MUCK DISPOSAL PLAN

PROPOSAL FOR DIVERSION OF WILDLIFE LAND AREA 20.111 HECTARES FOR CONSTRUCTION OF –

"Four Laning of NH-415 from Design Chainage 29.500 to 40.400 (Itanagar to Bandardewa Section) in the State of Arunachal Pradesh under Annual Plan 2016-17 on EPC Mode. (Package-A) (Length 10.9 KM)".

Terrain

1. The Southernmost part of Arunachal Pradesh district of Papumpare is the gateway of whole of the State connects from Assam by NH-415 with NH-37 by Gohpur of District Biswanath while Papumpare district connects to West Kameng, Siang, Lower Subansiri and all other parts of the State, has the only connectivity to the Country. West Siang District leads to the China Boarder via Yingkiang which is also depend on the NH-415 road proposed for **Wildlife clearance**.

   As such the subject proposal has been prepared as per revised forest (Conversation) rule 2003 under Forest (Conservation) Act 1980 for obtaining forest clearance from Govt of India for diversion of forest land for Non forestry purpose for of **"Four Laning of NH-415 from Design Chainage 29.500 to 40.400 (Itanagar to Bandardewa Section) in the State of Arunachal Pradesh under Annual Plan 2016-17 on EPC Mode. (Package-A) (Length 10.9 KM).**

   Approximately 12.00 Lakh cum of muck is to be disposed off in the total length of highway i.e. 10.9 KM. Out of this 20% of muck will be utilized for side filling and raising the level of the road in fill section. Hence the quantity of unusable muck which is to be disposed off = 80% of 1200000 = 960000.00 cum. This surplus quantity will be disposed off in dumping yards/muck disposal sites having area of 2.899 Hectares **(WL-2.007 Ha, RoW-0.177 Ha & Pvt Land 0.715)**. Land acquisition has not been done for these dumping areas. Dumping sites shall be stabilized with provision of retaining structures and plantation enclosed in this proposal.

2. Location of Muck disposal area **2.184 Ha. (WL-2.007 Ha, RoW-0.177)** as "Annex-III" is enclosed.

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BREAKUP OF THE LAND FALLS UNDER WILDLIFE AREA

Sl No.	Proposed Chainage		Existing Road Area Lies in PROW	Area Till PROW	Land Aquistion Area (Sqm)	Remarks	Length (Mtrs)	Widthn (Mtrs)	Area in ~~Hect.~~ (Sqm)
1	29+500	30+000	6074.654	13588.795	7514.141	From Start of Project	500	15.028	7514.141
2	30+000	31+000	12738.791	26444.652	13705.861		1000	13.706	13705.861
3	31+000	32+000	17227.207	24937.388	7710.181		1000	7.710	7710.181
4	32+000	32+760	11522.135	20517.498	8995.363		760	11.836	8995.363
5	36+670	37+000	5370.202	16068.763	10698.561	From Toyota Show Room	330	32.420	10698.561
6	37+000	38+000	12462.099	54709.538	42247.439		1000	42.247	42247.439
7	38+000	39+000	7480.086	63050.674	55570.588		1000	55.571	55570.588
8	39+000	40+000	13706.941	40433.248	26726.307		1000	26.726	26726.307
9	40+000	40+374	6166.6	14040.403	7873.803	Project End	374	21.053	7873.803
10	40+560	40+720	2400	5500	3100	Papunalla Park	160	19.375	3100
		TOTAL AREA			184142.244		Area to be diverted (WLC) (Heet).		18.414

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OFFICE OF THE CHIEF ENGINEER, HIGHWAY, WESTERN ZONE,
PUBLIC WORKS DEPARTMENT, ITANAGAR, ARUNACHAL PRADESH

FOUR LANING OF NH-415 FROM KM 29.500 TO 40.400 (ITANAGAR TO BANDARDEWA SECTION) IN THE STATE OF ARUNACHAL PRADESH UNDER ANNUAL PLAN 2016-17 ON EPC MODE

MUCK DISPOSAL MANAGEMENT PLAN

Contractor's Name:	:	TK ENGINEERING CONSORTIUM PVT LTD, MODEL VILLAGE, NAHARLAGUN, ITANAGAR, ARUNACHAL PRADESH, 791110
Contact Person:	:	MR. PRANJAL HAZARIKA, PROJECT MANAGER, 9435350053
Address:	:	TK ENGINEERING CONSORTIUM PVT LTD, MODEL VILLAGE, NAHARLAGUN, ITANAGAR, ARUNACHAL PRADESH 791110
Project Location:	:	ITANAGAR TO BANDARDEWA SECTION OF NH-415 FROM KM 29.500 TO 40.400
Designated Engineers:		1. Shri Nani That, Executive Engineer, PWD, Naharlagun Highway Division 2. Shri Debia Takam, Assistant Engineer, PWD, Naharlagun Highway Sub-Division 3. Shri Jiten Saikiya, Jr. Engineer, PWD, Naharlagun Highway Division

PREFACE:

Muck disposal management plan has strong links with environmental planning in general. On the one hand, Muck disposal planning is part of overall plan to ensure that certain environmental objectives are reached, while on the other hand, the objectives envisaged in the Muck Disposal Plan can only be achieved if environmental standards are set and controlled for all Muck management activities. The Construction Waste/Muck often contains non-chemical substances which do not liable to affect human health, however, distance of Muck disposal locations from human vegetation, wild life areas, natural sources of water, waterfalls, cultivated lands etc should always be 1000 meters, however, it may be reduced keeping in view of geographical shape and elevation of the terrain. Most Wastes/Mucks streams contain substances which are danger to the human, wild lives and environment and Wastes/Mucks treatment facilities are a potential sources of emissions of the these substances.

Project Description:

As part of the development of National Highways, MoRT&H has decided for construction of Four Laning of NH-415 keeping in view of the only and major connectivity from Capital of Arunachal Pradesh, Itanagar to Naharlagun and all other parts of the Arunachal Pradesh which lead to China Border. The existing length of project road is 10.900 Km and connects to Naharlagun, Bandardewa and Assam etc. The Road is inevitability required for communication for movement of the public at large as. The construction of the road will also ensure development to the otherwise remote areas in this Papumpare District. The geographical circumstance and landscaping of the whole

Arunachal Pradesh is high-elevations, steep gradients, hills and dales/valleys and natural sources of water viz; waterfalls, Nallahs and small rivers which carries water throughout the year. Moreover, waterfalls keeps penetrate the whole highway even in dry seasons too which makes Land Slide Zones, rock cataracts leads obstacles for the passengers and transports, therefore, the scientific and technological construction of the Highway is essential most to the Govt of India, Govt of Arunachal Pradesh and the Public at large. The project envisages construction of 10.900 KM length and 30 Meters width on Itanagar-Bandardewa Highway. Large quantity of soil and rocks would be excavated from the road. Muck generated from excavation of any project component is required to be disposed off in a planned manner so that it takes at least possible space and is not hazardous to the environment, flora, fauna, natural sources of water, human and wild lives.

In order to implement the project, proper construction of gradient and smooth riding surface, cutting of hilliest area and filling of valleys and dales are required which shall generate huge quantity of muck (Soils & rocks/dead rocks), required for proper disposal management to avoid loss of environment, flora & fauna, jeopardize to the wild animals and human vegetation and therefore, this MUCK DISPOSAL MANAGEMENT PLAN is required to be instituted.

Muck Disposal Management Objectives:

The objectives are to create a system which meets the needs of our generation without jeopardizing the needs of future generations. Besides, the objectives of the muck disposal management plan are to prevent from loss of environment, flora & fauna, jeopardize to the wild animals and human vegetation. The carrying capacity of planet earth is limited; hence, it is necessary, at least in the long term, to reduce radically environmental impacts and consumption of natural resources while ensuring that the civilization continues to grow.

QUANTIY OF MUCK TO BE GENERATED:

The total quantity of muck expected to be generated has been estimated to be of the order of approximately **12 Lakh CUM.** Considering requirement of construction materials of road, approx. 20% of the excavated muck shall be used for its construction and rest 80% of the generated muck i.e. **9.6 Lakh cum** shall be disposed off in the designated dumping stations. The Details are given in Appendix A separately. **Moreover, approx. 30% of the total generated muck 3.6 Lakh cm shall be provided to the local habitants and villagers for leveling of their houses, cultivated lands and fruits gardens on their requests. Thus, the total balance muck of 6 Lakh cm shall be required to be disposed off in scientific manner.**

DUMPING STATIONS: The identification of muck disposal areas is done in line with the topographic and specific conditions of the sites. Muck is to be dumped in pre-identified sites. The quantity of muck to be accommodated at each site is given in Appendix A.

CRITERIA FOR SELECTION OF DUMPING STATIONS:

Based on the geological nature and engineering properties of the soil & rocks, a part of muck shall be used for construction. However the balance requires being suitably disposed with in **approx 2.899 hectares of muck disposal stations.** The following points were considered and followed as guidelines for finalization of the areas to be used for dumping stations:-

1. The dumping stations have been selected as close as possible to the project area to avoid traffic jam and inconvenience to the public transports.
2. The dumping stations are free from active landslides or creep and care has been taken that the dumping stations do not have a possibility of toe erosion and slope instability.
3. The dumping stations are either at higher level than the flood level or are away from the river course so that the possibility of muck falling into the river is avoided.
4. There is no active channel or stream flowing through the dumping stations.
5. The dumping stations are far away from human vegetation & settlement areas.
6. All the dumping stations are identified out of the forest cover.
7. Populated and settlement areas are avoided and kept far away from dumping stations.

The generated muck would be piled at an angle of repose around 30°-40° at the proposed dumping stations to provide stability to the slopes and also to provide ample spare for planting of trees which would further help in holding and consolidation of the material stacked at the proposed dumping stations. For this, the slopes would be broken up by creating benches across the slope. This will be done to provide stability to the slopes and also to provide ample space for plantation. The Muck is expected to be comprised of fragmented rock mixed with soil.

METHODOLOGY OF DUMPING:

The main objectives of process of muck dumping and restoration of these muck disposal stations are:-

1. To protect and control soil erosion;
2. To create greenery in the muck disposal stations;
3. To improve and develop the stations into recreational stations;
4. To ensure maximum utilization of muck for construction purposes;
5. To develop the muck disposal stations to blend with the surrounding landscape;
6. To minimize damages due to the spoilage of muck in the nearby areas.

DUMPING PROCESS:

The generated muck will be carried in dumpers/trucks covered with heavy duty tarpaulin properly tied to the vehicle in tune with international practice. All precautionary measures will be followed during the dumping of

muck. All dumpers will be well maintained to avoid any chances of loose soil from being falling during the transportation. All routes will be periodically wetted with the help of sprinklers prior to the movement of dumpers/trucks. Dumping would be avoided during the high speed wind, so that suspended particulate matters level could be maintained. Further the dumping will be avoided during heavy traffic. After the dumping the surface of dumps will be sprayed with water with the help of sprinklers and then compacted. Loose muck shall be compacted layer-wise. The muck dumping stations shall finally be covered with fertile soil and suitable plants shall be planted adopting suitable bio-technological measures. The work plan will be formulated for re-vegetation of the dumping stations through integrated biotechnological approach.

Muck Stabilization Management Planning:

In order to prevent natural sources of water, waterfalls, rivers, nallahs, human vegetation and stabilize the generated muck from cutting of hilly terrains, the following measures shall be taken before the delivering the generated muck at selected dump yards:-

1. Construction of Dry Boulder/Gabion Walls – Minimum 1.5 Mtrs to 2 Mtrs high and 1 Mtr widen Dry boulders walls shall be provided in the areas where natural landscaping is less than 45°.
2. Construction of PCC Breast Walls/Retaining Wall/Sausage Wall with proper berm - Minimum 1.5 Mtrs to 2 Mtrs high and 0.500 Mtr widen PCC Breast walls shall be provided in the areas where natural landscaping is more than 45°.
3. **Construction of Parapet Walls-** Specified parapet walls shall be provided adjacent to the culverts, minor bridges and bridges etc, for stabilization of construction waste materials.

Cost analysis of the constructions of retaining/breast walls as follows:-

Sl No.	Description	Qty	Rate (Rs.)	Amount (Rupees)	Remarks
1	Excavation, Compaction and leveling	1425 cum	177/cm	252225.00	
1	Retaining Wall	2850 cum	6900/cm	19665000.00	
2	PCC foundation	214 cum	6192/cm	1325088.00	
	Total			**21242313.00**	

4. **Plantation** –

Selected species shall be implanted for prevention from soil erosion, rolling down of the dumped muck and construction wastes for its stabilization & binding. Nearly 1-2 years old saplings would be used for plantation. The plantation can be carried out in lines across the slopes. Grass and herb species would also be used in the inter space of tree species. They will help in providing the continuous chain of support in retaining debris, reinforcing soil and

increasing the infiltration capacity of the area. Since the total area of dumping stations shall be available **2.131 hectares, therefore, 1500 saplings shall be planted at these dumping stations.**

The afforestation with suitable plant species of high ecological and economic value which can adapt to local habitat will be undertaken with 700 plants per hectares depending upon the canopy cover required. The Estimated Cost of the rehabilitation of the dumping stations shall be as follows:-

Sl No.	Particulars	Quantity	Rate (Rs.)	Amount (Rs.)
1	Pitting	1500	40	60,000.00
2	Manure & Soil filling in pits	1500	8	12,000.00
3	Plants & plantations etc	1500	60	90,000.00
4	Turfing & Grass	21310 sqm	55	1172050.00
5	Fencing, maintenance, watering etc.	1500	40	60,000.00
	TOTAL			**1394050.00**

The quantity of the muck, location and area of its disposal sites and dimensions of all preventive measures are being provided in the Annexure A separately. However, 20% of the total generated Muck shall be utilized for construction of sites, shoulders and filling of lowlands.

Scope of Generation of Hazardous Waste Materials:

No disposal of tires, appliances, yard waste, mandatory recyclables, hazardous waste, batteries, fluorescent tubes, and large metal items shall be done and therefore, no need to discuss about the same here.

Project Construction Documents –

The Project construction documents along with Muck Disposal management directives shall be available at all construction sites with Site Engineers and shall be produced for verification by the **Wildlives/Forest Department Officials** any time.

The Muck Disposal Management Plan shall be implemented and executed as follows:-

1. Since there is no scope of generation of Salvageable materials therefore, no transportation shall be required to the feasible area.
2. Wood/Fire Wood felling sectioning and transportation to the designated Timber Yard shall be done by the Forest Department
3. There is no scope of Bio Medical/Hazardous Waste materials to be generated therefore experts of the same shall not be required at all.

Remediation Plan:

Since the Wastes/Mucks which shall be generated are non-chemical, non-bio medical and non-hazardous and therefore, there is no need for remediation plan. However, in case of any loss of the environment, human vegetation, wild lives, agriculture and the natural sources of waters shall be recorded/reported, the principal contractor shall be taken into task and shall be liable to compensate in terms of the prevailing laws, rules, regulations and standing orders/instructions.

Rehabilitation of Spoils Dumps:

The project authorities shall ensure that the dumping yards blend with the natural landscape to develop the stations with gentle slopes, bunds, terraces, water ponds, and patches of greenery in and around them. These stations can also be developed later as recreational parks and tourist spots with sufficient greenery by planting ornamental plants.

Communication & Education Plan:

The Principal Contractor will conduct an on-site pre-construction meeting with its supervisory staffs, site engineers and its subcontractors in the presence of the delegated Wildlive/Forest Department Officials for briefing about the Muck Disposal Management Plan. The purpose of the meeting is to reinforce to key field employees the commitments with regard to the objectives of the Muck Disposal Management Plan.

Muck prevention activities will be discussed at the beginning of each week to reinforce to key field employees the commitments with regard to the objectives of the Muck Disposal Management Plan. The contractor will make sure all their crews comply with the Muck Disposal Management Plan. Lists of acceptable/unacceptable materials will be recorded throughout the site and reported to the Forest & Environment Department from time to time.

Muck Disposal Management Drive Plan:

The project team will develop and publish a **Muck Disposal Management Drive** statement that can be distributed to the field staffs & subcontractors and posted at the jobsite.

The Contractor will conduct a pre-award meeting for subcontractors. Subcontractors under consideration will be required to attend the meeting to review Muck Disposal Management objectives and requirements with the project team. A sign-off will be done by subcontractors attending the meeting that Muck Disposal Management objectives are understood. This document will be an attachment to every subcontract. Copies of the attachment will be posted prominently at the jobsite.

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Appendix 'A'

OFFICE OF THE CHIEF ENGINEER, HIGHWAY, WESTERN ZONE,

PUBLIC WORKS DEPARTMENT, ITANAGAR, ARUNACHAL PRADESH,

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DETAILS OF MUCK DISPOSAL AREAS

SL No	Location in Km		Length (Mtr)	Width (Mtrs)	Hight (Mtrs)	Area (Hectares)	Volume of Muck to be disposed (cum)	Longitude			Latitude			Status of the Land	Remarks
	From	To													
1	35.100	35.135	35	35	21	0.123	25,725.000	N 27	06	304	E 93	38	104	Existing ROW	
								N 27	06	297	E 93	38	113		
2	35.230	35.248	18	30	20	0.054	10,800.000	N 27	06	290	E 93	38	149		
								N 27	06	284	E 93	38	162		
(A) Total Land falls under existing ROW						**0.177**	**36,525.000**								
3	36.650	36.660	10	75	30	0.075	22,500.000	N 27	06	239	E 93	38	722	**Wildlife Area**	
								N 27	06	237	E 93	38	727		
4	36.930	36.942	12	100	32	0.120	38,400.000	N 27	06	359	E 93	38	775		
								N 27	06	358	E 93	38	783		
5	37.050	37.110	60	35	45	0.210	94,500.000	N 27	06	350	E 93	38	853		
								N 27	06	381	E 93	38	870		
6	37.750	37.800	50	38	40	0.190	76,000.000	N 27	06	484	E 93	38	188		
								N 27	06	485	E 93	38	211		

SL No	Location in Km		Length (Mtr)	Width (Mtrs)	Hight (Mtrs)	Area (Hectares)	Volume of Muck to be disposed (cum)	Longitude			Latitude			Status of the Land	Remarks
	From	To													
7	37.850	37.930	80	36	42	0.288	1,20,960.000	N 27	06	483	E 93	38	240		
								N 27	06	495	E 93	38	271		
8	38.000	38.120	120	50	20	0.600	1,20,000.000	N 27	06	573	E 93	38	381		
								N 27	06	545	E 93	38	407		
9	38.200	38.240	40	40	25	0.160	40,000.000	N 27	06	456	E 93	38	442		
								N 27	06	447	E 93	38	452		
10	39.000	39.030	30	40	28	0.120	33,600.000	N 27	06	416	E 93	38	646		
								N 27	06	419	E 93	38	669		
11	39.300	39.350	50	35	25	0.175	43,750.000	N 27	06	427	E 93	38	812		
								N 27	06	422	E 93	38	828		
12	39.977	40.100	23	30	12	0.069	8,280.000	N 27	06	222	E 93	38	158		
								N 27	06	214	E 93	38	169		
(B) Total Land falls under Wildlife Area						**2.007**	**5,97,990.000**								
13	40.400	40.400	110	65	10	0.715	71,500.000	N 27	05	862	E 93	40	073	**Pvt Land**	
								N 27	05	809	E 93	40	125		
								N 27	05	824	E 93	40	169		
								N 27	05	833	E 93	40	139		
Total capacity of Muck Disposal Area is (cum)							**7,06,015.000**								

(A) Total Area falls under Wildlife area 2.007 Hectares

(B) Total Area falls under RoW (out of WL) 0.177 Hectares

(C) Total Area falls under Pvt Land 0.715 Hectares

SL No	Location in Km		Length (Mtr)	Width (Mtrs)	Hight (Mtrs)	Area (Hectares)	Volume of Muck to be disposed (cum)	Longitude	Latitude	Status of the Land	Remarks
	From	To									

(D) Grand Total of Area required for disposal of Muck 2.899 Hectares

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