

**Muck Disposal Plan**

**1. Generated Muck Volume**

Since proposed road completely traverses through Mountainous & Steep Terrain in Open Country due to which roadside cutting involves which requires removal of excavation of material i.e. soil, boulders etc. The estimated volumes of muck to be generated from the road side cutting are given in table 1 below. About 60 % of the generated muck is to be reused in road construction for filling, construction of retaining/RS walls and in approaches of VUP as necessary. The total quantity of generated muck, reusable quantity, and quantity to be disposed are provided in **Table 2** below.

**Table: 1 Volume of Muck to be generated**

<b><u>MUCK MANAGEMENT PLAN (MMP)</u></b>			
1	Total quantity of muck being produced	84600.00	Cum
2	Deduction of useful stone as required under the clause of agreement to be executed by the contractor and Executive Engineer of project.	14100.00	Cum
3	Net balance quantity of derbies/muck (1-2) (A)	70500.00	Cum <b>A</b>
4	Quantity available on site with swell factor @ 40% (1.40x A)	98700.00	Cum <b>B</b>
5	Material/muck used in the project:-		
	(i) Deduction for material required for the construction of dumping place in dry masonry/edge wall @ 5% of B	4935.00	Cum
	(ii) Less material/muck required for levelling of proposed road for the construction @ 15% of B	14805.00	Cum
	(iii) Less material/muck required for the construction of proposed road on the analogy of half cutting and half filling @ 40% of B	39480.00	Cum
	Total:- 5(i)+(ii)+(iii)	59220.00	Cum <b>C</b>
6	Net Material/Muck to be dumped in dumping site (B-C)	39480.00	Cum <b>D</b>

**Table 2 Summary of debris disposal**

S.No.	Reused material for road construction	Total debris including 40% swell factor	Total disposal in dumping zone
1	59220.00 cum	98700.00 cum	39480.00 cum

**Muck Holding Capacity of Disposal sites**

Sr.No.	Dumping SiteNo.	RD	Length & Width	Design anexed yes/No	Capacity (Cum)
1	1	0/500 to 0/540	40 x 20 =	Yes	40 x 20 x 10.5 = 8400 Cum

**CONSTRUCTION OF TATTA PANI TO KHUN SALHANU DHAR ROAD KM. 0/0 TO 9/400**

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2	2	2/500 to 2/580	80 x 20 =	Yes	80 x 20 x 10.5 = 16800 Cum
3	3	5/400 to 5/440	40 x 20 =	Yes	40 x 20 x 10.5 = 8400 Cum
4	4	8/560 to 8/600	40 x 20 =	Yes	40 x 20 x 10.5 = 8400 Cum
				<b>Total</b>	<b>42000.00 cum</b>

**2. Proposed Muck Disposal Sites**

Four (4) muck disposal sites measuring a total area of 0.40 ha have been selected as designated site for muck disposal as detailed in **Table 3 below**.

**Table 3: Muck Disposal Sites-Present Status**

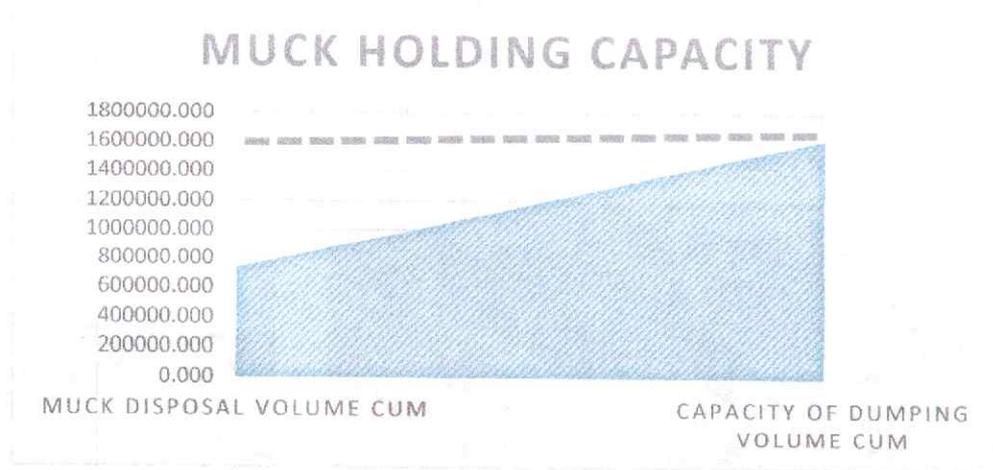
Dumping Site					
Sr. No	Range / Tehsil / Vill.	Khasra / Survey or compartment No. of km stone	Forest area proposed for diversion ( hact. )		
	Banjar/Banjar/Salhanu				
1		0/500 to 0/540	40 x 20 = 800 Sqm =	0.0800 Hect.	
2		2/500 to 2/580	80 x 20 = 1600 Sqm =	0.1600 Hect.	
3		5/400 to 5/440	40 x 20 = 800 Sqm =	0.0800 Hect.	
4		8/560 to 8/600	40 x 20 = 800 Sqm =	0.0800 Hect.	
		<b>Total:-</b>	<b>4000 Sqm</b>	<b>0.40 Hect.</b>	

The muck disposal lands proposed are generally in non-forest area but due to under-capacity some forest land has also been acquired within the PROW to fulfil the muck dumping as no other alternative non-forest land is available along the project area. Out of the total 4.9 ha, 0.40 ha. Area of Forest land will be diverted for muck disposal.

Digital elevation models, as presented in **Figure 1&2 below** of the Two (02) selected muck disposal sites, were prepared for all muck dumping sites to ascertain the topography and determining the location and length of the gabion wall for slope protection so as to prevent the muck from reaching into natural streams.

The muck holding capacity of the all muck disposal sites (including the already diverted/acquired plot) are detailed in **Table 4 below** and comparison of muck volume to be generated vis-à-vis capacity of the disposal sites are presented in info graphics in **Figure 3 below**.

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**Figure: 3 Generate Muck Volume Vis -a-Vis's capacity of Disposal sites**

It can be inferred from the Figure 3 above that capacity of the disposal sites fulfils the requirement of generated muck volume. Therefore, the proposed muck disposal sites with the suggested gabion wall height will suffice the requirement of dumping of excavated muck.

**3. Environmental Impacts of Improper Muck disposal**

The dumping of rock spoil can potentially be a cause for environmental problems and land degradation. It may cause landslides if not disposed properly and be an aesthetical damage to the natural landscape. Improper muck dumping without slope protection measures results in wash away into the channels/Khad/Streams causing siltation and blockage of natural channels. The trees and undergrowth vegetation of the dumping sites are also affected due to change in land use. Further, when stacked without adequate stabilisation measures, muck moves along with runoff and creates landslides.

**4. Environmental Safeguard Measures for Muck Disposal Sites**

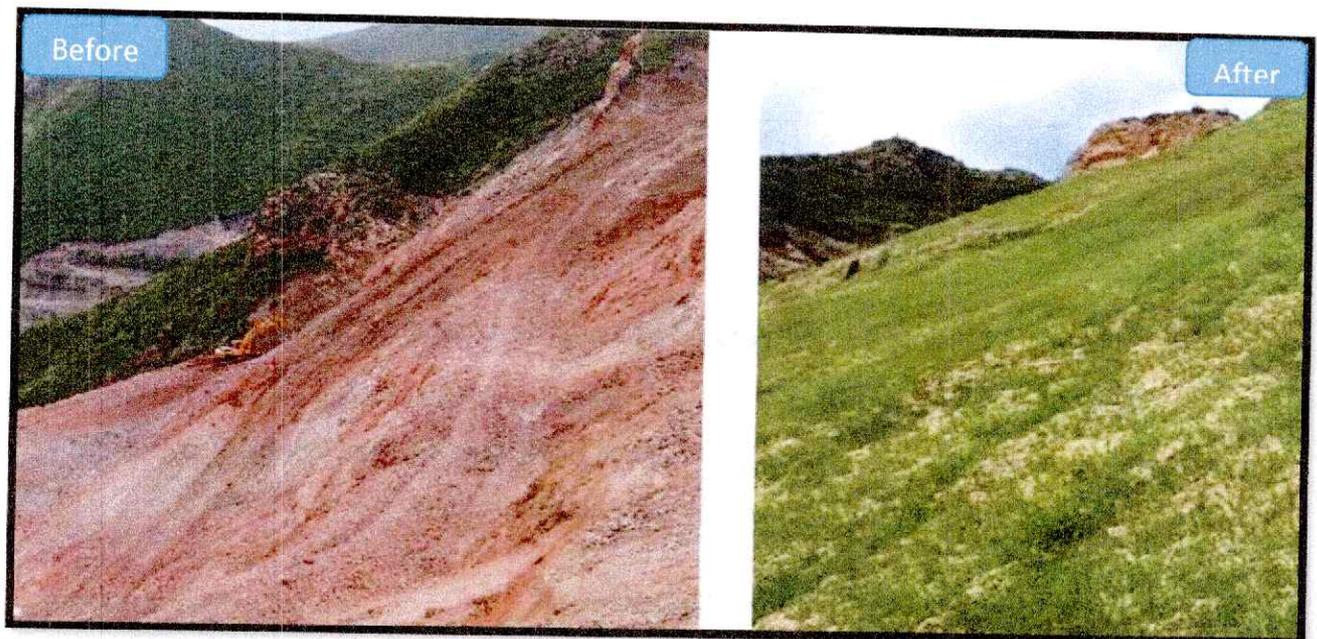
- Multiple gabion walls at different elevation levels are proposed to retain muck within the boundary of muck disposal sites. Gabion wall of height of 5 m including 0.75 m of buffer along with standard wire gauge galvanised wire (SWG GI) having 10 cm x 10 cm mesh and dimension 1.15 m x 1.15 m x 1.15 m in multi tiers with 0.5 m wide offset to be laid concurrently with the dumping of muck for side protection. Muck dumping plan of all four (04) proposed disposal sites along with elevation profile and desired Placement of gabion wall is provided in drawings at the end of this report.



**Use of Geo- mats for Slope Stabilization**

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- After preparing the gabion wall at muck disposal site, the muck brought in dumpers shall be dumped and manually spread behind the wall in such a manner that rock mass is properly stacked behind the wall with minimum of voids.



**Rehabilitation of slopes using bio-engineering techniques**

- Regular inspection by environmental expert of concessionaire and Independent engineer (IE) shall be made to ensure complete avoidance of spilling of muck outside the boundary, especially into channels/Khad/Streams.

**Bioengineering:**

- Bioengineering is the technique of utilizing vegetation in addressing geotechnical problems. Slope of muck disposal sites after completion of dumping to a particular site should be stabilized by stone pitching and turfing with geo mats (Coir Geotextile) & indigenous species of soil stabilizing legumes like Vetiver grasses. Natural geotextiles degrade quicker than man-made counterpart, but facilitate growth of vegetation quicker and better due to this inherent characteristics. Hydro-Seder sprays are to be used for restoring soil fertility of the slope walls for quicker result, as necessary.

**5. Engineering Safeguard Measures for Muck Disposal Sites**

- Supply and installation CE marked Gabion structure with Mechanically Woven Double Twisted Hexagonal Shaped Wire mesh Gabion Boxes as per IS 16014:2012, MORTH Clause 2500, of required size, Mesh Type 10x12(D=100 mm with tolerance of  $\pm 2\%$ ) Zn+PVC coated, Mesh wire diameter 2.7/3.7mm, mechanically edged/selvedge with partitions at every 1m interval and shall have minimum 10 numbers of openings per meter of mesh perpendicular to twist, tying with lacing wire of diameter 2.2/3.2mm(ID/OD), supplied @ 3% by weight of Gabion boxes, filled with boulders with least

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dimension of 200 mm, as per drawing, all complete as per directions of Engineer- in charge.

- Filling of boulders 150- 250mm size in Gabion boxes. The boulders shall be hard, angular to round in shape and free from weathering and fractures.
- fixing layer of Geo-jute/Coir-Mat mat with spraying of seeds of Lemon grass/Dedonia/Vetiver etc.
- Installation of CE and BIS Marked Mechanically Woven Double Twisted Hexagonal Shaped Wire Mesh Netting of Mesh Type 10x12 .
- Installation of Self Drilling Anchors of 40CR material of 32/18.5mm (outer/inner) diameter, yield load  $\geq$  230 kN, drill hole of 76 mm, hexagonal nut, washer plate, coupler for connecting bars, drill bit (in case of self-drilling anchors) and full length grouting with admixture including all ancillary items for foundation anchoring and as per technical specifications etc.

All due care and thorough site inspection was done while finalizing the Dumping sites. Due to non-availability of Private Land the sites finalized for Dumping in Forest Land is unavoidable.

  
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