Ref:- 8B/U.C.P./01/81/2022/F.C./1402 dated 19/01/2023

Sl No	RO, MoEF Observations	UJVN Replies
1-	The existing road of BRO is crossing the components of the propose hydel projects at few locations for which necessary NOCs under the provisions of guideline 5.6 of the handbook is require to furnish.	UJVNL is in process to acquire NOC from BRO. Letter in this regards is attached.
2-	The cost benefit analysis should be revised on the bases of revised NPV rates.	Updated cost benefit analysis on basis of revised NPV rates is attached.
3-	The area proposed for CA is seen difficult for raising plantation. Therefore the concern DFO is requested to submit the comments in this regard.	A joint inspection visit has already been conducted for same and report alongwith Comments of DFO, Pithoragarh is attached.
4-	The state govt, has not explained the provisions for evacuation of power to be generated in this project. Therefore, the State Govt in requested to submit the detailed evacuation plan to this office.	Power shall be evacuated through 220KV DC line upto 220 KV Substation of PTCUL. Letter from PTCUL in this regards is attached.
5-	State Govt is requested to submit the soil moisture conservation plan as per the prescribed guideline dated June, 2022.	An undertaking is attached.
6-	State Govt is requested to submit the comments on to maintain environmental flow(E-Flow) in order to sustain the forest water ecosystem in the said region.	MoEF vide letter no J-12011/12/2015-IA-I dated 20/01/2016 issued ToR for the project on basis of Standard ToR. As per Standard ToR (April 2015) the Environmental flow release should be 20% of the average of the 4 lean months of 90% dependable year during the lean season and 30% of Monsoon flow during monsoon season. The same has been adopted. Relevant Page of Standard ToR is attached.
7-	State Govt, in requested to submit the separate enumeration list for the dumping sites selected in the project	Muck Dumping Plan already incorporated in Forest land case proposal is attached.
8-	The state Govt in requested to submit a closure plan for this site along with the method of query	Restoration Plan for Quarry Sites from EIA/EMP report, already submitted to MoEF&CC, is attached.
9-	The proposal involves felling of 104 trees for area of 29.997 ha However, in the DSS analysis the VDF of more than 1 sq is observed foe which comments of concerned DFO is required by the state Govt.	Area of 29.997 ha &104 trees is for entire project however, the VDF of 1 sq is above Desilting Chamber and Head Race Tunnel (HRT) region which are underground structures hence felling of trees above Desilting chamber and HRT, on ground surface, is not envisaged.

13/07/2023

अधिशासी अभियन्ता (जानपद)
सि0भ्यो0रू0प0परि0,यू0जे0वि0एन0लि0
मुनस्यारी, पिथौरागढ़

10-	In the geologist report it is mentioned that in front of power house there is landslide zone is available. The state Govis requested to describe that what kind of mitigative measures they going to take while doing construction in the area and also submit the budgetry provisision to define the same.	Proposed powerhouse is to be constructed underground and location of TRT outfall has been shifted to downstream end to avoid any effect of Landslide on project component in compliance of observations of GSI & HCD, CWC.
11-	In the DSS analysis, the areaproposed for diversion is found 33.50 ha rather proposed 29.997 ha. The state area Govt is requested to do the necessary corrections in the KML file	Corrected KML file with project area 29.997 Ha is attached alongwith Updated DSS analysis on basis of corrected KML file.
12-	The state Govt is requested to submit the administrative approval/ Techno-Economic clearance for the project to this office.	GoU vide letters dated 09/12/2004 and 06/10/2005 allotted the project for DPR preparation and development. Copy of letters attached.
13-	Total 28 patches have been provided for CA in about 60 ha area and most of these patches are very small. In fact, half of these patches are less than 1.0 ha each. It will be difficult to manage such small isolated patches. State Govt. should provide consolidated patches for CA each of which should be 5.0 ha or more in extent and site specific separate CA scheme should also be provided for each patch.	In continuation to replies submitted at Point no 3, it is to mention that only area jointly inspected by Forest department, Revenue Department and UJVNL team is found suitable for compensatory afforestation in the region.

13/07/2023

अधिशासी अभियन्ता (जानपद)
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मुनस्यारी, पिथौरागढ़

यूजेवीएन लिमिटेड
(उत्तराखण्ड सरकार का उपक्रम)
UJVN Limited
(A Govt. of Uttarakhand Enterprise)
कार्यालय अधिशासी अभियन्ता (जानपद), सिरकारी भ्योल रूपसियाबगड परियोजना मुनस्यारी पिथौरागढ ई–मेल : ee.sbr.ujvn@gmail.com
Office of the Executive Engineer (Civil), Sirkari Bhyol, Rupsiabagar HEP Munsiyari, Pithoragarh Email: ee.sbr.ujvn@gmail.com
CIN No. U40101UR2001SGC025866

No. :- 19/UJVNL/03/Director Projects/EE(C-SBR)/L-1 Dated:- 17/02/2023

To,
The Officer Commanding
83 RCC (GREF)
C/o 56 APO

Subject: Regarding issue of"No Objection Certificate".

Sir,
UJVN Limited is entrusted developing green site hydroelectric projects Sirkari Bhyol Rupsiabagar Hydro Electric Project (120 MW) on river Goriganga in district Pithoragarh vide GoU letter no 4734/I/2005-05/51/03; Dated: 06/10/05. The project is under development stage and Environment Clearance of the proposed project and proposal for Forest land clearance are under progress at the Government level. At present, according to the layout plan of the project, many components and structures are to be crossed by the above mentioned motor road under 83 RCC(GREF).

In view of above, it is to bring to your kind concern that all the components of the project are completely underground and elevations/ levels of the components will be much lower than the finish / proposed level of the under construction road. Hence, these structures or components of the project will not have any effect on the proposed or finished level of the road.

The proposed ground levels of the various underground components of the project and the level of the road at the same place are being shown through the following table:-

Sl	Location	Components crossing road	Top level of structure
1	Rupasiabagar. (Power house site of Project.) (Appxt. 3.00 Km far from Milal)	**Finished level of road is appxt. 1950.00 M**	
		(a) Crown of Power house ventilation tunnel.	1760.00 M
		(b) Level of Main access tunnel of dia 4.50 M in D-Shape	1730.00 M
		(c) Top level of Tail race tunnel	1715.00 M

अधिशासी अभियन्ता (जानपद)
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मुनस्यारी, पिथौरागढ़

2	Radgari (Barrage/Diversion site) (Appxt. 6.00 Km far from Milal)	**Level of proposed road near Radgari is appxt. 2120.00 M**	
		(a) Intake tunnel of dia 3.00 M in D-Shape	2072.00 M

Project layout & detail contour maps showing project components is enclosed for your kind reference.

As none of underground component of the proposed hydroelectric project is crossing the road at its constructed or proposed level and there does not seem to be any scope for any possible damage or disruption to the under construction road due to the construction of the project. Also, If the project is approved, there will be plenty of employment opportunity for the local peopleand Project will prove to be a milestone in the energy sector.

Therefore, you are requested to kindly issue the necessary **"No Objection Certificate"** in respect of the parts of the project expected to pass under the road.

Thanking You.

Yours Sincerely.

7/02/2023

(Charu Lohani)
Executive Engineer

Copy forwarded to the following for kind information please.

1. DGM (Civil), UJVNL Ltd., Munsiyari, Pithoragarh.

Re. 22/02/23

Environment Cost and Benefits Analysis

S.N.	Environment Cost/Benefit	MoEF Guidelines for CBA of forest land diversion,2017	Parameters		Total loss (Rs lakh)
A	**Environment Cost**				
1	Eco-system services losses due to proposed forest diversion	Economic value of loss of eco-system services due to diversion of forests shall be the net present value (NPV) of forest land being diverted *(MOEF OM 5-3/2011-F.C dated 06.01.2022)*	NPV of 29.997ha forest land (eco-class-VI, dense forest) to be diverted @Rs 10.6947 lakh/ha.		320.81
			29.997	10.69	
2	Loss of animal husbandry productivity including loss of fodder	To be quantified and expressed in monetary terms or 10% of NPV applicable, whichever is maximum	(i)29.997ha x Rs25070/ha	7.52	32.08
			(ii) 10% of Rs 320.81 lakh	32.08	
			= Rs 32.08 lakh. (Max. of two is adopted)		
3	Cost of human resettlement	To be quantified and expressed in monetary terms as per R&R Plan	As per R&R Plan No resettlement is involved.		0
4	Loss of Public facilities and administrative infrastructure (Roads, buildings, schools, dispensaries, electric lines, railways, etc.) on forest land, which would require forest land if these facilities were diverted due to the project.	To be quantified and expressed in monetary terms as per actual cost basis at the time of diversion.	No public facilities on forest land are to be diverted		0
5	Possession value of forest land diverted	30% of environmental costs (NPV) due to loss of forests or circle rate of adjoining area in the district should be added as a cost component of possession value of forestland, whichever is maximum	30%	320.81	96.24
			= 30% of Rs 320.81 lakh (NPV)		
6	Cost of sufferings to oustees	The social cost of rehabilitation of oustees (in addition to the cost likely to be incurred in providing residence, occupation and social services as per R&R plan) be worked out as 1.5 times of what oustees should have earned in two years had he not been shifted	There are no oustess from forest land or private land, thus nosocial cost of rehabilitation of oustees is involved.		0
7	Habitat fragmentation cost	While the relationship between fragmentation and forest goods and services is complex, for the sake of simplicity the cost due to fragmentation has been pegged at 50% of NPV applicable as a thumb rule.	50% of NPV 0.50x Rs 320.81 lakh Rs 160.41 lakh		160.41
8	Compensatory afforestation & soil moisture conservation cost	The actual cost of Compensatory afforestation & soil moisture conservation and its maintenance in future at the present discounted value	Cost of Compensatory Afforestation& soil moisture conservation including maintenance cost =Rs 202.31 lakh		202.31
9	Cost of conservation of Schedule-I wildlife and endangered plant species	To be quantified and expressed in monetory terms based on actual cost of mitigation measures as per EMP	Cost of Wildlife and Bio-diversity Management plan		99
10	Cost of mitigating land degradation	To be quantified and expressed in monetory terms based on actual cost of mitigation measures as per EMP	Cost of Catchment Area Treatment Plan, Muck Management Plan, Cost of Restoration of quarry area and landscaping plan, Reservoir rim treatment Plan (=Rs 595+1262+70+252)		2179
11	Cost of impairment in air quality in project area and haul roads, increase in noise levels and impairment in surface water quality	To be quantified and expressed in monetory terms based on actual cost of mitigation measures as per EMP	Cost of water, air,noise management, Environ safe guard during road construction, green belt development plan, Env. Monitoring Plan (= Rs 36+80+25+85)		226
12	Cost of Environmental Management Plan for avoiding, mitigating, checking the adverse impacts on various environmental components during construction and operational phase of the project.	As per cost of EMP included in EIA report avoiding the cost of losses already included in serial No.1,8,9,10 and 11	Total cost of EMP after discounting cost included against SL No 1,8,9,10 and 11 (=3798-202.31-99-2179-226)		1092
			Total Environment Cost(A) =		**4407.85**

अधिशासी अभियन्ता (जानपद)
सि०म्यो०रुप०परि०, यू जे वि एन लि०
मुन्स्यारी, पिथौरागढ़

Environment Cost and Benefits Analysis

S.N.	Environment Cost/Benefit	MoEF Guidelines for CBA of forest land diversion,2017	Parameters	Total loss (Rs lakh)
B	**Environment Benefits**			
1	Increase in productivity attribute to the specific project	To be quantified and expressed in monetary terms avoiding double counting	After accounting for 12% free power to the state and 1% free power for local development of area, net annual Saleable annual energy (after accounting for 0.70% auxiliary consumption and 0.50% transmission loss) = 522.8 GWhX0.87 = 454.90 MU. The benefit expressed in monetary terms shall be for 454.90 MU @ levellised tariff of Rs3.31/unit.	15057.19
2	Benefits to economy due to specific projects	The incremental economic benefit in monetary terms due to the activities attributed to the specific project.	Establishment of project will facilitate the emergence of industries, trade and commerce and would bring more and more economic development in the State and Country At present the industry sector alone consumes 42% of total consumption of the state. Therefore, on a conservative estimate about 219.58 GWh shall be consumed in industry. Since the tariff for mixed industry in the state is Rs 5.30/unit, which implies that the difference of Rs 5.30-3.31=Rs 1.99/unit shall accrue as an additional income of Rs 4369.64 lakh to the state.	4369.64
3	Number of Populations benefit due to specific project	As per DPR	The project will directly benefit the population of the country as a whole and the population of state, due to share of 12% free power and people of the project area by 1% free power for local development of area. The benefit expressed in monetary terms shall be for 522.8x0.13=67.96 MU @ levellised tariff of Rs3.31/unit	2249.48
4	Economic benefits due to direct and indirect employment due to the project.	As per DPR	(i) During peak stage of construction, employment will be generated for 1000 skilled/semi-skilled/unskilled labour. Assumung that on an average 500 persons are employed with an average minimum wage of Rs 9383/- pm after discounting the income of Rs 4000/pm by the personbeing earned before being engaged in construction, the net benefit shall be =Rs 5383x12x500= Rs322.98 lakh. (ii) After completion during operation about 50 people will get employment for O&M, routine upkeep / maintenance of roads and buildings. Average benefit shall be 25x12x25000=Rs75 lakh	322.98 75
5	Economic benefits due to compensatory afforestation	Benefits from such compensatory afforestation accruing over next 50 years monetised and discounted to the present value should be included as benefits of compensatory forestation. For benefits of CA the guidelines of the Ministry for NPV estimation may be consulted	Benefits from Compensatory afforestation in 60 ha @ discount rates of 6% /yr of NPV (6% of NPV @10.6947 =10.05) (Rs 10.05x60=Rs 603 lakh)	30.15
			Total Environment Benefits (B) =	**22104.442**
Total benefits due for useful life of 40-year = 40x (15057.19+4369.642+2249.48+75+30.15)+322.98				**871581.46**
Environment Benefit Cost Ratio= (871581.46/4407.853)				**197.73 : 1**

अधिशासी अभियन्ता (जानपद)
सि०भ्यो०रुप०परि०, यू जे वि एन लि०
मुन्स्यारी, पिथौरागढ़

कार्यालय वन क्षेत्राधिकारी मुनस्यारी

Mail Id:- rengeofficemunsyari@gmail.com

पत्रांक 965 / 12–1 दिनांक, मुनस्यारी 19 अक्टूबर, 2022

सेवा में,

प्रभागीय वनाधिकारी,
पिथौरागढ़ वन प्रभाग,
पिथौरागढ़।

विषयः– **जनपद पिथौरागढ़ के तहसील मुनस्यारी अन्तर्गत सिरकारी भ्योल रूपसियाबगड़ जल विद्युत परियोजना (3*40MW) हेतु चयनित क्षतिपूरक वृक्षारोपण क्षेत्र के निरीक्षण के सम्बन्ध में।**

संदर्भः– आपकी पत्र संख्या 888 / 12–1 दिनांक 26.08.2022।

महोदय,

उपरोक्त विषयक संदर्भित पत्र के क्रम में निवेदन है कि जनपद पिथौरागढ़ के तहसील मुनस्यारी अन्तर्गत सिरकारी भ्योल रूपसियाबगड़ जल विद्युत पिरयोजना (3*40MW) हेतु ग्राम साईपोलो, साईभाट, क्वीरी, बुई एवं ग्राम पातों (सिविल सोयम भूमि) में क्षतिपूरक वृक्षारोपण स्थल का चयन किया गया है।

महोदय, उक्त क्षेत्र लगभग नवम्बर माह के अन्तितम सप्ताह से आगामी फरवरी माह के द्वितीय सप्ताह तक हिमाच्छादित रहती है। जियोरेफरेन्स मैप एवं के0एम0एल0 फाईल में दर्शाये गये स्थल कुल क्षेत्रफल 59.994 है0 का पुनः निरीक्षण कर लिया गया है। उक्त क्षेत्र वृक्षारोपण की दृष्टि से उपयुक्त है। फोटोग्राफ्स सहित उपयुक्ता प्रमाण पत्र संलग्न कर आवश्यक कार्यवाही हेतु प्रस्तुत की जा रही है।

संलग्नः– यथोपरि।

भवदीय

वन क्षेत्राधिकारी
मुनस्यारी

क्षतिपूरक वृक्षारोपण स्थल उपयुक्तता प्रमाण पत्र

जनपद पिथौरागढ़ के तहसील मुनस्यारी अन्तर्गत प्रस्तावित सिरकारी भ्यौल जल विद्युत परियोजना (क्षमता 3*40= 120MW) के सापेक्ष (क्षतिपूरक वृक्षारोपण हेतु 59.994है0) ग्राम साईपोलो, साईभाट, क्वीरी, बुईं एवं पातों (सिविल सोयम भूमि) का पुनः स्थलीय निरीक्षण किया गया। उक्त क्षेत्र वृक्षारोपण हेतु उपयुक्त है। अतः उपयुक्ता प्रमाण पत्र महोदय की सेवा में सादर प्रेषित्।

(लक्ष्मण राम)
वन बीट अधिकारी
गोल्मा/साईपोली बीट

वन क्षेत्राधिकारी
मुनस्यारी

(महेन्द्र सिंह)
अवर अभियन्ता (जानपद)
SBR परि० UJVNL मुनस्यारी

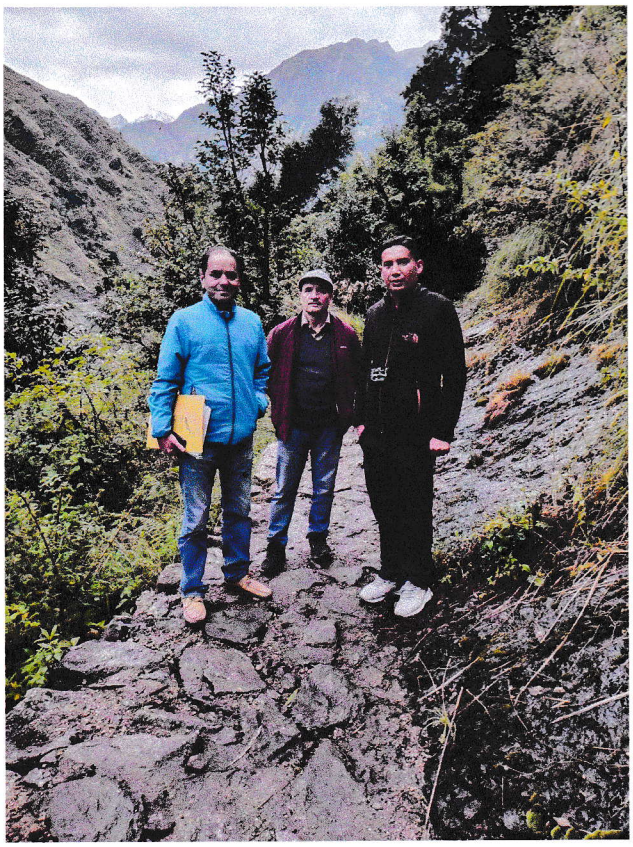
(गोविन्द कुमार)
व० ए०
जोशिम्या बीट

(R.C. Joshi)
Asst. Eng. (Civil)

प्रभागीय वन अधिकारी
पिथौरागढ़ वन प्रभाग
पिथौरागढ़

उप प्रभागीय वनाधिकारी
बेरीनाग
पिथौरागढ वन प्रभाग

EE



Village - Bunie Panto

(लक्ष्मण राम)
व.वी.अ. गोलमा
अल्मोड़ा

वन क्षेत्राधिकारी
मुनस्यारी

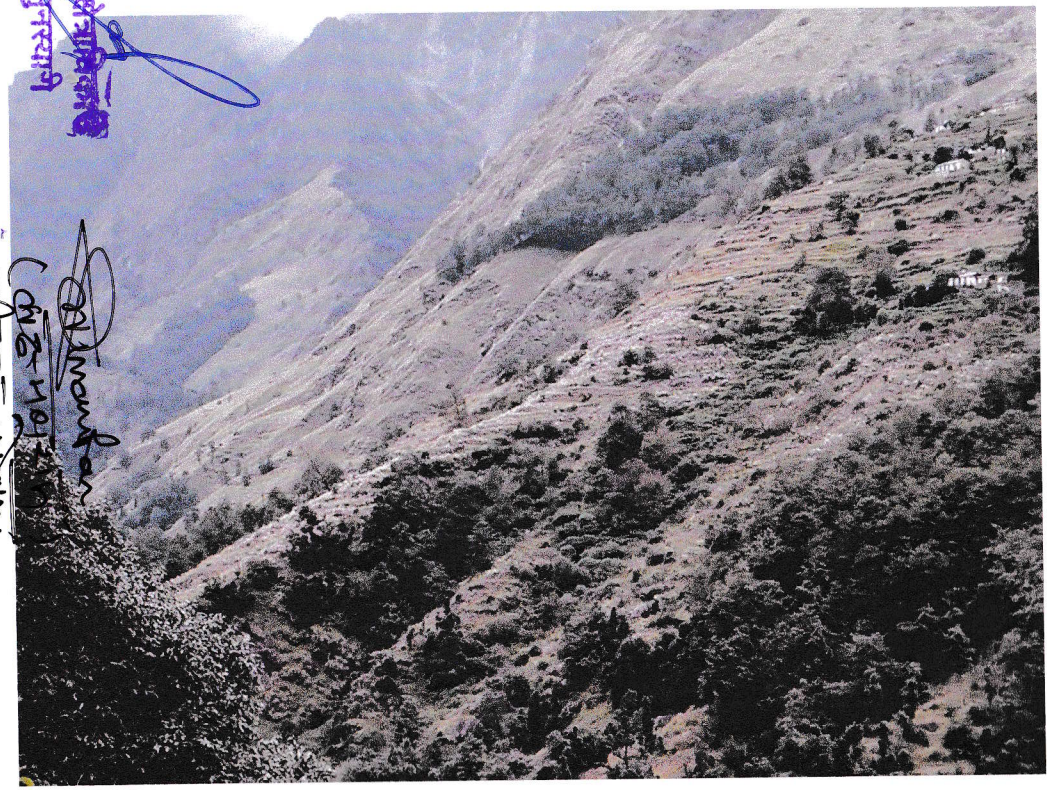
प्रभागीय वन अधिकारी
पिथौरागढ़ वन प्रभाग
पिथौरागढ़

(गोविन्द कुमार)
व. द.

Village - Sain Polu, Sain Bhatt, Dhura

Village -

Sain Polu,
Sain Bhatt,
Dhura



(Village - Dhura)

वन क्षेत्राधिकारी
मुनस्यारी

(Village - Quiri)

प्रभागीय वन अधिकारी
पिथौरागढ़ वन प्रभाग
पिथौरागढ़.

(Village - Dhura)

वन क्षेत्राधिकारी
मुनस्यारी

(Village - Quiri)

प्रभागीय वन अधिकारी
पिथौरागढ़ वन प्रभाग
पिथौरागढ़.

पावर ट्राँसमिशन कारपोरेशन ऑफ उत्तराखण्ड लि0
(उत्तराखण्ड सरकार का उपक्रम)
मुख्य अभियन्ता (परियोजना) गढ़वाल
विद्युत भवन, नजदीक–आई0एस0बी0टी0 क्रासिंग, सहारनपुर रोड़, माजरा, देहरादून–248002
दूरभाष नं0 0135–2640039 फैक्स नं0 0135–2644153 email :- ce_projectg@ptcul.org

PTCUL

निदेशक (परियोजना)
दैनिकी सं. 988
दिनांक 11/5/23
फाईल मार्क HEP

No. 500 **/CE(Project)/PTCUL/** **Dated:** 11 **/05/2023**

Subject:– Power evacuation of Sirkari Bhyol Rupsiabagar HEP (120 MW).

Director (Project)
PTCUL, Vidyut Bhawan,
Majra, Dehradun.

Kindly refer to GM (CDH & NP) UJVNL office letter no. 117/UJVNL/03/Director Projects/GM(C-NP/SBR dated 10/04/2023 (copy enclosed) regarding above subject.

In this matter, Preliminary Tentative Power Evacuation Plan of Sirkari Bhyol Rupsiabagar HEP (120 MW) based upon information provided by concerned field units is enclosed for kind information and onwards submission to UJVNL.

Encls: As above

No. 654 /Dir(P)PTCUL/HEP
Dt. 11.05.2023

[signature] 11/05/2023
(Anupam Sharma)
Chief Engineer (Project)

CC :

1. CE (Project), PTCUL Non ADB, Kumaon Zone, Haldwani.
2. SE (SS & DPR Costing), PTCUL, Dehradun.
3. SE (PI), PTCUL, Pithoragarh.

Seen
मु.अभि. (स्तर–1)
मु. अभि.
अधी. अभि.
उप.महा. (सू.प्रो.)
अधि.अभि.
नि.स./का.स./डी.ई.ओ.
निदेशक (परियोजना)

As directed pls forward information to UJVNL through e-mail as requested CE(P) Dehradun
cc: 1. Managing Director, PTCUL office for kind information & perusal.
2. CE(P) Dehradun with the remark may look to compliance/reply as per letter no. 117/UJVNL dated 10.04.2023 with UJVNL because of Director (P) Sir is in Kumaon tour departmentally.

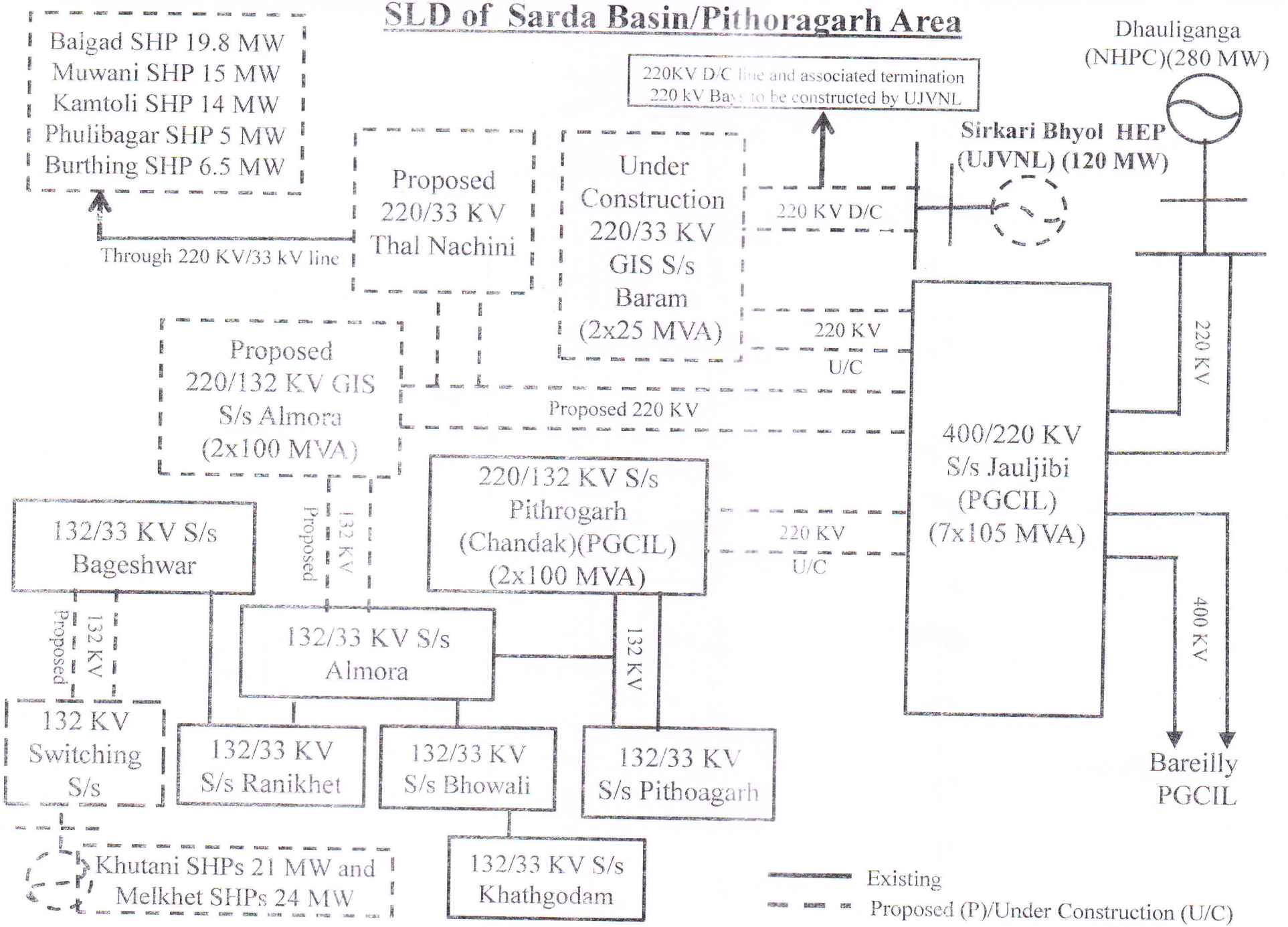
[signature]
EA to D(P)

Preliminary Tentative Power Evacuation Plan of Sirkari Bhyol Rupsiabagar HEP (120 MW).

1. UJVNL requested PTCUL to provide Power Evacuation Plan of Sirkari Bhyol Rupsiabagar HEP (120 MW) vide letter no. 117/UJVNL/03/Director Projects/GM(C-NP/SBR dated 10/04/2023.
2. Further field report was sought through SE (SS & DPR Costing) office letter no. 116 dated 19/04/2023, SE (SS & DPR Costing) office letter no. 119 dated 24/04/2023 & CE (Project) office letter no. 464/CE(Project)/PTCUL dated 03/05/2023 from concerned PI and O&M units.
3. In response, information regarding availability of 02 No. 220 kV Bays at under construction 220/33 kV S/s Baram has been provided by SE (PI) Pithoragarh vide office letter no. 63/SE-PI-PTH/PTCUL dated 06/05/2023 and forwarded by CE (Project) Non ADB office letter no. 893 dated 08/05/2023 is enclosed as Annexure-I.
4. Considering the above, Tentative Power Evacuation of Sirkari Bhyol Rupsiabagar HEP (120 MW) UJVNL may be planned at under construction 220/33 kV S/s Baram through 220 kV D/C line as per enclosed SLD as Annexure-II. Further Power of Sirkari Bhyol Rupsiabagar HEP (120 MW) may be evacuated through proposed 220 kV DC Baram-Jauljivi (PGCIL) line.
5. Evacuation Plan mentioned at above point no. 04 is purely tentative based upon present information provided by field units. In future, UJVNL may apply grid connectivity to PTCUL as per relevant UERC Regulation's with all associated technical details. Details load flow study will be carried out as per details provided grid connectivity application and other relevant technical details to firm up the evacuation plan.
6. Existing 400 kV Jauljivi substation and associated 400 kV line of PGCIL is under ISTS system. UJVNL may also approach to CEA/CTU for Integrated Evacuation Planning.

Assistant Engineer (System Study)	Executive Engineer (System Study)	Superintending Engineer (SS & DPR Costing)	Chief Engineer (Project)Garhwal Zone

SLD of Sarda Basin/Pithoragarh Area



यूजेवीएनलिमिटेड
(उत्तराखण्डसरकार का उपक्रम)
UJVN Limited
(A Govt. of Uttarakhand Enterprise)
कार्यालय अधिशासीअभियन्ता (जानपद), सिरकारीभ्योल रूपसियाबगडपरियोजनामुनस्यारीपिथौरागढ
Office of the Executive Engineer (Civil),SirkariBhyol, RupsiabagarHEP Munsiyari. Pithoragarh
CIN No. U40101UR2001SGC025866

Undertaking

We hereby undertake to deposit 0.5% of total project cost towards the cost of implementation of the soil and Moisture Conservation Plan, if required into the account of CAMPA and the same will be intimated to the RO, Dehradun, MoEF&CC for the purpose of obtaining approval under the Forest Conservation Act, 1980.

We also hereby undertake to deposit the deficit amount, if any, from the money already realized to the tune of 0.5% of project cost in the CAMPA account prior to actual working on the Forest area.

13/07/2023

(Charu Lohani)
Executive Engineer (Civil)
अधिशासी अभियन्ता (जानपद)
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मुनस्यारी, पिथौरागढ़

- For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km-2 year-1.
- Set-up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
- Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
- Environmental flow release should be 20% of the average of the 4 lean months of 90% dependable year during the lean season and 30% of Monsoon flow during monsoon season. For remaining months, the flow shall be decided by the Committee based on the hydrology and available discharge.
- A site specific study on minimum environment flow should be carried out.

C. Biological Environment

Flora

- Characterization of forest types (as per Champion and Seth method) in the study area and extent of each forest type as per the Forest Working Plan.
- General vegetation profile and floral diversity covering all groups of flora including Bryophytes, Pteridophytes, Lichens and Orchids. A species wise list may be provided.
- Assessment of plant species with respect to dominance, density, frequency, abundance, diversity index, similarity index, importance value index [IVI], Shannon Weiner Index etc. of the species to be provided. Methodology used for calculating various diversity indices along with details of locations of quadrats, size of quadrats etc. to be reported within the study area in different ecosystems.
- Existence of National Park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
- Economically important species like medicinal plants, timber, fuel wood etc.
- Details of endemic species found in the project area.
- Flora under RET categories should be documented using International Union for the Conservation of Nature and Natural Resources (IUCN) criteria and Botanical Survey of India's Red Data list along with economic significance. Species diversity curve for RET species should be given.

Fauna

- Fauna study and inventorisation should be carried out for all groups of animals including reptiles and nocturnal animals in the study area. Their present status along with Schedule of the species.
- Information (authenticated) on Avi-fauna and wild life in the study area.
- Status of avifauna their resident/migratory/ passage migrants etc.

प्रारूप - 34

मक डम्पिंग प्रमाण पत्र

प्रमाणित किया जाता है कि जनपद पिथौरागढ़ के तहसील मुनस्यारी अन्तर्गत सिरकारी भ्योल रूपसियाबगड़ जल विद्युत परियोजना (क्षमता 3X40=120मेगावॅाट) के नवनिर्माण से उत्सर्जित मलवे को उचित प्रकियानुसार डम्पिंग किया जायेगा। मलवा प्रस्तावित मक साइटों में ही डाला जायेगा।

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अधिशासी अभियन्ता (जनपद)
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मुनस्यारी,पिथौरागढ़

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मुनस्यारी

प्रभागीय वन अधिकारी
पिथौरागढ़ वन प्रभाग
पिथौरागढ़

Muck Management Plan of Sirkari Bhyol Rupsiabagar HEP (120MW)

General

For construction of different components of HEP, open excavation for foundation of barrage, intake, feeder tunnels, desilting chamber, HRT, surge shaft, underground powerhouse besides various construction adits substantial underground excavation in over burden and would be required. The excavation shall result in large quantity of excavated material i.e. muck which shall have to be evacuated, disposed at designated sites and roller compacted or laid on mild slopes *pari-passu* with the excavation work. In the present case, the total quantity of muck / debris, to be generated due to the project, shall be 8.59 lakh cum, out of which 4.30 lakh cum shall be consumed on project work leaving 4.29 lakh cum, which with 40% swell factor shall amount to 6.00 lakh cum, to be disposed-off away from sites so as to make available the clear site for construction activities. The muck which is suitable for use as, backfill and for construction/widening of the road shall be properly stacked. The muck unsuitable for use in concrete etc. shall be dumped on slopes and treated to mix and match with the surrounding environment with least change in landscape.

Component Wise Details of the Muck Generated and its Management

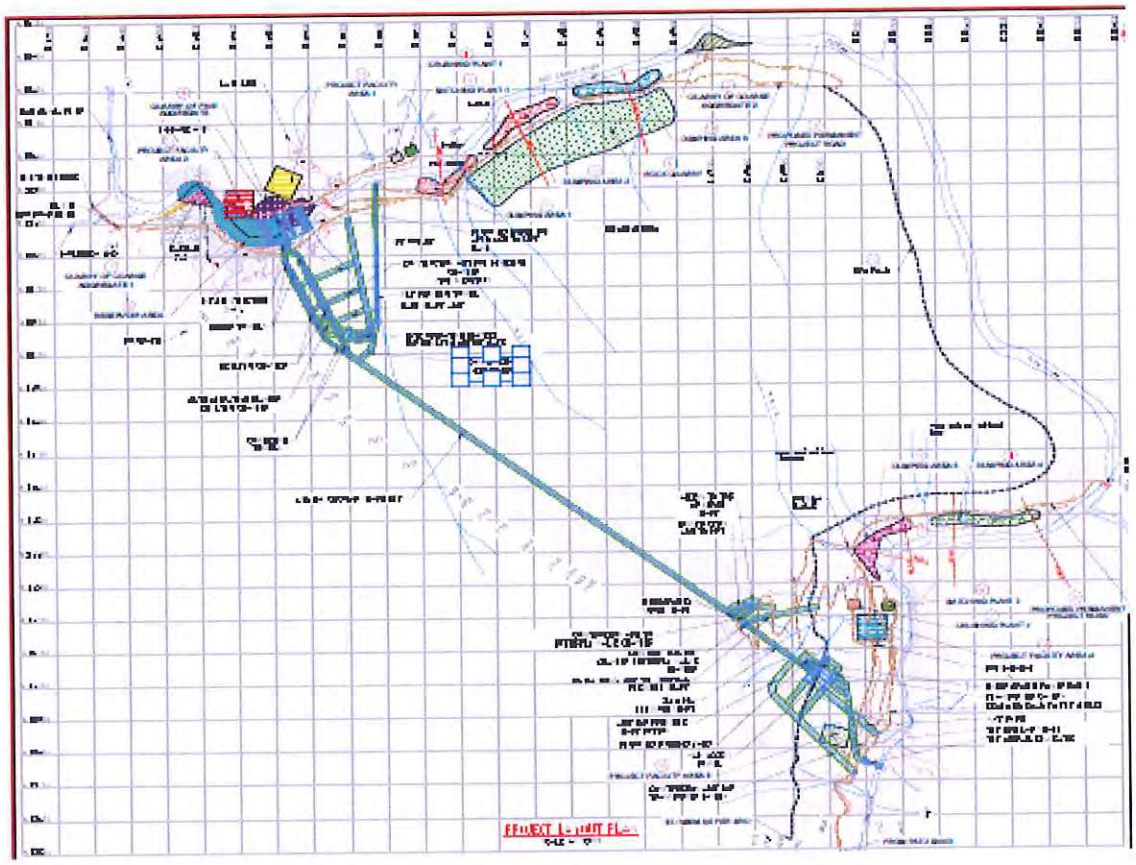
S. No.	Project Component	Excavation in soil	Excavation in rock	Total Muck generated (cum)	Muck/Debris proposed to be utilized (cum)	Muck to be Disposed (cum)	Disposable Muck with 40% swell factor (cum)
1	Barrage& Intake	146460	61340	207800	103900	103900	145460
2	HRT	0	37868	37868	18934	18934	26508
3	Adits i/c MAT	10800	276069	286869	143435	143434	200808
4	Pressure Shaft	0	21387	21387	10694	10693	14970
5	Powerhouse	20000	232089	252089	126045	126044	176462
6	Draft tube& TRT	25920	26860	52780	26390	26390	36946
Total		**203180**	**655613**	**858793**	**429398**	**429395**	**601153**

Muck Disposal

Five muck disposal sites with total land requirement of 8.60 ha, have been identified keeping in view the lead consideration, considering the quantity of the muck, landscape, cost effectiveness, nearness to source of generation absence of ground and surface water, relief and scope for afforestation works.

Component Wise Details of the Muck Generated

S.N.	Dumping site	Capacity (lakh cum)	Quantity to be dumped (lakh cum)	Remark
D-1	About 300 m d/s of Barrage	0.435	0.400	Top surface shall be vegetated
D-2	About 550 m d/s of Barrage	2.600	2.500	Top surface shall be vegetated
D-3	About 830 m d/s of Barrage	0.610	0.600	Top surface shall be vegetated
D-4	About 1400 md/s of Barrage	0.810	0.800	Top surface shall be vegetated
D-5	About 500 m u/s of TRT	1.780	1.700	Top surface shall be vegetated
Total		6.235	6.000	



Location of Muck Disposal and Quarry Sites

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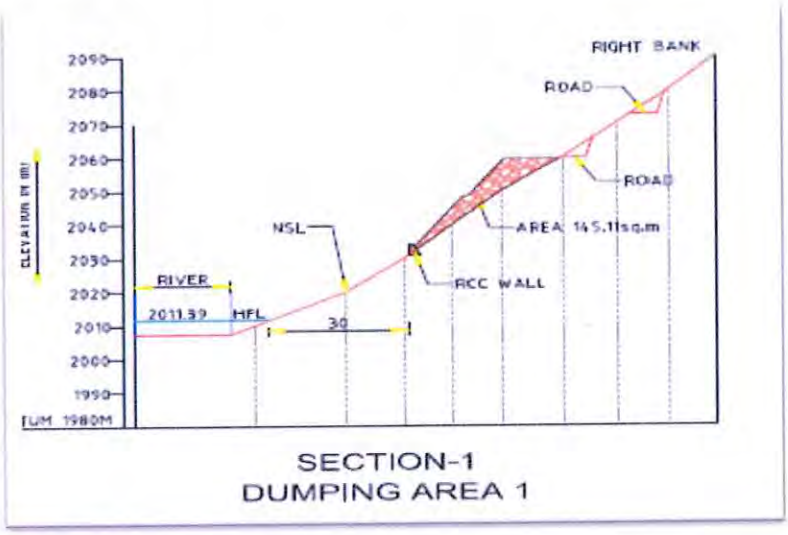
Muck Disposal Site-1

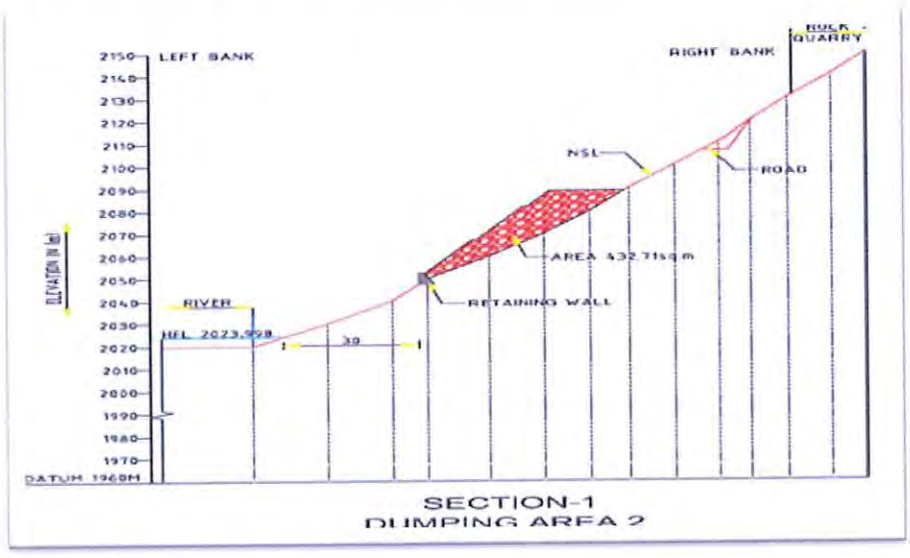
The muck disposal sites D-1 is located on right bank of Goriganga River and is about 300m d/s of proposed barrage. It shall be approachable through proposed road from barrage on right bank and also from outlet of silt flushing tunnel. The muck site lies forest land. The muck site is about 300 m long and has capacity to store 0.435 lakh cum of muck against which 0.400 lakh cum shall be dumped. The plot of typical x-section with supporting structure (R.R. Stone Masonry retaining wall) at the toe is shown in Figure



SECTION-1
DUMPING AREA 1

Muck Disposal Site-2

The muck disposal sites D-2 is located on right bank of Goriganga River and is about 550m d/s of proposed barrage. It shall be approachable through proposed road from barrage on right bank. The muck site lies forest land. The muck site is about 600 m long and has capacity to store 2.60 lakh cum of muck against which 2.50 lakh cum shall be dumped. The plot of typical x-section with supporting structure (R.R. Stone Masonry retaining wall) at the toe is shown in **Figure**



SECTION-1
DUMPING AREA 2

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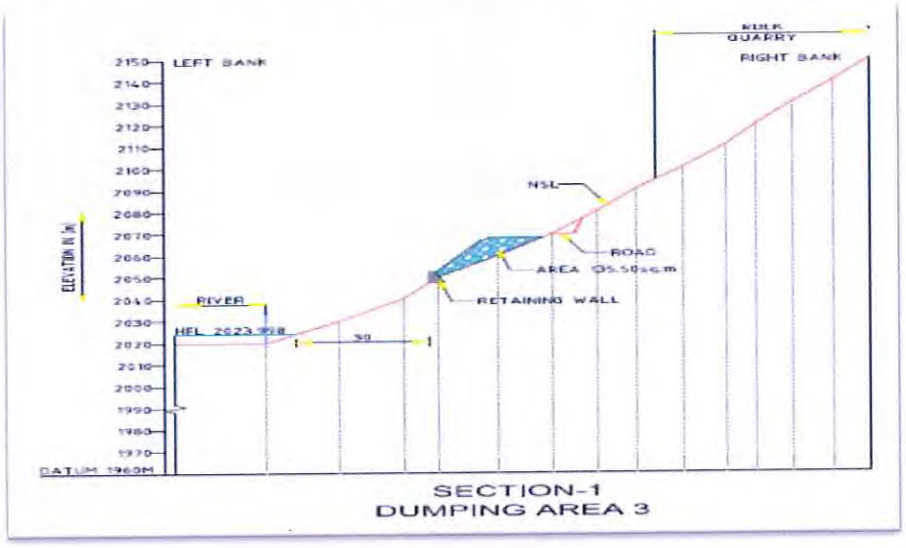
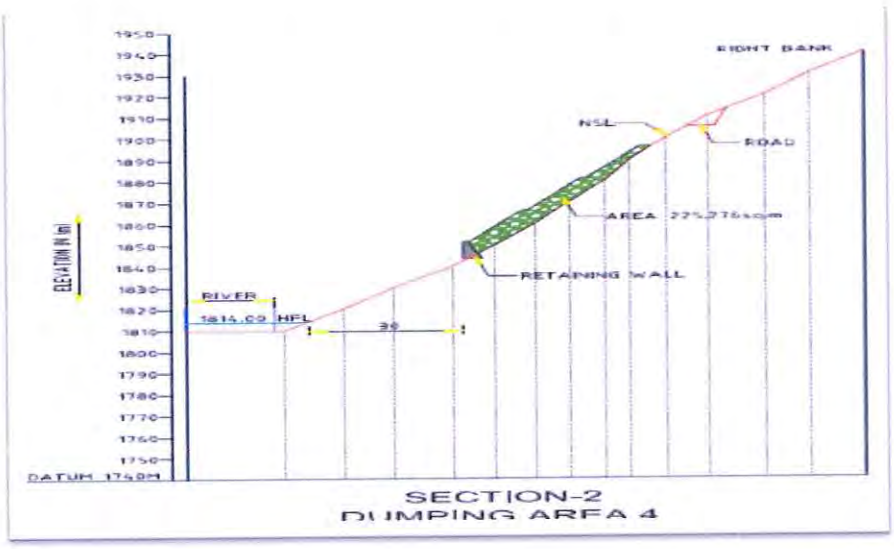
Muck Disposal Site-3

The muck disposal sites D-3 is located on right bank of Goriganga River and is about 900m d/s of proposed barrage. It shall be approachable through proposed road from barrage on right bank. The muck site lies forest land. The muck site is about 450 m long and has capacity to store 0.61 lakh cum of muck against which 0.600 lakh cum shall be dumped. The plot of typical x-section with supporting structure (R.R. Stone Masonry retaining wall) at the toe is shown in **Figure**



Muck Disposal Site-4

The muck disposal sites D-4 is located on right bank of Goriganga River and is about 1400m d/s of proposed barrage. It shall be approachable through proposed road from barrage on right bank. The muck site lies forest land. The muck site is about 400 m long and has capacity to store 0.81 lakh cum of muck against which 0.800 lakh cum shall be dumped. The plot of typical x-section with supporting structure (R.R. Stone Masonry retaining wall) at the toe is shown in **Figure**



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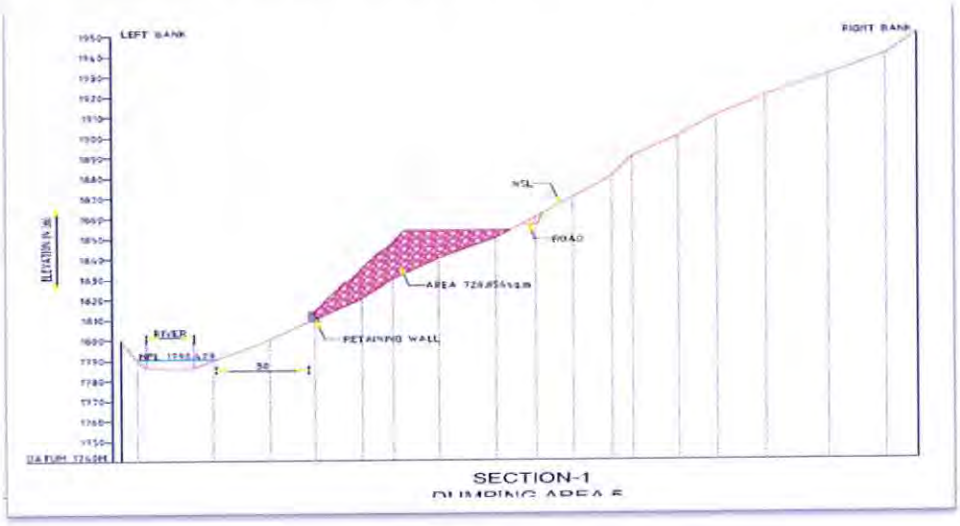
Muck Disposal Site-5

The muck disposal sites D-5 is located on right bank of Goriganga River and is about 300m u/s of proposed TRT. It shall be approachable through proposed road from barrage on right bank. The muck site lies forest land. The muck site is about 400 m long and has capacity to store 1.78 lakh cum of muck against which 1.70 lakh cum shall be dumped. The plot of typical x-section with supporting structure (R.R. Stone Masonry retaining wall) at the toe is shown in **Figure**



Implementation of Engineering & Biological Measures

As already explained engineering measures like providing of GI wire crates and retaining walls and compaction of muck will provide stability to the profile of muck piles.

Engineering Measures

It has been observed that after excavation the disposal of muck creates problem as it is susceptible to scattering unless the muck disposal yards are supported with engineering measures such as retaining structures, crate walls and gabions. All the dumping sites need proper handling to avoid spilling of muck either on the adjoining and or into the river water while dumping and in the post dumping stages. The muck disposal sites shall have to be developed from below the ground level by providing 6 m high R.R. Stone Masonry retaining wall. The retaining wall shall be kept at least 30m away from the point of intersection of HFL of the river with the hill slope. After construction of retaining wall, the muck brought in dumpers shall be dumped and manually spread behind the wall. The muck shall be laid with vertical angle not exceeding 28^0 in such a manner that rock mass is properly stacked behind the wall with minimum of voids. The muck pile shall be later covered with geo-Geo-coir textile properly held to the ground by steel wire U-nails and rehabilitated by afforestation of herbs and shrubs. Geo-coir textile should also be provided on

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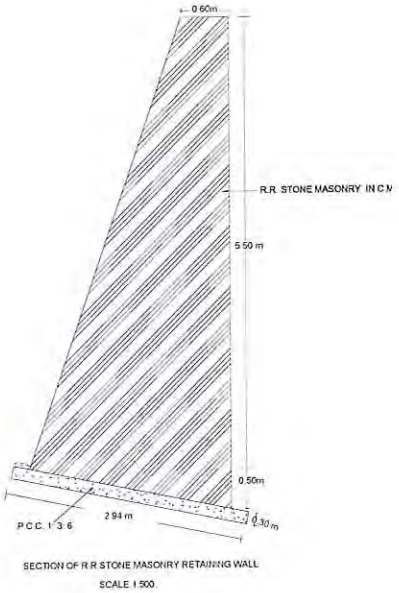
surface of muck piles where top surface is to be vegetated. The typical section of retaining wall is shown in **Figure.**



Section of retaining wall 6m high

Biological Measures

Biological measures, however, require special efforts as the muck disposed in disposal yards will in general be devoid of nutrients and soil contents to support vegetation. The selection of soil for spreading over such an area would require nutrient profiling of soil for different base elements. Suitable ad mixture of nutrients would be done before placing the soil on the top surface of muck disposal areas to have administered growth of forest canopy.

Plantation Technique

In view of the peculiar site conditions particularly the soil conditions, the planting technique for all the categories of the plants has to be very site specific and suited to the stress conditions as anticipated and discussed above. The planting substrates would need to be considerably improved to support the plants in their initial stages of establishment. The moisture retention capability, availability of nutrients and soil aeration, permeability and porosity would require intervention and assistance.

Multistoried and multipurpose plantations are proposed to be raised on the muck dumping sites as also in road side strips using grasses, shrubs and bushes in the under story and trees in the upper story. Nursery raised grass slips, seedlings of shrubs & bushes and tree species would be planted in the area combined with grass sowing in patches. In addition, cuttings of bushes and shrubs can also be planted to supplement the nursery raised stock but this would substitute requirement of raising the nursery of these species. Intimate mixture of species would be avoided right at the planning stage and would be strictly followed during planting. Each patch should

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contain maximum of two species. Grasses would be mixed by groups in rows, shrubs and bushes by group again in rows.

Grass slip planting and grass seed sowing would be done in strips at 0.10 m x 0.10 m spacing in the prepared staggered patches of 1 m x 0.5 m with a depth of 0.30 m. Soil mixture would be used while filling the patches. Balance dug up soil/muck will be stacked along the patch on the downhill side for rain water tapping and enhanced percolation in the patch. Number of such patches in each hectare is proposed at 500.

Shrubs and bushes would be planted in elongated strips of 1.5 m x 0.5 m with a depth of 0.45m. Soil mixture would be used while filling the patches. Balance dug up soil/muck will be stacked along the patch on the downhill side for water tapping and better percolation in the patch. These would be staggered throughout the area numbering 500 per hectare. Each patch would have two rows of planting with staggered spacing between plants in a row as 15 cm and distance between rows as 15 cm.

Planting of trees would be done in contour staggered pits of 0.60 m x 0.60 m x 0.60 m size numbering 800 per hectare. Out of these 800 plants, about 200 plants per hectare are meant for planting along the periphery of the area. If the periphery gets filled up with lesser numbers, the remainder would be planted in the core/main area. Soil mixture would be used while filling the pits. Balance dug up soil/muck will be stacked on downhill side of the pit for trapping the rain water and allowing it to percolate in the pit.

It is proposed to use soil mixture in the pits & patches consisting of soil imported from nearby areas mixed with compost or human or vermin-compost or all of these. The ratio for the mix would be 5 parts: Compost/manure 2 parts: Sand 2 part: and humus or vermin-compost 1 part. This will make nutrients really available for the plants in the preliminary stages and also help increase soil aeration, porosity & permeability and improved moisture available for the plants.

The stabilization sites from the time of execution of biological measures would be protected with barbed wire fencing on 2m high RCC posts and provided with inspection paths. Since the muck dumping sites are being provided with either RCC walls or the wire crate (gabion) wall on the valley side (towards river) which is not negotiable by animals and human beings, fencing would not be required along the entire perimeter. Hence, it would be done on the vulnerable sections i.e. towards the hillside only.

The proposed costs include nursery costs for initial planting and also for mortality replacement.

The biological measures shall be taken up towards the end of construction. The plantations would be maintained for a period of 5 years by irrigating the plantation during dry seasons, mortality replacement and repair of fencing & inspection paths

within the area. The task of irrigation would be performed by the watch & ward (chowkidar) provided in the cost estimate.

Species for Plantation

Afforestation with suitable plant species of high ecological and economic value and adaptable to local conditions will be undertaken at the rate of 800 plants per hectare in accordance with canopy cover requirement. The major plant species which can be used in the area shall belong to indigenous species.

Cost Model for Plantation

The cost model for plantation on muck dumping sites is given in **Table**

Cost Model for Plantation on Muck Dumping Sites (For One-hectare Area)

S. No.	Particular	Qty.	Unit	Rate (Rs.)	Amount (Rs.)
A.	**PALANTATION:**				
(1)	**GRASS SLIP PLANTING AND GRASS SEED SOWING:**				
1	Preparation of soil mixture (soil, sand, humus & compost) including digging, purchase, carriage to the site of work and mixing at site.	75.00	Cum.	850.00	63750
2	Digging of staggered patches 1 m x 0.50 m x 0.30 m @ 500 patches/ha.	75.00	Cum.	50.00	3750
3	Filling of staggered patches with imported soil mixture.	75.00	Cum.	15.00	1125
4	Extraction of grass slips from nursery beds @ 50 slips per patch.	25000	Per Slip	0.12	3000
5	Carriage of grass slips from nursery to work site.	25000	Per Slip	0.15	3750
6	Planting of the extracted grass slips in above patches @ 50 slips per patch.	25000	Per Slip	0.18	4500
7	Cost of grass slips (in nursery).	25000	Per Slip	0.5	12500
8	Purchase of grass seeds @ 5 gm. Per patch.	2.50	Kg.	115.00	288
9	Sowing of grass seeds in furrows in each patch.	500	Patch.	2.50	1250
				TOTAL	**93913**
(II)	**SHRUBS AND BUSHES PLANTATION:**				
1	Preparation of soil mixture (soil, sand, humus & compost) including digging, purchase, carriage to the site of work and mixing at site.	168.75	Cum.	850.00	143438

2	Digging of elongated patches 1.5 x 0.50 m x 0.45 m @ 500 patches/ha.	168.75	Cum.	50.00	8438
3	Filling of elongated patches with imported soil mixture.	168.75	Cum.	15.00	2531
4	Extraction of shrubs & bushes from nursery beds @ 50 per patch.	25000	Per plant	0.15	3750
5	Carriage of shrubs & bushes from nursery to work site.	25000	Per plant	0.15	3750
6	Planting of the extracted shrubs & bushes un above patches @ 50 per patch.	25000	Per plant	0.20	5000
7	Cost of shrubs & bushes (in nursery).	25000	Per plant	1.00	25000
				TOATL	191906
(III)	**FOUR LINE STRIP PLANTATION (TREE SPECIES):**				
1	Preparation of soil mixture (soil, sand, humus & compost) including digging, purchase, carriage to the site of work and mixing at site.	18.225	Cum.	850.00	15491
2	Digging of pits (45cm x 45cm x 45cm) in periphery of area.	200	No.	4.45	890
3	Filling of pits (45cm x 45cm x 45 cm) with imported soil mixture.	200	No.	1.27	254
4	Extracted of plants from nursery beds.	200	No.	0.25	50
5	Carriage of plants from nursery to the work site over average distance of 10 km uphill carriage.	200	Nos. per Km.	0.17	340
6	Planting of extracted plants in above pits including ramming.	200	No.	0.86	172
7	Mulching of plants with grass.	200	No.	0.28	56
8	Cost of plants (in nursery).	200	No.	1.00	200
				TOTAL	**17453**
(IV)	**PLANTATION OF TREE SPECIES IN BLANK AREA:**				
1	Preparation of soil mixture (soil, sand, humus & compost) including digging, purchase, carriage to the site of work and mixing at site	54.675 .	Cum.	850.00	46474
2	Digging of pits (45cm x 45cm x 45cm) for B/L plantation.	600	No.	4.45	2670
3	Filling of pits (45cm x 45cm x 45cm) for B/L plantation with imported soil mixture.	600	No.	1.27	762
4	Extraction of plants from nursery beds.	600	No.	0.25	150
5	Carriage of plants from nursery to the work	600	No.	0.17	1020

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	site over an average distance of 10 Km uphill carriage.		per Km.		
6	Planting of B/L plants in pits including ramming.	600	No.	0.86	516
7	Mulching of B/L plants with grass.	600	No.	0.28	168
8	Cost of plants (in nursery).	600	No.	4.00	2400
				TOTAL	**54160**
(V)	**MAINTENANCE:**				
1	1st year maintenance.	1	Ha.	4000	4000
2	2nd year maintenance.	1	Ha.	3600	3600
3	3rd year maintenance.	1	Ha.	3200	3200
4	4th year maintenance.	1	Ha.	2800	2800
5	5th year maintenance.	1	Ha.	2000	2000
6	Watch and ward of plantation for 5 years (60 months @ 1000/=) including irrigation during lean seasons.	1	Ha.	1000	60000
				TOTAL	**78000**
B.	**SOIL CONSERVATION:**				
1.	Construction of gulley plugs, small check walls/dams etc.			LUMP-SUM	**50000**
				TOTAL (A) + (B)	
				GRAND TOTAL	**4,85,432**

अधिशासी अभियन्ता (जानपद)
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मुनस्यारी, पिथौरागढ़

Cost Estimate for Muck Management Plan

The cost estimate for muck management plan indicating engineering, biological, bio-technological measures and maintenance is provided in **Table**.

Cost Estimate for Muck Management Plan

Sl. No.	Particulars	Quantity	Unit	Rate (Rs.)	Amount (Rs. lakh)
A. Engineering Measures					
1	RCC Counterfort retaining wall (10m high) for Dumping Site 1in 300m.	300	RM	200000	600.00
2	R.R. Stone Masonry in Cement Mortar 1:5 with 0.3 m thick PCC 1:3:6 in foundation at Dumping Sites2,3,4 and 5 in total length1850				
	PCC 1:3:6 in foundation				
a.	1850 X 2.57 X 0.15 = 816 cum	713	cum	4000	28.52
b.	R.R. Stone Masonry in C.M. 1:5 1850 X 0.5 (0.6+2.27) X 5.0 =13274 cum	13274	cum	3500	464.59
				Sub-total (A)	**1093.11**
B. Biological Measures					
1.	Plantation of muck disposal sites	8.6	ha	485432	41.75
2.	Barbed wire fencing on 2m high RCC posts	8.6	ha	60000	5.16
3.	Providing and laying Geo-coir textile	7.0	ha	10,00,000	70.00
4.	Cost of portable pump with accessories	5	No.	300000	15.00
5.	Cost of sprinkler system of irrigation	8.6	ha	100000	8.60
6.	Watch and ward 528 no. @ Rs. 12000 p.m. for 4 years	240	month	12000	28.80
				Subtotal (B)	**169.31**
				Grand Total (A) + (B)	**1262.42**
				Say Rs.	**1262.00**

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प्रभागीय वन अधिकारी
पिथौरागढ़ वन प्रभाग
पिथौरागढ़

अधिशासी अभियन्ता (जानपद)
सि0ध्यो0रू0प0परि0.यू0जे0वि0एन0लि0
मुनस्यारी, पिथौरागढ़

Restoration Plan for Quarry Sites

General

The HEP mainly involves construction of barrage, intake, head race tunnel, surge shaft, pressure shaft, underground powerhouse and tail race tunnel and adits. For the construction of such component's substantial quantities of concrete work, structural steel work, shotcreting and grouting and fixing of pre-cast lagging is involved for which construction materials like coarse and fine aggregates, boulders, stones and earth for backfilling are required besides cement, structural steel and reinforcement steel. The quantities of construction material like fine aggregate, shingle or coarse aggregate for various uses and their potential quarry/mining sites are mentioned in **Table**. Assuming the total losses (38%) for in the quantity estimation of raw material from quarry site to aggregate processing plant for producing aggregates, the total quantity of raw material works out to be 1.45 lakh cum for coarse aggregate and for sand 0.73 lakh cum. Thus, the total raw material requirement for aggregate comes to 2.18 lakh cum, which shall be met from two rock-in-situ quarry sites and, the location of which is depicted in **Figure.**

: Quantity of Various Materials (Lakh cum)

S. No	Material	Estimated Quantity	Net Quantity with 38% losses	Quantity retrieved from excavated muck	Balance quantity to be obtained from quarries
1	Coarse aggregate	1.50	2.07	1.00	1.07
2	Fine aggregate	1.00	1.38	0.82	0.56
3	Boulder	1.80	2.48	2.48	0.00
Total		**4.30**	**5.93**	**4.30**	**1.63**

JF

प्रभागीय वन अधिकारी
पिथौरागढ़ वन प्रभाग
पिथौरागढ़

सहायक अभियन्ता (जानपद)
सि0 म्यो0रू0प0परि0,यू0जे0वि0एन0लि0
मुनस्यारी, पिथौरागढ़

GORI GANGA RIVER
LANDSLIDE
BARRAGE AXIS
EXISTING BRIDGE
EL 2115
BRO ROAD LEVEL
JAULCHIDDA GAD
RESERVOIR AREA
FOOTPATH
INTAKE STRUCTURE 2NOS.
FEEDER TUNNELS
DESILTING CHAMBER
GATE OPERATING CHAMBER DESILTING CHAMBER
CONNECTING TUNNELS
4.2m DIA, CIRCULAR SHAPE HRT
SFT OUTLET
PROPOSED BRIDGE FOR APPROACH TO LEFT BANK
CONSTRUCTION ADIT FOR DESILTING CHAMBER (TOP & BOTTOM)
SILT FLUSHING TUNNEL
GATE SHAFT ADIT
GATE OPERATING CHAMBER FOR DESILTING OUTLET GATE
CONSTRUCTION ADIT TO HRT
UNDERGROUND SURGE SHAFT
PROPOSED POTHEAD YARD
EL 1980M AS PER BRO
FROM PATO BAND
UNDER GROUND POWER HOUSE
TRANSFORMER CAVERN
TEMPORARY BRIDGE
BRO ROAD
PROPOSED PERMANENT PROJECT ROAD
DUMPING AREA 1
DUMPING AREA 2
DUMPING AREA 3
DUMPING AREA 4
DUMPING AREA 5
Boulders
Rain Shelter
Hot spring
Dense mixed jungle
Open Scrub and scattered trees
NALA
FLOW

LAND REQUIREMENT FOR MUCKING SITE

SL. NO	LEGENDS	DESCRIPTION	TENTATIVE AREA (sq.m)
1		DUMPING AREA 1	6000
2		DUMPING AREA 2	7500
3		DUMPING AREA 3	7500
4		DUMPING AREA 4	9000
5		DUMPING AREA 5	7500
		PROPOSED ROAD	
		BRO ROAD	

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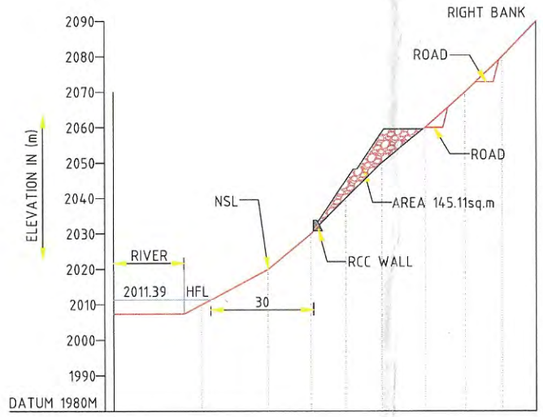
अधिशासी अभियन्ता (जानपद)
सि0भ्यो0रू0प0परि0 यू0जे0वि0एन0लि0
मुनस्यारी, पिथौरागढ़

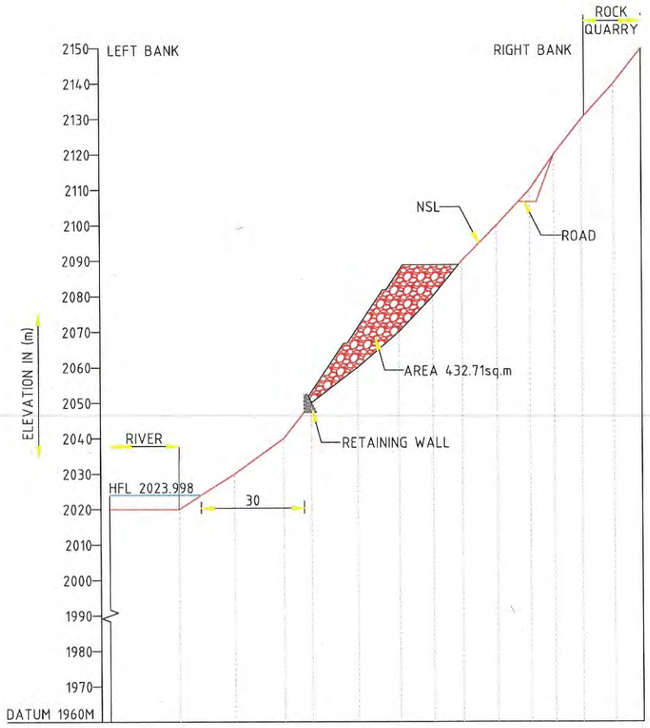
PROJECT LAYOUT PLAN

SCALE 1 : 5000 (50 0 50 100 150 200 250m)

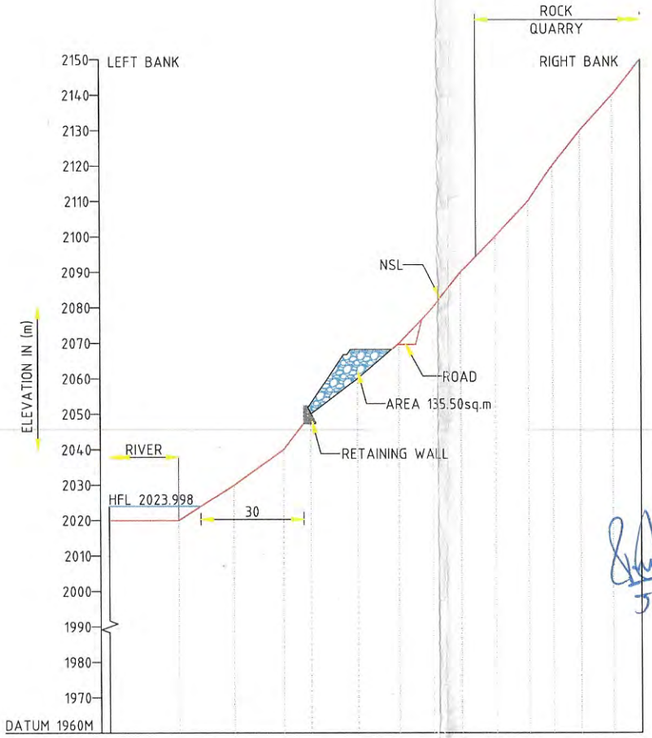
प्रभागीय वन अधिकारी
पिथौरागढ़ वन प्रभाग
पिथौरागढ़



SECTION-1
DUMPING AREA 1



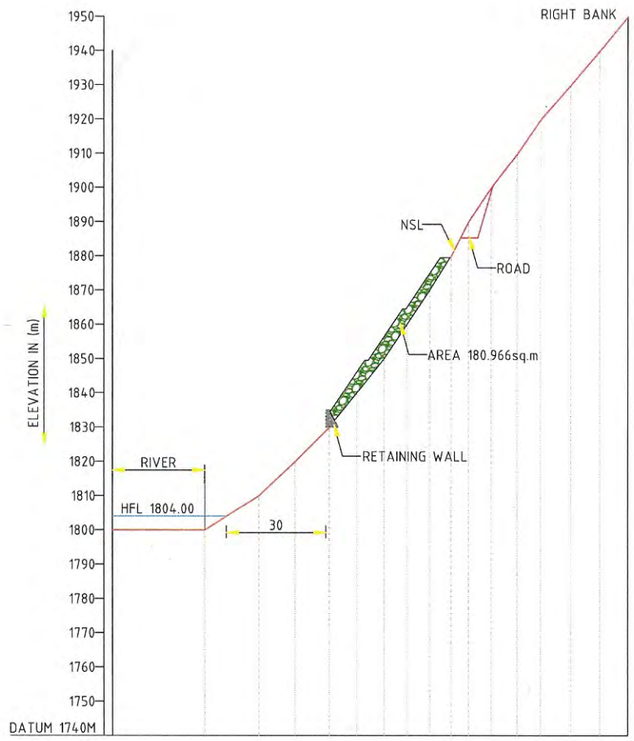
SECTION-1
DUMPING AREA 2



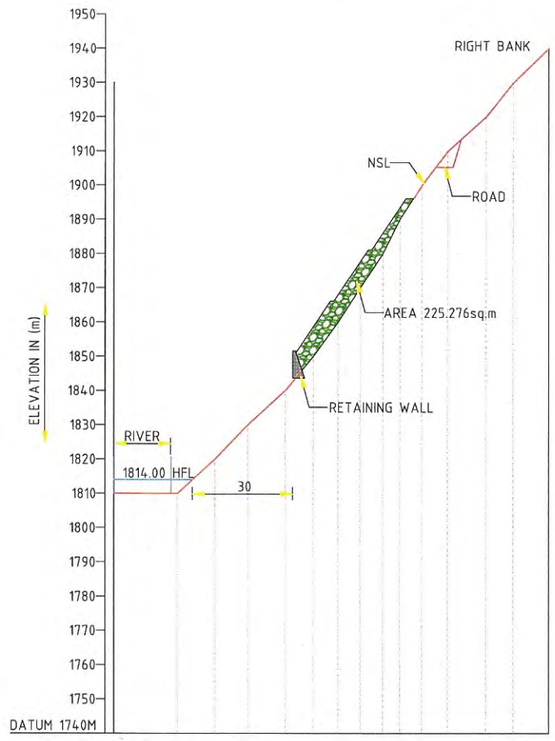
SECTION-1
DUMPING AREA 3

अधिशासी अभियन्ता (जानपद)
सि0भ्यो0रू0प0परि0,यू0जे0वि0एन0लि0
मुनस्यारी, पिथौरागढ़

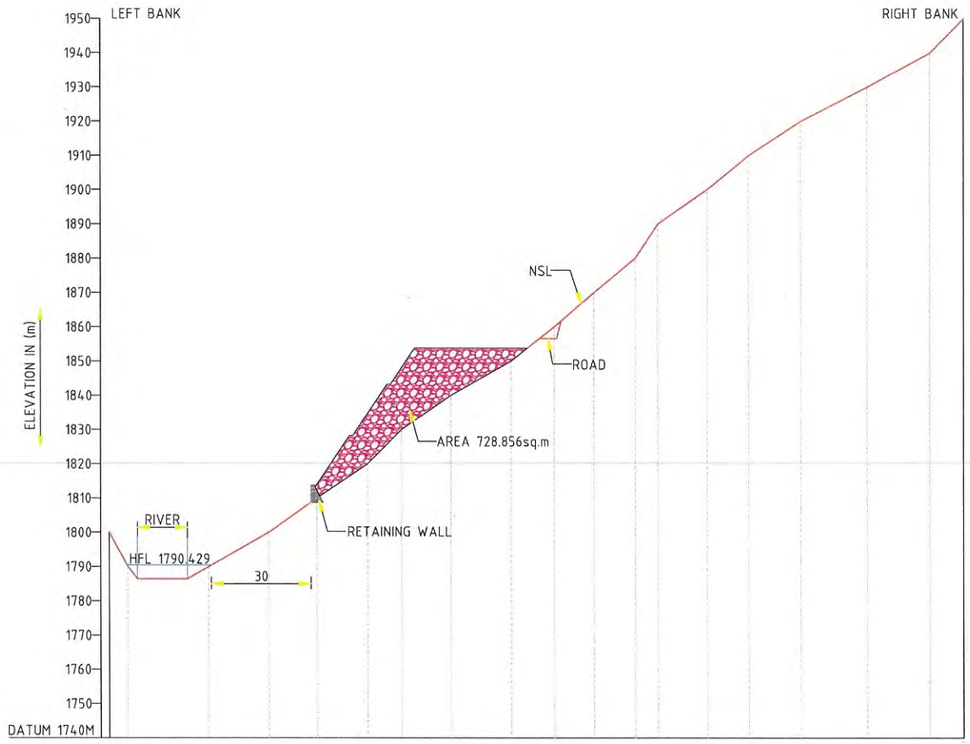
क्षेत्रीय वन अधिकारी
पिथौरागढ़ वन प्रभाग
पिथौरागढ़



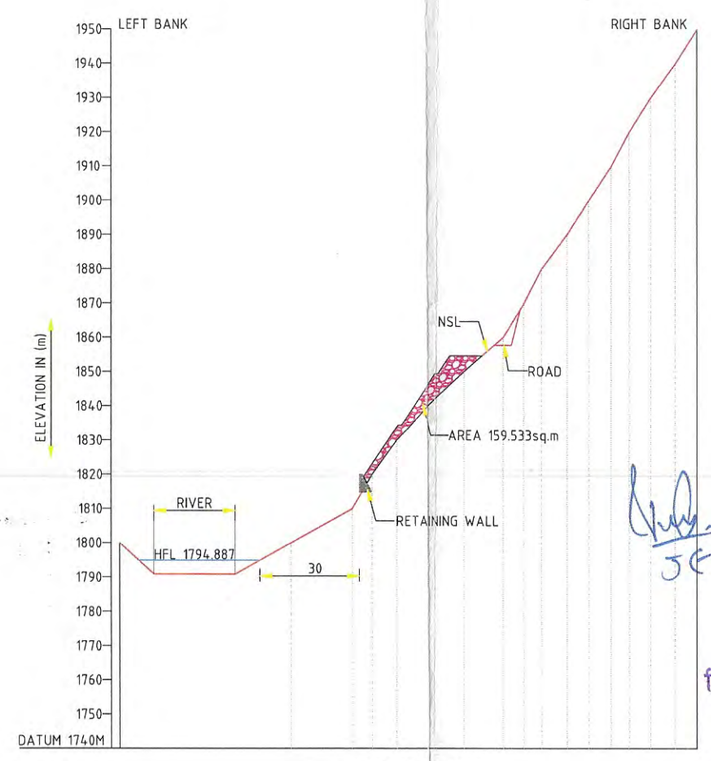
SECTION-1
DUMPING AREA 4



SECTION-2
DUMPING AREA 4



SECTION-1
DUMPING AREA 5



SECTION-2
DUMPING AREA 5

अधिशासी अभियन्ता (जानपद)
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मुनस्यारी, पिथौरागढ़

प्रभागीय वन अधिकारी
पिथौरागढ़ वन प्रभाग
पिथौरागढ़

प्रारूप-38

मक डिस्पोजल प्लान प्रमाण पत्र

जनपद पिथौरागढ़ के तहसील मुनस्यारी अन्तर्गत सिरकारी भ्यौल रूपसियाबगड़ जल विद्युत परियोजना (क्षमता 3X40=120मेगावॉट) से उत्सर्जित मलवा निस्तारण हेतु प्रस्ताव (जिला पिथौरागढ़) डम्पिंग साईट मानचित्र (1,2,3,4,5)

अवर अभियन्ता
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मुनस्यारी

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मुनस्यारी

अधिशासी अभियन्ता (जानपद)
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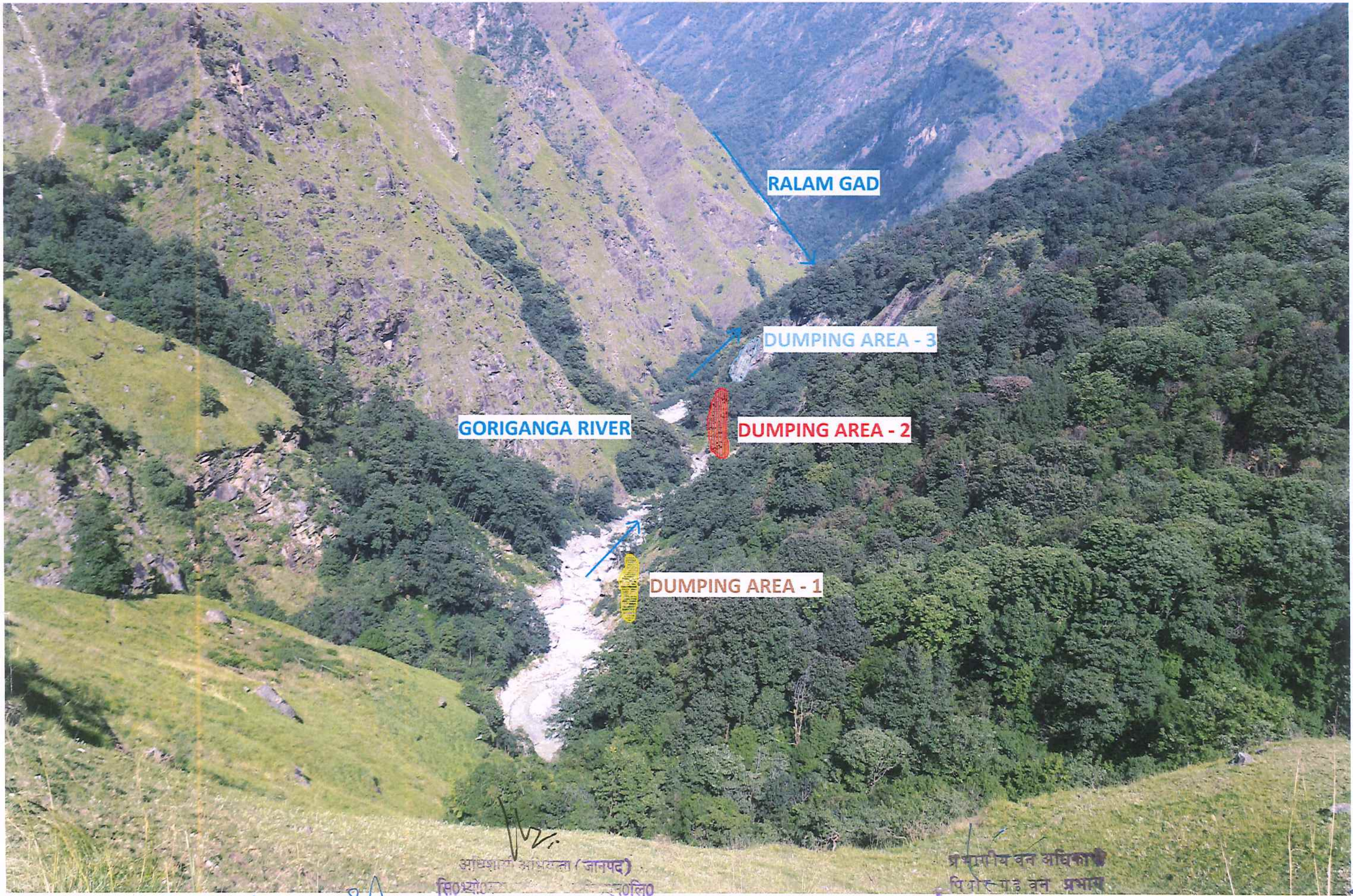
मुनस्यारी, पिथौरागढ़

प्रभागीय वन अधिकारी
पिथौरागढ़ वन प्रभाग
पिथौरागढ़



अधिशासी अभियन्ता (जानपद)
मुनस्यारी, पिथौरागढ़

प्रभागीय वन अधिकारी
पिथौरागढ़ वन प्रभाग
पिथौरागढ़

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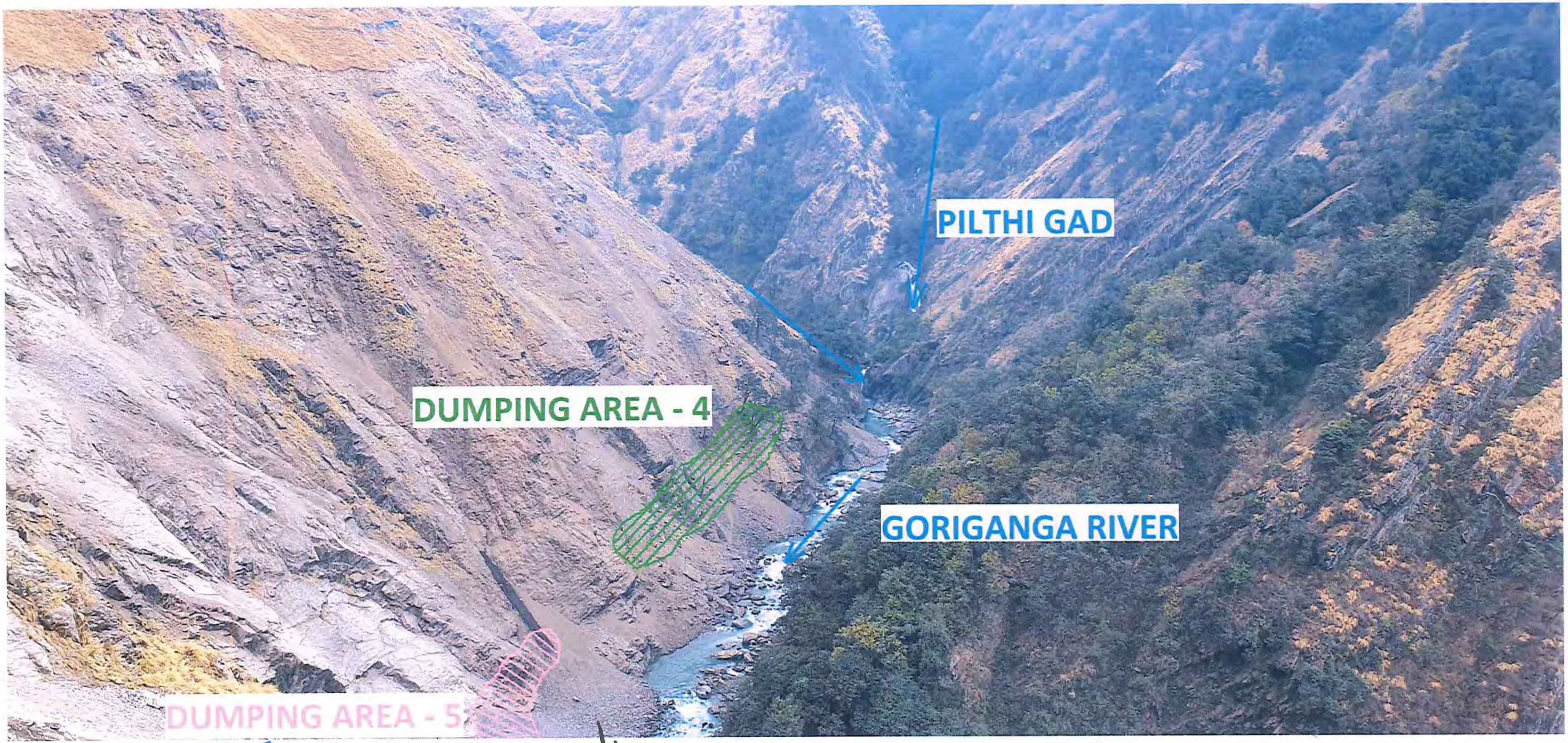

अधिशासी अभियन्ता

वन अधिकारी
वन प्रभाग
पिथौरागढ़

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Table 10.33 : Cost Estimate for Muck Management Plan

Sl. No.	Particulars	Quantity	Unit	Rate (Rs.)	Amount (Rs. lakh)
A. Engineering Measures					
1	RCC Counterfort retaining wall (10m high) for Dumping Site 1in 300m.	300	RM	200000	600.00
2	R.R. Stone Masonry in Cement Mortar 1:5 with 0.3 m thick PCC 1:3:6 in foundation at Dumping Sites2,3,4 and 5 in total length1850				
	PCC 1:3:6 in foundation				
a.	1850 X 2.57 X 0.15 = 816 cum	713	cum	4000	28.52
b.	R.R. Stone Masonry in C.M. 1:5				
	1850 X 0.5 (0.6+2.27) X 5.0 =13274 cum	13274	cum	3500	464.59
				Sub-total (A)	**1093.11**
B. Biological Measures					
1.	Plantation of muck disposal sites	8.6	ha	485432	41.75
2.	Barbed wire fencing on 2m high RCC posts	8.6	ha	60000	5.16
3.	Providing and laying Geo-coir textile	7.0	ha	10,00,000	70.00
4.	Cost of portable pump with accessories	5	No.	300000	15.00
5.	Cost of sprinkler system of irrigation	8.6	ha	100000	8.60
6.	Watch and ward 528 no. @ Rs. 12000 p.m. for 4 years	240	month	12000	28.80
				Subtotal (B)	**169.31**
				Grand Total (A) + (B)	**1262.42**
				Say Rs.	**1262.00**

10.10. Restoration Plan for Quarry Sites

10.10.1. *General*

The HEP mainly involves construction of barrage, intake, head race tunnel, surge shaft, pressure shaft, underground powerhouse and tail race tunnel and adits. For the construction of such component's substantial quantities of concrete work, structural steel work, shotcreting and grouting and fixing of pre-cast lagging is involved for which construction materials like coarse and fine aggregates, boulders, stones and earth for backfilling are required besides cement, structural steel and reinforcement steel. The quantities of construction material like fine aggregate, shingle or coarse aggregate for various uses and their potential quarry/mining sites are mentioned in **Table 10.34**. Assuming the total losses (38%) for in the quantity estimation of raw material from quarry site to aggregate processing plant for producing aggregates, the total quantity of raw material works out to be 1.45 lakh cum for coarse aggregate and for sand 0.73 lakh cum. Thus, the total raw material requirement for aggregate comes to 2.18 lakh cum, which shall be met from two rock-in-situ quarry sites and, the location of which is depicted in **Figure 10.10.**

Table 10.34 : Quantity of Various Materials (Lakh cum)

S. No	Material	Estimated Quantity	Net Quantity with 38% losses	Quantity retrieved from excavated muck	Balance quantity to be obtained from quarries
1	Coarse aggregate	1.50	2.07	1.00	1.07
2	Fine aggregate	1.00	1.38	0.82	0.56
3	Boulder	1.80	2.48	2.48	0.00
Total		**4.30**	**5.93**	**4.30**	**1.63**

10.10.2. ***Details of Quarry Sites***

The requirement of coarse aggregate for wearing concrete surface shall be met from two rock-in-situ quarry sites identified. Sand shall be obtained from river bed shoal deposit from Goriganga river. The suitable material obtained from muck generation shall be used as aggregate for non-wearing concreting in non-wearing and boulder in wire crates and stone masonry work.

Rock-in-situ Quarry Site: Q-I

The quarry site in approximately 0.29 ha, lies 0.250 km u/s of the barrage site on the right bank of river. The quarry site can be approached by planning haul road on right bank. The quarry material from this site shall be utilized in construction of barrage intake and desilting chambers and appurtenant works.

Rock-in-situ Quarry Site: Q-2

The quarry site (0.382 ha) lies on the right bank of river near powerhouse site at Rupsia Bagar. The quarry site can be approached by planning haul road on right bank. The quarry material from this site shall be utilized in concreting of HRT, Surge shaft, pressure shaft, power house and TRT.

Find Sand Quarry Site:

River bed material quarry site is approachable from barrage site and located in left bank of gori ganga approximate stretch of 400m from confluence of Jaulchilla gad with Gori Ganga river up to barrage site. The quarry (1.906 ha) with average 4m depth of excavation shall yield 0.77lakh cum of fine sand.

10.10.3. ***Environmental Impacts***

The environmental impacts of excavation of construction materials such as rock mass/boulder and sand for construction of hydroelectric projects depend on excavation process, local hydrological conditions, climate, rock types, size and type of operations and topography. Impacts also vary with stage of development at quarry sites e.g., development of working platforms has a less impact compared to the excavation of aggregates and sand. Physical changes in the soil, water and air associated with environment impacts would be due to excavation and degradation of land around the quarry and on biota around it. About 20% excavated material from the proposed underground works shall be utilized together with materials obtained from river bed shoal deposit quarry. The mining method for wining rock mass from rock-in-situ quarry shall be opencast semi-mechanize using wet drilling process, proper benches of height not more than 5m shall be developed with width of bench depending upon the equipment used for loading. The river bed quarry does not require any major restoration measures. The quarrying operation in the river bed shall be manual and the quarry

pits shall not be dug more than 1.0-meter-deep and the hill side edge of the quarry line shall be at-least 5m away from the foot of the hill. Blasting shall not be allowed in the stream bed. Copious use of sprinkler shall be resorted to stock piles of aggregate and the washing of the aggregate shall be first allowed to settle in the setting tanks before disposing into river. As a dust arrester G.C sheet shield of adequate height shall be erected.

10.10.4. *Legal Provisions for Mining from Quarries*

In consonance with EIA Notification September, 2006 and Notification dated 14th August, 2018, read conjointly with Appendix-XI in respect of requirements on EC of Minor Minerals sand quarry (1ha) and both rock quarry sites which are located more than 500m of each other and with individual and consolidated area less than 25 ha, shall be categorized as 'B2' for the purpose of granting EC. These projects will be appraised on the basis of documents viz. Form-1M, PFR, DSR and approved Mine Plan.

In compliance of this mandatory requirement the project proponent shall have to act in accordance with the mandatory provision of the notification/office memorandum.

10.10.5. *Treatment Measures for Restoration*

The environment management plan for mining activity shall be prepared on the basis of impacts and shall be compatible with the eco-friendly management plan in case of the minor mineral. The plan shall have various ingredients like plantation in the area above thalweg line and also within 7.5-meter safety barrier along the hill side and also at such pockets of the river which are above the HFL and normally not affected due to floods.

10.10.6. *Cost Estimate for Restoration of Borrow Areas*

The details of the expenditure likely to be incurred on the implementation of biological and engineering measures to be adopted are placed in **Table-10.35**.

Table 10.35 : Cost estimates for restoration of borrow areas

Sl. No.	Item of Work	Qty.	Unit	Rate (Rs.)	Amount (Rs. lakh)
1	Construction of drains	500	M	1000	5.00
2	Stone masonry (1:5) in retaining wall of 4 m height in 150 m.	600	Cum	2510	15.00
3	Plantation in 5 ha. Including maintenance for 4 years.	5.0	ha	200000	10.0
4	Watch and ward 2 No Chowkidars @ Rs 12000 p.m. for 4 years	96	months	12000	11.52
5	Provision for Settling Tanks	Job		LS	1.00
6	Barbed wire fencing on 2m high RCC posts	9.5	ha	60000	5.70
7	For execution of eco-friendly management plan for 3 nos. quarry area	1	Job	LS	10.00
8	Sprinkling of water	1	Job	LS	4.00
				Total	**62.22**
				Say	**62.00**

10.10.7. *Landscape and Restoration Plan*

The HEP encompassing barrage, intake structure, underground water conductor system and underground powerhouse is located in the interior area of Pithoragarh District of Kumaon Division of Uttarakhand. The proposed project, which is nearby the mule track to Milam Glacier, shall create a substantial increase in tourism due to reservoir. For attracting people for picnic excursion, some picnic park shall have to be developed near dam with facility for water sports. The barrage site provides a limited opportunity for landscaping for being aesthetically attractive. The water conductor system and appurtenant works are all underground structures and thus their landscaping is not warranted. Considering this the landscape plan is restrictive in nature being limited to dam and power house site, residential, and office complex areas. It is proposed to provide for landscaping the area around barrage complex. The financial provision of landscape works is presented in **Table 10.36**.

Table 10.36 : Cost Estimate for Landscaping Plan

S.N.	Particular	Quantity	Amount (Rs lakh)
1	Providing one view point each on road overlooking barrage site	LS	2.00
2	Providing rest benches	LS	2.00
3	Watch and ward @ Rs. 1.44 lakh/year for 2 years	LS	2.88
4	Provision for recurring cost on maintenance of item 1 through 2 @ 2.5% of cost per year for 4 years	LS	0.50
5	Contingencies	LS	0.50
		Total	**7.88**
Say			**8.00**

10.10.8. *Cost Estimate for Restoration of Borrow Areas and Landscaping Plan*

The overall cost of restoration of Borrow area and of landscaping plan is shown in **Table 10.37**

Table 10.37 : Total Cost Estimate for Restoration of Borrow area and Landscaping Plan

S.N.	Particular	Amount (Rs lakh)
1	Cost of Restoration of Borrow Area	62.00
2	Cost of Landscaping Plan	8.00
		70.00

10.11. Study of Design Earthquake Parameters

10.11.1. *Introduction*

Indian Institute of Technology (IIT), Roorkee have carried out "Site specific design earthquake parameters for Sirkari Bhyol-Rupsiabagar H.E Project". The values for Maximum Considered Earthquake (MCE) and Design Based Earthquake (DBE) conditions have accordingly been suggested as 0.708 and 0.426 for horizontal and 0.472g MCE and 0284g DBE for the vertical ground motion for riverbed and for bedrock it is recommended as 0.531 g and 0.308 g for horizontal and 0.345 g and 0.205g for vertical components respectively.

WEB-GIS BASED DECISION SUPPORT SYSTEM RESULT

Proposal No.- FP/UK/HYD/119861/2021 Date 27-06-2023.

Proposal name- SIRKARI BHYOL RUPSIABAGAR HEP.

Location - Uttarakhand

District- Pithoragarh

Decision Support System (DSS) Analysis:

Area of total land to be diverted: 29.997 hectare
Area of total land calculated from DSS: 29.99 hectare

Decision Rule-1

Layer info	Details	Results /Remarks
Hydrological info (Major River, Wetland)	Yes	**The polygon touches Goriganga River.**
VDF	Yes	**The polygon is having a VDF of more than 1 sq. km**
Last Remnants FTM	N/A	Not inviolate
Protected Area info	N/A	Not inviolate
Wildlife Info	N/A	Not inviolate

Decision Rule-2 result table:

A. Forest Cover Map Statistics (Software Calculated):

Sl No.	Forest Cover	Area in Hectare (Approx.)
1	VDF	11
2	MDF	05
3	Open Forest	01
4	Non-Forest	11
5	Water	03

B. Forest Type Map Statistics (Software Calculated):

Sl. No	Forest Type	Area in Hectare (Approx.)
1	Water	1
2	Non-Forest	24

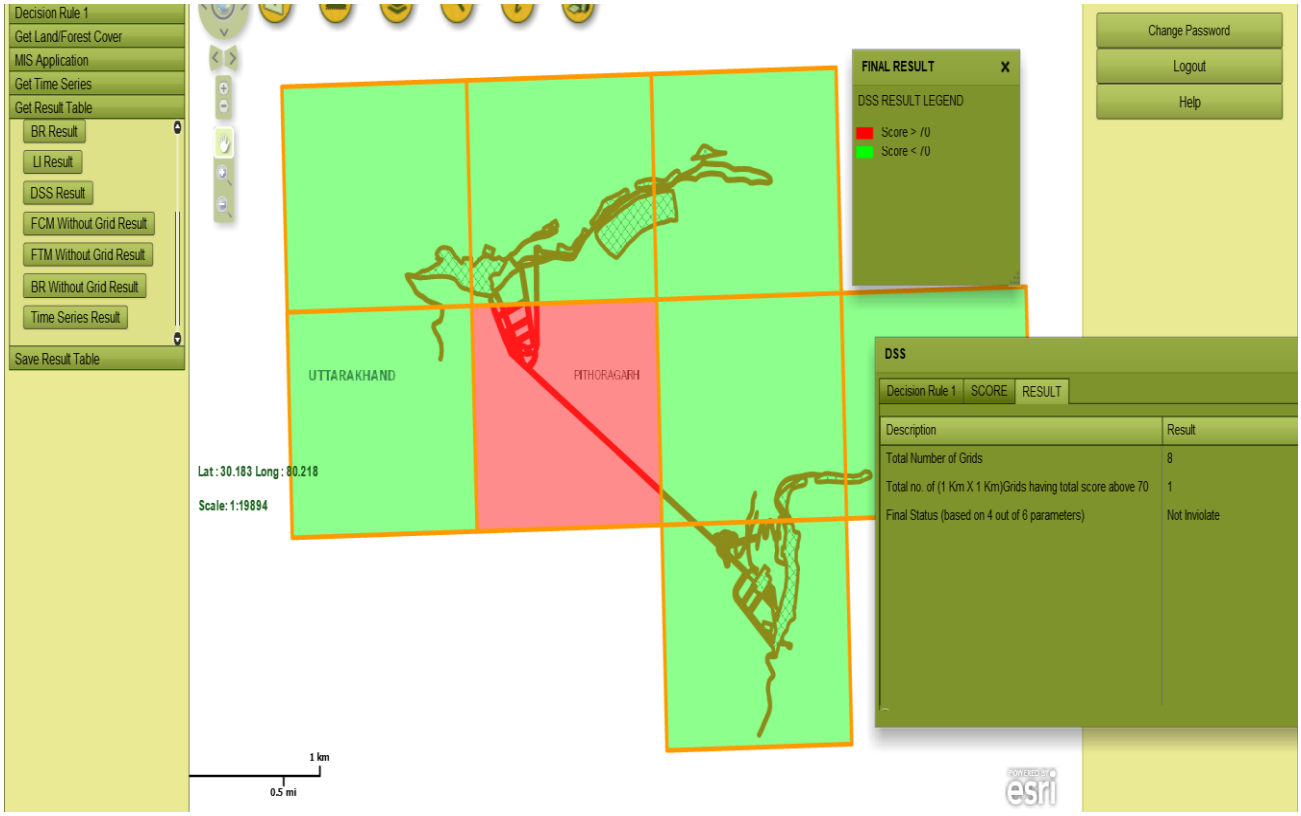
C. Biological Richness (Software Calculated):

Sl No.	Class	Area in Hectare (Approx.)
1	Very High	6
2	High	5
3	Medium	0
4	Low	1
	Non-Forest	18

DSS FINAL RESULT

DESCRIPTION	*RESULT*
Total Number of Grids	*8*
Total no. of (1 Km X 1 Km) Grids having total score above 70	*1*
Final Status (based on 4 out of 6 parameters)	***Not Inviolate***

Output Map of DSS analysis is given below



Note: 1 grid (Red) is inviolate out of total 8 grid. Therefore, Final result is not inviolate.

Encl - B

संख्याः 760 /I/2004-05/51/03

प्रेषक,

बी0पी0पाण्डे,
सचिव,
उत्तरांचल शासन ।

सेवा में,

अध्यक्ष एवं प्रबन्ध निदेशक,
उत्तरांचल जल विद्युत निगम लि0,
देहरादून ।

ऊर्जा विभाग

देहरादूनः दिनांकः 9, दिसम्बर, 2004

विषयः जल विद्युत परियोजनाओं का DPR तैयारी/कियान्वयन हेतु आवंटन ।

महोदय,

उक्त विषय के सम्बन्ध में मुझे यह सूचित करने का निदेश हुआ है कि राज्य सरकार द्वारा उत्तरांचल जल विद्युत निगम को क्रियान्वयन हेतु पूर्व में आवंटित जल विद्युत परियोजनाओं क्रमशः पालामनेरी (416 मे0वॉ0), बावला नन्दप्रयाग (132 मे0वॉ0), आराकोट त्यूनी (70 मे0वॉ0) एवं त्यूनी पलासू (42 मे0वॉ0) के अतिरिक्त निम्नांकित परियोजनायें भी डी0पी0आर0 तैयार करने हेतु आवंटित की जाती हैंः-

(1)	तमक लता	280 मे0वॉ0	धौलीगंगा	चमोली
(2)	नन्दप्रयाग लंगरासू	141 मे0वॉ0	अलकनन्दा	चमोली
(3)	ऋषिगंगा-1	70 मे0वॉ0	ऋषिगंगा	चमोली
(4)	ऋषिगंगा	35 मे0वॉ0	ऋषिगंगा	चमोली
(5)	सेला उर्थिंग	230 मे0वॉ0	धौलीगंगा (काली)	पिथौरागढ़
(6)	सरकारी ग्योल कपसियाबगड़	210 मे0वॉ0	गौरीगंगा	पिथौरागढ़
(7)	भैरोघाटी (I,II, हरसिल व गंगोत्री सम्मिलित)	400 मे0वॉ0	भागीरथी	उत्तरकाशी
(8)	तालुका सांकरी	140 मे0वॉ0	टौंस	उत्तरकाशी
		2175 मेगावाट		

मुझे यह भी कहने का निदेश हुआ है कि उक्त परियोजनाओं की DPR बनाने हेतु भारत सरकार से वित्तीय सहायता प्राप्त करने की व्यवस्था की जाए एवं परियोजनाओं की DPR हेतु समयबद्ध कार्यक्रम बनाकर शीघ्र कार्यवाही प्रारम्भ की जाए ।

भवदीय

(बी0पी0पाण्डे)
सचिव
9/12/2004

Encl: C

संख्याः 4734/I/2005-05/51/03

प्रेषक,

एन0रवि शंकर,
सचिव,
उत्तरांचल शासन ।

सेवा में,

अध्यक्ष एवं प्रबन्ध निदेशक,
उत्तरांचल जल विद्युत निगम लि0,
देहरादून ।

ऊर्जा विभाग देहरादूनः दिनांकः 6 अक्टूबर, 2005

विषयः जल विद्युत परियोजनाओं का DPR तैयारी/कियान्वयन हेतु आवंटन।

महोदय,

उक्त विषयक शासन के पूर्व पत्र संख्याः 760/I/2004-05 /51 / 03, दिनांकः 9-12-04 एवं 768/I/2004-05/51/03, दिनांकः 10-12-05 क्रम में मुझे आपको यह सूचित करने का निदेश हुआ है उक्त वर्णित पत्रों के माध्यम से उत्तरांचल जल विद्युत निगम को डी0पी0आर0 तैयार करने हेतु आवंटित की गई परियोजनाओं के सम्बन्ध में शासन द्वारा लिए गए निर्णय के क्रम में पत्र में वर्णित निम्नांकित समस्त परियोजनाऐं उत्तरांचल जल विद्युत निगम को डी0पी0आर0 तैयार करने के साथ-साथ विकास हेतु भी आवंटित की जाती हैः-

क0सं0	परियोजना	क्षमता	नदी	जनपद
(1)	तमक लता	280 मे0वॉ0	धौलीगंगा	चमोली
(2)	नन्दप्रयाग लंगरासू	141 मे0वॉ0	अलकनन्दा	चमोली
(3)	ऋषिगंगा-1	70 मे0वॉ0	ऋषिगंगा	चमोली
(4)	ऋषिगंगा	35 मे0वॉ0	ऋषिगंगा	चमोली
(5)	सेला उर्थिंग	230 मे0वॉ0	धौलीगंगा (काली)	पिथौरागढ़
(6)	सरकारी भ्योल रुपसियाबगड़	210 मे0वॉ0	गौरीगंगा	पिथौरागढ़
(7)	भैरोघाटी (I,II, हरसिल व गंगोत्री सम्मिलित)	400 मे0वॉ0	भागीरथी	उत्तरकाशी
(8)	तालुका सांकरी	140 मे0वॉ0	टौंस	उत्तरकाशी
		1506 मेगावाट		

भवदीय
N. Ravi Sh
(एन0रवि शंकर)
सचिव

No /GMCDCV/UJVNL/ C-7
Sd. cc to following:
D.G.M (E&D)-I / E&P-II for information necessary action
Dated 13/10/05