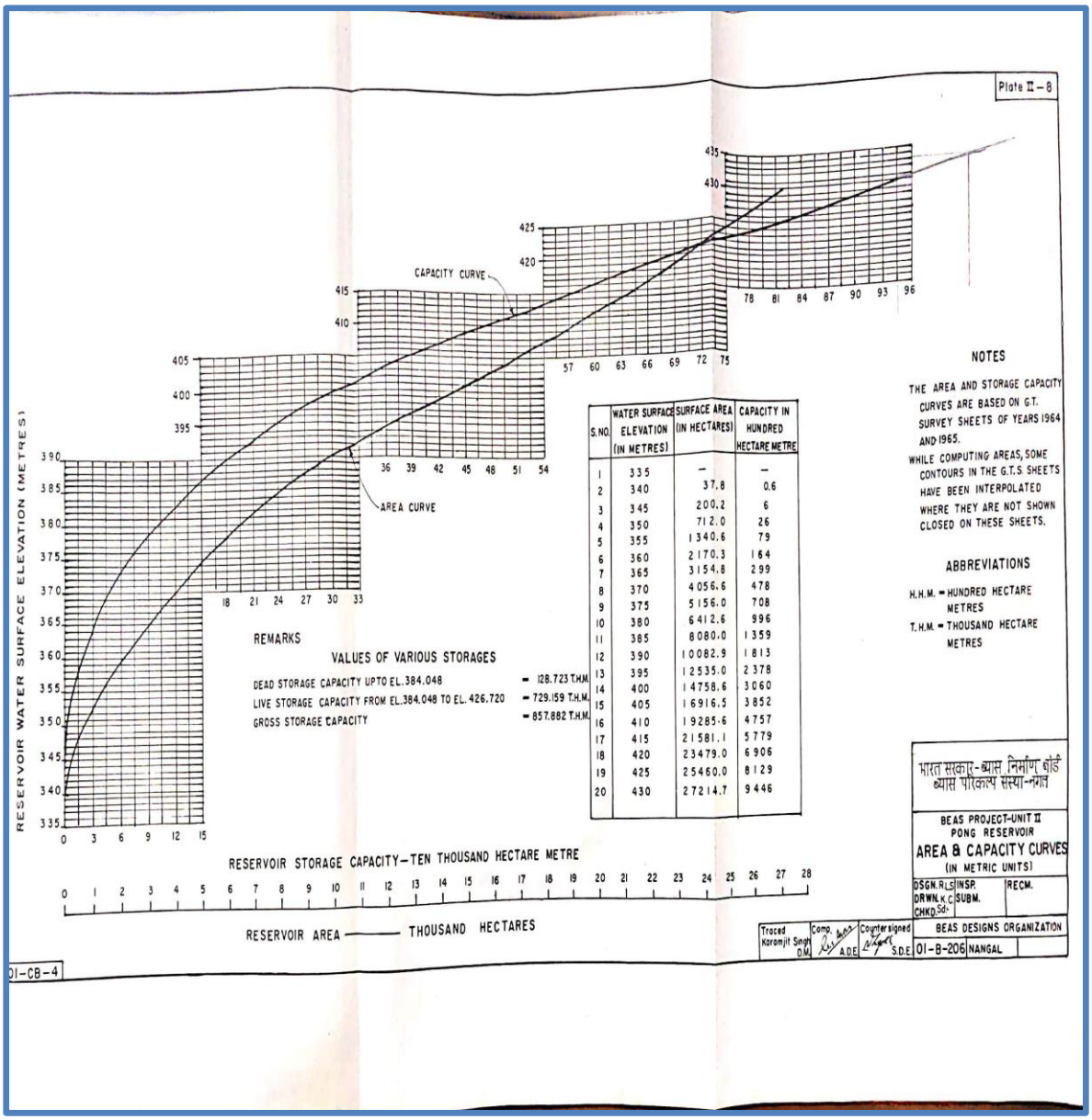


Appendix-I D

ELEVATION -AREA-CAPACITY CURVE (ORIGINAL)

The attached Plate cover detail of Area Capacity Curve in both Tabular and Graphical form

Sr. No.	Elevation (m)	Water Spread Area (x 1000 m2)	Cumulative Capacity (In Million Cubic Meter)
1	335	-	-
2	340	378	0.6
3	345	2002	6
4	350	7120	26
5	355	13406	79
6	360	21703	164
7	365	31548	299
8	370	40566	478
9	375	51560	708
10	380	64126	996
11	385	80800	1359
12	390	100829	1813
13	395	125350	2378
14	400	147586	3060
15	405	169165	3852
16	410	192856	4757
17	415	215811	5779
18	420	234790	6906
19	425	254600	8129
20	430	272147	9446

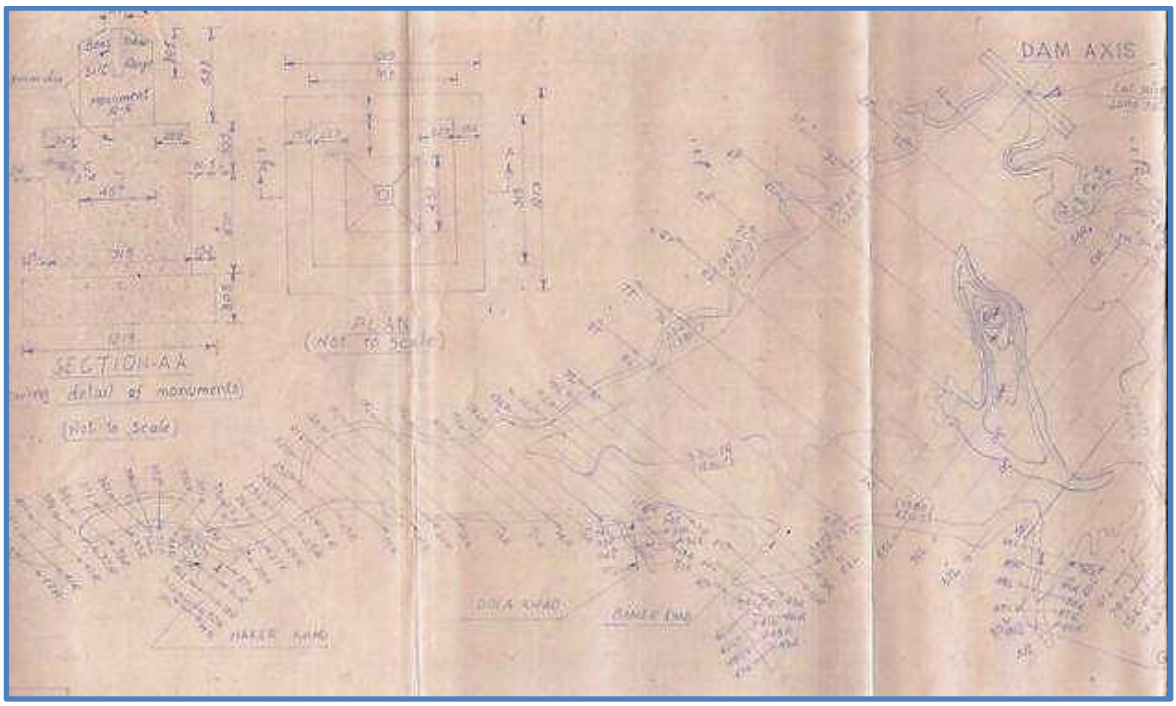


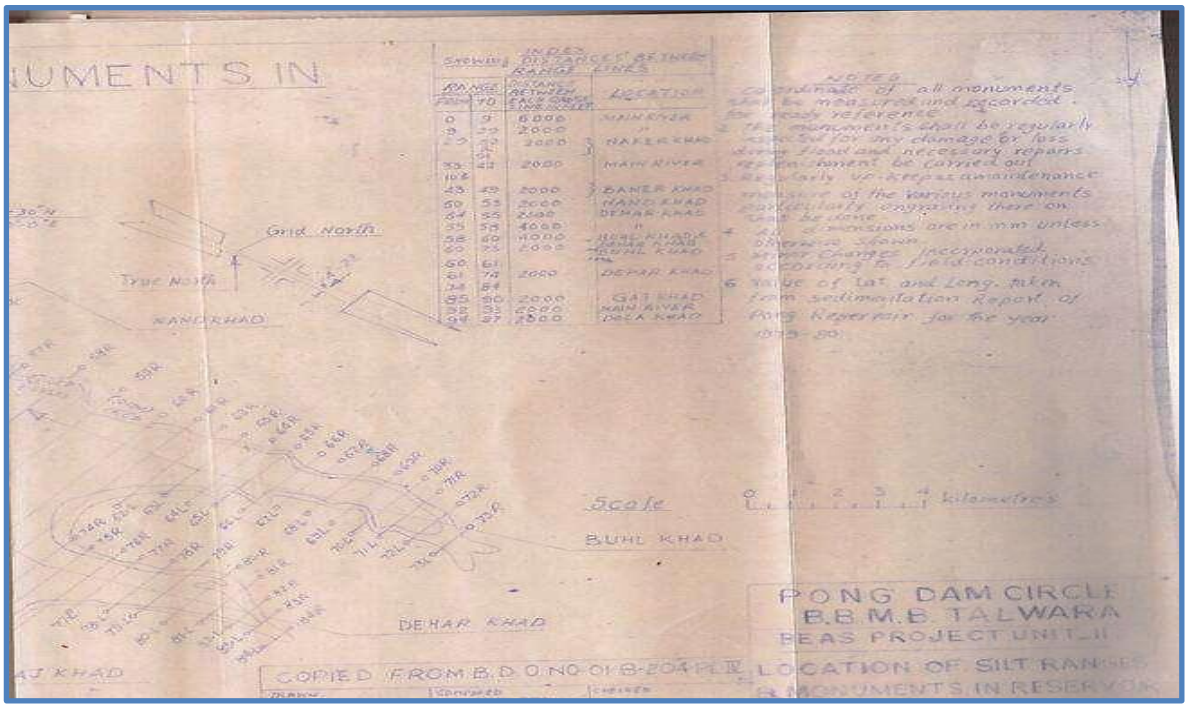
S.NO.	WATER SURFACE ELEVATION (IN METRES)	SURFACE AREA (IN HECTARES)	CAPACITY IN HUNDRED HECTARE METRE
1	335	–	–
2	340	37.8	0.6
3	345	200.2	6
4	350	712.0	26
5	355	1340.6	79
6	360	2170.3	164
7	365	3154.8	299
8	370	4056.6	478
9	375	5156.0	708
10	380	6412.6	996
11	385	8080.0	1359
12	390	10082.9	1813
13	395	12535.0	2378
14	400	14758.6	3060
15	405	16916.5	3852
16	410	19285.6	4757
17	415	21581.1	5779
18	420	23479.0	6906
19	425	25460.0	8129
20	430	27214.7	9446

Appendix-I E

RESERVOIR SUBMERGENCE MAP OF PROJECT

(SHOWING FRL & MWL CONTOURS FOR FREEBOARD STUDY)





FORM-II: DAM SPECIFIC DETAILS

1. Dam Features:

I. Main Dam

a. Type: Earth Core Cum Gravel

b.. Total length of the Main dam (m): 1950.70

c.. Length of Embankment dam (m): 1502.68

d. Length of Masonry/Concrete dam (m): NA

e. Top width of Embankment Dam (m): 13.72

f. Top width of Masonry/Concrete Dam (m): 13.72

g. Elevation of top of Embankment Dam (m): 435.86

h. Elevation of top of Masonry/Concrete Dam (m): 435.86

i. Elevation of top of Upstream Solid Parapet Wall (m): 323.50

j. Height of Embankment Dam above Lowest River Bed Level (m): 132.59

k. Height of Masonry/Concrete Dam above deepest foundation level (m): 132.59

l. Lowest River Bed Elevation (m): 384.048

m. Deepest Foundation Elevation (m): 384.048

II. Saddle Dam NA

a. Type: NA

b. Length of the Saddle dam (m): NA

c. Top width of Saddle Dam (m): NA

d. Elevation of top of Saddle Dam (m): NA

e. Elevation of top of Upstream Solid Parapet Wall (m): NA

f. Height of Saddle Dam above Lowest Bed Level in case of embankment dam or above deepest foundation level in case of concrete / masonry dam (m): NA

III Main Spillway: Overflow gated chute Spillway

(a) Type of Spillway:

(b) Length of Spillway (m): 655.62

(c) Location of Spillway: (CH:- 30+30)

(d) Spillway Crest Level (m): 416.05

(e) Number of Bays: Six

(f) Number and thickness of Piers (m): 04 Nos. & 3.048m

(g) Total Discharging Capacity at MWL (m^3/s): 12375

(h) Design head used for working out spillway crest profile (m): 416.05

(i) Type of Energy Dissipation Arrangement: Stilling basin with chute blocks

(j) Type of Spillway Gate: Radial Gates

(k) Size of Spillway Gate: Width (m) 14.47 Height (m) 12.344

(l) Type of Hoist for Spillway Gates: Mechanical
(Rope Drum/ Hydraulic)

(m) Hoist Capacity of Spillway Gates (MT): 150

(n): Hoist Operation: Electrical & Mechanical (Diesel engine)

(o) Number of Sets of Stop-logs: NA

(p) Number of Stop Log Units per Set & Size: NA

(q) Number of Gantry Crane(s) for Stop Log Gates: NA

(r) Gantry Crane Capacity (MT): NA

IV Auxiliary Spillway: There is no auxiliary spillway arrangement.

(a) Type of Spillway: NA

(b) Length of Spillway (m): NA

(c) Location of Spillway: NA

(Central Spillway/Left Flank/Right Flank/Saddle, in addition Chainage may also be mentioned)

(d) Spillway Crest Level (m) NA

(e) Number of Bays: NA

(f) Number and Thickness of Piers: NA

(g) Total Discharging Capacity at MWL (m^3/s): NA

(h) Design head used for working out spillway crest profile (m): NA

(i) Type of Energy Dissipation Arrangement: NA

(j) Type of Spillway Gate: NA

(k) Size of Spillway Gate: Width (m) NA Height (m) NA

(l) Type of Hoist for Spillway Gates: NA

(m) Hoist Capacity of Spillway Gates (MT): NA

(n): Hoist Operation: NA
(Manual/Electrical/Remote Control)

(o) Number of sets of Stop-logs: NA

(p) Number of Stop Log Units per set & size: NA

(q) Number of Gantry Crane(s) for Stop Log Gates: NA

(r) Gantry Crane Capacity (MT): NA

V Fuse Plug:

(a) Location: NA

(b) Length (m): NA

(c) Crest Level (m): NA

(d) Top Width (m): NA

NA

(e) Discharging Capacity at MWL (m^3/s):

VI. Sluice Arrangement (In Concrete and Masonry Dams):Not Applicable

(a) No. of Sluices & Sill Level (m): NA

(b) Size of Sluice: Width (m): NA__ Height (m): NA_ Dia. (m): _NA___

(c) Discharging Capacity of Sluice at FRL (m^3/s): NA

(d) Type of Service Gate: NA

(e) Size of Service Gate: Width (m) NA Height (m) NA

(f) Type of Hoist for Service Gates: NA

(g) Hoist Capacity of Service Gates (M.T.): NA

(h): Hoist Operation: NA

(i) Type of Emergency Gate: NA

(j) Size of Emergency Gate: Width (m) NA Height (m) NA

(k) Type of Hoist for Emergency Gates: NA

(l) Hoist Capacity of Emergency Gates (M.T): NA

(m): Hoist Operation: NA

(Manual / Electrical)

VII. Outlet works (In Embankment, Concrete & Masonry Dams):

(a) Location: T1, & T2 CH:- 44+44, 45+20 T1=1101.47' T2==1101.44

(b) Number: Two

(c) Sill level (m) T1=1101.47' & T2=1101.44'

(d) Size: Width (m) 9.144ø Height (m) 9.144 ø Dia (m) 9.144

(e) Discharging Capacity (m^3/s 253

(f) Type of Service Gate: Slide

(g) Size of Service Gate: Width (m) 2.13 Height (m) 3.20

(h) Type of Hoist for Service Gates : Slide

(i) Hoist Capacity of Service Gates (M.T): 625

(j) Hoist Operation:(Manual/Electrical/Both) Electrical

(k) Type of Emergency Gate Slide

(l) Size of Emergency Gate: Width (m) 2.13 Height (m) 3.20

(m) Type of Hoist for Emergency Gates : Hydraulic

(n) Hoist Capacity of Emergency Gates (M.T): 625

(o) Hoist Operation: Electrical

(Manual / Electrical)

2. Reservoir Features:

a. Catchment Area at Dam site (km^2): 12560 b. Maximum Water Level (m): 433.12

c. Full Reservoir Level (m): 428.244

d. Minimum Draw Down Level (m): 384.05 e. Dead Storage Level (m): 384.05

f. Live Storage Capacity (Mm^3): 7290

g. Gross Storage Capacity (Mm^3) at FRL: 8570

h. Reservoir Spread Area (km^2) at FRL: 260

3. Construction Aspects:

a. Date of Starting the Construction (DD/MM/YYYY): 1963

b. Date of Completion (DD/MM/YYYY): 1974

c. Designing Agency: BBMB

d. Construction Agency: BBMB

e. Construction Cost (Rupees in Lakh): 32588

4. Operational Aspects:

a. Date of first full impoundment (MM/YYYY): 30/06/1974

b. Whether Pre & Post monsoon inspection being carried out: Yes

c. Major recommendations of dam safety inspection, along with brief status on compliance:

The Recommendations are detailed in Chapter 5 of DSRP Inspection Report

d. Any operational failure in the past: No

e. Any other past dam incident: No

f. Operation and Maintenance Manual: Yes

Year of publication: 03/1988

g. Emergency Action Plan: Yes

Year of Publication: 2002

5 Instrumentation Aspects

a. List of Instruments installed in the Dam:

Sl. No.	Name of Instrument	Working Status	Year of Installation	No. of Year data available
1.	Water Level Sensor	Yes	2013	From 2014 onwards
2.	Plumb Bob	N	N.A	
3.	Inclinometer	Yes	1974	From 2006 onwards
4.	Stress meters	N	N.A	
5.	Strain meters	N	N.A	
6.	Toe Drain	Yes	1974	From 2006 onwards

Sl. No.	Name of Instrument	Working Status	Year of Installation	No. of Year data available
7.	Drain Wells	Y/N	NA	
8.	V-Notches	Y	1974	
9.	Pressure Gauges	Yes	1974	From 2006 onwards
10.	Accelerograph	Yes	1974	From 2006 onwards
11.	SCADA	N		
12.	Surveillance	N		
13.	Rain Gauge ORG	Yes	01/1979	From 1979 onwards
14.	Rain Gauge SRRG	Yes	01/1979	From 1979 onwards

d. Summary on adequacy and justification for additional instrumentation:

Most of the instrumentation in the dam was installed during its construction about 44 years ago. With the age, some of the embedded instruments have become unserviceable and are not amenable to reinstallation. Also, the needs for monitoring have also changed and the emphasis is now on the deformation, seepage, uplift and other transient behavior of the dam. A large database has been created out of systematic observations from beginning and is very valuable. In view of improved technologies, it is necessary that the required modernization of the selected observation programme may be carried out along with establishment of a computerized database for the historical observations and covering the current and future observations.

Please refer Chapter 9 of DSRP Inspection Report.

6. List of Past Rehabilitation Works: NO

a. Name of Scheme (If any): NA

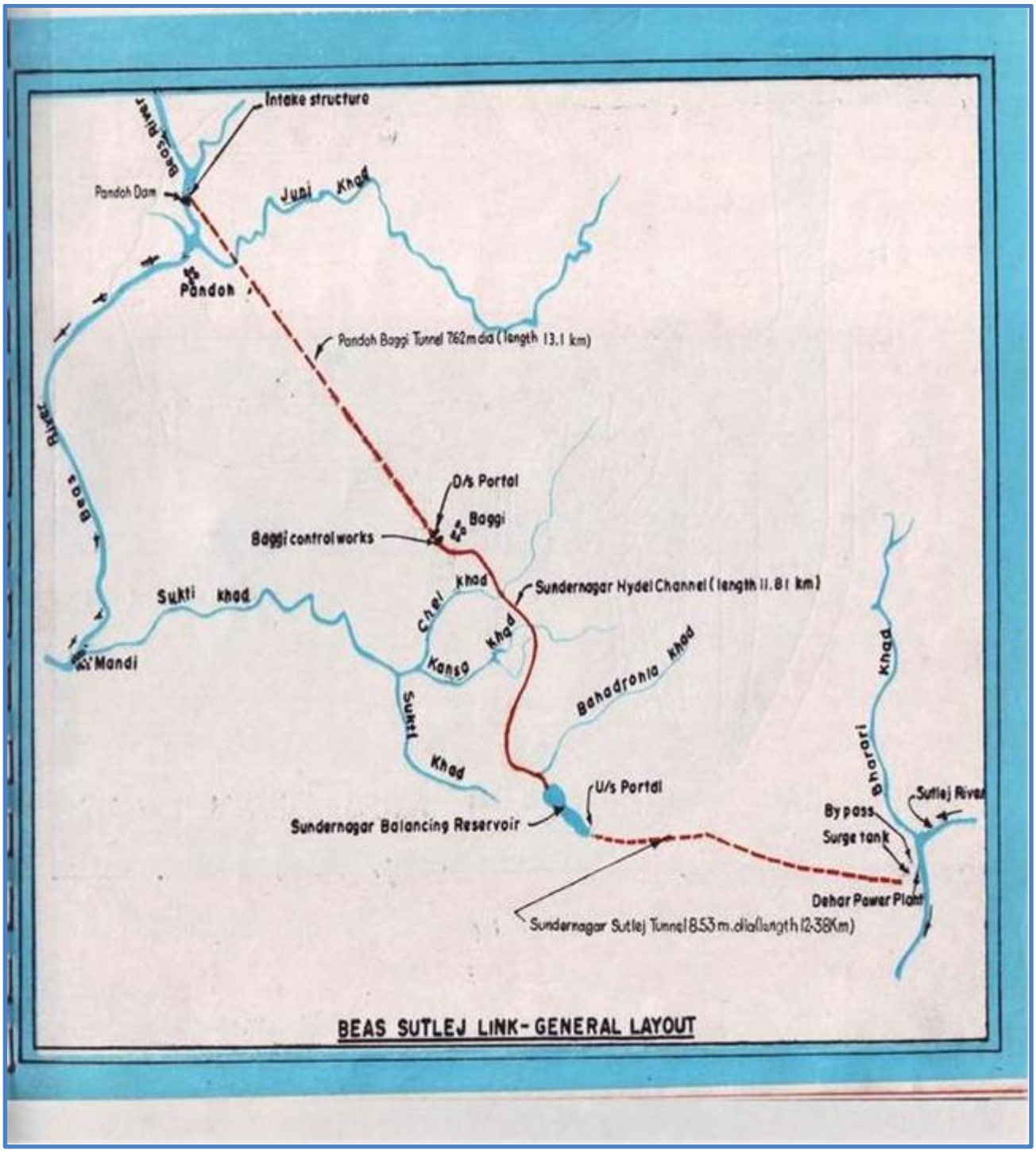
b. Period of Scheme: From NA to NA

c. Detail of Important Rehabilitation Works Carried Out (including by state funds):

Please refer Chapter 6 of DSRP Inspection Report.

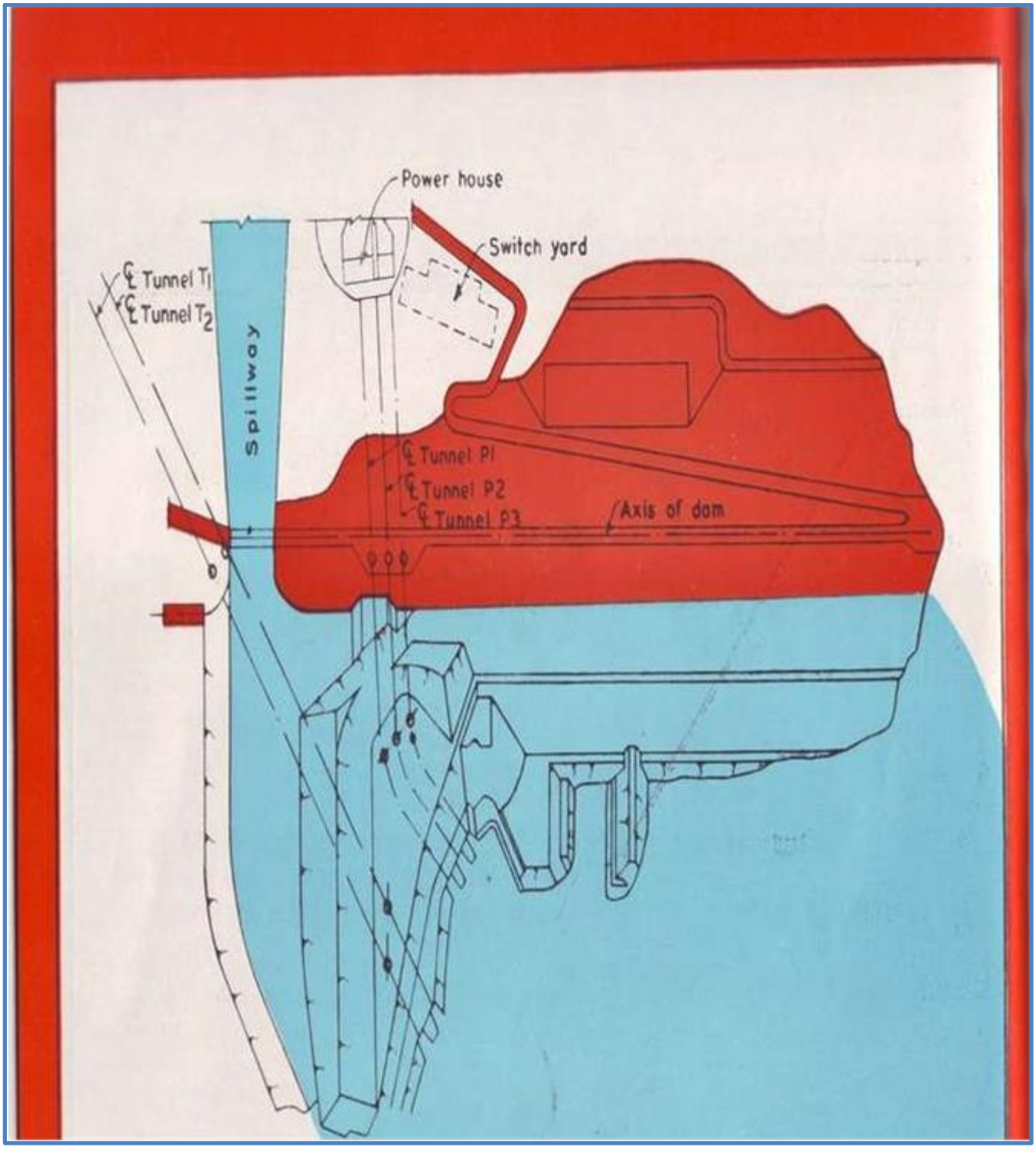
Appendix-II A

LAYOUT PLAN OF DAM



Appendix-II B

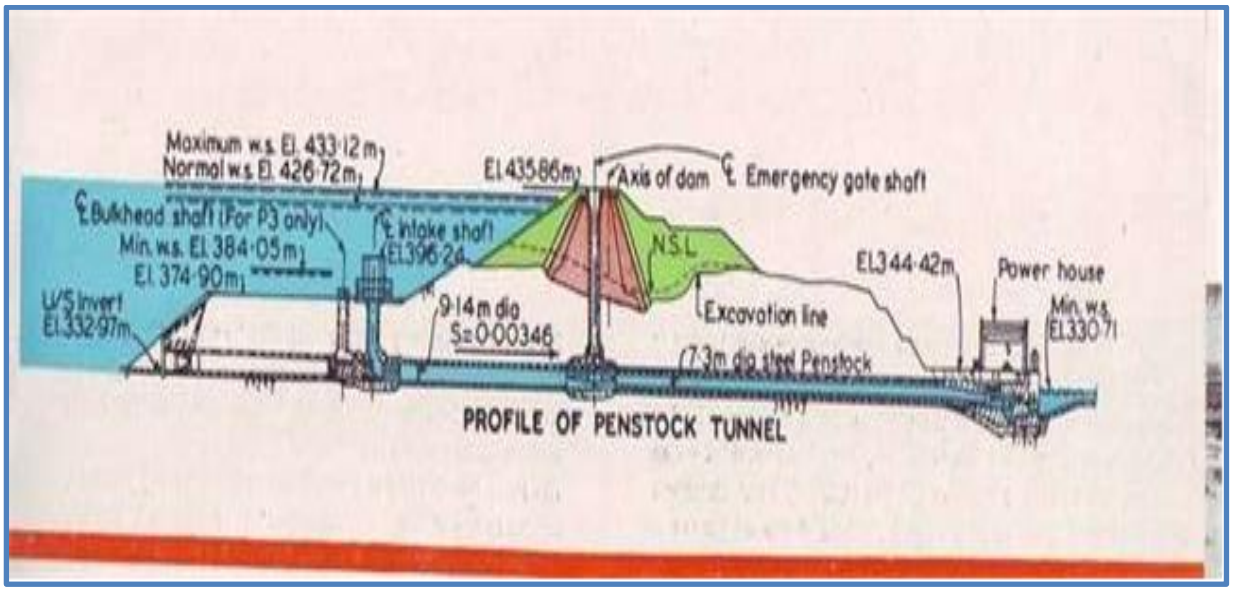
LONGITUDINAL SECTION OF THE DAM



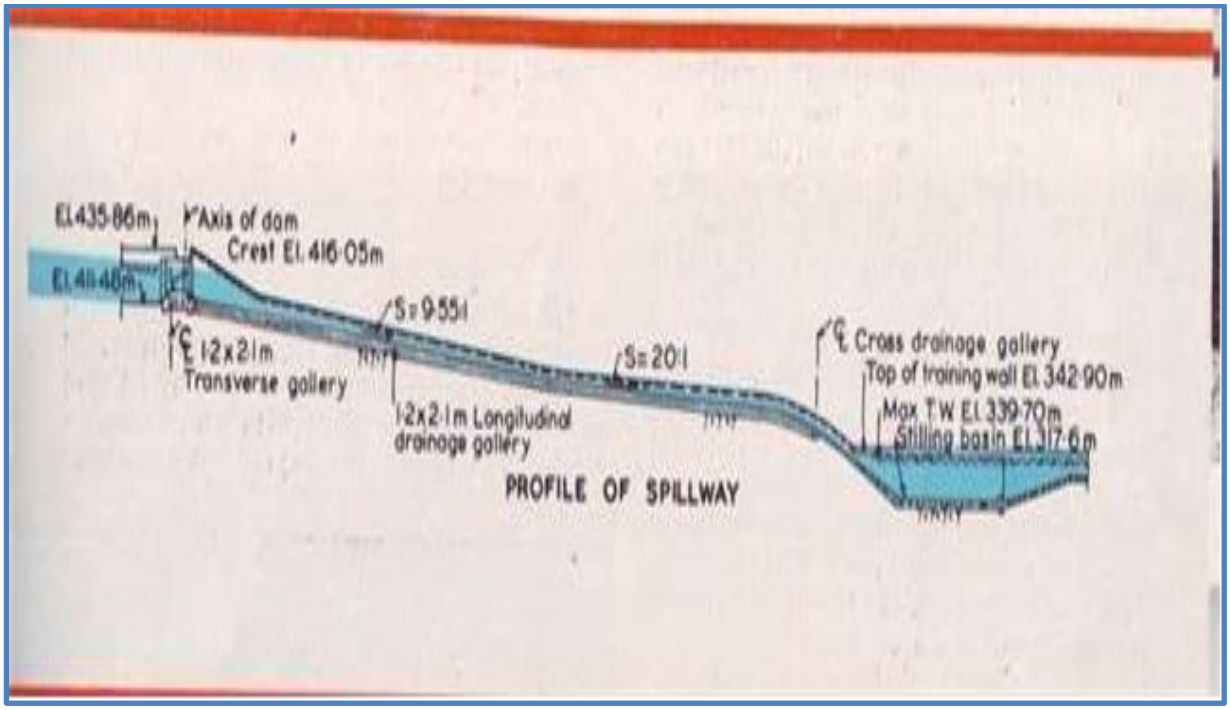
Appendix-II C

TYPICAL CROSS SECTIONS OF THE DAM

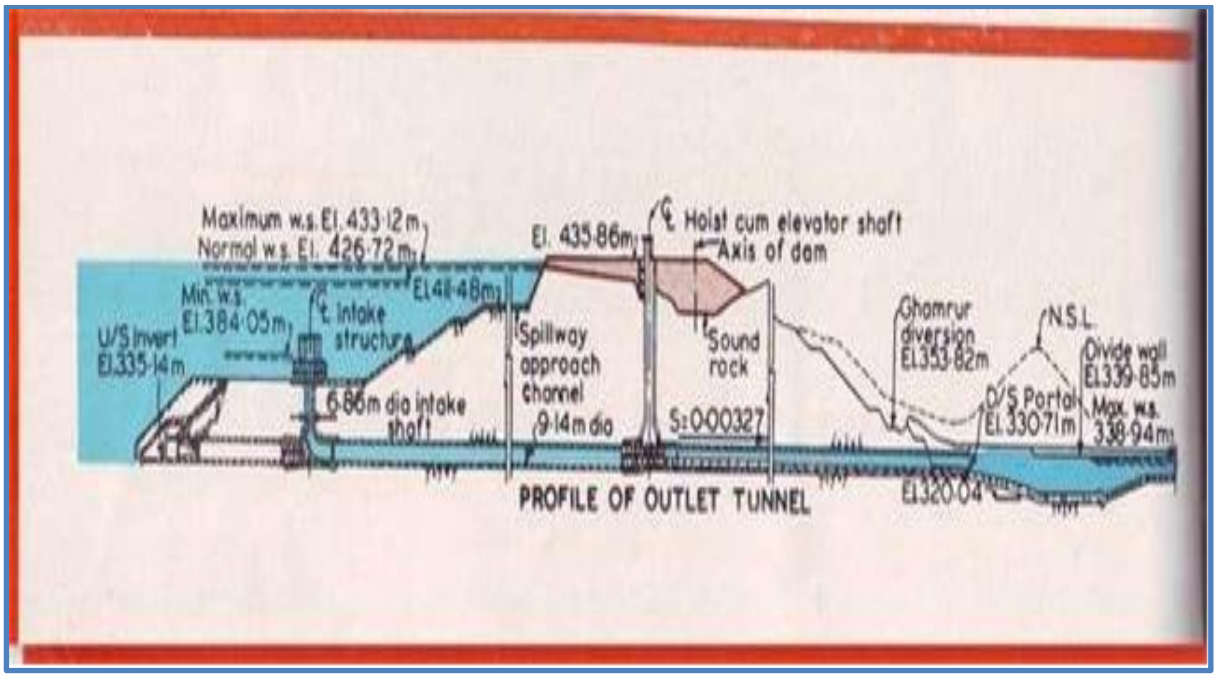
i) Typical Cross Section Of NOF Section Of Dam

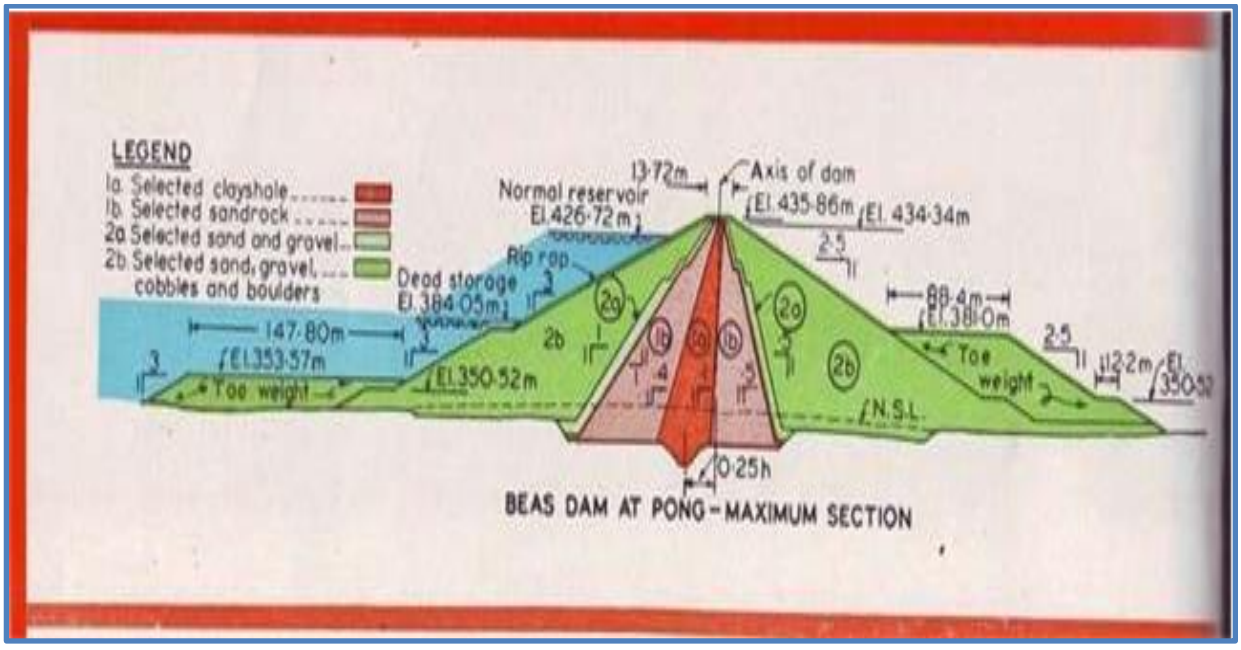


ii) Typical Cross Section Of OF Section of Dam



iii) Typical Cross Section Of Dam showing zoning of material





Appendix-II D

REPORT ON DAM INSTRUMENTATION

Various types of instruments installed at Beas Dam are following:-

A. Piezometer

a. Embankment Type Piezometer
b. Foundation Type Piezometer
c. Porous Tube Piezometer
d. Piezometer in Penstock Header
e. Piezometer in Irrigation Tunnel (T1 &T2)

B. Slope Indicator
C. Vertical & Horizontal Movement Devices
D. Strong Motion Accelerocoder

Reading from the Instruments are being observed every month and report is submitted to Director, Design, BBMB, Nangal for analysis.

FORM-III: HEALTH STATUS OF DAMS

1. Design Flood Review (In case of PMF/SPF, as approved by CWC):

a. Original Inflow Design Peak Flood (m^3/s): 33555

a.1. Original MWL (m): 433.121 a.2. Original Routed Outflow (m^3/s): 7977

a.3. Maximum observed flood peak (m^3/s) and date: 20260 19/08/1978

b. Date of Latest Review (DD/MM/YYYY): Not Required

c. Revised Inflow Design Peak Flood (m^3/s): 23704
(PMF / SPF / 100 Year Flood)

C.1. Revised MWL (m): Not Required
c.2. Revised Routed Outflow (m^3/s): 30662.46

Report of Design Flood Review is enclosed as Appendix III-A (along with copy of CWC approval) : Report Enclosed

d. Flood Routing Conducted? Under consideration with CWC

If Yes, Attach Flood Routing Report with Calculations in Appendix III-B:

e. Attach Free Board Calculations in Appendix-III C:
f. Proposed measures to accommodate increase in design flood, attached in Appendix-IIID:

g. If design flood review & flood routing is not yet done, tentative time frame for carrying out the same:

From: DD/MM/YYYY To: DD/MM/YYYY

2. Dam Safety Review Panel (DSRP) Review:

a. Date of Latest DSRP Inspection 18 / 12 / 2019

b. Attach DSRP Report as in Appendix III E: Yes

c. Key Actionable Points for Rehabilitation:

1. Restoration Of Downstream slope Of Beas Dam By Providing Stone Pitching.
2. SCADA Enabled Automation of 6 Nos. Radial Gates of Beas Dam Talwara and SCADA Enabled Automation of 8 Nos. Slide gates of Irrigation Tunnel T-1 & T-2 of Beas Dam Talwara.
3. Stabilizations Measure To Reduced Silt Ingress In Beas Dam Reservoir.

3. Seismic Review:

a. Seismic Zone at the time of Design: IV

b. Revised Seismic Zone: V

c. Historical significant earthquake events in the near vicinity: **Y** If Yes,

Event 1: Date: 02-08-2013 Epicenter: Lushan Country

Magnitude: 0.008

Event 2: Date: 24-09-2019 Epicenter: Jatlaan (Pakistan)

Magnitude: 0.007

d. Details of nearest project whose site specific seismic parameter study has been approved by National Committee on Seismic Design Parameter (NCSDP): **NA**

(i) Name of Project: NA

(ii) Date of Approval: NA

(iii) Approved Parameters:

(a). Peak Ground Acceleration (PGA) NA

(b). Maximum Credible Earthquake (MCE): NA

(c). Design Basis Earthquake (DBE): NA

(d). Seismic Design Coefficient (Horizontal): NA

(e). whether need for seismic design review: **Y/N**

4. Summary of Present Distress Condition:

Sl N	Description	Composite
1.	Leakage through dam body	Nil
2.	Excessive seepage through dam body	Nil
3.	Excessive seepage through foundation	Nil
4.	Leakage through contraction joints	Nil
5.	Excessive settlement of dam body?	Nil
6.	Clogging of Porous / Formed and	Nil
	foundation drains holes?	
7.	Are Porous / Formed Drains Counter – sunk	N.A
	plug in place on top of dam?	
8.	Are Water Seals in Place on Porous /	N.A
	Formed Drains in gallery?	
9.	Undesirable vegetation?	N.A
10.	Deteriorated Concrete-Facing, Outlet,	
	Spillway	
11.	Erosion of surfaces, slides & signs of	Nil
	differential movement	
12.	Are there any surface cracks?	No
13.	Adequate slope protection?	Yes on Upstream face
14.	Erosion of the upstream/downstream face?	Yes on downstream face
15.	Animal Burrows?	No
16.	Any evidence of piping through dam body?	No
17.	Any evidence of piping through foundation	No
18.	Are there wet spots or areas on the	No
	downstream face, at the toe, or beyond the	
	dam?	
19.	Spillway glacis erosion?	No
20.	Can water flow into the principal spillway	
	without difficulty, as intended when	Yes
	constructed?	
21.	Is the primary spillway/waste weir structure	
	in good condition?	Yes
22.	If there are drainage outlets, are they clear	Yes
	and flowing?	
23.	Is the seepage water clear or muddy?	Clear
24.	Is there any unusual movement or cracking	
	at or beyond the toe?	No
25.	Is there any evidence of instability on the	
	slopes around the reservoir?	No
26.	Is a lot of sediment entering the reservoir,	

Sl N	Description	Composite
	or has this happened in the past?	No
27.	Are gates/stop logs/valves and other	
	operating equipment in working condition?	Yes
28.	Is the drainage gallery easily accessible	
	and does it have adequate lighting facilities	Yes
	and safety handrails on steps?	
29.	Gate corrosion	No
30.	Are Gate Seals showing signs of	No
	weathering, cracking or tearing?	
31.	Is the surface of gates and paint	No
	deteriorated?	
32.	Is the alternative power system for gate	Yes
	operation working properly?	
33.	Are the hydraulic hoists working	Yes
	satisfactorily?	
34.	Are the decking, girders and structural	
	supports of spillway bridge, hoist bridge	Yes
	and catwalks structurally sound?	
35.	Is the floor of the bridge structurally sound	
	and safe?	Yes
36.	Is there catwalk access to gate trunions?	
37.	Is the concrete surface of the Energy	
	Dissipation Arrangement (EDA) and d/s	
	apron in good condition?	
38.	Is access road to dam site well maintained?	Yes
39.	Are communication facilities available at	Yes
	dam site?	
40.	Whether there is a standby power supply?	Yes
41.	Is fencing of project area required or needs	No
	to be strengthened?	
42.	Is sufficient stock of spare which needs	
	frequent replacement maintained at the	Yes
	site?	
43.	Are the instruments installed properly	
	accessible?	Yes
44.	Are all the instruments in proper working	

Sl N	Description	Composite
	condition?	Yes
45.	Need for repair of instrument	No
46.	Need for replacing instruments	Yes
47.	Need for additional instruments	Yes
48.	Need for Stability Analysis	N.A
49.	Need for E/Q design review	N.A
50.	Need for operational review	Yes
51.	Need for sump/pumping arrangement to	No
	dewater Drainage Gallery	
52.	Inspection of Sluice / Outlets conducted?	Yes
53.	Seepage through outlets / interfaces?	No
54.	Is there evidence of Sluice / outlet scour?	No
55.	Settlement of outlet head works?	No
56.	Is there differential settlement in outlets?	No
57.	Is there siltation at sluice / outlet intake?	No
58.	Is there impact of siltation on discharge capacity of sluice / outlet?	No
59.	Is there seepage in outlet gate wells?	No

5. Any Other Distress Conditions, if any, noted other than above:

NIL

Appendix-III-A

REPORT OF DESIGN FLOOD REVIEW

Design Flood Review Report is attached as Appendix-III-A

Appendix III-B

FLOOD ROUTING STUDIES INCLUDING SPILLWAY OUTFLOW CALCULATIONS

Design Flood Review is under consideration with CWC.

Appendix III-C

FREE BOARD CALCULATIONS

Revised free board calculations are not required as already freeboard of 9.00 feet exists between MWL El 1421 ft and top of Dam El 1430 ft. revised design flood is under review with CWC as explained above.

APPENDIX III-D

PROPOSED MEASURES TO ACCOMMODATE REVISED DESIGN FLOOD

a. Original design flood (m^3/s): 33555

b. Revised design flood (m^3/s): **Under consideration with CWC**

c. Percentage increase (%): NA

Proposed Rehabilitation Measures: Will be decided after final review.

(a) Structural Measures

- Provision of U/S solid Parapet Wall: Not required
- Increasing dam height : Not Required
- Additional spillway : Not Required
- Fuse plug : Not Required

(b) Non-structural Measures

- Lowering of FRL : Not Required
- Modification in Operation Rule Curve : Done
- Provision for Early Flood Warning System : Required

APPENDIX III-E

LATEST INSPECTION REPORT OF DAM SAFETY REVIEW PANEL (DSRP)

DSRP Report is attached as appendix III E

Brief description of proposed Rehabilitation Works.

1. Restoration Of Downstream slope Of Beas Dam By Providing Stone Pitching.
2. SCADA Enabled Automation of 6 Nos. Radial Gates of Beas Dam Talwara and SCADA Enabled Automation of 8 Nos. Slide gates of Irrigation Tunnel T-1 & T-2 of Beas Dam Talwara.
3. Stabilizations Measure to Reduced Silt Ingress In Beas Dam Reservoir.

Appendix III-F

SEISMIC DESIGN REVIEW

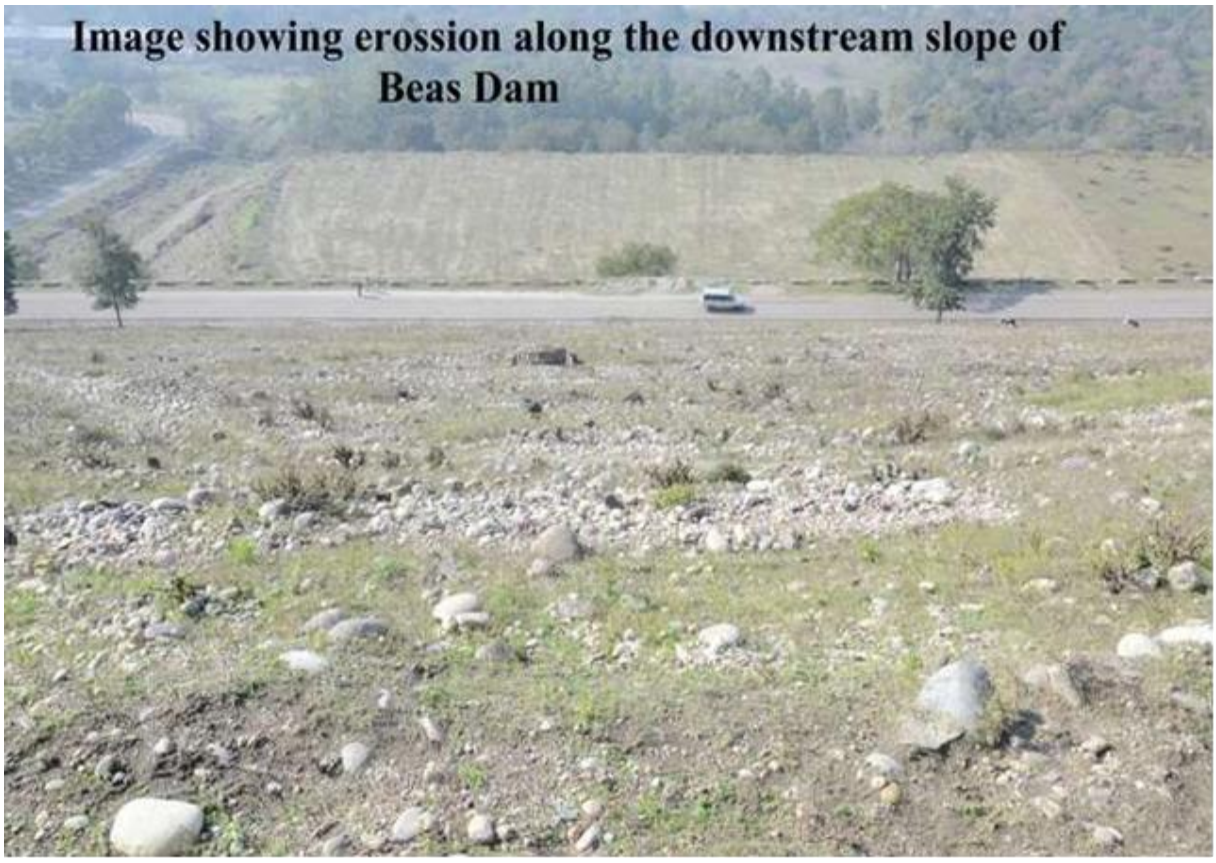
NA.

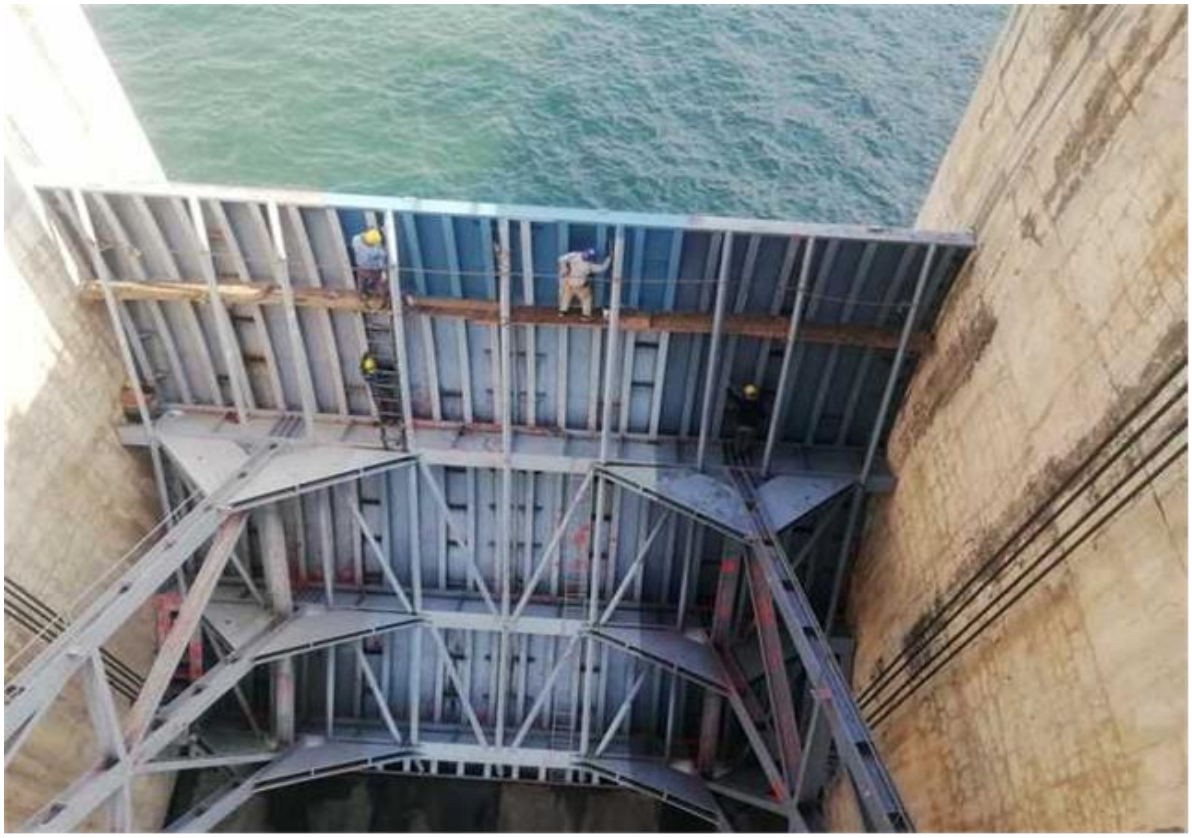
Appendix-III-G

PHOTOGRAPHS SHOWING DISTRESS CONDITION

S. No.	Date of Photograph	Description with details of location, nature of distress and other remarks
1.	11-11-2019	Beas Dam is the earth core cum gravel shell Dam having height of 132.59 m above the deepest foundation. The original slope provided at the Downstream face of Beas Dam was 2.5:1. With the passage of time due to erosion as well as weathering action, the original slope has been disturbed. There is deficient of material along the slope at some places and overburden at others. The proposal under consideration has been prepared for the restoration of slope in its original shape as well as providing pitching.

The Downstream view of Pong Dam





The spillway gate of Pong Dam

FORM-IV: REHABILITATION PROPOSALS

1. Structural Rehabilitation Works:

(List all the items identified for the structural rehabilitation: Civil/ HM/ Electrical)

1. Restoration of downstream slope of Beas Dam by providing stone pitching.
2. Stabilizations measure to reduced silt ingress in Beas Dam Reservoir Room, and gantry.

2. Structural Measures for Ensuring Hydrological Safety:

NIL

3. Non-structural Measures:

NIL

4. Basic Facilities Enhancement:

NIL

5. Instrumentation, SCADA, Surveillance system, etc.:

1. SCADA Enabled Automation of 6 Nos. Radial Gates of Beas Dam Talwara and 8 Nos. Slide gates of Irrigation Tunnel T-1 & T-2 of Beas Dam Talwara.

6. Tourism/Fisheries/Hydropower Development:

NA

7. Others (Investigation, Design Studies, Consultancy):

S. No.	Description	Estimated Cost in Crores	Remarks
1	**Purpose Driven Study:** Seismic Analysis of Beas Dam to examine seismic safety under revised seismic parameter inputs	1.00	Work is proposed to be undertaken in Phase-II after finalization of TOR by experts of DSRP.

6. ITEM WISE DETAIL OF COST

Work 1. : Name of work: Estimate for Restoration of Down Stream face of Beas Dam by providing stone pitching

ABSTRACT OF COST

Sr. No.	Description	Unit	Tentative Qty.	Total rate	Amount in Rs
1	Jungle clearance	Hectare	176.73	5423.41	958455.65
2	Dismantling pucca grouted pitching	Cum.	39.61	351.96	13940.89
3	Earth work in excavation of foundation of bridges culverts, building including handling of material with combined lead of 15 meters dressing of bed and sides stacking the excavated soil clear from the edge of excavation and subsequent filling around: - (b) for semi conglomerate or soil of nature of pick jumper	Cum.	11392.54	263.772	3005032.32

4	Dressing side slopes and prepration of sub grade for lining in earth work with admixture of shingle or kankar:- (b) above 40 percent	Sqmt.	47520.46	11.7376	557776.12
5	Plain cement concrete 1:3:6 nominal mix in foundation with creshed stone aggregate 40mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.	Cum.	6862.38	3845.44	26388864.73
6	Plain / Reinforced cement concrete in sub - structure complete as per drawing and Technical Specifications. (A). PCC Grade M-15 , Height upto 5 mtr.	Cum.	19632.79	4688.85	79505711.75
7	Providing and laying filter material underneath pitching in slopes complete as per drawing and Technical specification includes mazdoor required for trimming of slope to proper profile and preparation of bed.	Cum.	184200.91	1517.55	279534089.23
8	Centering and shuttering for carbels, parapet, fascias and other similar items including edges.	Sqmt.	109534.02.23	404.0415	44256288.60
9	Stone masonry work in cement mortar 1:3 in Foundation complete as per Drawing and Technical Specification: - (B) Random Rubble Masonary	Cum	6234.74	3794.03	23654777.37
10	Raking out joints in lime or cement mortar and preparing the surface for repointing or re-plastering including disposal of rubbish to the dumping ground within 50m lead (excluding the cost of scraping of plaster and replastering).	Sqmt.	22897.94	134.38	3077025.81
11	Cement pointing 1:2 (Raised) on stone walls.	Sqmt.	18859.62	145.95	2752560.81

12	Providing and laying pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and Technical specification. Stone boulder more than 18kg.	Cum.	49463.30	1481.6	73284818.74
13	Providing weep hole in brick masonry / plain / reinforcement concrete abutment, wing wall / return wall with 100mm dia PVC pipe extending through the full width of the structure with slope of 1V:20H towards drawing face. Complete as per drawing and Technical Specifications	No.	1333.00	168.5596	224689.95
14	Providing and laying of filter media with granular materials / stone crushed aggregates satisfying the requirements laid down in clause 2504.2.2 of MoRTH specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and provided over the entire surface behind abutment, wing wall land return wall to the full height compacted to a firm condition complete as per drawing and technical specification	No.	1333.00	926.73	1235331.09
15	Grouting stone filling or pitching :- (a) with bajri or shingle	Sqmt.	5067.52	94.55	479133.88
16	Extra for steel shuttering pattern as specifiled by the Engineer -in -Charge	Sqmt.	107876.34	137.7	14854572.48
17	Sand filling in foundation trenches as per drawing and technical specification.	Cum.	1000.30	1080.59	1080915.07
18	Earth work in excavation of foundation of structures as per drawing and technical specification including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material:- (E) Hard rock (blasting not required)	Cum.	1630.60	464.113	756783.59

Total	**555620768.085**
Add 5% for variation of Qty.	**27781038.404**
Grand Total	**583401806.489**
Say	**5900.00 Lacs**

Work No 2: Name of work : SCADA Enabled Automation of 6 Nos. Radial Gates of Spillway of Beas Dam Talwara.

Sr. No.	Particulars	Qty.	List Price (in Rs.)	Total Amount (in Rs.)
A	**SUPPLY FROM MAIN PANEL**			
1	63Amp, 25kA 3P MCCB with Magnetic O/L, S/C protection	6	18890.00	113340.00
2	Spreader Kit	12	620.00	7440.00
3	Direct rotary handle	6	1120.00	6720.00
4	Trip Contact Block	6	925.00	5550.00
5	Auxiliary Contact Block	6	925.00	5550.00
6	Control MCB SP 6A	24	314.00	7536.00
7	R,Y Phase Indicating Lamps	12	298.00	3576.00
8	B Phase Indicating Lamps	6	460.00	2760.00
9	0-250Amp Ammeter Digital with ASS Acc. Cl-1.0	6	1619.00	9714.00
10	0-500Volt Voltmeter Digital with VSS Acc. Cl-1.0	6	1619.00	9714.00
11	ON, OFF, TRIP Indicating Lamps	18	298.00	5364.00
12	CT 250/5, 15 VA, RESIN CAST, Cl. 1. (For Metering)	18	1120.00	20160.00
13	C.T. Shorting Link	24	200.00	4800.00
14	Neutral Link	6	100.00	600.00
B	**OUT GOING**			
	For Radial Motor			
1	**22KW VFD FEEDER**	**1NOs.**		
2	63Amp 3P MCCB having O/L & S/C protection	6	6480.00	38880.00

3	Direct rotary handle	6	1120.00	6720.00
4	Auxiliary Contact Block	6	925.00	5550.00
5	Trip Contact Block	6	925.00	5550.00
6	22KW AC DRIVE	6	224000.00	1344000.00
7	Control Contactor	6	1150.00	6900.00
8	Add. ON Block 2NO + 2NC	6	595.00	3570.00
9	Control MCB SP 6A	6	314.00	1884.00
10	Illuminated Push Button	12	460.00	7559.04
11	TRIP Indicating Lamp	6	298.00	1914.56
12	Auto/Manual Selector Switch	6	388.00	2328.00
13	Multiturn POT	6	800.00	4800.00
C	**PLC FEEDER**			0.00
1	16A DP MCB, 10KA with "C" curve For I/C Supply	6	948.00	5688.00
2	10A DP MCB, 10KA with "C" curve	24	948.00	22752.00
3	6A DP MCB, 10KA with "C" curve For smps	12	948.00	11376.00
4	Panel Light	6	450.00	2700.00
5	Limit switch	6	450.00	2700.00
6	6'' Cooling Fan with Filter Kit	12	2000.00	24000.00
7	CONTROLLER M241-40IO TR.NPN ETHERNET WITH HIGH SPEED INPUT HSC	6	69953.00	419718.00
8	GXU Touch Panel, 7"W TFT, SL + ETH	6	40875.00	245250.00
9	PLC to HMI cable-2Meter	6	1500.00	9000.00
10	MODEM COMMUNICATION	6	20000.00	120000.00
11	SCADA ARCHITECTURE WITH LOCAL AND REMOTE SUPRIVISION INCLUDING IT'S SERVER,DONGLE, FULL ACTIVE BASED LISENCE AND SWITCHS	1	1500000.00	1500000.00
12	Auto/Manual Selector Switch	6	180.00	1080.00

13	Hooter	6	500.00	3000.00
14	Indicating Lamp ON (DC)	6	100.00	600.00
15	SMPS 10A	6	5454.00	32724.00
16	relay card	6	1000.00	6000.00
17	Encoder with 5 mtr cable	6	170900	1025400.00
18	ENCODER CABLE	600	300	180000.00
19	Labour only panel coonection	6	70000	420000.00
20	Engineering	2	55000	110000.00
21	16 SqMM 4 core cu armoud cable SHIELDED	600	543	325800.00
22	LINE CHOWK 30 HP	6	104970	629820.00
23	UPS FOR PLC WITH 20 MINUTE BACKUP 1KVA	1	35460	35460.00
	Panel Fabrication : 14/16 Guage , CRCA Sheet Steel , Floor Mounted , Compartmentalised			0.00
	Paint : Powder Coating , RAL 7032 , Siemens Grey			0.00
	Cable Entry : Bottom			0.00
	Panel Dimension : H=1300+75mm , W=800mm , D=350mm	6	55142.00	330852.00
	ACCESSORIES LIKE : Key Lock Type,Gasket,Insulator Conical/Finger Type/ L-Type SMC, Zink Passivated Hardware, Feeder Name Plate, Busbar color Coded Insulated Sleeve, All Outgoing Feeder Hardware	6	69850.00	419100.00
TOTAL				**7515499.60**
Miscellaneous EXPANSES 2%				150309.99
TOTAL PRICE				**7665809.59**

Total 76,65,809.59 GST @ 18% 13,79,845.72

Grand Total 90,45,655.31

Say Rs. 90,45,655.00

02(b Name of work: SCADA Enabled Automation of 8 Nos. Slide Gates of irrigation outlet T-1 & T-2 of Beas Dam Talwara.

Sr. No.	Particulars	Qty.	Reference	List Price (in Rs.)	Total Amount (in Rs.)
A	**SUPPLY FROM MAIN PANEL**				
1	250Amp, 25kA 3P MCCB with Magnetic O/L, S/C protection	2	LV525458	27640.00	55280.00
2	Spreader Kit	4	LV431564	820.00	3280.00
3	Direct rotary handle	2	LV429337	1120.00	2240.00
4	Trip Contact Block	2		925.00	1850.00
5	Auxiliary Contact Block	2		925.00	1850.00
6	Control MCB SP 6A	8	A9N1P06C	314.00	2512.00
7	R,Y Phase Indicating Lamps	4	220V AC LED	348.00	1392.00
8	B Phase Indicating Lamps	2	220V AC LED	399.00	798.00
9	0-250Amp Ammeter Digital with ASS Acc. Cl-1.0	2		1572.00	3144.00
10	0-500Volt Voltmeter Digital with VSS Acc. Cl-1.0	2		1572.00	3144.00
11	EM6400 METER	2	EM6400	17000.00	34000.00
12	ON, OFF, TRIP Indicating Lamps	6	220V AC LED	197.00	1182.00
13	CT 250/5, 15 VA, RESIN CAST, Cl. 1. (For Metering)	8	250/5A	862.00	6896.00
14	C.T. Shorting Link	8		100.00	800.00

15	Neutral Link	2		100.00	200.00
B	**OUT GOING**				
	For TUNNAL Motor				
1	**30KW VFD FEEDER**	**1NOs.**			
2	100Amp 3P MCCB having O/L & S/C protection	4	LV516463	16120.00	64480.00
3	Direct rotary handle	4	LV429337	1120.00	4480.00
4	Auxiliary Contact Block	4		925.00	3700.00
5	Trip Contact Block	4		925.00	3700.00
6	30KW AC DRIVE	4	ATV71HD30N4	285091.00	1140364.00
7	Control Contactor	4	CA2KN22*	1150.00	4600.00
8	Add. ON Block 2NO + 2NC	4	LA1KN22	595.00	2380.00
9	Control MCB SP 6A	4	A9N1P06D	414.00	1656.00
10	Illuminated Push Button	8	220V AC	388.00	7559.04
11	TRIP Indicating Lamp	4	220V AC	348.00	1914.56
12	Auto/Manual Selector Switch	4	XB5AJ33N	399.00	1596.00
13	Multiturn POT	4	10KOHM	800.00	3200.00
C	**PLC FEEDER**				0.00
1	16A DP MCB, 10KA with "C" curve For I/C Supply	2	A9N2P16C	948.00	1896.00
2	10A DP MCB, 10KA with "C" curve	8	A9N2P10C	948.00	7584.00
3	6A DP MCB, 10KA with "C" curve For smps	4	A9N2P06C	948.00	3792.00

4	Panel Light	2		450.00	900.00
5	Limit switch	2		450.00	900.00
6	6" Cooling Fan with Filter Kit	4		2000.00	8000.00
7	CONTROLLER M241-40IO TR.NPN ETHERNET WITH HIGH SPEED INPUT HSC	2	TM241CE40R	69953.00	139906.00
8	GXU Touch Panel, 7"W TFT, SL + ETH	4	HMIGXU3512	40875.00	163500.00
10	MODEM COMMUNICATION WITH GPRS 485 OPTIONS	2		53314.00	106628.00
11	SCADA CENTRALIZED SCADA WITH SERVER,DONGLE SWITCH , FULL ACTIVE.	1		969000.00	969000.00
9	PLC to HMI cable-2Meter	2		1500.00	3000.00
10	Auto/Manual Selector Switch	2		399.00	798.00
11	Hooter	2		500.00	1000.00
12	Indicating Lamp ON (DC)	2		100.00	200.00
13	SMPS 10A	2		5000.00	10000.00
14	relay card	4		1000.00	4000.00
17	Labour only panel coonection	1		70000	70000.00
18	Engineering	1		85000	85000.00
19	16 SqMM 4 core cu armoud cable	100		543	54300.00
20	LINE CHOWK 40 HP	4		115343	461372.00
21	Supply, Installation, Testing & Commissioning of Electromagnetic Flow Meter **(Line Size – 50mm)**	2		237345	474690.00
22	REMOTE JUNCTION BOX	4		118697	474788.00

D	**STATIC CAMERA 14 CAMERA**				
1	CAMERA'S HD BULLET CAMERA INDUSTRAIL GRADE	14		12565.00	158319.00
2	SWITCH PORT POE 8 CHANNEL	2		12913	25826.00
3	RACK 6U	1		8342	8342.00
4	NETWORK VIDEO RECORDER NVR	1		22917	22917.00
5	HDD 1 TB SEGATE	1		14607	14607.00
6	COMPUTER SERVER BASED	1		115000	115000.00
7	CABLYING, LAYING,CAT-6,CONNECTORS	1		78805	78805.00
8	INSTALLATION	1		45040	45040.00
9	UPS 1KVA 20 minutes Backup	1		35460	35460.00
E	**LEVEL SENSOR**				0.00
1	ULTRASONIC SENSOR LEVEL SENSOR	8		85090	680720.00
2	FIXING ANGLE	8		15000	120000.00
3	INSTALLATION	8		30000	240000.00
4	SHEILDED CABLE SPECIAL TYPE	800		35	28000.00
					0.00
	Panel Fabrication : 14/16 Guage , CRCA Sheet Steel , Floor Mounted , Compartmentalised				0.00
	Paint : Powder Coating , RAL 7032 , Siemens Grey				0.00
	Cable Entry : Bottom				0.00
	Panel Dimension : H=1300+75mm , W=800mm , D=350mm	2		198893.00	397786.00

	ACCESSORIES LIKE : Key Lock Type,Gasket,Insulator Conical/Finger Type/ L-Type SMC, Zink Passivated Hardware, Feeder Name Plate, Busbar color Coded Insulated Sleeve, All Outgoing Feeder Hardware	2		175340.00	350680.00
TOTAL					**6720953.60**
Miscellaneous 2 %					134419.07
GRAND TOTAL					**6855372.67**

Total 68,55,372.67
Add GST @ 18% 12,33,967.08
Grand Total 80,89,339.75
Say Rs.

80,89,340.00

GRAND TOTAL OF WORK 2.(a) & WORK 2.(b)= 9045655.00+8089340.00 = 1,71,34,995.00/-

03 Name of work : Stabilisations measure to reduced silt ingress in Beas Dam Reservoir.

Sr.No	Description of Items	Unit	Qty.	Rate	Amount in Rs
1.	Digging of holes 20-30cm dia 45 cm deep	Nos.	04	1360.12	5440.48
2.	Fixing of vegetable spur double	m	04	87.37	349.48
3.	Fixing of brushwood any brush cutting	m	04	21.75	87.00
4.	Prep of iponea cutting	Nos.	04	91.87	367.48
5.	Cutting & carriage of iponea P/HL of 30kg	H.L	04	12.60	50.40
6.	Road plating of iponea cutting around check Dam	Nos.	04	255.75%	1023.00
Amount for 01 No. Brushwood Check Dam					**7318.00**
Amount for 1289 Nos. Brushwood Check Dam= 1289x7318.00					**94,32,902/-**

Sr No	Description of Items	Unit	Qty.	Rate	Amount in Rs
1.	Earthwork In Excavation of	Cum	1.00	146.54+80%	**264.00**

	Foundation of Bridge Culverts , including handling of materials with combined lead of 15 meters dressing of bed and sides stacking the excavated soil clear from the edge of excavation and subsequent filling around- (b) For semi conglomerate or Soil of nature of pick jumper. **(CSR ITEM No-6.7)**			=263.77	
2.	Boulder masonry in cement mortar (1:6) in foundations and plinth. **(CSR ITEM-12.33)**	Cum	7.00	2269.52+35% 3063.85	**21447.00**
3.	Rough hammer dressing of boulders:- (b) Quartzite stone 4-5 faces. **(CSR ITEM-12.37b)**	Cum of masonry	7.00	573.64+52% =871.93	**6104.00**
Amount for 01 No. Dry Stone Check Dam					**27,815/-**
Amount for 3046 Nos. Dry Stone Check Dam= 3046x27815					**8,47,24,490/-**

Sr. No	**Description of Items**	**Unit**	**Qty.**	**Rate**	**Amount**
1.	Earthwork In Excavation of Foundation of Bridge Culverts , including handling of materials with combined lead of 15 meters dressing of bed and sides stacking the excavated soil clear from the edge of excavation and subsequent filling around- (b) For semi conglomerate or Soil of nature of pick jumper. **(CSR ITEM No-6.7)**	Cum	3.00	146.54+80% =263.77	**791.00**
2.	Boulder masonry in cement mortar (1:6) in foundations and plinth. **(CSR ITEM-12.33)**	Cum	12.00	As Per Analysis 3401.60	**40819.00**
3.	Wire creates of specified dimensions from all directions of GI wire filled with boulders with square cut faces against the wire.(d) 4.75mm dia GI wire 15cm x 15cm mesh (diagonal wise) **(CSR ITEM-23.38 (d))**	Cum	12.00	196.24+12% =219.78	**2637.00**
Amount for 01 No. Gabion Check Dam					**44,247/-**
Amount for 1140 Nos. Dry Stone Check Dam= 1140x44247					**5,04,41,580/-**

Sr. No	**Description of Items**	**Unit**	**Qty.**	**Rate**	**Amount**
1.	Earthwork In Excavation of Foundation of Bridge Culverts , including handling of materials with combined lead of 15 meters dressing	cum	74.59	**146.54+80%** =263.77	19675

	of bed and sides stacking the excavated soil clear from the edge of excavation and subsequent filling around-- For semi conglomerate or Soil of nature of pick jumper.**(CSR ITEM No-6.7 b)**				
2.	Plum cement concrete 1:5:10 with stone ballast 40mm gauge using 20 percent plum. **(CSR ITEM No-10.43)**	cum	316.08	(**As per Analysis)** =2722.94	8,60,667
3.	Centring and shuttering for faces of walls ,partitions, retaining walls and the like (vertical or battering) including attached pilasters, buttresses etc. when curved. **(CSR ITEM No-9.3)**	sqm	578.06	**234.13+35%** =316.08	1,82,713
4.	Earth filling under floors with surplus ordinary soil or soil containing gravel or kankar upto 40% excavated from foundation and taken only from outside the building plinth in 15cm layers including ramming, watering and consolidating lead upto 30 metres. **(CSR ITEM No-6.8 (a)(i))**	cum	229.80	**26.09+80%** =46.96	10791
5.	Providing weep holes in Brick masonry/ Plain/ Reinforced concrete abutment, wing wall/ return wall with 100mm dia PVC pipe, extending through the full width of the structure with slope of 1V:20H towards drawing face. Complete as per drawing and technical Specifications.**(CSR ITEM-21.35)**	No.	98	**145.31+16% =168.55**	16518
Amount for 01 No. Retaining Wall					**10,90,364/-**
Amount for 529 Nos. Retaining Wall = 529x10,90,364					**57,68,02,556/-**
Sr. No	**Description of Items**	**Unit**	**Qty.**	**Rate**	**Amount**
1	Excavation in soil (any type) with Dozer with lead up to 100 metres Excavation for road way in soil by mechanical means including cutting and pushing the earth to site of embankment up to a distance of 100 metres (average lead 50 metres), including trimming bottam and side slopes in accordance with requirements of lines, grades and cross sections. **(CSR ITEM-6.19)**	Cu m	169	164.16+13% =185.50	**31350**
2	Cement concrete 1:4:8 with stone	Cu	173.50	As Per	**6,54,938**

	ballast of size.(b) 40mm gauge**.** **(CSR ITEM-10.10)**	m		Analysis 3774.86	
3	Reinforced Cement Concrete M-20 With cement mech batch mixed using batch type conc mixer as per IS 1791 and vibrated by needle vibrator but excluding steel reinforcement centering and shuttering in Foundation & Plinth**.** **(CSR ITEM-10.15)**	Cu m	107.39	As Per Analysis 5329.29	**5,72,312**
4	Centering and shuttering for faces of walls, partitions, retaining walls and the like (vertical or battering) including attached pilasters, buttresses etc when curved**.(CSR ITEM-9.3)**	Sq m	123.40	234.13+35% 316.07	**39003**
5	Mild Steel reinforcement for RCC work where not including in the complete rate of RCC including bending , binding and placing in position complete:- (i) Up to 20mm dia bars **(CSR ITEM-18.16)**	Qtl	64.43	5031.92+16% =5837.02	**3,76,079**
Amount for 01 No. Silt Detention Dam					**16,73,682/-**
Amount for 21 Nos. Silt Detention Dam = 21x16,73,682					**3,51,47,322/-**

1. **Unforeseen** **= 100000/-**

Total Amount = 75,66,48,850/-

Rs. Seventy Five Crore Sixty-Six Lacs Forty-Eight Thousand Eight Hundred Fifty Only

APPENDIX IV-A
Cost Estimates of Rehabilitation Proposal

NAME OF WORK: DAM IMPROVEMENT AND REHABILITATION WORKS OF BEAS DAM		
GENERAL ABSTRACT		
SL NO	**DESCRIPTION OF WORK**	**AMOUNT (In crores)**
1.	**Structural Rehabilitation Works**	
i	Estimate for Restoration of Down Stream face of Beas Dam by providing stone pitching	59.00
ii	Stabilisations measure to reduced silt ingress in Beas Dam Reservoir	76.00
	Sub Total	135.00
2.	**Structural Measures for Ensuring Hydrological Safety**	
i		
	Sub Total	
3.	**Non-structural Measures**	
i		
	Sub Total	
4.	**Basic Facilities Improvement**	
	Sub Total	
5.	**Instrumentation, SCADA, Surveillance system, etc.**	
i	SCADA Enabled Automation of 6 Nos. Radial Gates of Spillway of Beas Dam Talwara and of 8 Nos. Slide gates of Irrigation Tunnel T-1 & T-2 of Beas Dam Talwara.	1.72
	SUB TOTAL	1.72
6.	**Tourism/Fisheries/Hydropower Development**	
	SUB TOTAL	
7.	**Others (Investigation, Design Studies, Consultancy)**	
	Purpose driven study seismic study	1.00
	Sub Total	
	GRAND AMOUNT	**137.72**

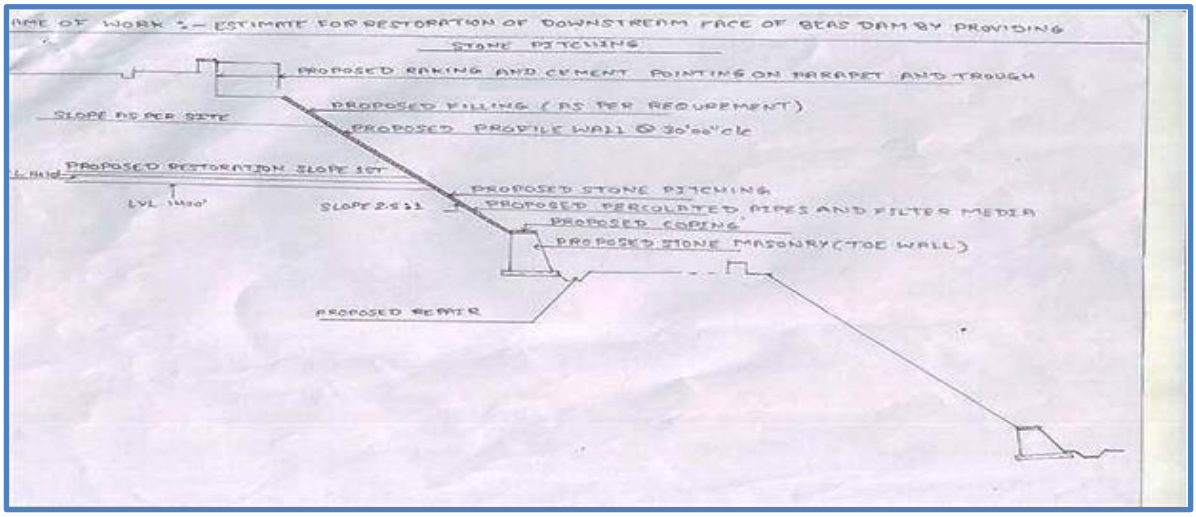
APPENDIX IV-B

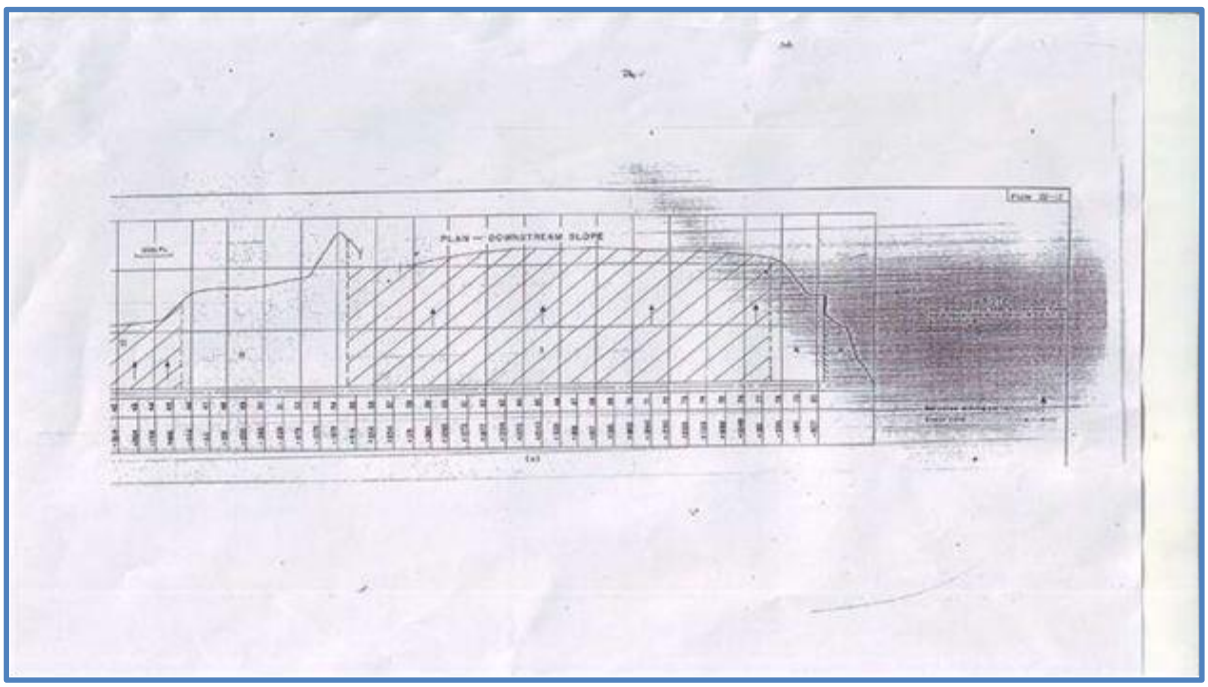
(i) Item wise Detail of Costs

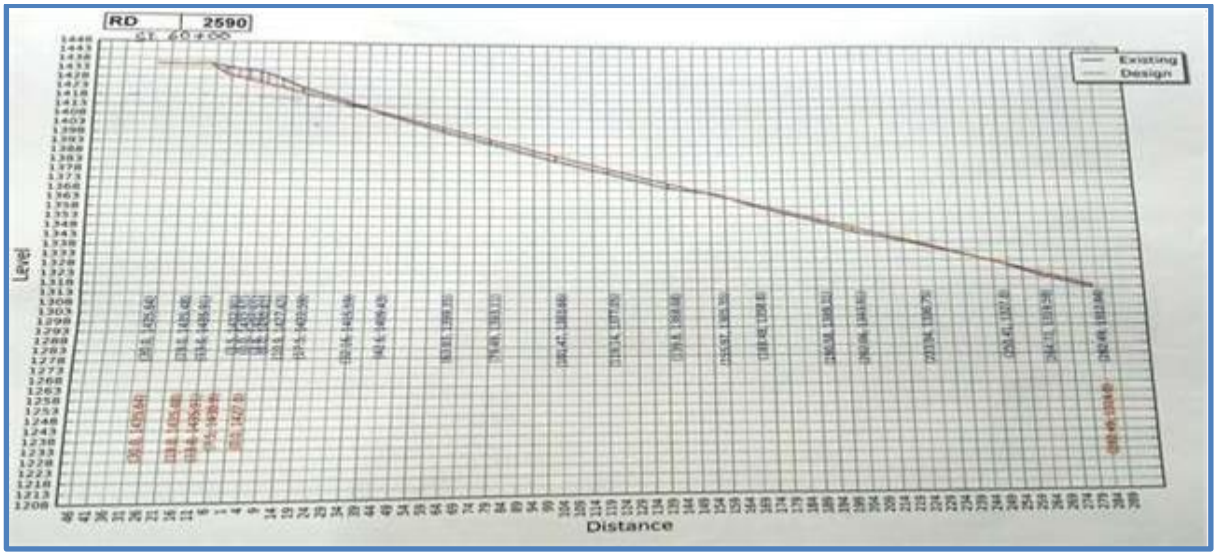
The item wise detail cost is mentioned in Form IV (para 6) of PST

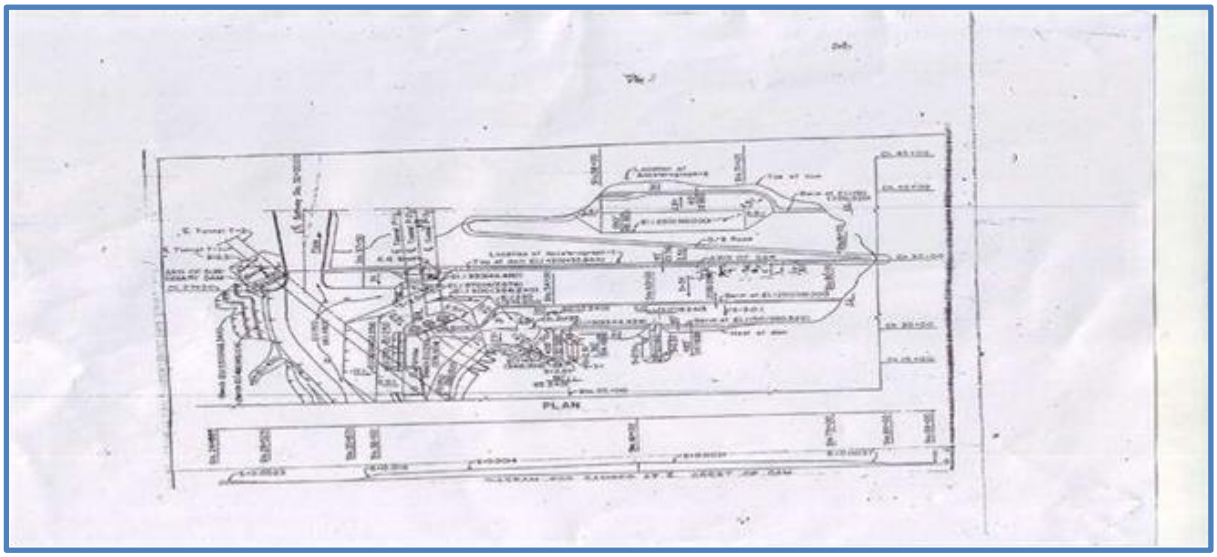
(ii) Design and Drawings of Rehabilitation Works

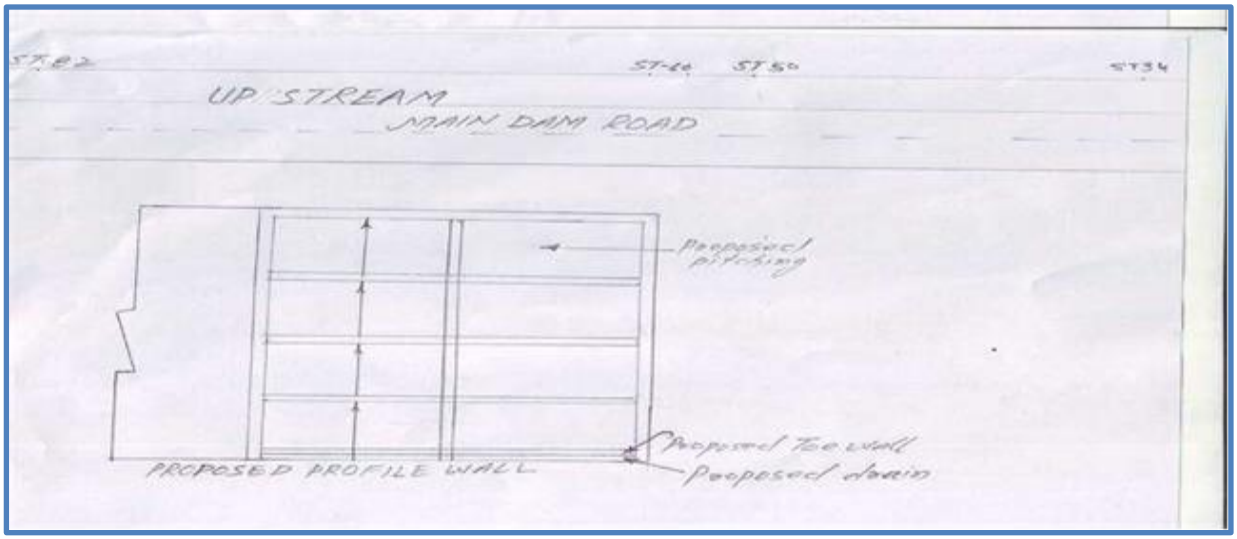
The Drawings of Rehabilitation proposals are attached below.






RD 2590
Existing
Design
Level
Distance


PLAN


UP STREAM
MAIN DAM ROAD
Proposed pitching
Proposed Toe wall
Proposed drain
PROPOSED PROFILE WALL

FORM-V: ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF) COMPLIANCE

1. Project Siting

A. Is the Project adjacent to or within any of the following environmentally sensitive areas?

Environmentally Sensitive Area	Yes	No	Name/ Identify	Distance from the project area
• Wildlife Sanctuary/ Bird Sanctuary National Parks/ Ecologically Protected Area/ Tiger Reserves	Yes		Pong Dam lake	In reservoir area
• Reserved Forest Area		No		
• Buffer zone of protected area		No		
• Elephant movement Corridor		No		
• Designated Wildlife Migratory Route		No		
• Eco-sensitive zone		No		
• Cultural Heritage Site/ Archaeological sites	Yes		Bathu Temple	In reservoir area
• Others		No		

B. Details of Clearances required for proposed rehabilitation activities as per the table given in Appendix V-C:

S. No.	Proposed Activity	Clearance Required
1	Restoration of Down Stream face of Beas Dam by providing stone pitching	Clearance is required from forest Department and the process for the same is under process,
2	Stabilisations measure to reduced silt ingress in Beas Dam Reservoir	Clearance is required from forest Department and HP Government. The process for the same has been initiated.

2. Identification of activities having potential environmental and social impact:

The activities taken in project are majorly rehabilitation and improvement activities for SCADA , Restoration of Down Stream face of Beas Dam by providing stone pitching and and Stabilizations measure to reduced silt ingress in Beas Dam Reservoir but no significant environment and social impacts are expected.

3. Whether Requirement for Specific Environment Management Plan (EMP) proposed:

No, Not Required

(a) If yes, tentative time frame of ESMF Study:

From: MM/DD/YYYY To: MM/DD/YYYY

4. Whether mitigation measures have been identified as per Attachment 1:

No , If yes Please attach as Appendix V-A

5. Whether mitigation measures are required to be implemented by Contractor:

yes , If yes, Please attach as Appendix V-B

Attachment 1 – Abstract Screening for ESMF Activities and Categorization

Sr. No	ESMF Activity/ Component	Diversion of Forest Land	Resettlement and Rehabilitation	Tree Felling	Borrow Area	Quarry Area	Blasting	Dredging/ DE silting of Reservoir	Labour Camps	Transportation of construction materials ,manpower and Equipment through Protected areas/ Reserve Forest	Heavy Machinery	Hot Mix Plant	Concrete Mixer and Heavy Pumps	Material Handling and Storage	Temporary Land Acquisition	Bush/ Vegetation Clearing	Haulage of Machinery	Debris Disposal	Transport of Materials	Small Tools and Pumps	Sheds to keep Machines and Tools	Others
1	Bringing the earth dam section to design section to address the stability aspect	C – Generic mitigation measures will be applicable																				
2	Improving dam instrumentation and	D – No action is required.																				

	monitoring, SCADA and automation system of dams	
3	Catchment Area Treatment (CAT) and Reservoir rim treatment	C – Generic mitigation measures will be applicable
4	Other Purpose Driven study : Seismic Analysis	D – No action is required.

Fill with A/B/C/D (A-High Risk, B-Substantial Risk, C- Moderate Risk, D-Low Risk).

- For A & B – ESIA study including RAP & R&R shall be carried out by a third party. For C – Generic mitigation measures will be applicable. For D – No action is required beyond the above screening.

Appendix V-A

IDENTIFIED MITIGATION MEASURES

In case mitigation measures have not been identified, please leave the information blank.)

Enclosed (Yes/No):

Appendix V-B

MITIGATION MEASURES REQUIRED TO BE IMPLEMENTED BY THE CONTRACTOR

SPMU to provide a summary of mitigation measures to be implemented by contractor, if any:

Sl. No	Components	Potential Impacts	Mitigation Measures	Executing Responsibilities	Supervising Responsibilities	Monitoring Responsibilities
1.	Labour Camps	Worker/ Local people exposure	- Located handling sites away from populated areas - Proper operation and handling measures would be taken to minimize exposure - Would Provide sirens in vehicles to avoid any collision with human/animals - Child labour would be strictly prohibited - Would Provide signage near construction sites and approach roads	Contractor	Dam site in-charge	SPMU

Sl. No	Components	Potential Impacts	Mitigation Measures	Executing Responsibilities	Supervising Responsibilities	Monitoring Responsibilities
2.	Heavy Machinery	Air / Noise Pollution	- Air pollution control measure like water sprinkling would be under taken - Use of barriers to reduce exposure - Plants, machinery and equipment would be handled so as to minimize generation of dust. - All crusher used in construction should confirm to relative dust emission devises - Low emission construction equipment, vehicles and generator sets would be used	Contractor	Dam site in-charge	SPMU
		Worker/ Local people exposure	- Handling sites would be located away from populated areas - Sirens in vehicles would be provided to avoid any collision with human/animals - Provide signage near construction sites and approach roads	Contractor	Dam site in-charge	SPMU
3.	Material Handling And Storage	Air / Noise Pollution	- Air pollution control measure like water sprinkling would be under taken - Limited hours of operation in populated areas would be considered - Use of barriers to reduce exposure - Low emission construction equipment, vehicles and generator sets may be used	Contractor	Dam site in-charge	SPMU

Sl. No	Components	Potential Impacts	Mitigation Measures	Executing Responsibilities	Supervising Responsibilities	Monitoring Responsibilities
		Worker/ Local people exposure	- Handling sites would be located away from populated areas - Sirens in vehicles would be provided to avoid any collision with human/animals - Provide signage near construction sites and approach roads	Contractor	Dam site in-charge	SPMU
4.	Haulage of Machinery	Air / Noise Pollution	- Air pollution control measure like water sprinkling would be under taken - Limited hours of operation in populated areas would be considered - Use of barriers to reduce exposure - Low emission construction equipment, vehicles and generator sets would be used	Contractor	Dam site in-charge	SPMU
		Soil Pollution	- Measures to prevent accidental Spills would be under taken	Contractor	Dam site in-charge	SPMU
		Worker/ Local people exposure	- Handling sites would be located away from populated areas - Sirens in vehicles would be provided to avoid any collision with human/animals - Provide signage near construction sites and approach roads	Contractor	Dam site in-charge	SPMU
5.	Debris Disposal	Air / Noise Pollution	- Air pollution control measure like water sprinkling would be under taken - Limited hours of operation in populated areas would be considered - Use of barriers to reduce exposure	Contractor	Dam site in-charge	SPMU

Sl. No	Components	Potential Impacts	Mitigation Measures	Executing Responsibilities	Supervising Responsibilities	Monitoring Responsibilities
			- Low emission construction equipment, vehicles and generator sets may be used			
		Water Pollution (Surface Water)	- Solid waste would be dumped in specified place to minimize contamination of water	Contractor	Dam site in-charge	SPMU
		Soil Pollution	- Measures to prevent accidental Spills would be under taken	Contractor	Dam site in-charge	SPMU
		Trucks Traffic increase	- Traffic in populated areas would be avoided as much as possible - Speed breaker and Signage would be installed near settlements - Roadside plantation would be taken	Contractor	Dam site in-charge	SPMU
6.	Transport of Materials	Air / Noise Pollution	- Air pollution control measure like water sprinkling would be under taken - Limited hours of operation in populated areas would be considered - Use of barriers to reduce exposure - Low emission construction equipment, vehicles and generator sets would be used emission devises	Contractor	Dam site in-charge	SPMU
		Soil Pollution	- Measures to prevent accidental Spills would be under taken	Contractor	Dam site in-charge	SPMU
		Trucks Traffic increase	- Traffic in populated areas would be avoided as much as possible - Speed breaker and Signage would be installed near settlements - Roadside plantation would be taken	Contractor	Dam site in-charge	SPMU

Sl. No	Components	Potential Impacts	Mitigation Measures	Executing Responsibilities	Supervising Responsibilities	Monitoring Responsibilities
7.	Small Tools and Pumps	Air / Noise Pollution	- Air pollution control measure like water sprinkling would be under taken - Limited hours of operation in populated areas would be considered - Use of barriers to reduce exposure - Low emission construction equipment, vehicles and generator sets would be used emission devises	Contractor	Dam site in-charge	SPMU
8	Borrow Materials/ Area	Air / Noise Pollution	- Air pollution control measure like water sprinkling would be under taken - Limited hours of operation in populated areas would be considered - Use of barriers to reduce exposure - Low emission construction equipment, vehicles and generator sets would be used emission devises	Contractor	Dam site in-charge	SWRD
		Generation of Excavated material	- Remove dredged material as soon as possible from river side - Dumping of dredging material only in designated place by the engineers to minimize impact on environment	Contractor	Dam site in-charge	SPMU
		Landscape Degradation	- It is a direct, short term impact; Irreversible in nature; Severity is low; Insignificant Impact on	Dam Site In-charge	Dam Owner	SPMU

Sl. No	Components	Potential Impacts	Mitigation Measures	Executing Responsibilities	Supervising Responsibilities	Monitoring Responsibilities
		Impact on Forest	▪ The hot mix plant will be installed and operated away from the forest area. ▪ The contractor will take all the precaution to avoid forest fire during operation of the hot mix plant	Contractor	Dam site in-charge	SPMU
9.	Concrete Mixture and Heavy Pumps	Air / Noise Pollution	- Air pollution control measure like water sprinkling would be under taken - Limited hours of operation in populated areas would be considered - Use of barriers to reduce exposure - Low emission construction equipment, vehicles and generator sets may be used	Contractor	Dam site in-charge	SPMU
		Soil Pollution	- Measures to prevent accidental Spills would be under taken	Contractor	Dam site in-charge	SPMU
		Worker/Local people exposure	- Located handling sites away from populated areas - Proper operation and handling measureswould be taken to minimize exposure - Would Provide sirens in vehicles to avoid any collision with human/animals - Child labour would be strictly prohibited - Would Provide signage near construction sites and approach roads	Contractor	Dam site in-charge	SPMU

Appendix V-C

ACTIVITY-WISE CLEARANCES

Activity-wise Applicability of Environmental, Forest and Wildlife Clearances for Dam Rehabilitation and Improvement Works

S.N.	Types of Rehabilitation Works	Nature of Activities	Environmental Clearance	Forest Clearance	Wildlife Clearance	Remarks
1.	**Bringing the earth dam section to design section to address the stability aspect**	It is a minor and localized work, It requires survey works and transportation of selected earth from borrow areas, compaction equipment, etc.	No	yes	No	Clearance is required from forest Department and the process for the same is under process,
2.	**Improving dam instrumentation and monitoring, SCADA and automation system of dams**	Involves carriage of the instruments, cables etc to project site and their installation in the project area.	No	No	No	
3.	**Catchment Area Treatment (CAT) and Reservoir rim treatment**	This activity is widespread within the dam catchment. Generally this activity is executed by Agriculture department/Forest department/ Watershed department of a given State. It involves transportation of materials and equipments for slope stabilization, check dams, sapling etc. Also this activity is very rare and exceptional in the rehabilitation Project as it is done at the time of construction of a new Project.	yes	No,		Clearance is required from forest Department and the process for the same is under process,
4.	**Other Purpose Driven study : Seismic Analysis**		no	no	no	

FORM-VI: IMPLEMENTATION ARRANGEMENT

1. Civil Works-Main Package:

(a) Work Components

1. Restoration of downstream slope of Beas Dam by providing stone pitching.
2. SCADA Enabled Automation of 6 Nos. Radial Gates of Beas Dam Talwara and 8 Nos. Slide gates of Irrigation Tunnel T-1 & T-2 of Beas Dam Talwara.
3.Stabilisations measure to reduced silt ingress in Beas Dam Reservoir

Work no 01: Restoration of downstream slope of Beas Dam by providing stone pitching.

(a) Procurement Method: NCB

(b) Estimated Cost of Package (in Rupees): 59 crore

Work no 02: SCADA Enabled Automation of 6 Nos. Radial Gates of Beas Dam Talwara and 4 Nos. Slide gates of Irrigation Tunnel T-1 & T-2 of Beas Dam Talwara.

(a) Procurement Method: NCB

(b) Estimated Cost of Package (in Rupees): 1.72 crore

Work no 03: Stabilisations measure to reduced silt ingress in Beas Dam Reservoir

(a) Procurement Method: NCB

(b) Estimated Cost of Package (in Rupees): 76 crore

Work no 04: Other Purpose Driven study : Seismic Analysis

(a) Procurement Method: NCB

(b) Estimated Cost of Package (in Rupees): 1.00crore

2. Other Packages

Sl. No.	Description	Procurement Method	Estimated Cost (Rs.in Lakhs)
	NIL		

3. Procurement of Goods:

Sl No.	Description	Procurement Method	Estimated Cost(Rs.in Lakhs)
	NIL		

4. Consultancy Assignment(s):

Sl No.	Description	Procurement Method	Estimated Cost (Rs.)
	NIL		

5. Implementation Timeline:

(a) Overall Phasing of Project Implementation:

Proposed Starting of implementation (MM/DD/YYYY): 01/04/2020

Proposed Ending of implementation (MM/DD/YYYY): 31/03/2026

Implementation Duration (months) (MM): __72__

(b) Timeline phasing of implementation:

Sl. No.	Description	From (Month/Year)	To (Month/Year)	Status of Procurement Process
1	Civil Work – Main Package	04/2020	03/2023	NCB subject to approval of PST
	Work 1	04/2021	03/2024	Subject to clearance from Forest Department for removal/ uprooting of trees from downstream face of Dam.
	Work 2	04/2020	09/2021	NCB subject to

Sl. No.	Description	From (Month/Year)	To (Month/Year)	Status of Procurement Process
				approval of PST
	Work 3	04/2025	03/2029	DRIP Phase -III
	Work 4	10/2021	03/2024	After preparation of TOR by DSRP
2	Other Packages			
3	Procurement of Goods (a) Provision for Instrumentation (b) Provision for the inspection vehicles			

FORM-VII: ADDITIONAL INFORMATION

1. Operation and Maintenance Manual

(a) Operation & Maintenance Manual : Yes

(b) Year of Publication: July 1982

2. Emergency Action Plan

(a) Emergency Action Plan: Yes

(b) Year of Study: July 2019

(c) Agency Conducting Study : BBMB

3. Dam Break Analysis

(a) Dam Break Analysis: No

(b) Year of Study: Not Available

(c) Agency Conducting Study: Under Process with BBMB

4. Geotechnical Investigation

(a) Year of Investigation: No

(b) Agency Conducting Investigation: NA

5. Geophysical Investigation

(a) Area of Study: No

(b) Year of Investigation: NA

(b) Agency Conducting Investigation: NA

6. Stability Analysis of Dam and any other studies

(a) Area of Study: No

(b) Year of Study: NA

(c) Agency Conducting Study: NA

7. Others

(a) Area of Study: No

(b) Year of Study: NA

(c) Agency conducting study: NA