

MUCK DISPOSAL PLAN

1. GENERAL

For construction of different components of the project, substantial excavation has to be done for formation cutting. The excavation shall result in large quantity of excavated material i.e. muck which have to be evacuated, disposed off with the excavation work to such designated areas where the muck piles do not substantially interfere with either environment / ecology or the river flow regime and do not cause turbidity impairing the quality of water in the nearby rivers. The disposal of muck has to be scientifically planned keeping in view the economic aspects necessitating nearness to the muck generating component of work, which understandably reduce the travel time of dumpers, less interference to surface flow and ground water aquifer and disposition of habitation. Based on the quantities of earthwork in excavation involved a muck management plan, therefore, has been formulated to manage the disposal of muck and restore such areas from further degradation of the environment. During construction of the project, huge quantities of excavation will be carried out from the excavated formation and shall be dumped in designated areas to provide stable slopes.

2. QUANTITY OF MUCK GENERATED AND ITS CONSUMPTIVE USE

During construction of the various components of the project, muck is generated both from soil or slide material and from rock excavation. Total quantity of muck / debris, generated due to the project in the proposed section, shall be cum which shall amount to 10519383.8cum with swell factor. Out of the total muck generated, 168995.6 cum shall be utilized on project work leaving 9315349.38 cum to be dumped with 10% consolidation at designated sites. It is proposed to utilize about 20.26% of the excavated material as construction material for embankment construction, back fill and for construction of various project components. The balance shall have to be disposed off away from sites to make available the site clear. The muck shall be properly dumped on slopes and treated to mix and match with the surrounding environment with least change in landscape.

Name of Work: “*CONSTRUCTION OF ROING-HUNLI ROAD (GREEN FIELD ALIGNMENT) SECTIONS FROM CH 24.640 TO CH 47.00 AND FROM CH 62.970 TO CH74.01 (KM 21.500 OF EXISTING HUNLI-ANINI ROAD) AT LOWER DIBANG VALLEY DISTRICT IN ARUNACHAL PRADESH*” under SADRP-NE on EPC basis ::: Change of alignment from KM 70+100 to KM 74+683 due to change of location of Bridge over River Ithun along with muck disposal areas from 24.640 to 47.00km and from 62.97 to 74.01 KM.

Table 1: Abstract of Muck Generated and its Disposal FROM 24.640 to 47.00km and from 62.97 to 74.01 KM **and from with the change of location of Bridge over River Ithun from KM 70+100 to KM 74+683**

Project Component	Quantity of muck/debris generated (cum)	Estimated quantity of muck/ debris proposed to be utilized (cum)	Balance quantity of muck/debris (cum)	Effective Muck to be dumped (cum) with 10% consolidation	Name of the dumping site	Capacity of the dumping site (cum)
Earthwork in excavation in formation cutting	10300236.2	51533.6	10248702.6	9223832.4	As per Table 2	As per Table 3
Earthwork in excavation in foundation of Bridges	109770	53044	56726	51053.4		
Earthwork in excavation for foundation of Retaining walls and breast walls	69448.4	40310	29138.4	26224.6		
Earthwork in excavation in foundation of culverts	39929.2	24108	15821.2	14239		
Total	10519383.8	168995.6	10350388.2	9315349.38		

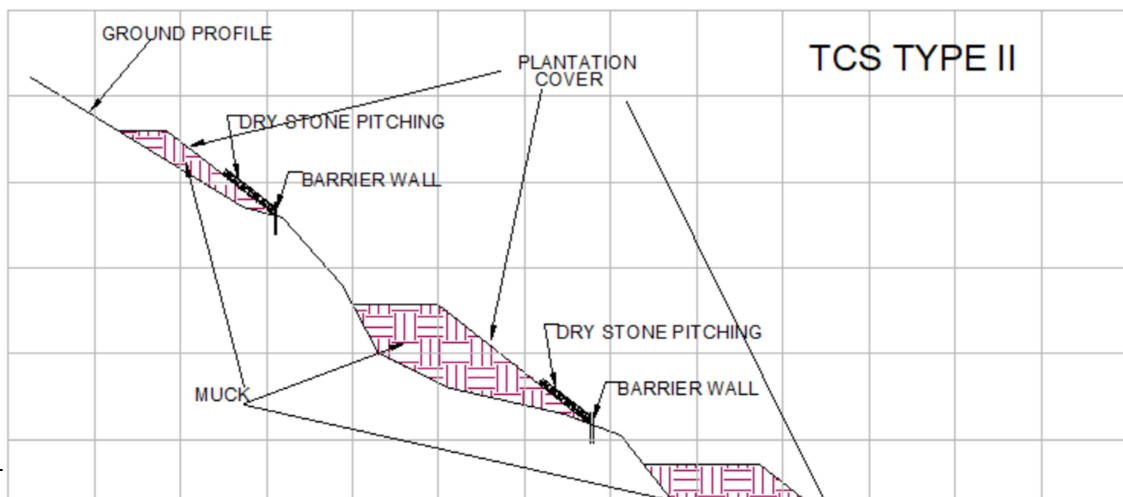
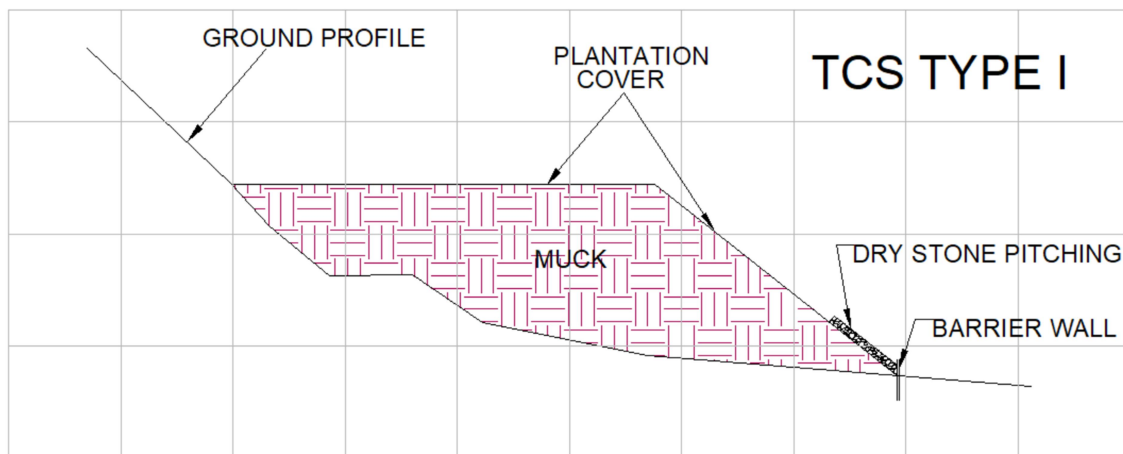
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3. SELECTION OF MUCK DISPOSAL SITES

The selection of muck disposal sites was carried out 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. All the dumping locations shall be well supported at base and at higher elevation by suitable retaining structures. Subsequently all the spoil tips (muck disposal sites) will be developed by taking up plantation through bio-technological methods to generate a thick forest canopy over them. 91 (Ninety one) muck dumping sites have been identified matching the criteria. The details of dumping sites along with their total capacity and amount of muck to be disposed are enumerated in Table 2.

The typical sectional drawings of muck disposal site is shown below:



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Table 2. Details of Muck Disposal locations

Muck Disposal site Already Proposed CHAINAGE KM 24-KM47						
Muck Disposal Site	Dimension		SIDE CORNER	Latitude	Longitude	Volume m2
	Area (ha)	Height (m)				REMARKS
MDA1	1.5	15	A	28°19' 36.810" N	95°47' 24.638" E	225000
			B	28°19' 36.753" N	95°47' 23.384" E	
			C	28°19' 48.803" N	95°47' 17.530" E	
			D	28°19' 49.233" N	95°47' 18.848" E	
MDA2	1.5	15	A	28°20' 3.317" N	95°48' 1.270" E	225000
			B	28°20' 4.227" N	95°48' 4.096" E	
			C	28°20' 9.620" N	95°48' 0.644" E	
			D	28°20' 8.340" N	95°47' 58.332" E	
MDA3	1.5	15	A	28°21' 2.474" N	95°47' 2.167" E	225000
			B	28°21' 2.721" N	95°47' 5.470" E	
			C	28°21' 8.395" N	95°47' 3.314" E	
			D	28°21' 7.414" N	95°47' 0.531" E	
MDA4	1.5	15	A	28°22' 9.250" N	95°46' 39.743" E	225000
			B	28°22' 13.842" N	95°46' 35.059" E	
			C	28°22' 11.831" N	95°46' 33.215" E	
			D	28°22' 7.238" N	95°46' 38.209" E	
MDA5	1.5	15	A	28°22' 32.457" N	95°46' 23.563" E	225000
			B	28°22' 36.021" N	95°46' 28.509" E	
			C	28°22' 37.847" N	95°46' 26.908" E	

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			D	28°22' 33.865" N	95°46' 21.035" E		
MDA6	1.5	15	A	28°23' 49.392" N	95°47' 37.469" E	225000	
			B	28°23' 53.206" N	95°47' 44.466" E		
			C	28°23' 54.864" N	95°47' 43.081" E		
			D	28°23' 51.743" N	95°47' 36.899" E		
Muck Disposal site Newly Proposed							
Site	Area (ha)	Height (m)		Latitude	Longitude		
MDP1	0.83	15	A	28° 20' 3.197" N	95° 47' 9.164" E	124240	
			B	28° 20' 6.075" N	95° 47' 12.294" E		
			C	28° 20' 4.940" N	95° 47' 13.286" E		
			D	28° 20' 2.834" N	95° 47' 10.450" E		
MDP2	0.46	15	A	28° 20' 3.743" N	95° 47' 17.073" E	68621.92	
			B	28° 20' 5.208" N	95° 47' 18.148" E		
			C	28° 20' 2.501" N	95° 47' 22.954" E		
			D	28° 20' 1.094" N	95° 47' 21.739" E		
MDP3	0.71	15	A	28° 19' 51.666" N	95° 47' 37.753" E	106321.9	
			B	28° 19' 52.304" N	95° 47' 39.450" E		
			C	28° 19' 47.972" N	95° 47' 41.401" E		
			D	28° 19' 47.379" N	95° 47' 39.741" E		
MDP4	0.78	15	A	28° 19' 45.578" N	95° 47' 41.156" E	117352.6	
			B	28° 19' 46.659" N	95° 47' 42.878" E		
			C	28° 19' 42.876" N	95° 47' 45.590" E		
			D	28° 19' 41.521" N	95° 47' 44.054" E		
MDP5	0.77	15	A	28° 19' 30.093" N	95° 47' 58.522" E	115038.9	
			B	28° 19' 31.170" N	95° 48' 0.069" E		

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			C	28° 19' 28.750" N	95° 48' 2.566" E		
			D	28° 19' 27.021" N	95° 48' 1.954" E		
MDP6	1.15	15	A	28° 19' 23.617" N	95° 48' 13.973" E	171795.3	
			B	28° 19' 26.951" N	95° 48' 18.942" E		
			C	28° 19' 25.455" N	95° 48' 20.520" E		
			D	28° 19' 21.761" N	95° 48' 14.157" E		
MDP7	0.49	15	A	28° 19' 29.921" N	95° 48' 27.649" E	72897.47	
			B	28° 19' 30.901" N	95° 48' 26.518" E		
			C	28° 19' 33.689" N	95° 48' 27.665" E		
			D	28° 19' 33.610" N	95° 48' 29.233" E		
MDP8	0.40	15	A	28° 19' 41.596" N	95° 48' 25.115" E	59460.88	
			B	28° 19' 44.363" N	95° 48' 26.075" E		
			C	28° 19' 44.743" N	95° 48' 27.565" E		
			D	28° 19' 41.200" N	95° 48' 26.265" E		
MDP9	0.47	15	A	28° 19' 53.438" N	95° 48' 21.953" E	69908.97	
			B	28° 19' 54.210" N	95° 48' 20.825" E		
			C	28° 19' 51.595" N	95° 48' 17.419" E		
			D	28° 19' 50.856" N	95° 48' 18.597" E		
MDP10	0.43	15	A	28° 19' 49.148" N	95° 48' 17.206" E	64968.05	
			B	28° 19' 49.286" N	95° 48' 15.781" E		
			C	28° 19' 45.685" N	95° 48' 14.958" E		
			D	28° 19' 45.445" N	95° 48' 16.268" E		
MDP11	0.85	15	A	28° 19' 52.494" N	95° 48' 4.246" E	128088.9	
			B	28° 19' 53.691" N	95° 48' 4.807" E		
			C	28° 19' 55.864" N	95° 47' 58.126" E		
			D	28° 19' 54.311" N	95° 47' 57.846" E		

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MDP12	0.94	15	A	28° 20' 21.942" N	95° 47' 52.165" E	140812.1	
			B	28° 20' 25.702" N	95° 47' 46.675" E		
			C	28° 20' 24.731" N	95° 47' 45.144" E		
			D	28° 20' 21.086" N	95° 47' 50.272" E		
MDP13	1.14	15	A	28° 20' 24.485" N	95° 47' 38.028" E	171428.8	
			B	28° 20' 26.108" N	95° 47' 31.012" E		
			C	28° 20' 25.154" N	95° 47' 29.380" E		
			D	28° 20' 22.923" N	95° 47' 37.930" E		
MDP14	0.65	15	A	28° 20' 33.115" N	95° 47' 27.977" E	97258.02	
			B	28° 20' 37.745" N	95° 47' 29.156" E		
			C	28° 20' 37.894" N	95° 47' 27.482" E		
			D	28° 20' 33.357" N	95° 47' 26.378" E		
MDP15	0.99	15	A	28° 20' 43.578" N	95° 47' 13.458" E	148160.4	
			B	28° 20' 47.325" N	95° 47' 6.670" E		
			C	28° 20' 46.400" N	95° 47' 5.323" E		
			D	28° 20' 42.409" N	95° 47' 12.640" E		
MDP16	1.00	15	A	28° 20' 55.336" N	95° 47' 6.812" E	149812.6	
			B	28° 20' 56.320" N	95° 47' 4.859" E		
			C	28° 20' 52.463" N	95° 47' 1.301" E		
			D	28° 20' 51.094" N	95° 47' 3.118" E		
MDP17	0.90	15	A	28° 21' 34.668" N	95° 46' 59.657" E	134563.8	
			B	28° 21' 39.408" N	95° 46' 55.379" E		
			C	28° 21' 39.823" N	95° 46' 53.441" E		
			D	28° 21' 33.948" N	95° 46' 58.356" E		
MDP18	0.82	15	A	28° 21' 53.551" N	95° 46' 54.798" E	123447.5	
			B	28° 21' 58.206" N	95° 46' 52.439" E		

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			C	28° 21' 57.658" N	95° 46' 50.690" E		
			D	28° 21' 53.054" N	95° 46' 52.884" E		
MDP19	0.80	15	A	28° 22' 33.243" N	95° 46' 46.715" E	119266.2	
			B	28° 22' 33.793" N	95° 46' 48.436" E		
			C	28° 22' 28.313" N	95° 46' 46.598" E		
			D	28° 22' 29.209" N	95° 46' 45.330" E		
MDP20	0.60	15	A	28° 22' 21.429" N	95° 46' 52.976" E	90541.73	
			B	28° 22' 20.629" N	95° 46' 56.970" E		
			C	28° 22' 19.149" N	95° 46' 56.461" E		
			D	28° 22' 20.004" N	95° 46' 52.286" E		
MDP21	0.84	15	A	28° 22' 29.110" N	95° 46' 55.754" E	125815.5	
			B	28° 22' 28.854" N	95° 46' 57.466" E		
			C	28° 22' 33.162" N	95° 47' 0.038" E		
			D	28° 22' 34.190" N	95° 46' 58.729" E		
MDP22	1.14	15	A	28° 22' 38.183" N	95° 47' 1.066" E	170361.8	
			B	28° 22' 41.676" N	95° 47' 5.971" E		
			C	28° 22' 43.392" N	95° 47' 4.442" E		
			D	28° 22' 38.768" N	95° 46' 59.191" E		
MDP23	1.55	15	A	28° 22' 49.904" N	95° 47' 9.552" E	232699.6	
			B	28° 22' 55.782" N	95° 47' 14.331" E		
			C	28° 22' 54.305" N	95° 47' 16.508" E		
			D	28° 22' 48.915" N	95° 47' 12.131" E		
MDP24	2.09	15	A	28° 23' 7.232" N	95° 47' 19.087" E	313120.2	
			B	28° 23' 10.099" N	95° 47' 23.831" E		
			C	28° 23' 9.275" N	95° 47' 26.528" E		
			D	28° 23' 4.437" N	95° 47' 20.284" E		

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MDP25	1.91	15	A	28° 23' 14.899" N	95° 47' 23.663" E	286970.3	
			B	28° 23' 21.920" N	95° 47' 23.231" E		
			C	28° 23' 22.886" N	95° 47' 25.739" E		
			D	28° 23' 14.278" N	95° 47' 26.214" E		
MDP26	2.11	15	A	28° 23' 31.914" N	95° 47' 22.511" E	315786.8	
			B	28° 23' 39.746" N	95° 47' 25.930" E		
			C	28° 23' 39.269" N	95° 47' 28.747" E		
			D	28° 23' 31.347" N	95° 47' 25.324" E		
MDP27	1.51	15	A	28° 23' 53.811" N	95° 48' 4.573" E	225831.7	
			B	28° 23' 52.183" N	95° 48' 11.934" E		
			C	28° 23' 49.910" N	95° 48' 11.623" E		
			D	28° 23' 51.296" N	95° 48' 4.164" E		
MDP28	1.18	15	A	28° 23' 46.250" N	95° 48' 23.635" E	176421.7	
			B	28° 23' 47.354" N	95° 48' 25.332" E		
			C	28° 23' 42.977" N	95° 48' 30.194" E		
			D	28° 23' 41.603" N	95° 48' 28.686" E		
MDP29	1.07	15	A	28° 23' 40.192" N	95° 48' 33.259" E	160480.9	
			B	28° 23' 42.220" N	95° 48' 33.888" E		
			C	28° 23' 40.155" N	95° 48' 39.842" E		
			D	28° 23' 38.227" N	95° 48' 39.215" E		
MDP30	0.96	15	A	28° 23' 38.809" N	95° 48' 50.053" E	143726.2	
			B	28° 23' 42.128" N	95° 48' 53.411" E		
			C	28° 23' 40.446" N	95° 48' 54.934" E		
			D	28° 23' 36.995" N	95° 48' 51.621" E		
MDP31	1.10	15	A	28° 23' 47.013" N	95° 48' 49.885" E	164264.2	
			B	28° 23' 47.936" N	95° 48' 51.784" E		

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			C	28° 23' 52.163" N	95° 48' 48.756" E		
			D	28° 23' 51.904" N	95° 48' 46.497" E		
MDP32	1.13	15	A	28° 23' 54.556" N	95° 48' 43.888" E	170168.8	
			B	28° 23' 55.532" N	95° 48' 46.090" E		
			C	28° 23' 59.517" N	95° 48' 41.628" E		
			D	28° 23' 58.015" N	95° 48' 39.881" E		
MDP33	0.78	15	A	28° 24' 8.830" N	95° 48' 21.909" E	117190	
			B	28° 24' 9.460" N	95° 48' 23.596" E		
			C	28° 24' 5.454" N	95° 48' 25.660" E		
			D	28° 24' 4.275" N	95° 48' 24.051" E		
MDP34	0.79	15	A	28° 24' 12.493" N	95° 48' 21.928" E	119219.7	
			B	28° 24' 16.867" N	95° 48' 24.353" E		
			C	28° 24' 16.019" N	95° 48' 26.151" E		
			D	28° 24' 11.928" N	95° 48' 24.093" E		
Muck Disposal site Already Proposed CHAINAGE KM 62-KM74							
Muck Disposal Site	Dimension		SIDE CORNER	Latitude	Longitude		
MDS1	1.50	15	A	28° 24' 49.041" N	95° 53' 4.053" E	225000	
			B	28° 24' 42.262" N	95° 53' 9.985" E		
			C	28° 24' 41.387" N	95° 53' 8.199" E		
			D	28° 24' 47.708" N	95° 53' 2.723" E		
MDS2	1.50	15	A	28° 24' 35.320" N	95° 53' 27.313" E	225000	
			B	28° 24' 35.829" N	95° 53' 29.114" E		
			C	28° 24' 28.960" N	95° 53' 32.275" E		
			D	28° 24' 28.267" N	95° 53' 30.208" E		

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MDS3	1.50	15	A	28° 24' 26.333" N	95° 53' 30.717" E	225000	
			B	28° 24' 26.888" N	95° 53' 32.935" E		
			C	28° 24' 19.090" N	95° 53' 30.345" E		
			D	28° 24' 20.388" N	95° 53' 29.413" E		
MDS4	1.50	15	A	28° 24' 12.938" N	95° 53' 23.952" E	225000	
			B	28° 24' 10.901" N	95° 53' 25.293" E		
			C	28° 24' 5.070" N	95° 53' 19.949" E		
			D	28° 24' 5.965" N	95° 53' 18.186" E		
MDS5	1.50	15	A	28° 24' 1.401" N	95° 53' 21.561" E	225000	
			B	28° 24' 2.912" N	95° 53' 28.306" E		
			C	28° 24' 1.295" N	95° 53' 30.587" E		
			D	28° 23' 59.305" N	95° 53' 21.815" E		
MDS6	1.50	15	A	28° 23' 55.935" N	95° 53' 41.191" E	225000	
			B	28° 23' 51.012" N	95° 53' 51.129" E		
			C	28° 23' 49.702" N	95° 53' 50.083" E		
			D	28° 23' 54.348" N	95° 53' 40.905" E		
MDS7	1.50	15	A	28° 23' 47.073" N	95° 53' 59.920" E	225000	
			B	28° 23' 49.223" N	95° 54' 1.045" E		
			C	28° 23' 45.963" N	95° 54' 9.456" E		
			D	28° 23' 44.736" N	95° 54' 9.125" E		
MDS8	1.50	15	A	28° 23' 41.593" N	95° 54' 17.783" E	225000	
			B	28° 23' 42.385" N	95° 54' 19.775" E		
			C	28° 23' 38.028" N	95° 54' 26.668" E		
			D	28° 23' 36.453" N	95° 54' 25.150" E		
MDS9	1.50	15	A	28° 23' 38.362" N	95° 54' 29.347" E	225000	
			B	28° 23' 41.967" N	95° 54' 36.545" E		

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			C	28° 23' 40.797" N	95° 54' 38.704" E		
			D	28° 23' 36.841" N	95° 54' 31.395" E		
MDS10	1.50	15	A	28° 23' 42.916" N	95° 54' 40.754" E	225000	
			B	28° 23' 44.940" N	95° 54' 40.077" E		
			C	28° 23' 41.164" N	95° 54' 49.648" E		
			D	28° 23' 40.593" N	95° 54' 48.182" E		
MDS11	1.50	15	A	28° 23' 32.531" N	95° 54' 54.330" E	225000	
			B	28° 23' 34.127" N	95° 54' 55.030" E		
			C	28° 23' 26.692" N	95° 54' 59.569" E		
			D	28° 23' 26.675" N	95° 54' 57.672" E		
MDS12	1.50	15	A	28° 23' 23.596" N	95° 54' 58.660" E	225000	
			B	28° 23' 24.719" N	95° 54' 59.912" E		
			C	28° 23' 16.130" N	95° 55' 3.504" E		
			D	28° 23' 16.416" N	95° 55' 1.584" E		
MDS13	1.50	15	A	28° 22' 43.322" N	95° 55' 30.571" E	225000	
			B	28° 22' 43.865" N	95° 55' 31.961" E		
			C	28° 22' 34.466" N	95° 55' 34.056" E		
			D	28° 22' 33.711" N	95° 55' 32.088" E		
MDS14	1.50	15	A	28° 22' 28.701" N	95° 55' 35.170" E	225000	
			B	28° 22' 30.355" N	95° 55' 36.261" E		
			C	28° 22' 28.388" N	95° 55' 45.314" E		
			D	28° 22' 26.643" N	95° 55' 44.634" E		
MDS15	1.50	15	A	28° 22' 25.760" N	95° 55' 45.671" E	225000	
			B	28° 22' 27.477" N	95° 55' 47.049" E		
			C	28° 22' 21.142" N	95° 55' 52.797" E		
			D	28° 22' 19.446" N	95° 55' 51.637" E		

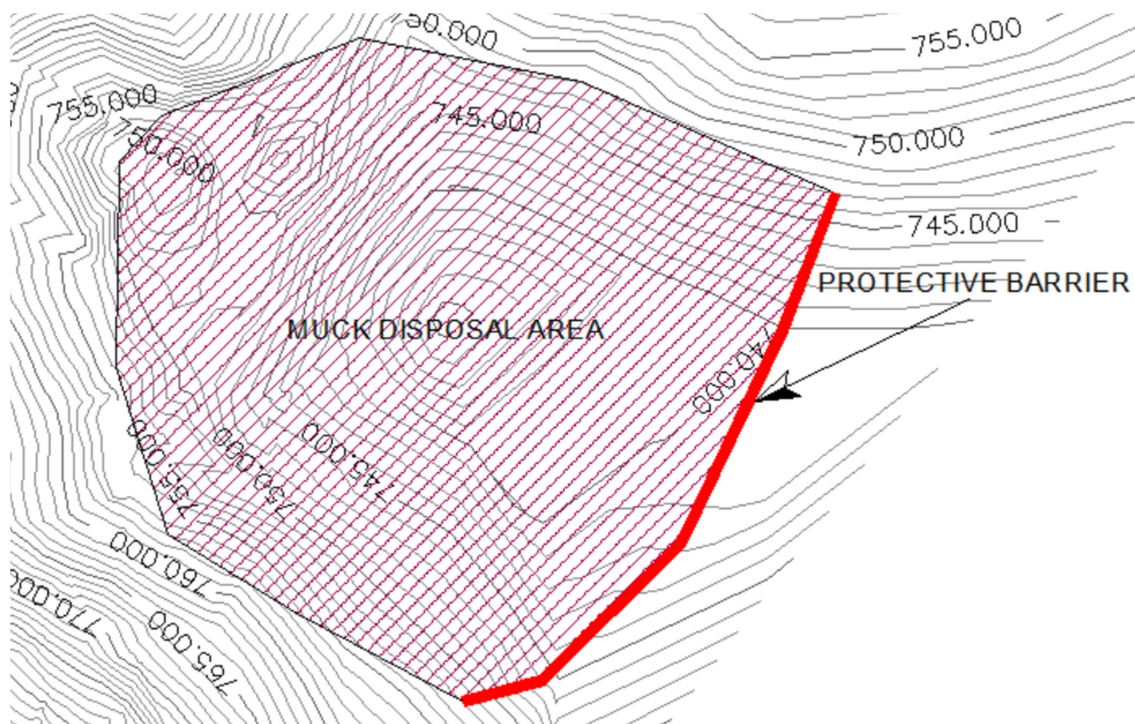
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MDS16	1.50	15	A	28° 22' 14.294" N	95° 55' 59.607" E	225000	
			B	28° 22' 15.256" N	95° 56' 0.789" E		
			C	28° 22' 8.321" N	95° 56' 11.855" E		
			D	28° 22' 7.555" N	95° 56' 10.967" E		
MDS17	1.50	15	A	28° 22' 15.968" N	95° 56' 8.265" E	225000	
			B	28° 22' 17.492" N	95° 56' 10.104" E		
			C	28° 22' 13.944" N	95° 56' 16.698" E		
			D	28° 22' 11.967" N	95° 56' 15.905" E		
MDS18	1.50	15	A	28° 22' 16.982" N	95° 56' 7.801" E	225000	
			B	28° 22' 18.610" N	95° 56' 8.781" E		
			C	28° 22' 23.401" N	95° 56' 2.247" E		
			D	28° 22' 22.606" N	95° 56' 0.660" E		
MDS19	1.50	15	A	28° 22' 30.199" N	95° 55' 57.311" E	225000	
			B	28° 22' 30.835" N	95° 55' 59.140" E		
			C	28° 22' 37.668" N	95° 55' 52.003" E		
			D	28° 22' 36.389" N	95° 55' 50.786" E		
Total Volume						10621043.62	

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4. IMPLEMENTATION OF ENGINEERING MEASURES AT MUCK DISPOSAL SITE

It has been observed that after disposal of muck, it creates problem as it is susceptible to scattering unless the muck disposal yards are supported with engineering measures such as bamboo/Bali walls, dry stone pitching etc. . All the dumping sites need proper handling to avoid spilling of muck into the river water while dumping and in the post dumping stages. All the muck disposal sites have to be developed from the ground level either by providing bamboo/balli walls, dry stone pitching etc. In all the muck dump sites, the muck brought in dumpers shall be dumped and manually spread behind the walls in such a manner that rock mass is properly stacked behind the walls with minimum of voids.



TYPICAL LAYOUT OF A MUCK DISPOSAL LOCATION

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5. IMPLEMENTATION OF BIOLOGICAL MEASURES AT MUCK DISPOSAL SITE

Biological measures, however, require special efforts as the disposed muck will 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 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.

6. 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. Multi-level 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. 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. 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. Each patch would have two rows of planting. Planting of trees would be done in pits of 0.60 m x 0.60 m x 0.60 m size. Soil mixture

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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 vermin-compost manually. The ratio for the mix would be 5 parts: Compost/manure 2 parts: Sand 2 part: and humus or vermicompost 1 part. This will make nutrients available for the plants in the preliminary stages and also help increase soil aeration, porosity & permeability and improved moisture available for the plants.

Although the sites would be either levelled or finished in a grade, yet due to rain and sliding etc., they tend to develop rills and gulley. As such, while carrying out plantation; suitable soil conservation measures would also be taken.

7. SPECIES FOR PLANTATION

Afforestation with suitable plant species of high ecological and economic value and adaptable to local conditions will be undertaken in accordance with canopy cover requirement. The selection of plant species, propagation and cultivation technique would be done in coordination with the institutes like State Forest Research Institute, Itanagar; Rajiv Gandhi University, Itanagar and North-Eastern Regional Institute of Science and Technology, Nirjuli.

Suggested Species for Plantation

Sl. No.	Name of species	Family
1.	<i>Abies densa</i>	Pinaceae
2.	<i>Achyranthes aspera</i>	Amaranthaceae
3.	<i>Alangium alpinum</i>	Alangianaceae
4.	<i>Alnus nepalensis</i>	Betulaceae
5.	<i>Aristolochia griffithii</i>	Aristolochiaceae
6.	<i>Berberis aristrata</i>	Berberidaceae
7.	<i>Betula alnoides</i>	Betulaceae
8.	<i>Daphnae papyracea</i>	Thymelaeaceae
9.	<i>Lyonia ovalifolia</i>	Ericaceae
10.	<i>Pinus roxburghi</i>	Pinaceae
11.	<i>Pinus wallichiana</i>	Pinaceae
12.	<i>Populus sp.</i>	Salicaceae
13.	<i>Rhododendron campanulatum</i>	Ericaceae
14.	<i>Rhododendron cinnabarium</i>	Ericaceae
15.	<i>Salix sp.</i>	Salicaceae
16.	<i>Tsuga dumosa</i>	Pinaceae
17.	<i>Zanthoxylum armatum</i>	Rutaceae

Muck Disposal Plan

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(Sunil Kumar)

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