

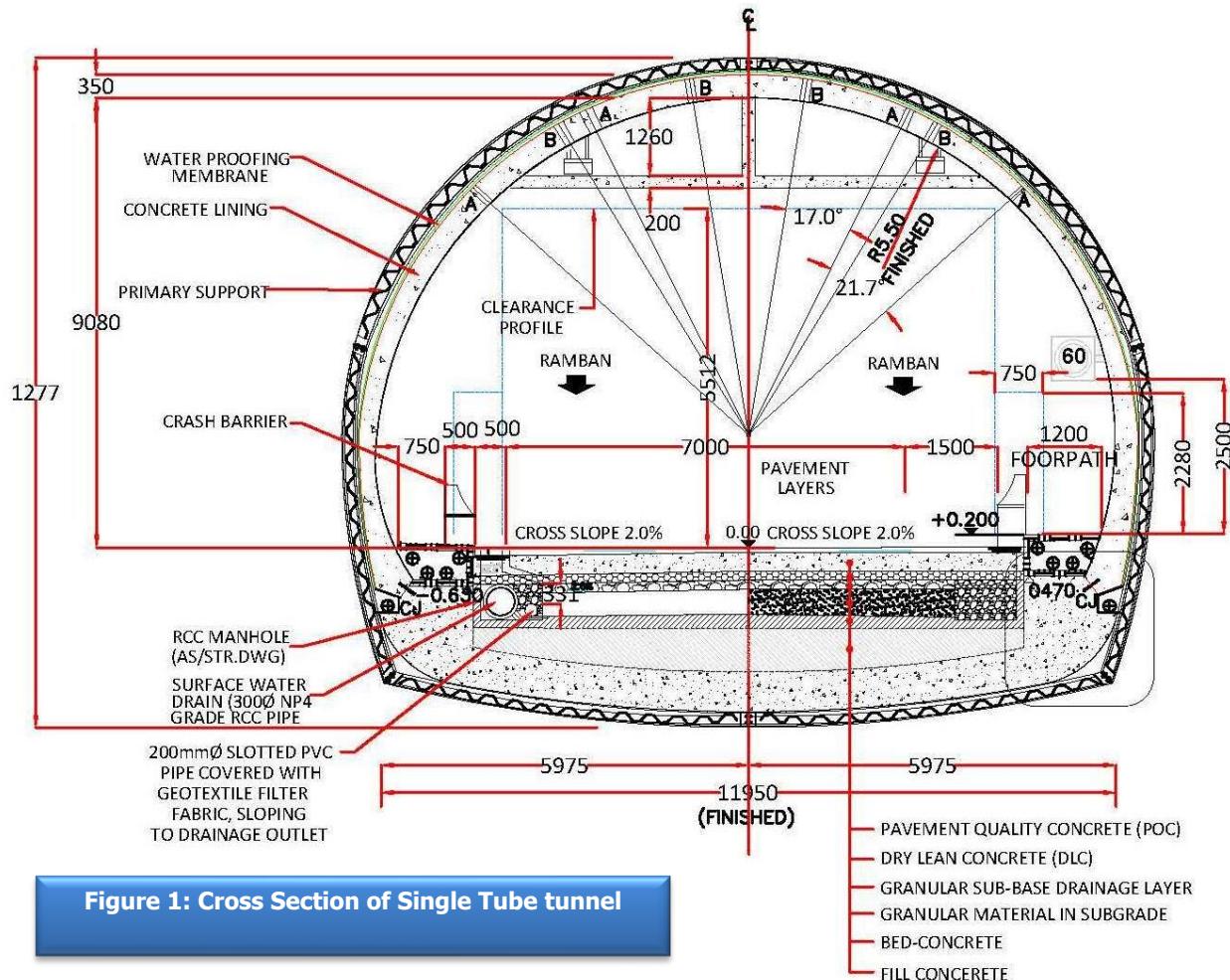
MUCK DISPOSAL PLAN

1.0 Proposed Tunnels

The project involves construction of 1 tunnel. Total length of the proposed tunnel is 608 meters. Details of the proposed tunnels along with length and construction packages are provided in **Table 1**. The typical cross sections of single tube tunnel provided in Figure 1.

Table 1: Details of the Proposed Tunnels

Tunnel	Type	Side	Start	End	Length
Tunnel 1	Single Tube	South Bound	147+967	148+575	608



2.0 Muck Disposal Site

The identified muck disposal site measuring a total area of 4.8054 ha. **This site has already been accorded Stage I approval for Ramban-Banihal Section of NH-44 vide File No 9-JKC-093/2021-Jammu Dated 15.02.2022.** This site was originally designed to accommodate the muck to be generated from construction of tunnels in Ramban-Banihal Section. As this site is nearest to the proposed tunnel under this proposal, capacity of the site is planned to be enhanced so that additional muck can be accommodated. *Capacity enhancement of existing site will reduce the requirement of fresh forest land for diversion and will save forests.* Details of the muck disposal site is provided in **Table 2**.

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Table 2: Details of Approved Muck Disposal Site

Village	Dumping Site	Survey No	Forest Land (Ha.)	Non-Forest Land (Ha.)	Present Status
Maroog	MDS1a	633	2.7519	-	Stage I clearance for this land accorded on 15.02.2022
	MDS1b	630	2.0535	-	
	MDS1 Total (Ha.)		4.8054	-	

3.0 Muck Holding Capacity

The muck holding capacity of this disposal site after the proposed enhancement is detailed in **Table 3**. The original capacity of the site as per the approval (refer Section 2.0) is 263,793 m³. The proposed enhancement will result accommodation of additional 157,972 m³ of muck in the same site. Digital elevation model has been prepared to as per the topographic conditions so as to prevent the muck from reaching into natural streams is presented in **Figure 2**.

Table 3 Muck Holding Capacity of Disposal Site

Village	MDS Sections	Length (m)	Width (m)	Wall Height (m)	No of Walls	Enhanced Capacity (m ³)	Approved Capacity*
Maroog MDS-1	Section-1	96	185	7	6	1,24,320	263793
	Section-2	90	210	7	6	1,32,962	
	Section-3a	47	160	7	3	52,483	
	Section-3b	78	160	7	4	87,360	
	Section-3c	22	160	7	2	24,640	
Total		333	-	-	21	4,21,765	

* as per Stage I Forest Clearance Approval for Ramban-Banihal Section dated 15.02.2022

4.0 Muck Volume

The estimated volumes of muck to be generated from the proposed tunnels and reusable quantity and quantity to be disposed are detailed in **Table 2**. About 20% of the generated muck is to be reused in road construction for filling, construction of retaining/gabion walls and in approaches of viaducts as necessary.

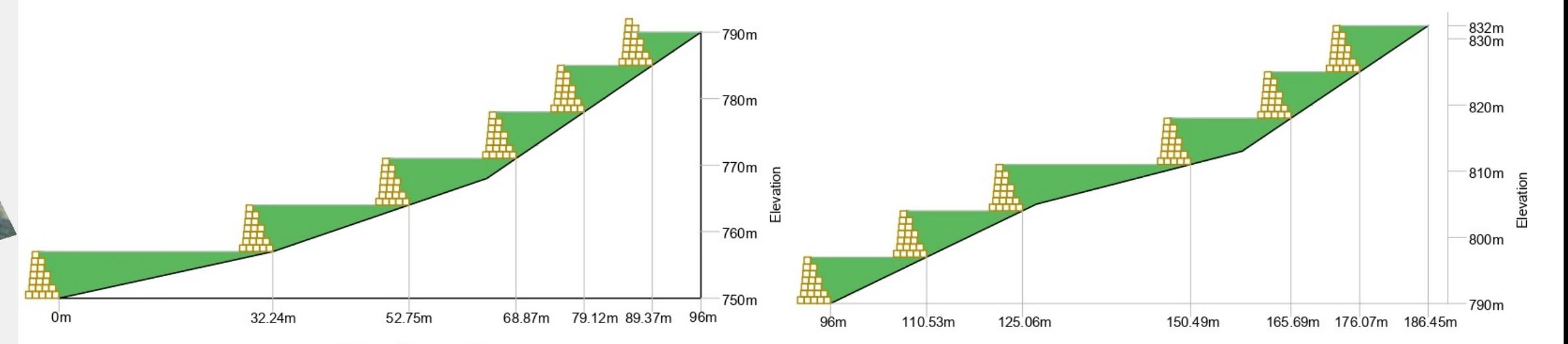
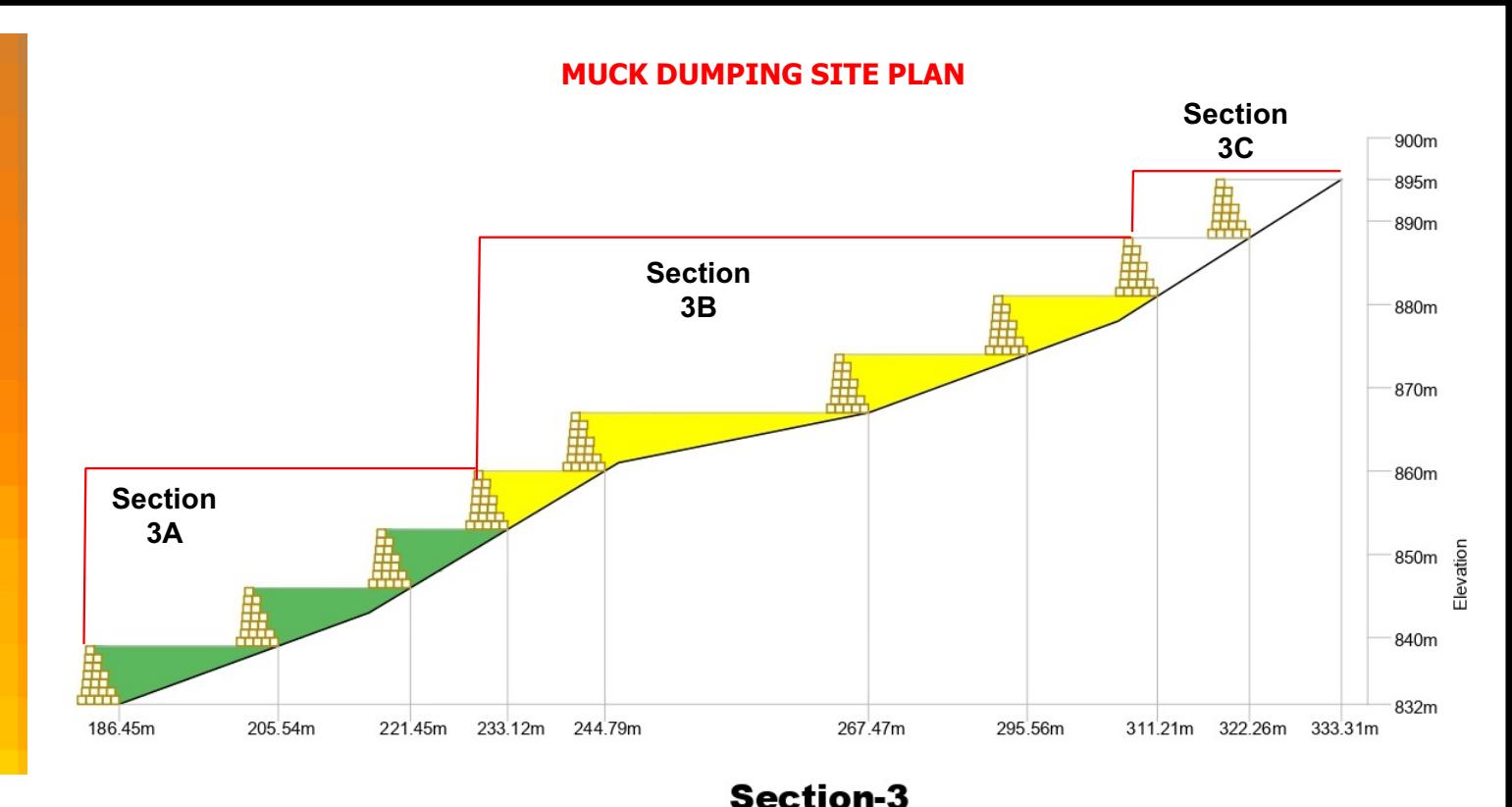
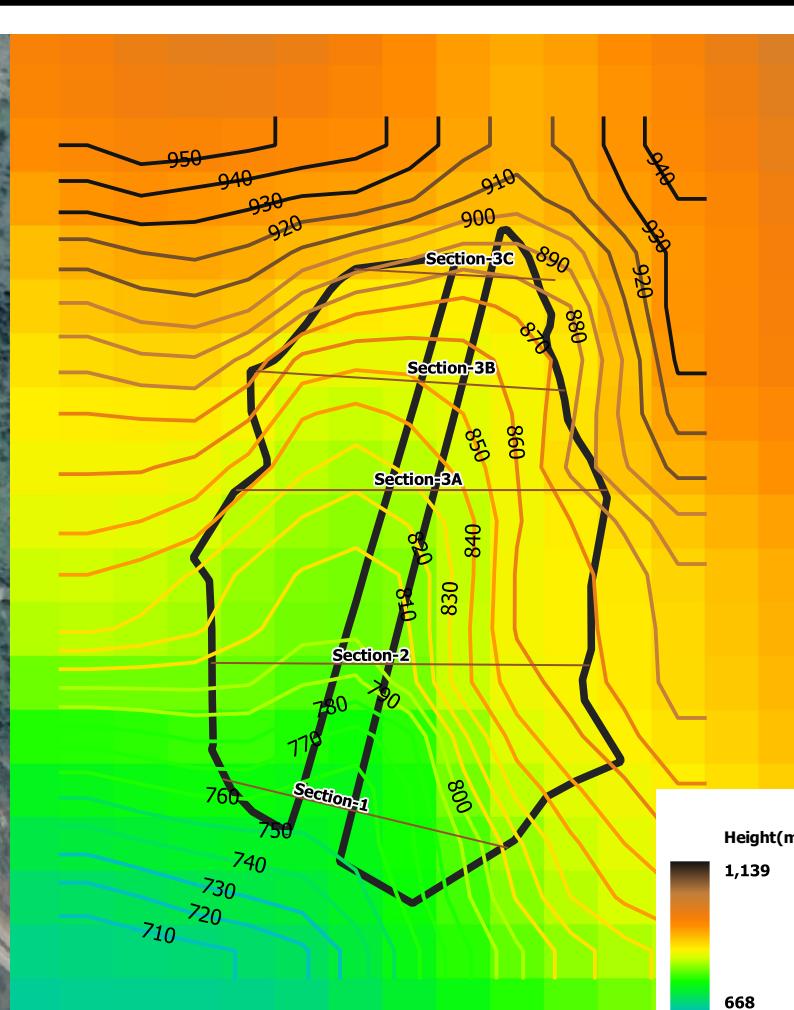
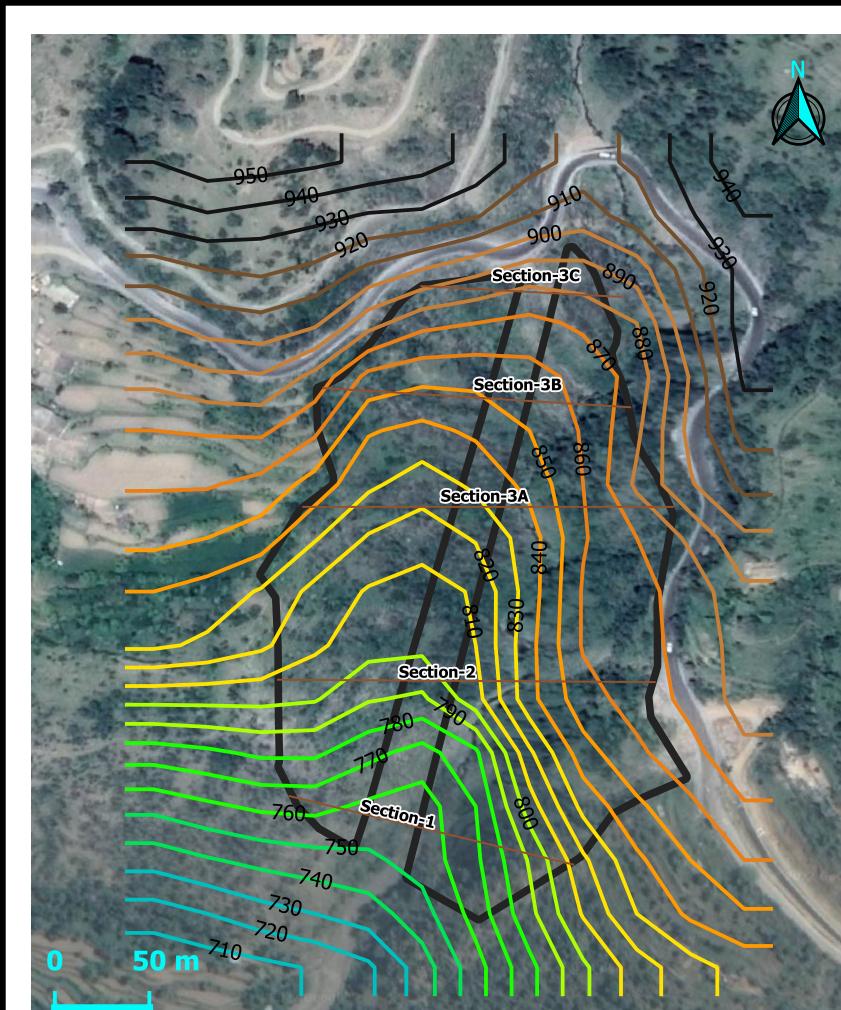
Table 4: Volume of Muck to be generated

Feature	Length (m)	CS Area (m ²)	Muck Volume (m ³)	Re-used Volume (m ³)	Disposal Volume (m ³)
Tunnel 1	608	119.56	72692.48	14358	58,154
Muck to be deposited from Ramban-Banihal Section* (m ³)					2,63,793
Total volume of muck to be disposed (m ³)					3,21,947

* as per Stage I Forest Clearance Approval for Ramban-Banihal Section dated 15.02.2022

Comparison of enhanced muck holding capacity of the site and muck volume to be disposed are presented in infographics in **Figure 3**. It can be inferred from the Figure 3 that capacity of the disposal sites exceeds the generated muck volume. Therefore, the proposed muck disposal sites with the suggested gabion wall heights will suffice the requirement of dumping of excavated muck.


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Original Capacity	2,63,793
Enhanced Capacity	4,21,765
Capacity Increase	1,57,972

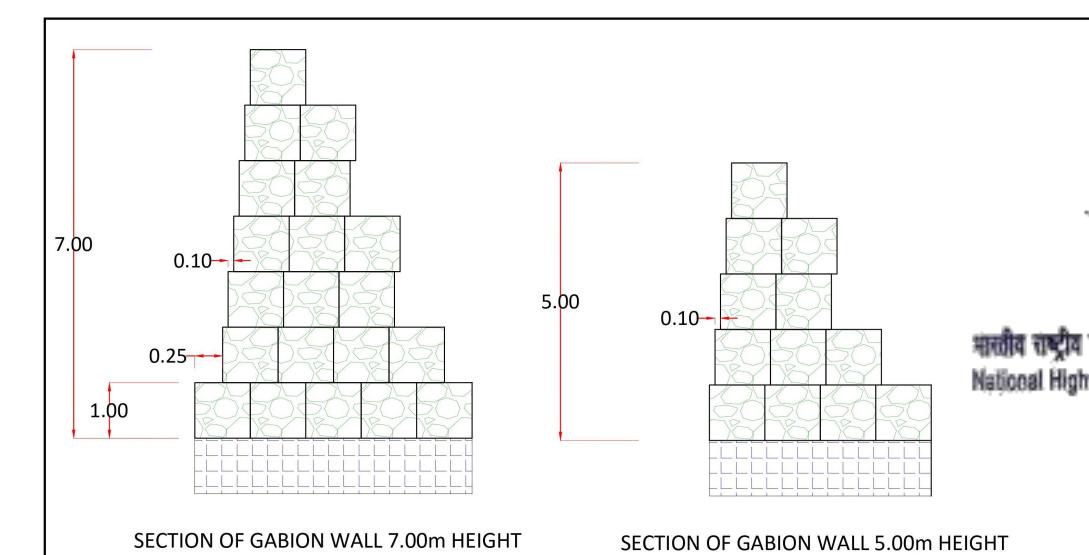
Ramban-Banihal Section	2,63,793
Udhampur-Ramban Section	72,692
	3,36,485

	Length (m)	Width (m)	Capacity (m³)	Wall Height (m)	No of Wall
Section-1	96	185	1,24,320	7	6
Section-2	90	210	1,32,962	7	6
Section-3A	47	160	52,483	7	3
Section-3B	78	160	87,360	7	4
Section-3C	22	160	24,640	7	2
	333		4,21,765		

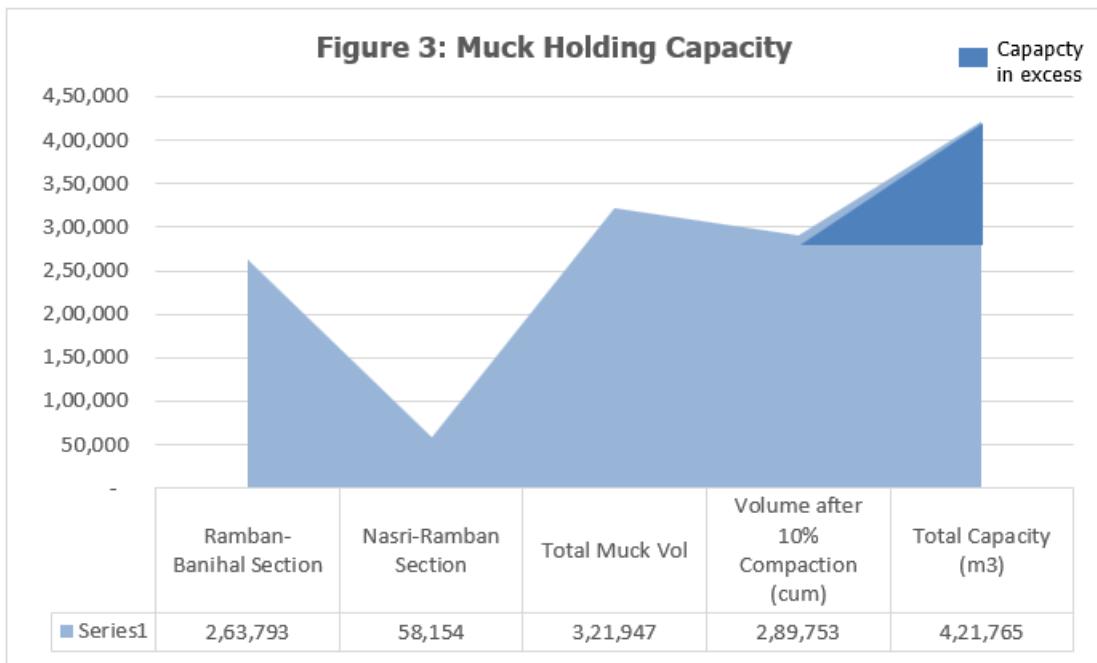
PROJECT NAME:
4 Laning of Udhampur to Ramban Section of NH-44
(Old NH1A) at Critical Locations Between km 130 to
km 150 in the UT of Jammu and Kashmir

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5.0 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 river 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.

6.0 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 7 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 4 proposed disposal sites along with elevation profile and desired placement of gabion wall is provided in drawings at the end of this report.

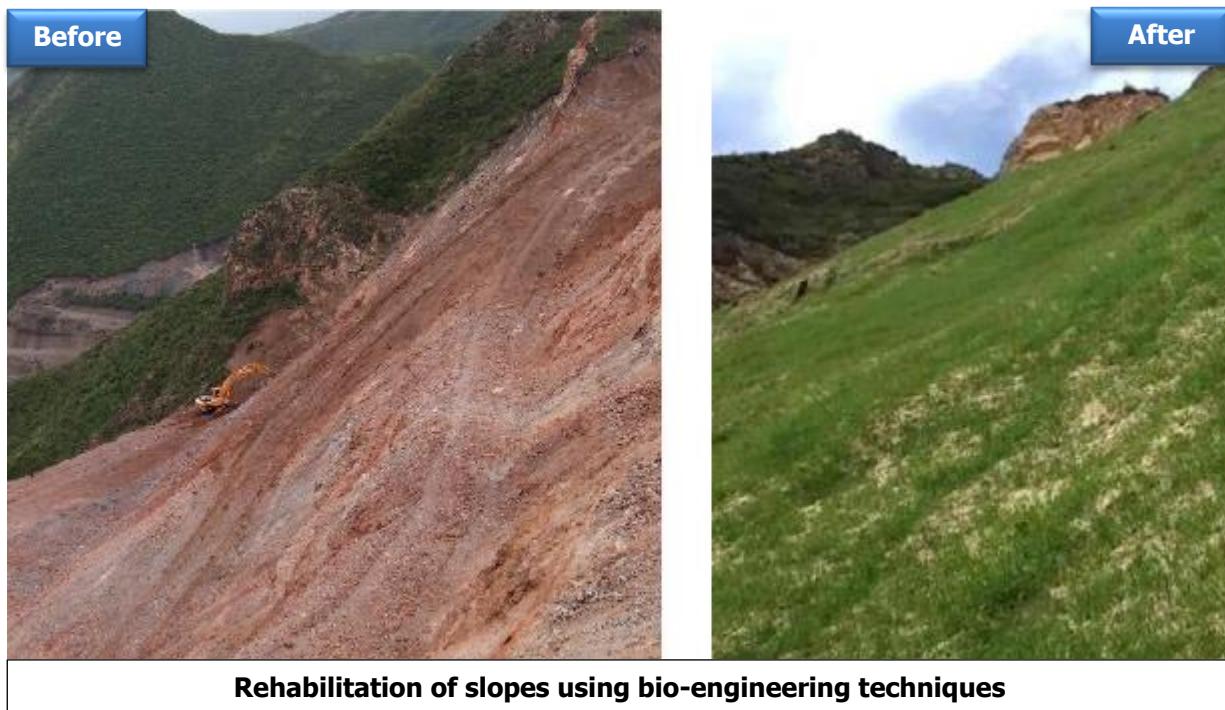

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National Highway Authority of India (NHA) After preparing the gabion wall at muck disposal site, the muck brought in dumpers shall be dumped through conveyor belts. **No muck should be dumped from the top.** The bottom layers are to be filled first, levelled and then upper layers to be used for dumping.



Use of Geo-mats for Slope Stabilization

- Regular inspection by environmental expert of contractor and authority engineer (AE) shall be made to ensure complete avoidance of spilling of muck outside the boundary, especially into river beds.
- The Maroog Nala, flowing through the site is required to be channelised through stepped gabions.
- Bio-engineering 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 its inherent characteristics. Hydro-seeder sprays are to be used for restoring soil fertility of the slope walls for quicker results, as necessary.



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