

Land Suitability Certificate

This is to certify that 67.000 Ha. Of degraded Forest land (Kuluti PRF - 30 Ha. and Mirabali RF – 37 Ha.) in Rayagada Range under Rayagada Forest Division is identified for Compensatory Afforestation and found suitable for plantation (ANR @500 seedlings per ha.) from management point of view and is free and all sorts of encumbrance and encroachment.



Divisional Forest Officer
Rayagada Division

**COMPENSATORY AFFORESTATION SCHEME OVER 67.000 HA. OF DEGRADED
RESERVED FOREST LAND IN RAYAGADA DISTRICT IN LIEU OF DIVERSION
PROPOSAL OVER 33.152 HA. FOR THE CONSTRUCTION OF KORAPUT – SINGAPUR**

**ROAD DOUBLING RAILWAY PROJECT (FROM BHALUMASKA TO SINGAPUR
ROAD, 128.950 KM TO 163.725 KM) OF EAST COAST RAILWAY, VISAKHAPATNAM.**

INTRODUCTION

Indian Railways has started construction of Koraput-Rayagada New B.G. Rail Link Project (164 Km) in the year 1982-83 and commissioned for the entire project in the year 1996-97 for goods traffic initially. Koraput-Rayagada line popularly known as K-R line of East Coast Railway is a single line section, which connects to the Raipur/Sambalpur-Vizianagaram line at Singapur Road stations and Kottavalasa-Kirandul line at Koraput Station, it is an important Rail link to Bailadilla Mines. The line traverses through scenic hills of Eastern Ghats from a height of 943m above MSL to 245m above MSL through hinterland of Odisha State. The scenic hills are having difficult Ghats through which the alignment of existing single line traverses, comprising of sharp curves, continuous steep gradient, large nos. of tunnels, deep gorges and subsequent length of cuttings. The line was opened to Goods traffic in 1996-97 initially and finally passenger traffic in Dec'1998. Electrification of Koraput-Damanjodi section was commissioned consequent on setting of the Aluminium Plant at Damanjodi by M/s NALCO Ltd. Further, electrification of Damanjodi-Singapur Road section was commissioned in the year 2018-2019.

The line was constructed to serve several purposes simultaneously viz. extending railway network in an undeveloped area, bringing industrial development to a backward tribal district, Koraput, providing rail connection to M/s NALCO Ltd. at Damanjodi for the movement of raw materials and finished products and providing alternative route for the movement of iron ore from Bailadilla mountain range to Visakhapatnam steel plant & Vizag port and other destinations. To cater to the requirement of fine ore for Vizag Steel Plant from 1984-85 onwards, the fine ore handling scheme in Bailadilla Deposit No.5 has been commissioned.

The existing railway line between Koraput-Rayagada is a single line with speed potential upto 65 Kmph and classified as "D" category and used as the transportation corridor of goods traffic mainly minerals and mine products.

The coaching traffic at present consists of seven pairs of Up & Dn trains. The demand of goods traffic on the existing single line is increasing over a period due to increase of production of goods and minerals in the vast catchment and consequent transportation requirement. As a result, doubling of the existing line is essentially required to cater the goods traffic as the existing line is already saturated.

Considering the traffic growth and projected traffic demand of the section and to avoid heavy load on single supersaturated main line. The PET survey for Koraput-Rayagada doubling was sanctioned by the Railway Board under Demand No.2 (Surveys) vide Blue Book 2012-13.

Accordingly, the PET Survey was carried out by D.N. Consultants, Cuttack and the Report was submitted to Railway Board in the year 2015-16. The proposed doubling line connects at Singapur Road and Koraput of Odisha State. The double line between Singapur Road to Rayagada was completed during construction of Raipur-Vizianagaram doubling. Elevation of Koraput is 870m above MSL and the elevation of Singapur Road is 244.50 above MSL.

HAL factory (Hindustan Aeronautics Limited, a defense enterprise of the Government of India) is only 15Km from Koraput town. This HAL factory makes military aircraft engines for MIG and expanding for Sukhoi assembly line. The HAL factory and township surrounded by hills and forest. It employs 6000 Engineers and Technicians, all are staying in the township, next to the factory. The NALCO, Damanjodi also its significance to boost up the economy of the Koraput District. Around 2500 Engineers & Technicians are engaged in the process of extraction of Alumina from Bauxite. Other than the employees there are thousands of workers engaged by hundreds of contractors. Nearby Similguda is developed to cater this population for marketing as well as entertainment. Similguda is mostly inhabited by trading community. These traders and contractors do business in HAL, Sunabeda and NALCO, Damanjodi.

In the area the major Alumina plant established by M/s Aditya Aluminium Ltd. viz. Utkal Alumina International Ltd. (UAIL) of 1.5MTPA near Tikiri and expansion of production capacity is under progress. Besides existing major steel plant of M/s RINL at VSKP, three new steel plants are being established in the area viz. M/s TISCO with 5.5 MTPA capacity (near Jagadapur). M/s Essar Steel Plant of 3.7 MTPA capacity near Bhaunsi station and Integrated Steel Plant of 3.0 MTPA capacity of M/s NMDC near Ambagaon. Due to which substantial additional goods traffic of Ore, finished goods as well as coal linkage is expected on this section.

The doubling line in between Koraput-Singapur Road project falls entirely in Odisha State and will traverses through two districts of Odisha viz. Koraput & Rayagada.

LAND INVOLVED

These project extents over an area of 33.152 Ha. Forest land for construction of double Railway line from Koraput to Singapur Road Doubling Railway Project. From Bhalumaska to Singapur Road (Km 128.925 to Km. 163.725) respectively. Hence, this 33.152 Ha. of forest land has been proposed for Diversion under Forest (Conservation) Act, 1980 in lieu of which the Compensatory Afforestation will be raised over double the extent of degraded forest land i.e. 66.304 Ha. Say 67.000 Ha. in Rayagada Forest Division.

Details of Compensatory Afforestation Scheme:

This Scheme of Compensatory Afforestation over an area of 67.000 Ha is prepared against the diversion of forest land over an area of 33.152 Ha. for construction of Koraput to Singapur Road Doubling Railway Project. From Bhalumaska to Singapur Road (Km128.950 to Km. 163.725). The Proposed Compensatory Afforestation area has been selected based on the DSS report (density < 0.4) and is well within the Notified forest blocks. In order to accommodate the total number of seedlings (@ 1000 seedling per ha of diverted area) a gross area of 67.000 ha has been selected in Kutuli PRF (30.00Ha.) and Mirabali RF (37.00Ha.).

The scheme has been prepared over **67.00** Ha under ANR with Gap @500 plants/ Ha. with maintenance up to ten years (with 0th year) in the current wage rate @ Rs.345/- per manday to accommodate 33500nos. of seedlings.

Details of land selected for the CA Scheme

Sl. No.	Name of Range	Name of the site	Mode of Plantation	No of seedling /ha	Area in Ha.	No. of seedlings to be planted
1.	Rayagada	Kutuli PRF	ANR	500	30.00	15000
2	Rayagada	Mirabali RF	ANR	500	37.00	18500

1. Scheme for Compensatory Afforestation over 30.00 ha @ 500 no of seedlings/ha in Kutuli PRF of Rayagada Range

District: Rayagada
Forest Division: Rayagada
Range: Rayagada
PRF Name: Kutuli
Area suitable for CA: 30.00 Ha

Description of area:

Kutuli PRF situated in Rayagada Range of Rayagada Division has an area of 30.000 ha with an GIS area of 30.363 ha. The forest type is Northern Dry Mixed Deciduous Forest as per Champion and Seth's Forest classification. The crop constitution of the forest is of Dhaura, Asan, Kusum, Mitikinia, Arjun, Mahul, Barabakulia, etc. middle storey comprises of Chara,

Kendu, Bahada, Jamun, Kochila, Kasi, Kansa, Genduli with few Sal. The main species found in the undergrowth are Kapasia, Mallotus, Sunari, Dhatki, Nahalabeli and Tilei.

This PRF is located on Survey of India Open Series Topo sheet no. **E44F4** confined within LATITUDE 19° 7'26.70"N & 19° 8'4.03"N, LONGITUDE: 83°11'9.61"E & 83°11'31.82"E for UTM **Zone -44** and indicated on the map enclosed in **Page No.-6**. The proposed area of plantation is free from encroachment, other encumbrances and found suitable for plantation.

Soil type:

Soil is fairly deep, well drained and moderately acidic with high phosphorus fixing capacity. Red Soil is seen in Kutuli PRF. The texture ranges from loamy to clayey loam.

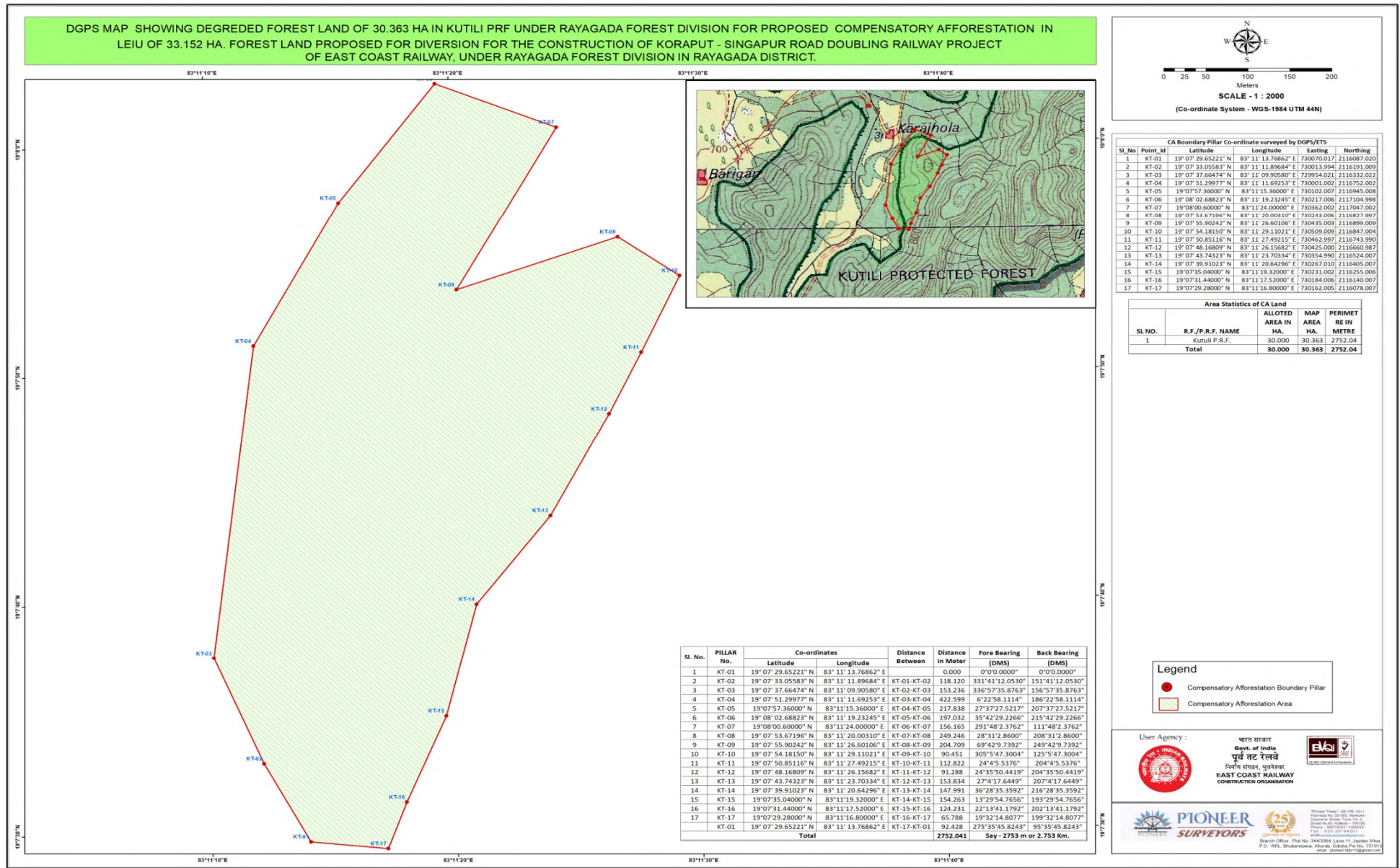
Topography and slope:

The topographical configuration of the identified site is undulating with a slope of less than 45° and medium to gentle slope.

Whether the area is bearing any root stock of vegetation:

The site selected for Compensatory Afforestation has existing root stock of local species and the existing vegetation are in degraded stage.

Geo Referenced Map of the site :



Temperature:

The area experiences cold weather between November – January when the temperature drops to less than 13° C. the temperature rises steadily from January onwards reaching 32° C to 45° C in summer (May). So, it is under tropical condition with limited rainy days.

Climate& Rainfall:

The area has tropical climate with monsoon rains from June to September and occasional rains during the autumn. This area also experiences occasional gusty wind to heavy thunderstorms during summer season (April to June). Monsoon breaks out in early to middle of June and continues up to September. The average annual rainfall is about 1600 mm under the influence of south west monsoon. On average, there are about 100 rainy days. The humidity is maximum in the month of July to August (90%) and minimum in February (36%). The wind velocity varies between 40 KMPH and 80 KMPH, although occasional higher values have also been reported. Lightening incidents are rarely reported in this area.

Plantation Model:

The identified site over 30.00 Ha. in Kutuli PRF is a patch of degraded Forest with density <0.4. The topography is gentle and has good soil depth. Thus, it is proposed to take up plantation under ANR mode with 500 seedling/ha in 01 patch.

Special Objectives of Compensatory Afforestation Scheme are as follows:

- To restrict the degradation by reducing the biotic interference to barest minimum and reverse the trend towards the process of restoration of vegetation.
- To develop the forest by providing site-specific silvicultural treatment.
- To facilitate the boosting of natural regeneration and ensure their establishment.
- To take up appropriate soil moisture conservation (SMC) measures to improve the soil and moisture regime.
- To improve the bio-diversity of these blocks.
- To meet the need of the local villagers with regard to firewood and small timber depending upon the productivity (from silvicultural operations like thinning,

subsidiary silvicultural operation, climber cutting, cutting of high stumps, double shoot cutting etc.)

Item of works to be taken up:

To achieve the above objectives, the following items of works are mainly prescribed to be taken up:

- Survey & Demarcation.
- Fencing.
- Site Clearance & Planting in gaps
- Soil & Moisture Conservation Measures.
- Protection of Plantation
- EPA (Entry Point Activity)
- Monitoring & Evaluation Mechanism

Survey & Demarcation:

The identified area has been surveyed by DGPS and also map has been prepared. DGPS Coordinates of Survey Stations of Compensatory Afforestation area is given in the following table. The area will be demarcated with RCC pillars of size 1.0 m x 10 cm x 10 cm for clear demarcation of the area.

DGPS Coordinates:

Sl_No	Point_Id	Latitude	Longitude
1	KT-01	19° 07' 29.65221" N	83° 11' 13.76862" E
2	KT-02	19° 07' 33.05583" N	83° 11' 11.89684" E
3	KT-03	19° 07' 37.66474" N	83° 11' 09.90580" E
4	KT-04	19° 07' 51.29977" N	83° 11' 11.69253" E
5	KT-05	19°07'57.36000" N	83°11'15.36000" E
6	KT-06	19° 08' 02.68823" N	83° 11' 19.23245" E
7	KT-07	19°08'00.60000" N	83°11'24.00000" E
8	KT-08	19° 07' 53.67196" N	83° 11' 20.00310" E
9	KT-09	19° 07' 55.90242" N	83° 11' 26.60106" E
10	KT-10	19° 07' 54.18150" N	83° 11' 29.11021" E

11	KT-11	19° 07' 50.85116" N	83° 11' 27.49215" E
12	KT-12	19° 07' 48.16809" N	83° 11' 26.15682" E
13	KT-13	19° 07' 43.74323" N	83° 11' 23.70334" E
14	KT-14	19° 07' 39.91023" N	83° 11' 20.64296" E
15	KT-15	19°07'35.04000" N	83°11'19.32000" E
16	KT-16	19°07'31.44000" N	83°11'17.52000" E
17	KT-17	19°07'29.28000" N	83°11'16.80000" E

Fencing:

To protect the plantation from grazing and other biotic interference, it is proposed to provide Vegetative fencing (Bamboo Twig and Thorns) along the 2.753 km periphery. The cost estimate for Vegetative fencing (Bamboo Twig and Thorns) has been provided in Annexure- II (Page no.- 23)

Site Clearance & Planting:

Plantation over 30.00 ha. shall be taken up with planting model of ANR @500 plants per hectares at spacing of 2.5 m x 2.5 m. Site clearance and cleaning to be done in the treatment area to create gap for plantation. Silvicultural cleaning by cutting of high stumps, removal of weeds, singling of multiple shoots, removal of plants in congested areas will be done, so that the plants get optimum condition for growth. All post planting measures like casualty replacement, soil working, manuring, fire protection etc. will be undertaken.

The materials so removed from the site clearance and SSO to be distributed among the villagers/VSS people. A register of distribution to be maintained at Range level.

Species:

Considering adverse soil & moisture conditions, preference should be given on hardy indigenous species. For success of plantation in interior tribal areas, emphasis has been given on plantation of fruit and NTFP species. Considering the topography, soil and moisture availability of the plantation area, the following species will be planted.

Sl.no	Scientific Name of species	Common name	Sl.no	Scientific Name of species	Common name
1	<i>Terminalia arjuna</i>	Arjun	10	<i>Dalbergia sissoo</i>	Sissoo
2	<i>Azadirachta indica</i>	Neem	11	<i>Gmelina arborea</i>	Gambhari
3	<i>Pongamia pinata</i>	Karanja	12	<i>Dendrocalamus strictus</i>	Salia Bamboo
4	<i>Emblica officinalis</i>	Amla	13	<i>Terminalia tomentosa</i>	Asana
5	<i>Terminalia belerica</i>	Bahada	14	<i>Madhuca indica</i>	Mahul
6	<i>Albizia lebbek</i>	Sirisa	15	<i>Acacia catechu</i>	Khaira
7	<i>Zizyphus mauritania</i>	Barakoli	16	<i>Mangifera indica</i>	Mango
8	<i>Syzygium cumini</i>	Jamun	17	<i>Ficus benghalensis</i>	Bara
9	<i>Ficus religiosa</i>	Pipal	18	<i>Artocarpus heterophyllous</i>	Panasa

Soil and Moisture Conservation Works: -

Rain water harvesting, run off management and enhancement of percolation are the cardinal activities to improve infiltration of water for re-charging of ground aquifer. It enhances the moisture availability to the vegetation in forest eco-system. Soil and moisture conservation activities have been taken up in forestry in various scales and levels as a subsidiary activity and dovetailed to plantation and other afforestation activities. In order to improve water availability in Forests, it is to be practiced as core forestry activity independent of other forestry interventions.

The strategy adopted for rain water harvesting in forest areas is enumerated below

(I) Forest Floor Treatment-

The forest floor is the catchment where the precipitation touches the ground and subsequently is drained through the drainage line. It forms the focus area in the rain water harvesting. Permissible interventions will not only capture the rain water but also enhance the retention period ultimately leading to increased infiltration. The Staggered Trenches primarily aims to break the run off. In a Ha. of land up to 300 nos. of Staggered Trenches will be created. The dimension of the Staggered Trenches will be 2.5mt. X 0.5 mt X 0.5 mt. It will help in conserving rain waters of that region and facilitate its percolation. Adequate care should be taken during alignment of such trenches so that gullies are not formed by the water flowing downhill from the edges of the Trench. The identified nallas will be treated, from top to bottom (ridge to valley) approach as per the specific site condition, which will retard the velocity of run-off and be helpful in recharging as well as feeding ground water to the plants planted below it.

(II) Drainage line Treatment-

The micro catchment drain the water into drainage line and rain water flows from the ridge to bottom and higher slope to lower slope in varying velocity. The primary objective of drainage line treatment is therefore, centres around reducing the velocity and increasing the retention of water at various levels. It is therefore, required to have appropriate interventions along drainage line to alter the pattern of rain water flow.

- **Loose Boulder Check Dams (LBCD):**

This structure will be created across the drainage line for retention of runoff and reduction of velocity. Such structures should preferably have top width of one meter with upstream slope of 1:1 and downstream slope of 1:5. The dimensions of each structure are dependent on several factors such as gradient, catchment size, etc. Hence, designs will be fixed with appropriate dimensions as per the size of the nallas on which it will be constructed..

- **LBCD with Wire Mesh:**

At very special locations, such a structure should be planed where boulders will be stacked on steps and width of the drainage line is very large. In such structure, the actual cost of the wire mesh will be added.

Strategy for Implementation:

The terrain of the RF is hilly and undulating. However the area identified has 2 no. of nala of 1st Order (primary nala) to be taken up for treatment. In order to achieve the objective and implement the programme efficiently, a well-planned strategy is indispensable. The entire area will be treated with major focus on the drainage line treatment by providing LBCD in the major nalas within the prescribed cost norm.

DRAINAGE LINE TREATMENT

LOOSE BOULDER CHECK DAM

(A) Size- 10' X 10' X 5'

- i. Requirement of boulder (**Procured from quarry**)

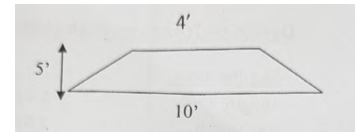
$$\frac{1}{2} (10' + 4') \times 10' \times 5' = 350\text{cft or } 9.90 \text{ cum}$$

- ii. Labour for construction of LBCD for 1 cum

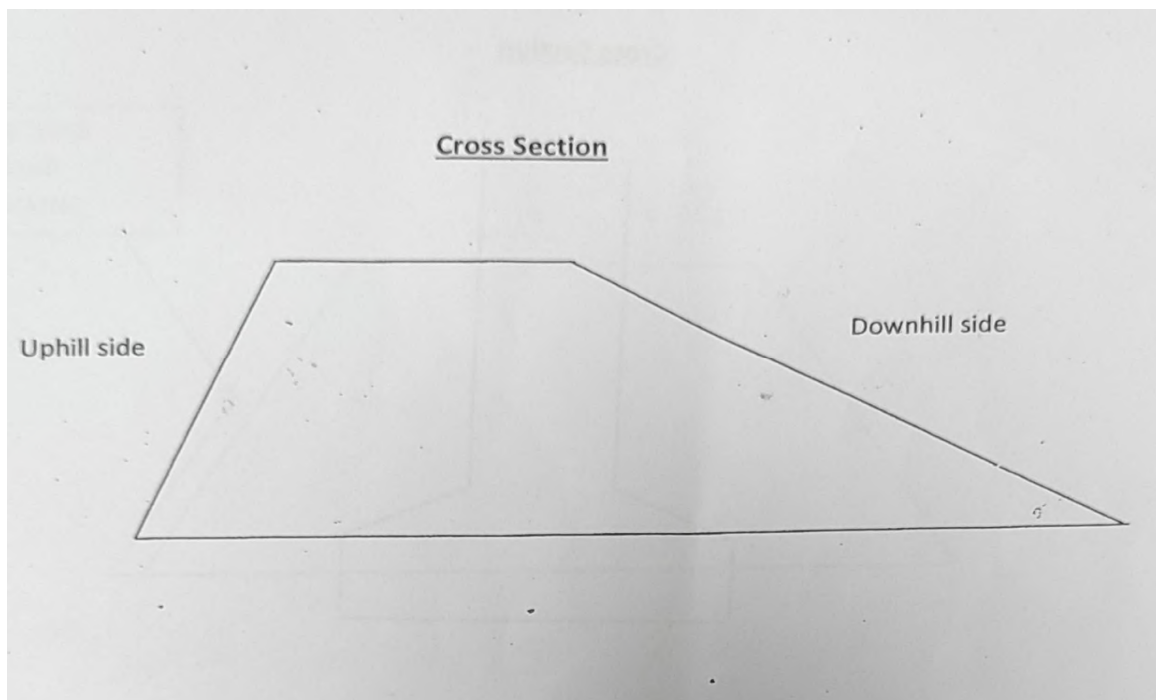
Mulia 1.04 No.

Mason special 0.17 No.

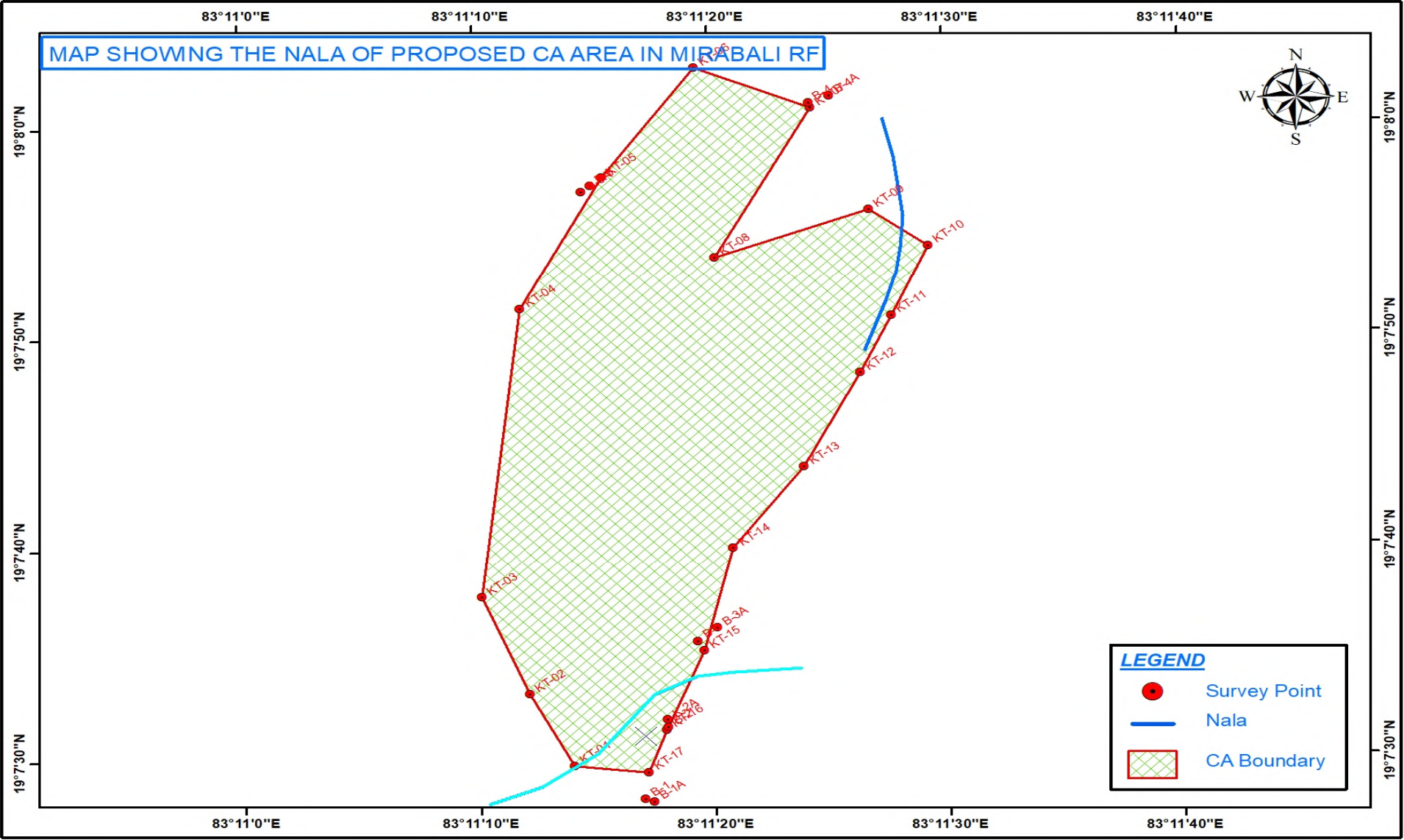
Stone packer 0.35 No.



Design of LBCD



Map Showing Nala:



Protection of the plantation:

Vegetative fencing all along the periphery of the plantation will be provided. Few watchers will also be engaged for protection of the plantation. Assistance of V.S.S is necessary for better protection of plantation.

Peoples Participation:

In the recent times, no scheme shall be effective if the local villagers are not involved in the implementation of the scheme itself. The villagers who are having a right on the NTFP items in the adjoining forest area are to be associated with the implementation of the scheme at all different levels. For that, Van Samrakhyan Samiti (VSS) is proposed to be constituted in all the villages around the Compensatory Afforestation site. The villagers are to be motivated, inspired and above all, explained the benefits they will be getting, if plantation is protected by them.

EPA (Entry Point Activity):

To build the confidence of the local public and smooth execution of the works, Entry-Point Activities are proposed to orient the community members towards thrift and credit activities. EPA will be taken up after discussion with the nearby villages surrounding the CA areas.

Monitoring & Evaluation Mechanism:

The scheme shall be effective for a period of 10 years. The cost will be deposited by the user agency and work will be executed by the Divisional Forest Officer, Rayagada Division with his staff and all prescribed records are to be maintained. In addition to internal monitoring by Forest Officers of State Government, a Monitoring Committee under item no. 3.4 (iii) of consolidated guidelines under F.C Act 1980 issued by MoEF, shall be established with a nominee of the Central Government to oversee that the stipulations, including those pertaining to Compensatory Afforestation are carried out for Kutuli PRF.



Divisional Forest Officer
Rayagada Division

2. Scheme for Compensatory Afforestation over 37.00 ha @ 500 no of seedlings/ha in

Kutuli PRF of Rayagada Range

District: Rayagada

Forest Division: Rayagada

Range: Rayagada

PRF Name: Mirabali RF

Area suitable for CA: 37.00 Ha

Description of area:

Mirabali RF situated in Rayagada Range of Rayagada Division has an area of 37.000 ha with an GIS area of 38.560 ha. The forest type is Northern Dry Mixed Deciduous Forest as per Champion and Seth's Forest classification. The crop constitution of the forest is of Dhaura, Asan, Kusum, Mitikinia, Arjun, Mahul, Barabakulia, etc. middle storey comprises of Chara, Kendu, Bahada, Jamun, Kochila, Kasi, Kansa, Genduli with few Sal. The main species found in the undergrowth are Kapasia, Mallotus, Sunari, Dhatki, Nahalabeli and Tilei.

This RF is located on Survey of India Open Series Topo sheet no. **E44F12** confined within LATITUDE 19° 5'45.99"N & 19° 6'13.66"N, LONGITUDE: 83°33'10.54"E & 83°33'42.97"E for UTM **Zone -44** and indicated on the map enclosed in **Page No.-6**. The proposed area of plantation is free from encroachment, other encumbrances and found suitable for plantation.

Soil type:

Soil is fairly deep, well drained and moderately acidic with high phosphorus fixing capacity. Red Soil is seen in Kutuli PRF. The texture ranges from loamy to Clayey loam.

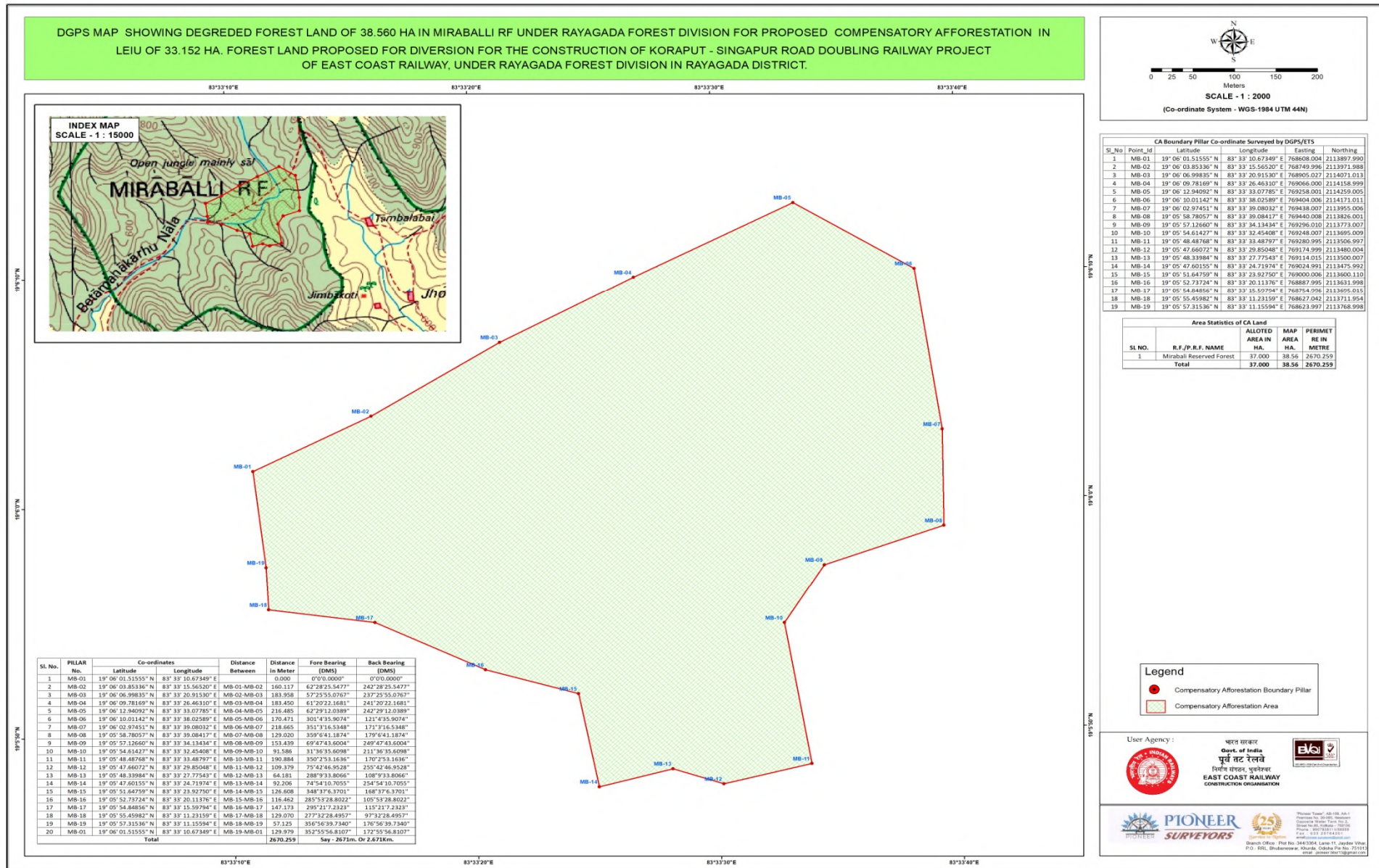
Topography and slope:

The topographical configuration of the identified site is undulating with a slope of less than 45° and medium to gentle slope.

Whether the area is bearing any root stock of vegetation:

The site selected for Compensatory Afforestation has existing root stock of local species and the existing vegetation are in degraded stage.

Geo Referenced Map of the site :



Temperature:

The area experiences cold weather between November – January when the temperature drops to less than 13° C. the temperature rises steadily from January onwards reaching 32° C to 45° C in summer (May). So, it is under tropical condition with limited rainy days.

Climate& Rainfall:

The area has tropical climate with monsoon rains from June to September and occasional rains during the autumn. This area also experiences occasional gusty wind to heavy thunderstorms during summer season (April to June). Monsoon breaks out in early to middle of June and continues up to September. The average annual rainfall is about 1600 mm under the influence of south west monsoon. On average, there are about 100 rainy days. The humidity is maximum in the month of July to August (90%) and minimum in February (36%). The wind velocity varies between 40 KMPH and 80 KMPH, although occasional higher values have also been reported. Lightening incidents are rarely reported in this area.

Plantation Model:

The identified site over 37.00 Ha. in Mirabali RF is a patch of degraded Forest with density <0.4. The topography is gentle and has good soil depth. Thus, it is proposed to take up plantation under ANR mode with 500 seedling/ha in 01 patch.

Special Objectives of Compensatory Afforestation Scheme are as follows:

- To restrict the degradation by reducing the biotic interference to barest minimum and reverse the trend towards the process of restoration of vegetation.
- To develop the forest by providing site-specific silvicultural treatment.
- To facilitate the boosting of natural regeneration and ensure their establishment.
- To take up appropriate soil moisture conservation (SMC) measures to improve the soil and moisture regime.
- To improve the bio-diversity of these blocks.
- To meet the need of the local villagers with regard to firewood and small timber depending upon the productivity (from silvicultural operations like thinning,

subsidiary silvicultural operation, climber cutting, cutting of high stumps, double shoot cutting etc.)

Item of works to be taken up:

To achieve the above objectives, the following items of works are mainly prescribed to be taken up:

- Survey & Demarcation.
- Fencing.
- Site Clearance & Planting in gaps
- Soil & Moisture Conservation Measures.
- Protection of Plantation
- EPA (Entry Point Activity)
- Monitoring & Evaluation Mechanism

Survey & Demarcation:

The identified area has been surveyed by DGPS and also map has been prepared. DGPS Coordinates of Survey Stations of Compensatory Afforestation area is given in the following table. The area will be demarcated with RCC pillars of size 1.0 m x 10 cm x 10 cm for clear demarcation of the area.

DGPS Coordinates:

Sl_No	Point_Id	Latitude	Longitude
1	MB-01	19° 06' 01.51555" N	83° 33' 10.67349" E
2	MB-02	19° 06' 03.85336" N	83° 33' 15.56520" E
3	MB-03	19° 06' 06.99835" N	83° 33' 20.91530" E
4	MB-04	19° 06' 09.78169" N	83° 33' 26.46310" E
5	MB-05	19° 06' 12.94092" N	83° 33' 33.07785" E
6	MB-06	19° 06' 10.01142" N	83° 33' 38.02589" E
7	MB-07	19° 06' 02.97451" N	83° 33' 39.08032" E
8	MB-08	19° 05' 58.78057" N	83° 33' 39.08417" E
9	MB-09	19° 05' 57.12660" N	83° 33' 34.13434" E
10	MB-10	19° 05' 54.61427" N	83° 33' 32.45408" E

11	MB-11	19° 05' 48.48768" N	83° 33' 33.48797" E
12	MB-12	19° 05' 47.66072" N	83° 33' 29.85048" E
13	MB-13	19° 05' 48.33984" N	83° 33' 27.77543" E
14	MB-14	19° 05' 47.60155" N	83° 33' 24.71974" E
15	MB-15	19° 05' 51.64759" N	83° 33' 23.92750" E
16	MB-16	19° 05' 52.73724" N	83° 33' 20.11376" E
17	MB-17	19° 05' 54.84856" N	83° 33' 15.59794" E
18	MB-18	19° 05' 55.45982" N	83° 33' 11.23159" E
19	MB-19	19° 05' 57.31536" N	83° 33' 11.15594" E

Fencing:

To protect the plantation from grazing and other biotic interference, it is proposed to provide Vegetative fencing (Bamboo Twig and Thorns) along the 2.671 km periphery. The cost estimate for Vegetative fencing (Bamboo Twig and Thorns) has been provided in Annexure- II (Page no.- 23)

Site Clearance & Planting:

Plantation over 37.00 ha. shall be taken up with planting model of ANR @500 plants per hectares at spacing of 2.5 m x 2.5 m. Site clearance and cleaning to be done in the treatment area to create gap for plantation. Silvicultural cleaning by cutting of high stumps, removal of weeds, singling of multiple shoots, removal of plants in congested areas will be done, so that the plants get optimum condition for growth. All post planting measures like casualty replacement, soil working, manuring, fire protection etc. will be undertaken.

The materials so removed from the site clearance and SSO to be distributed among the villagers/VSS people. A register of distribution to be maintained at Range level.

Species:

Considering adverse soil & moisture conditions, preference should be given on hardy indigenous species. For success of plantation in interior tribal areas, emphasis has been given on plantation of fruit and NTFP species. Considering the topography, soil and moisture availability of the plantation area, the following species will be planted.

Sl.no	Scientific Name of species	Common name	Sl.no	Scientific Name of species	Common name
1	<i>Terminalia arjuna</i>	Arjun	10	<i>Dalbergia sissoo</i>	Sissoo
2	<i>Azadirachta indica</i>	Neem	11	<i>Gmelina arborea</i>	Gambhari
3	<i>Pongamia pinata</i>	Karanja	12	<i>Dendrocalamus strictus</i>	Salia Bamboo
4	<i>Emblica officinalis</i>	Amla	13	<i>Terminalia tomentosa</i>	Asana
5	<i>Terminalia belerica</i>	Bahada	14	<i>Madhuca indica</i>	Mahul
6	<i>Albizia lebbeck</i>	Sirisa	15	<i>Acacia catechu</i>	Khaira
7	<i>Zizyphus mauritania</i>	Barakoli	16	<i>Mangifera indica</i>	Mango
8	<i>Syzygium cumini</i>	Jamun	17	<i>Ficus benghalensis</i>	Bara
9	<i>Ficus religiosa</i>	Pipal	18	<i>Artocarpus heterophyllous</i>	Panasa

Soil and Moisture Conservation Works: -

Rain water harvesting, run off management and enhancement of percolation are the cardinal activities to improve infiltration of water for re-charging of ground aquifer. It enhances the moisture availability to the vegetation in forest eco-system. Soil and moisture conservation activities have been taken up in forestry in various scales and levels as a subsidiary activity and dovetailed to plantation and other afforestation activities. In order to improve water availability in Forests, it is to be practiced as core forestry activity independent of other forestry interventions.

The strategy adopted for rain water harvesting in forest areas is enumerated below-

(III) Forest Floor Treatment-

The forest floor is the catchment where the precipitation touches the ground and subsequently is drained through the drainage line. It forms the focus area in the rain water harvesting. Permissible interventions will not only capture the rain water but also enhance the retention period ultimately leading to increased infiltration. The Staggered Trenches primarily aims to break the run off. In a Ha. of land up to 300 nos. of Staggered Trenches will be created. The dimension of the Staggered Trenches will be 2.5mt. X 0.5 mt X 0.5 mt. It will help in conserving rain waters of that region and facilitate its percolation. Adequate care should be taken during alignment of such trenches so that gullies are not formed by the water flowing downhill from the edges of the Trench. The identified nalas will be treated, from top to bottom (ridge to valley) approach as per the specific site condition, which will retard the velocity of run-off and be helpful in recharging as well as feeding ground water to the plants planted below it.

(IV) Drainage line Treatment-

The micro catchment drain the water into drainage line and rain water flows from the ridge to bottom and higher slope to lower slope in varying velocity. The primary objective of drainage line treatment is therefore, centres around reducing the velocity and increasing the retention of water at various levels. It is therefore, required

to have appropriate interventions along drainage line to alter the pattern of rain water flow.

- **Loose Boulder Check Dams (LBCD):**

This structure will be created across the drainage line for retention of runoff and reduction of velocity. Such structures should preferably have top width of one meter with upstream slope of 1:1 and downstream slope of 1:5. The dimensions of each structure are dependent on several factors such as gradient, catchment size, etc. Hence, designs will be fixed with appropriate dimensions as per the size of the nallas on which it will be constructed..

- **LBCD with Wire Mesh:**

At very special locations, such a structure should be planed where boulders will be stacked on steps and width of the drainage line is very large. In such structure, the actual cost of the wire mesh will be added.

Strategy for Implementation:

The terrain of the RF is hilly and undulating. However the area identified has 3 no. of nala of 1st Order (primary nala) to be taken up for treatment. In order to achieve the objective and implement the programme efficiently, a well-planned strategy is indispensable. The entire area will be treated with major focus on the drainage line treatment by providing LBCD in the major nallas within the prescribed cost norm.

DRAINAGE LINE TREATMENT

LOOSE BOULDER CHECK DAM

(B) Size- 10' X 10' X 5'

iii. Requirement of boulder (Procured from quarry)

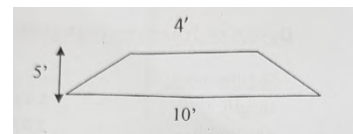
$$\frac{1}{2} (10' + 4') \times 10' \times 5' = 350\text{cft or } 9.90 \text{ cum}$$

iv. Labour for construction of LBCD for 1 cum

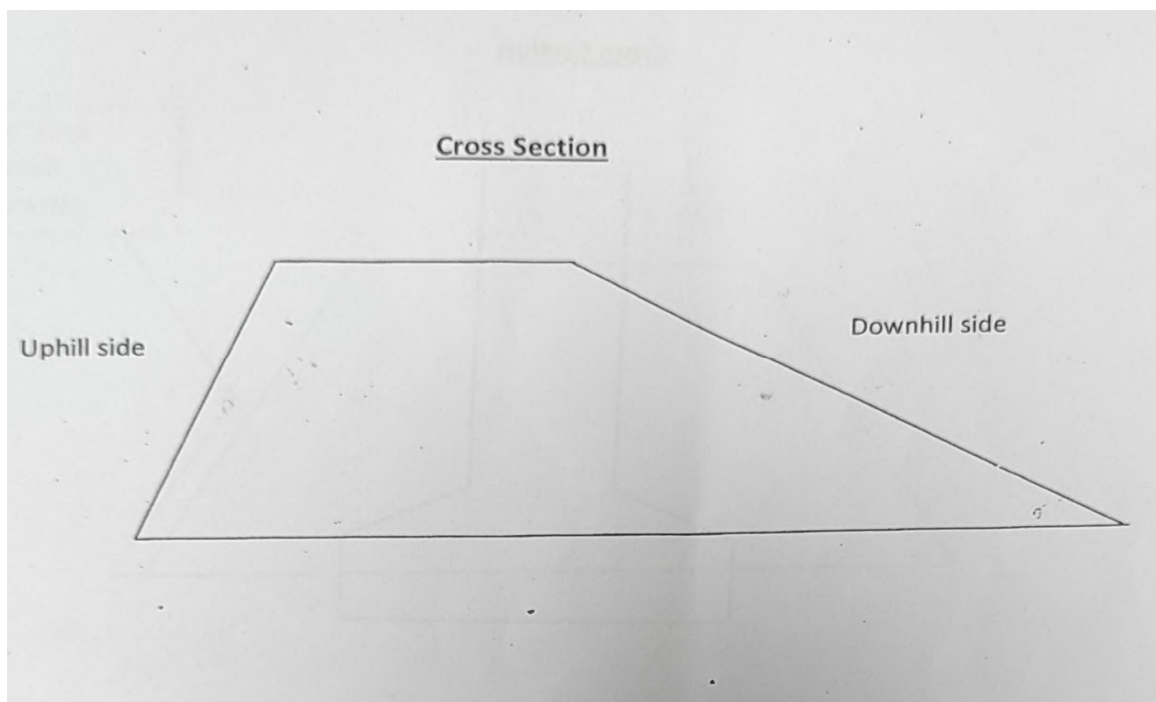
Mulia 1.04 No.

Mason special 0.17 No.

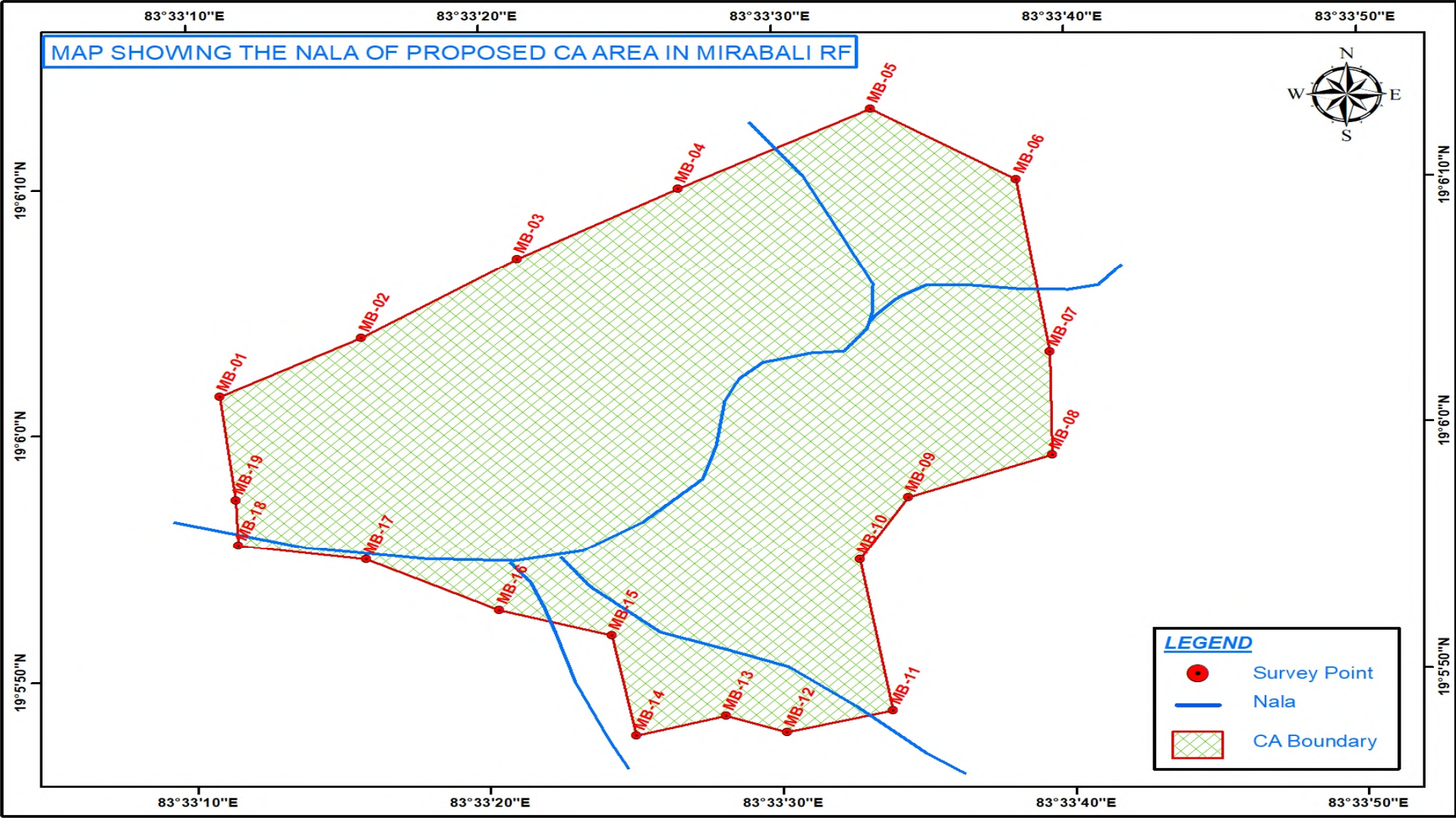
Stone packer 0.35 No.



Design of LBCD



Map Showing Nala:



Protection of the plantation:

Vegetative fencing all along the periphery of the plantation will be provided. Few watchers will also be engaged for protection of the plantation. Assistance of V.S.S is necessary for better protection of plantation.

Peoples Participation:

In the recent times, no scheme shall be effective if the local villagers are not involved in the implementation of the scheme itself. The villagers who are having a right on the NTFP items in the adjoining forest area are to be associated with the implementation of the scheme at all different levels. For that, Van Samrakhyan Samiti (VSS) is proposed to be constituted in all the villages around the Compensatory Afforestation site. The villagers are to be motivated, inspired and above all, explained the benefits they will be getting, if plantation is protected by them.

EPA (Entry Point Activity):

To build the confidence of the local public and smooth execution of the works, Entry-Point Activities are proposed to orient the community members towards thrift and credit activities. EPA will be taken up after discussion with the nearby villages surrounding the CA areas.

Monitoring & Evaluation Mechanism:

The scheme shall be effective for a period of 10 years. The cost will be deposited by the user agency and work will be executed by the Divisional Forest Officer, Rayagada Division with his staff and all prescribed records are to be maintained. In addition to internal monitoring by Forest Officers of State Government, a Monitoring Committee under item no. 3.4 (iii) of consolidated guidelines under F.C Act 1980 issued by MoEF, shall be established with a nominee of the Central Government to oversee that the stipulations, including those pertaining to Compensatory Afforestation are carried out for Kutuli PRF.


Divisional Forest Officer
Rayagada Division

Financial outlay of raising of Compensatory Afforestation Scheme over an area of 67.000 Ha. (30.00 Ha of Kutuli PRF and 37.00 Ha. of Mirabali RF) in ANR with Gap Plantation mode @ 500 plants / Ha. of degraded Reserved Forest Land in Rayagada Forest Division to accommodate 33500 Nos, of plants. The said scheme has been prepared as per One Time Cost Norm for Compensatory Afforestation as approved By PCCF, Odisha Bhubaneswar vide his O.O No. 1109 dtd. 08.11.2021 with commencement of plantation from 2024-25.

Sl. No.	Description	Amount (Rs.)
1	(A) Cost of Plantation ANR with Gap plantation @ 500 Plants per Ha. over 30.00 Ha, without Fencing @ Rs. 1,73,705/- per Ha. with provision of 10 years maintenance	52,11,150.00
	(B) Cost of Plantation ANR with Gap plantation @ 500 Plants per Ha. over 37.00 Ha, without Fencing @ Rs. 1,73,705/- per Ha. with provision of 10 years maintenance	64,27,085.00
2	(A) SMC Activities like Staggered Trench, Percolation pit, Contour trench, Graded earthen bund, LBCD, Sub surface Dyke & WHS as per the slope & site requirement@ Rs, 45,475/- per Ha. over 30.00 Ha.	13,64,250.00
	(B) SMC Activities like Staggered Trench, Percolation pit, Contour trench, Graded earthen bund, LBCD, Sub surface Dyke & WHS as per the slope & site requirement@ Rs, 45,475/- per Ha. over 37.00 Ha.	16,82,575.00
3	(A) Cost of Fencing for Compensatory Plantation raised inside the Forest Areas using Bamboo Twigs & Thorns (250 Rmt/ Ha.) @ Rs. 1,27,588/- per Ha.	38,27,640.00
	(B) Cost of Fencing for Compensatory Plantation raised inside the Forest Areas using Bamboo Twigs & Thorns (250 Rmt/ Ha.) @ Rs. 1,27,588/- per Ha	47,20,756.00
4	(A) Cost of Diesel Pump set with Bore well(One pump set & Bore well for 5 ha. plantation) to CA plantation with 5 years maintenance over 30ha @ Rs.6,10,441/- per 1000 plant/ha. So, Seedling total planted = $15000/5000=3\text{no's}$ x Rs. 6,10,441=Rs.18,31,323/-	18,31,323.00

	(B) Cost of Diesel Pump set with Bore well(One pump set & Bore well for 5 ha. plantation) to CA plantation with 5 years maintenance over 37ha @ Rs.6,10,441/- per 1000 plant/ha. So, Seedling total planted = $18500/5000=3.7$ or 4no's x Rs. 6,10,441=Rs.24,41,764/-	24,41,764.00
7	EPA & Incentive to VSS Rs.7,50,000/-in lump sum. The amount to be spent after proper meeting and Regulation with VSS/Village.	7,50,000.00
	Sub-Total	2,82,56,543.00
5	2% of the Total cost towards Monitoring & Evaluation	5,65,131.00
	Grand Total	2,88,21,674.00
(Rupees Two Core Eighty Eight Lakh Twenty One Thousand Six Hundred Seventy Four only.)		


 Divisional Forest Officer
 Rayagada Division