Green Highways (Plantation & Maintenance) Policy-2015

VISION

To develop eco friendly National Highways with participation of the community, farmers, NGOs, private sector, institutions, government agencies and the Forest Department. Documentation of species to be planted along National Highways.

OBJECTIVES

To evolve a policy frame work for plantation along National Highways;

To reduce the impacts of air pollution and dust as trees and shrubs are known to be natural sink for air pollutants;

To provide much needed shade on glaring hot roads during summer;

To reduce the impact of ever increasing noise pollution caused due to increase in number of vehicles;

To arrest soil erosion at the embankment slopes;

Prevention of glare from the headlight of incoming vehicles;

Moderating the effect of wind and incoming radiation;

Employment to local people;

Augmenting in maintaining biodiversity

1. Introduction:

1.1 Loss of vegetation is one of the inevitable consequences of Highway Development. It is the responsibility of the highway development agencies to offset this loss by way of following the approach of Corridor Development & Management.The highway development agencies must strive to enhance the aesthetics of the highway corridor at all possible locations. Highways should not be looked upon merely as a means of transportation, but an integral part and parcel of the physical environment and Socio-economic milieu.

1.2 Often, while preparing the Land acquisition Plans for the highway projects, the land needed for the avenue plantation and landscape improvement is not considered during the DPR stage. As a result, after construction, when the planting is actually to start, there is no option but to accommodate planting in whatever space is available. The width of the remaining ROW is, many times, not sufficient enough to accommodate even a single row of plants; whereas at some places, three to four rows can be planted. In order to ensure availability of sufficient width throughout for avenue planting, it is recommended that the requirement of land for tree plantation should be included in the Land Acquisition Plans prepared by the DPR consultants.

2. Objectives of Plantation:

2.1 The main objectives of planting along the Highways are as follows: - For aesthetic enhancement of the project corridors and places of importance by planting selective ornamental trees, landscaping and turfing with grasses and ornamental shrubs.

- To reduce the impacts of air pollution and dust as trees and shrubs are known to be natural sink for air pollutants.
- To provide much needed shade on glaring hot roads during summer.
- To reduce the impact of ever increasing noise pollution caused due to increase in number of vehicles.
- To arrest soil erosion at the embankment slopes.
- Prevention of glare from the headlight of incoming vehicles.
- Moderating the effect of wind and incoming radiation

3. Selection of Tree Species for roadside plantations:

3.1 Plantation is one of the most important constituents of soft landscaping. Trees, shrubs and climbers have been used to enhance the soft natural ambience against harsh elements in most of the enhancement schemes. The planting species are decided based on the physical growth characteristics of trees, like form and shape, foliage pattern, growth rate, branching pattern, soil characteristics and conditions of the strip like water logged areas etc. While selecting the species of trees for landscaping a great care should be taken to choose the species, which already exist along the project corridor. On the other hand, if a pure avenue of single species is planted for a considerable length of the road, it gives a harmonious and pleasing look. It is, therefore, essential that mixtures of different species should be avoided and pure avenues of a single species be planted over long stretches of road. This will enhance the aesthetic quality and will also render management easier.

3.2 The selection of plant types and planting arrangement should be based on the following considerations:-

3.2.1 Aim and objective of plantation
3.2.2 Shape and size (size and spread)
3.2.3 Texture and colour of foliage/flower/fruits in different seasons and stages of growth.
3.2.4 Adaptability and suitability to agro-climatic regions/zones
3.2.5 Growth rate (slow/fast) average age of maturity and replacement cycle
3.2.6 After care and maintenance required for sustenance and growth
3.2.7 Economic and other social/recreational benefits
3.2.8 Drawbacks and demerits if any, like prone to insects/pests disease, animal grazing and human interference.

3.3 The Guidelines on Landscaping and Tree Plantation (IRC:SP:21-2009), provide for detailed specifications with respect to roadside plantations and Median Plantation.

4. Plantation Pattern

4.1 The road landscape should be developed envisaging a holistic approach to the entire stretch. A concept should be evolved so as to maintain visual characteristics and uniformity in terms of landscape along

the stretch. In the absence of uniform land availability for the plantations, different schemes may be worked out in tune with the local variations in the design. To achieve this, the entire stretch of the project corridor should be divided into homogenous landscape sections based on similarity in terms of available width, soil conditions, climate (temperature and rainfall) and topography. A study on the local flora and vegetative cover native to these sections should be carried out as part of the field surveys to enable a choice of the suitable species for particular section. Depending on the available ROW, plantation pattern should be worked out as follows:-

- The first row along the Highways will be of small to medium sized ornamental trees.
- Subsequent rows depending on the availability of width will comprise of ornamental and/or shade bearing species, of more height than those in the first row. In rural sections the last row will always be of shade bearing tall trees.
- Planting of shrubs in the median.
- Planting of herbaceous species as ground cover in the median, special landscapes, and embankment slopes.
- Turfing with grass in the median, special landscapes, and embankment slopes.

4.2 Table 1,2, and 3 list a few species, which can generally be planted throughout India.

Table 1: Species Recommended for Ist Row of Avenue Plantations

S.NO.	SOIL	BOTANICAL NAME	LOCAL NAME
1.	Loamy	Delonix regia	Gulmohar
2.		Cassia fistula	Amaltas
3.		Bauhinia sps.	Kachnar
4.		Cassia nodusa	Cassia
5.		Jacaranda mimosaefolia	Jacranda
6.		Peltophorum ferrugineum	Peltophorum
7.	Water logged condition	Terminalia arjuna	Arjun
8.		Syzygiumcuminii	Jamun
9.		Cordia dicotma	Lasoda
10.	Alkalinesoils[Usar]	Terminalia arjuna	Arjun
11.		Pongamia pinnata	Kanji
12.		Albizzia lebbek	Kala Siris

Table 2: Species Recommended for 2nd and subsequent row, except the last row of Avenue Plantations

1.	**Loamy**	Melia azadiracta	Bakain	
2.		Pongamia pinnata	Kanji	
3.		Gravillea robusta	Slver Oak	
4.		Albizzia lebbek	Kala siris	
5.		Dalbergia sissoo	Shisham	
6.		Terminalia arjuna	Arjuna	

Table 3: Shade trees recommended for last (or the only) row in roadside avenues

SOIL	SPECIES	
LOAMY	Local name	BOTANICAL NAME
	Peepal	Ficus religiosa
	Paker	Ficus infectoria
	Mahua	Madhuca indica
	Mango	Mangifera indica
	Neem	Azadirachta indica
	Imli	Tamarindus indica
	Jamun	Syzynium cuminii
	Shisam	Dalberjia sissoo
SANDY	Shisam	Dalbergia sissoo
ALKALINE [USAR]	Neem	Azadirachta indica [at ph up to 8.5]
	Kanji	Pongamia pinnata [upto 9.0 p h]
	Arjun	Terminelia arjuna
WATER LOGGED AREA	Jamun	Syzyniumcuminii
	Arjun	Terminalia arjuna

4.3 The above lists represent common species, which can be planted almost throughout India. Region-wise specific choices can be made with the help of local experts from the Forest department and Horticulture department. As far as possible, fruit bearing trees like Mango, Neem, Jamun and Imli are ideal for areas near habitations throughout India. Other locally useful fruit bearing species like Jackfruit, Mahua, Bel, etc., may also be preferred.

4.4 The shrubs to be planted in the median should be of low or medium height for prevention of the headlight glare. One to two rows of flowering

shrubs will be provided according to the varying width of the median in different sections. In sections where the median width is less than 1.5m only grasses turf is proposed. Some herbaceous species may also be planted as a ground cover, not only on the medians but on special landscapes and embankment slopes also. The species proposed for the purpose of turfing/ground cover are: Cynodon dactylon, Cythocline perpurea, Solanum nigrum, Alternanthera, Chlorophytum, Eupatorium, Wedelia, Duranta, Portulacca, Ipomea, Pelia cadrii, Beleprone oblongata, Tradescantia, Asparagus, Opheopogon grass etc. The shrub species proposed in the median are mainly Bougainvillea and Thevetia nerifolia (Kaner). However, other suitable species may be planted in consultation with the local horticulture specialists.

4.5 Special landscapes/embankment slopes/ on the median:

The surface is to be prepared adequately for shrubs planting or grass sowing. The grasses and shrubs planting are done to provide a strong surface cover but needs a well-prepared surface. All masses of loose debris should be removed. Any convexities should be removed and similarly any concavities are to be filled by good soil. The surface should have sufficient layer of good quality soil [upto 45 cms] so as to have better growth and survival of grasses and shrubs.

Grass lines are used to provide a strong surface cover but need a well-prepared surface in which to be planted. If grass is to be an effective form, then it must be allowed to establish properly on a slope which does not subject to undue stress from erosion and mass movement in its initial stages.Sowing of grasses is intended to create a strengthened surface that is resistant to erosion.

It is the responsibility of the planting agency to ensure that the condition of the site is good enough for the successful establishment of grasses.The planting agency is required to supervise all field operations like preparation of surface, sowing of grasses and quality of grasses seeds used.

A cover of 25 grams of grass seed per square metre of surface should be achieved.The timing of sowing is of utmost importance. The seed sowing must be carried out before the onset of monsoon [May & June] so

that they yield desired results. The watering of the surface will be above by tankers till the onset of the monsoon.After sowing, mulch of prepared and dried out herbs should be laid over the whole seeded area in a thin layer so that the direct sunlight and transpiration loss may not affect the grasses.

Median Plantation – The species to be planted in median would be of low or medium height with ornamental value to enhance the visual experience of the road corridor. It will also act as a screen to prevent glare from the incoming vehicles.The species recommended for median are mainly Bougainvillea and Kaner. Bougainvillea is considered as the most suitable species as it has a great aesthetic value and it is found in various colours and shades. It can also withstand extreme temperature and climatic conditions and also has low requirement of water. These species have been proposed considering the climatic conditions, requirement of water and future management. However, other species suitable and suggested by Forest Department/ RO can also be used.

4.6 Transplantation

Occasion may arise when a grown-up tree has to be cut for making room for constructing a road, a building or other structure. It would be desirable to save this plant by transplanting it at a suitable site. To do this successfully some time is necessary. In winter when the tree is dormant or less active, it should be pruned heavily leaving a bare framework of the large branches. A 40 to 50 cm wide trench 1 to 2 m deep should be dug around the stem as much distance away from it, depending upon the stature of the specimen, cutting all the roots, big and small, in the process.The job of tree transplantation is quite complex and requires high quality expertise, technique besides specialised equipment and infrastructure.

The location for transplantation is to be identified and preliminary treatment is to be done at least 3-months in advance before the area is ready for transplantation. Transplantation of trees depends on the soil and climatic conditions of that area. Specialised techniques are required in transplantation of trees with specialised equipments and machinery.Transplantation of trees will be done to the maximum extent possible on the national highways to save the grown trees along existing

ROW. The Translocation site should be within 5 Kms. of the existing tree location.

5. Present System

5.1 The following different types of arrangements exist, with respect to raising and maintaining roadside plantations: -

5.1.1 Plantations done by Forest Department along highway as a statutory condition.
5.1.2 Plantations done through the Forest Department as deposit work.
5.1.3 Plantation in the scope of work of Concessionaire (schedule "C'), Section-11;
5.1.4 Plantation in the scope of work of OMT Contractor (Schedule 'B'), project facilities;
5.1.5 Plantation done by the private agency through competitive bidding
5.1.6 Plantation done through other agencies (NGOs, Govt departments / agencies other than Forest Department, communities, etc.).
5.17 Handing-over stretches to State Govt. for carrying out roadside plantation at their end with the funds of the State Govt.;

6. Land Requirement

Based on the inventory, an action programme should be prepared as regards additional landscaping measures and traveller amenities. If available land width is insufficient to implement this programme, acquisition of additional land should be seriously considered keeping in view the following requirements during feasibility/DPR study:-

I. To provide flatter side slopes in cuts and fills along with contouring of the adjacent land.
II. To provide enough space for planting suitable trees and plants.
III. To provide sufficient area for parking, look out spots and other aesthetic features.

7. Plantation Agency

7.1 The entire highway network can be divided into two categories based on the legal status of the existing road-side plantations. In areas,

where existing plantations along the highways have been notified as protected forests as plantation is either done by the forest department for management purpose or naturally grown trees. For these areas, permission for tree cutting is required to be taken from the forest department under the Forest Conservation Act, 1980. While granting the permission, the forest department stipulates the conditions not only for compensatory aforestation (CA) but also for avenue plantations. In these cases, the amount for avenue plantation is deposited with the Forest Department and normally the work of avenue plantation is taken up by them apart from CA.

7.2 In areas, such highway corridors where the ROW is not declared as protected forest,the roadside plantations may be taken up either through the contractor (if it is a BOQ item), the Concessionaire (if it is included in the concession agreement), forest departmentand department dealing the Watershed Development in the State, Watershed Cell-cum-Data Centre[WCDC] at district level and the Watershed Committee [WC] at local level withlocal communities / panchayat level institutions / Women Self Help Groups (WSHGs), Self Help Groups (SHGs) / Joint Forest Management Committees (JFMC), or through open bidding.

7.3 **Plantation through bidding process:**

The plantations and its maintenance may be taken up through outsourcing following bidding process as per standard protocol of procurement of MoRTH and its agenciesfor the stretch/ROW not declared as protected forest under Forest Conservation (Act) 1980.

7.4 **Empanelment of Agencies**

MoRTH/NHAI will appoint the authorised agency for empanelment of Plantation Agencies. Only empanelled agencies will be allowed to bid forplanting work on the National Highways.

8. Role of Local Bodies

8.1 For roadside plantations, nodal agencies will be encouraged to involve the local institutions like Panchayats, JFMCs & SHGs for plantations as per these guidelines.

8.2 All plantations, except those carried out by the Forest Department in compliance to any statutory condition, will be carried out under an MOU in the enclosed format entered by the nodal agency with the plantation agency.

9. Institutional arrangements and Financing Pattern

9.1.1 It is experienced that the scenario of road side plantation is not satisfactoryin most of the projects implemented through BOT,DBFOT and public funded projects. This is the responsibility of road implementation agencies to develop green corridor along highways for aesthetic enhancement of the project corridors and places of importance by planting selective ornamental trees, landscaping and turfing with grasses and ornamental shrubs, in order to reduce the impact of air pollution and dust as trees and shrubs are known to be natural sink for air pollutants and carbon sequencing. It also reduces noise pollution and provides much needed shade on glaring hot roads during summer. Plantation arrests soil erosion at the embankment slopes, prevents glare from the headlight of incoming vehicles and moderates the effect of wind and incoming radiation.Green corridors guide the drivers for long distance curves and openings.

9.1.2 For successful implementation of plantation along with development of road network in an eco-friendly manner throughout the country, development of green highways will be done through outsourcing of Plantation work to expert & experience agencies/organizations. The Nodal Agency will appoint such agencies for plantation work on National Highways.The successful agencyshall follow the model TOR, IRC-SP-21,2009 and project specific RFQ for plantation and maintenance.

9.1.3 The Nodal agency for forest areas will be the concerned forest range office. In case of Public Funded Projects the concerned Regional Officer of MoRT&H/NHAI will be the nodal agency. In cases where roadside plantation is included inthe concession agreement, the concerned concessionaire will be the nodal agency.

9.1.4 MoRTH/NHAI shall take up the plantation work if the contractor / concessionairefail to implement the plantation program withinthe stipulated

time period as per agreement at the risk & cost of the concerned contractor/concessionaire after terminating the particular scope of the contract. The responsibility of ensuring compliance to specifications will, however, rest with the nodal agency as per IRC-SP:21-2009.

9.1.5 The selection of species will be strictly doneas per the said guidelines or as per the recommendation of adjoining forest department with site specific native species.

9.1.6 The planting agency will have no right whatsoever on the land under plantation. Such agency will not be authorized to undertake any other form of under-plantations or any other activity on such land. An MOU shall be signed with the agency for strict compliance of the technical specification, species, maintenance schedule, survival, payment terms and conditions and on the legal right of the land as well as forest produce (Annexure-I).

9.1.7 The Procurement of the executing agency for plantation & maintenance, monitoring, termination of contract etc shall be done by a committee consisting of concerned Regional Officer NHAI/MoRT&H and the Concessionaire in case of BOT projects. In case of Public Funded Projects, a representative of CE(Planning) MoRT&H/CGM(Environment), NHAI will be member of the procurement committeealong with concerned Regional Officer. The cost of the Plantation & Maintenance will be borne by the concessionaire in case of BOT Projects & by NHAI/MoRT&H for Public Funded Projects.A model Terms of Reference (ToR) is given at Annexure-II.

9.1.8 There will be an Advisory committee which will meet once in a quarter and give its recommendations/advice to the monitoring cell. The ROs of MoRTH/NHAI in the district will be the convener of this committee.

10. Plantation Scheme

10.1 The plantation scheme has been broadly classified into two categories which are as follows:-

a) Tree planting along the HighwayTurfing with grasses and shrub/herb.

b) planting on medians/special landscapes/embankment slopes.

A. Tree Planting along the Highways

The technical specification for planting along the Highways are as follows:-

(i) Ornamental plants except last row

Distance from embankment	1.0 mt. away from the toe of the embankment
spacing between plant to plant	3 mts.
Spacing between rows	3 mts.
Size of the pits[Normal soil]	60x60x60 cms
For Alkaline soil [Usar]	By Augar
Water logged areas	mounds with height varyingdepending on the water level
Species recommended	as per annexure
No. of plants per km	333
Activity and time schedule	As per table
Height of the plant	1.5m to 2 m

[ii] Shade plants (Last row):

Distance from the preceding row	3 mts
Spacing between plant to plant	12 mts.
Size of the pits[Normal soil]	60x60x60 cms
Alkaline soil [usar]	By Augur
Water logged areas	Mounds
Species recommended	As per the table for shade plants
No. of plants per km	84
Height of the plants	more than 2 mts.

In localities where a really bad patch of usar occurs, there is a need to dug deep pits by auger [mechanical device] to break the kankar pan down below and replacing the soil by good quality soil. The soil amender Gypsum 1 to3 kg. depending on the pH along with 2 kg. composite and sand are filled in the pits. The treatment helps in lowering down the pH and thus enabling better survival of plants.

B. Guidelines for Median Plantation:

One or two rows of flowering shrubs are recommended in accordance to the varying width of the median in different sections. In sections where median width is less than 1.5 meter, only grass turf is recommended. In median width of 3 meters, one row of shrub whereas in 5 meter median width, plantation of two rows of flowering shrubs are proposed.

Only two rows of shrubs will be planted on median width of 5 meters and these plants will be at a spacing of 1.5 meters from the inner edge of the median.

The plants will be at spacing of 3 x 3 meters and size of the pits for planting will be 0.6m dia and deep. Therefore, total no. of plants per km will be 333 in case where single row is proposed and 666 in case of two rows.

The surface for the median plantation should be well prepared. The masses of loose derbies on the median and any convexities will be removed and similarly any concavities are to be filled by good soil. The surface should have sufficient layer of good quality soil so as to have a better growth and survival of grasses and shrubs.

10.2Protection measures

The fencing of single row plantations will be done by using iron/brick/cement guards. Locally available bamboo guards or thorn fencing may also be used where protection can be ensured through these. The specifications for the iron guards are as per IRC-SP-21, 2009

The fencing of multiple row plantations will be done preferably by barbed wire. A five strand barbed wire fencing, with cross strands, stretched on angle iron poles fixed at a distance of 4 meter from one another; is recommended. Live fencing/bamboo fencing/thorn fencing may also be used where protection can be ensured through these. The specifications for barbed wire fencing are as per IRC-SP-21, 2009

10.3Maintenance of Plantation

The scope of the maintenance work is as per Model Tor of plantation and maintenance, IRC-SP-21, 2009 and also as per adjoining forest schedule for those items which are not included in the model Tor/IRC guidelines.

10.4 Default

If the agency fails to arrange the sufficient quantities of material/ manure/pesticides/manpower/equipment (in good working condition) required to maintain the work in good condition within 7 days of its notification, the nodal agency will reserve the right to get it arranged at their risk and cost and will charge extra 20% on the actual expenditure incurred. In exceptional cases, RO, MoRTH/NHAI may consider to extend the time limit mentioned above. The decision of RO, MoRTH/NHAI shall be final and binding on the contractor in respect of extension of time for rectification of defects. However, all complaints will be attended promptly and within the time limit specified by RO, MoRTH/NHAI

11.0 Monitoring

11.1 The Monitoring Agency will monitor progress of planting and status of plantations on continuous basis.
11.2 This agency shall carry out the site visit for field verification in respect of survival, growth and size of plantation and maintenance of the same.
11.3 The project coordinator of the plantation agency will submit Progressreport to the monitoring Agency with a copy to the concerned Project office of PD/RO MoRTH/NHAI by 18^{th} and 3^{rd} date of every month, for the preceding fortnight (i.e., 1^{st} to 15^{th}, and 16^{th} to the last of every month, respectively), in excel format through e-mail.
11.4 The Horticulturist/Supervisor of plantation agencywill compile and report quarterly status to the monitoring agency with a copy to concerned (Regional office) by 7^{th} date of every quarter, in excel format by e-mail.
11.5 The monitoring agency shall examine the reports and send feedback and action points to planting agency, nodal agency and will send a comprehensivereport with recommendation to NHAI/MoRTH.
11.6 The concerned division in MoRTH/NHAI will examine the reports and after appropriate action. A verified of the monitoring database will be uploaded on the website.

In case of default on the part of the Concessionaire with respect to planting or maintenance of plantations (as provided under Schedule C and Schedule K of the concession agreement), and based on the report and recommendations of the monitoring agency action may be taken as per the conditions of the Concession Agreement or MOU with the concerned agency.

12. Performance Audit

The monitoring Agency will conduct performance audit of Executing agencies for various projects on an Annual basis and awardof new contracts to the agencies will be decided based on their past performance.

13. Sharing of usufructs

The usufructs from the roadside plantations will be shared as per the following arrangement:

- From plantations raised by the Forest Department, the share will be determined and approved by the competent authority in the Forest Department and will be specified in the plantation scheme.
- In case of plantations raised by WSHGs, JFMCs, SHGs or other such local institutions, the said agency will have full rights on intermediary produce like dried fuel wood, fruits, etc. for the period of contract only.
- The Panchayat/Local Authority will have full rights on intermediary produce like dried fuel wood, fruits, etc with in their jurisdiction after the expiry of the contract period of plantation and maintenance with the plantation agency with the condition they should protect the encroachment of ROW and plantation from the 1st day of project under implementation. An MOU should be signed with the local self Government Agency in this regard.

13. Compliance to Forest Conservation Act and local laws

Before starting any plantation, the local forest department will be consulted for ensuring compliance to any regulation in force that may

affect raising, maintenance, and harvesting of the raised plantation. Necessary modifications will be made in the plantation scheme, in consultation with the forest department, to ensure compliance to law and to avoid complications at the time of harvesting and transportation of forest produce. In case the State Government has any provision for registration of such plantations, the same will be ensured under the relevant scheme.

14. Survival

The survival should be 90% after raising the plantation of age one year at any stage during contractual period with normal shape and size.

15. Payment Terms & Conditions

The project shall be awarded on a turn-key basis based on the quantum of plantation for the specific site through bidding and payment will be made as per terms and conditions prescribed in the Terms of Reference (ToR).

1.6 Penalty

In case of default on the part of the Contractor/Concessionaire with respect to planting or maintenance of plantations, action will be taken as per the conditions of the Concession Agreement/Contract Agreement or MOU with the concerned agency. The legal and financial liabilities should be borne by the plantation agency for non compliances to Forest (Conservation) Act 1980 and subsequent amendments and Forest Conservation Rule and also local laws:

17. Review of Policy

Ministry of Road Transport & Highways reserves the right to renew or amend the policy from time to time.

Annexure-I

Memorandum of Understanding

This memorandum of understanding is made on this date of _____ between the _____ [name of the nodal agency] having its registered office at _____, hereinafter referred as _____ which expression shall, unless repugnant to the context thereof, includes its successors and assigns of the First Part

And

The _____ [name of the executing agency], _____ having its office at _____, which expression shall, unless repugnant to the context thereof, includes its successors and assigns of the Second Part; whereas:

1. _____ [name of the nodal agency] has been established under the _____ with the main objective of _____.

2. [name of the nodal agency] has constructed _____ highway between _____ and _____.

3. _____ is the _____ [Non-profit organization / cooperative society / etc.] primarily constituted for _____. The _____ [name of the executing agency] has sufficient expertise and infrastructure to take up plantations of this magnitude.

Therefore,

4. The [name of the nodal agency] proposes to the _____ [name of the executing agency], and the said agency agrees to take up the plantation along the _____.

5. _____ [name of the executing agency] would plant species as per Model TOR/IRC-SP-21, 2009/scheduled species of the adjoining forest division/site specific to meet the objectives of the plantation in accordance with the site suitability.

6. Species composition and plantation technique may change according to site requirement in terms of road alignment, soil type, elevation of embankment, climatic variations and availability of area for plantation.

7. The _____ [name of the executing agency] would perform year wise/month wise plantation activities as per model TOR. Changes in the schedule may occur due to changes in weather pattern or conditions caused by other unforeseen exigencies.

8. [name of the nodal agency] will coordinate with _____[name of the executing agency] through _____ [Name of the competent official]. _____ [name of the executing agency] will coordinate with _____ [name of the nodal agency] through _____ [Name of the competent official], who will act as project coordinator for this project.

9. _____ [name of the executing agency] will start plantation activities in this stretch during first year. Schedule of yearly activities has been suggested above and also in the project assuming that works of construction of highway between _____ and _____ will be complete during **[month, year]**.

10. _____ [name of the executing agency] will adopt the similar procedures of accounting and release of fund as that of procedures used for funds received from DRDA and other similar agencies.

11. Plantations are not possible in stretches where highway crosses any river, nala and road as area for plantation will not be available for that particular stretch.

12. The following funding arrangement has been agreed …… [specific details to be entered]

13. _____ [name of the nodal agency] will release the funds in advance as per payment terms [modify as per applicability]. The authorized representative of _____ [name of the nodal agency] will undertake physical verification and recommend for the release of fund, and funds will be released for the same. Physical verification and recommendation for release of fund would be conducted in such a way that fund is released in time to meet the expenditure of ongoing and necessary works and continuity is maintained.

14. Funds will be released preferably through online baking, or by demand draft in the name of _____. _____ will open a savings bank account in any nationalized bank and operate the fund through that account. Interest accrued on the fund would be utilized if necessary on the plantation and its maintenance activities with consent of the _____ [name of the competent official of nodal agency].

15. _____ [name of the nodal agency] will bear the cost escalation due to increase in minimum daily wage rate announced from time to time by Government of State [use this clause if applicable].

16. _____ [Name of the executing agency] will not be responsible for any damage to plantation due to unforeseen natural calamities like cyclone, flood, severe drought, etc.

17. Team consisting _____ or his representative and _____ or his representative will settle disputes, if any, coming up during execution of project. The said team may suggest unforeseen changes incidental to successful and better implementation of the project.

18. _____ [Name of the nodal agency] will allow the movement of labourers in plantation area. It will also permit construction of temporary huts, labour sheds, pipelines, water storage tanks, etc., purely temporary in natures which are required for raising the plantations. _____ [Name of the executing agency] will consult _____ [Name of the nodal agency] before construction of such temporary structures, and will do so only in agreement with _____ [Name of the nodal agency].

19. Any manpower whether from within or without, deployed by _____ [Name of the executing agency] shall have no relationship of master and servant with _____ [Name of the nodal agency], and _____ [Name of the executing agency] alone shall be solely responsible for discharging various statutory obligations in regard to such manpower. Any death or injury to any person deployed by _____ [Name of the executing agency] shall be the responsibility of _____ [Name of the executing agency] and _____ [Name of the nodal agency] shall not be responsible therefore and shall not be responsible for any liability whatsoever.

20. _____ [Name of the executing agency] will hand over the plantations to _____ [Name of the nodal agency] in years detailed below: **[please give actual schedule]**

Year of raising of plantation	Month and year in which plantation will be handed over to NHAI
	First week of April _____
	First week of April _____
	First week of April _____

_____ [Name of the nodal agency] will maintain the plantation once it is handed over to them. _____ [Name of the executing agency] will not be responsible for any damage of plantation, once it is handed over to _____ [Name of the nodal agency]. If _____ [Name of the nodal agency] wishes to get these plantations maintained further by _____ [Name of the executing agency], they may approach the _____ [Name of the executing agency]. The _____ [Name of the executing agency] may take up the maintenance works of the plantations on the mutually agreed term and conditions at that point of time.

21. _____ [Name of the executing agency] will ensure that the survival of plants should be 90% at the time of handing over the plantation to _____ [Name of the nodal agency]. In case the survival is less than 90%, casualties will be replaced by the _____ [Name of the nodal agency] at their own cost before handing over. The casualties will be replaced by plants of height not less than the average height of plantation. Average height of the plants should not be less than height achieved by the same species growing naturally in that area, except for the reasons beyond human control.

22. Rates suggested in the project are for budgeting purpose. Amount unutilized in one item may be utilized for another item within overall budget limit.

23. The certificate of utilization of funds along with number of trees/plants surviving will be provided by _____ [Name of the executing agency] to _____ [Name of the nodal agency] after every six months.

The essence of this MOU is to implement the plantation activity in the most effective manner using the expertise, knowledge and resources of both the organizations in furtherance of their common objectives.

This MOU will enter force upon signature by the _____ _____ [Name of the competent official of nodal agency] and _____ _____ [Name of the competent official of executing agency].

[Name of the executing agency] [Name of the nodal agency]

Annexure-II

Model TOR for Roadside/Median Plantation

Introduction

Amongst various Highway improvement projects being undertaken by the Government of India and different State Governments, foremost is the National Highway Development Project (NHDP). There is more than 96000 km long National Highways which are being developed under NHDP. The first consequence of NH widening, from environmental point of view, is the inevitable felling of some trees growing along the highways. In the hills and other fragile environmental settings, much more impacts are expected on the surroundings. It is the responsibility of the road agencies to offset the loss of trees, and other changes resulted to the surroundings due to Highways construction. There is a need to follow the approach of "Green Corridor Development & Management", rather than "Highways Development". Apart from mitigating the environmental losses, road agencies must plan to enhance the aesthetics of the highways corridor from all possible angles. Highways should not be looked upon merely as a means of transportation, but as an integral part of eco-system and Socio-economic milieu.

Objective

The main object of Road Side Plantation is to provide protection to road & traffic passengers, check soil erosion, provide food, fuel, fodder and timber to the Society and mitigate climate change.MoRTH/NHAI has taken steps to develop Green Highways throughout the country by outsourcing the work through the expert agencies/organizations at present. Contractors and concessionaires are subletting this work to third party in compliance of the concession agreement. The results however are not satisfactory. MoRTH/NHAI now aims to develop a parallel protocol for procurement of plantation agency through completive bidding as per the standard protocol of MoRTH and National Highways Authority of India, Govt. of India. In this regards, the technical specification shall be followed as per "Guidelines of Landscaping and Plantation, IRC-SP:21:2009". However where specification is not available, work shall be executed as per schedule/specification of adjoining forest department. In such cases,he

forest schedule and specification may follow for items and parameters which are not mentioned in the said guidelines.

Species Avenue Plantation

The executing agency shall plant following species as per specifications given there to meet the objectives of the plantation in accordance with the site suitability.

The first and subsequent rows of plantations along the highways except the last row should be worked out based on the land availability within the RoW along the various sections. In case of urban and semi-urban areas, where because of land constraints, only one row of plantation possible, ornamental species is should be planted instead of shade bearing species. A combination of ornamental, shade and screening trees have been recommended. The number of rows and the repetition of the trees and their type vary with the landscape section, the Typical Cross Section and the space available in the RoW for tree plantation.

Table 1 and 2 list a few species, which can generally be planted throughout India for this purpose.

Table 1: Species Recommended for Ist Row of Avenue Plantations

S.NO.	SOIL	BOTANICAL NAME	LOCAL NAME	FLOWERING MONTH/ COLOUR
1.	Normal Loamy soils	Acacia auriculiformis	Vilayatibabool	Sept.-Oct./ Yellow
2.		Bauhinia sps.	Kachnar	Feb-Mar./ Pink
3.		Cassia fistula	Amaltas	May /Yellow
4.		Cassia nodusa	Cassia	May-June/ Pink
5.		Delonixregia	Gulmohar	May/ Yellow
6.		Jacaranda mimosaefolia	Jacranda	April /Blue
7.		Peltophorumferrugineum	Peltophorum	Oct. /Yellow
8.	Water	Cordiadicotma	Lasoda	

S.NO.	SOIL	BOTANICAL NAME	LOCAL NAME	FLOWERING MONTH/ COLOUR
9.	logged areas	Syzygiumcuminii	Jamun	
10.		Terminaliaarjuna	Arjun	
11.	Alkaline soils [Usar]	Albizzialebbek	Kala Siris	
12		Pongamiapinnata	Kanji	
13.		Terminaliaarjuna	Arjun	

Table 2: Species Recommended for 2nd and subsequent row, except the last row of Avenue Plantations

1.	Normal Loamy soils	Albizzialebbek	Kala siris	
2.		Dalbergiasissoo	Shisham	
3.		Gravillearobusta	Slver Oak	
4.		Maliaazadiracta	Bakain	
5.		Pongamiapinnata	Kanji	
6.		Terminaliaarjuna	Arjuna	

Shade Plants

One of the main objectives of Roadside Avenue is to provide shade. The shade trees in the last available row should be planted at a spacing of 8-12 mtr. These tree species should be of local significance and should be mostly evergreen in nature, which ensures no substantial leaf-fall in winters preventing the problem of blockage of roadside drains. Trees with the following characteristics will be planted as shade trees:

i. Trees with high crown forms secure better visibility and are therefore ideal.
ii. Trees that retain their foliage longest are preferred to deciduous trees
iii. Trees with long gestation period and having rapid growth and a capacity to resist fungal and insects attack form ideal avenues.

The tree species recommended as shade plants for roadside avenues are given in Table 3. These species can be planted almost throughout India.

Table 3: Shade trees recommended for roadside avenues

SOIL	SPECIES	
LOAMY	Local name	BOTANICAL NAME
	Arjun	Termineliaarjuna
	Arjun	Terminaliaarjuna
	Imli	Tamarindusindica
WATER LOGGED AREA	Jamun	Syzyniumcuminii
	Jamun	Syzyniumcuminii
	Mahua	Madhucaindica
	Mango	Mangiferaindica
ALKALINE [USAR]	Neem Kanji	Azadirachtaindica[atph up to 8.5] Pongamiapinnata[upto 9.0 ph]
	Peepal	Ficusreligiosa
	Paker	Ficusinfectoria
	Shisam	Dalberjiasissoo
	Neem	Azadirachtaindica
SANDY	Shisam	Dalbergiasissoo

The above lists represent common species, which can be planted almost throughout India. Region-wise specific lists have been provided in the annexure I It is recommended that local experts from the Forest department and Horticulture department should be consulted before finalizing the choice of species for a particular stretch.

Species for Median

The shrubs to be planted in the median should be of low or medium height for prevention of the headlight glare. One to two rows of flowering shrubs will be provided according to varying width of the median in different sections. In sections where the median width is less than 1.5m only grasses turf is proposed. Some herbaceous species may also be planted as a ground cover, not only on the medians but also on special landscapes and embankment slopes. The species proposed for the purpose of turfing/ground cover are: Cynodon dactylon, Cythocline perpurea, Solanum nigrum, Alternanthera, Chlorophytum, Eupatorium, Wedelia,

Duranta, Portulacca, Ipomea, Pelia cadrii, Beleprone oblongata, Tradescantia, Asparagus, Opheopogon grass etc. The shrub species proposed in the median are mainly Bougainvillea and Thevetia nerifolia (Kaner). However, other suitable species may be planted in consultation with the local horticulture specialists.

SPECIFICATIONS FOR AVENUE PLANTATIONS

The technical specification for planting 1st ROW along the Highways are as follows:-

Ornamental plants (except last row)

Distance from embankment	1.5 mt. away from the toe of the embankment
Spacingbetween plant to plant	3 mts.
Spacing between rows	3 mts.
Size of the pits	60x60x60 cms (in alkaline soils, kankar panes to be broken by augur. In waterlogged areas, mound with height varying depending on water level)
No. of plants per km	333 X 2
Height of the saplings at the time of planting	1.5 m to 2 m

11.6.1 Shade plants (Last row)

Distance from preceding rows	3.0 mt.
Spacing between plant to plant	8-12 m (6m if high mortality expected)
Size of the pits	60x60x60 cms (in alkaline soils, kankar panes to be broken by augur. In waterlogged areas, mound with height varying depending on water level)
No. of plants per km	84 (167 at 6m spacing)
Height of the saplings at the time of planting	More than 2 m
Survival percentage of plantation	90% after replacement of causalities in first two years. 80% afterwards

Protection measure

The fencing of single row plantations is to be done by using iron/brick/cement guards or locally available bamboo guards. The fencing

of multiple row plantations should be done preferably by barbed wire. The description and specifications for protection shall be follow as IRC SP-21, 2009.

The Suggestive Schedule of Work:

The Plantation agency shall perform following year wise/month wise plantation activities. Changes in the schedule may occur due to changes in weather pattern or conditions caused by other unforeseen exigencies. However, activities should be so scheduled they can give the best possible results in the then prevailing circumstances. **[Please include actual schedule during submission of tender document]**

Year	Fin. Year	Month	Activities to be done
0 yr.		Nov.-March	Raising nurseries/procuring plants for --- Km. plantation, land preparation
1st yr.		April-June	Maintenance of nurseries, land preparation, procuring FYM and fertilizers.
1st yr.		July-October	Planting in ----- km. of highway, 3 weeding cum soil working, application of fertilizer and pesticide/insecticide, maintenance of remaining plants in the nursery
1st yr.		Nov.-March	Watering the plantation 4 times a month, applying fertilizer and pesticide/insecticide, raising nurseries/procuring plants for next ------ km. of plantation, land preparation for next year plantation.
2nd yr.		April-June	Watering the plantation 4 times a month, maintenance of nurseries, balance land preparation for plantation to be done during monsoon, procuring FYM and fertilizers, application of fertilizer and pesticide/insecticide.
2nd yr.		July-October	Planting in ------ km of highway, 3 weeding cum soil working in current yr. plantation and 2 weeding cum soil working in one yr. old plantation, application of fertilizer and pesticide/insecticide, maintenance of remaining plants in the nursery.
2nd yr.		Nov.-March	Watering 4 times a month in current year and 3 times a month in one year old plantation, applying fertilizer and pesticide/insecticide,

			raising nurseries/procuring plants for next ------ km. of plantation, land preparation for next year's plantation
3rd yr.		April-June	Watering 4 times a month in one year and 3 times a month in two year old plantation, maintenance of nurseries, balance land preparation for plantation to be done during monsoon. Procuring FYM and fertilizer, application of fertilizer and pesticide/insecticide.
3rd yr.		July-October	Planting in ------ km. of highways, 3 weeding cum soil working in current yr. plantation and 2 weeding cum soil working in one yr. old plantation, application of fertilizer and pesticide/insecticide, maintenance of remaining plants in the nursery.
3rd yr.		Nov.-March	Watering 4 times a month in current year, 3 times a month in one year and 2 times a month in two year old plantation, applying fertilizer and pesticide/insecticide.
4th yr.		April-June	Watering 3 times a month in current year, 3 times a month in one year and 2 times a month in two year old plantation, applying fertilizer and pesticide/insecticide.
4th yr.		July-October	2 weeding cum soil working in one yr. old plantation, 1 weeding cum soil working in two yr. old plantation, applying fertilizer and pesticide/insecticide.
4th yr.		Nov.,-March	Watering 3 times a month in one year and 2 times a month in two year old plantation, applying fertilizer and pesticide/insecticide.
5th yr		April-June	Watering 3 times a month in current year, 3 times a month in two year and 2 times a month in three year old plantation, applying fertilizer and pesticide/insecticide.
5th yr.		July - October	1 weeding cum soil working in three yr. old plantation, applying fertilizer and pesticide / insecticide.
5th yr.		Nov.,-March	Watering 3 times a month in two year and 2 times a month in three year old plantation, applying fertilizer and pesticide/insecticide.
6th yr		April-June	Watering 3 times a month in current year, 3 times a month in three year and 2 times a month in four year old plantation, applying fertilizer and pesticide/insecticide.

6th yr.		July – October	1 weeding cum soil working in four yr. old plantation, applying fertilizer and pesticide / insecticide.
6th yr.		Nov.,– March	Watering 3 times a month in three year and 2 times a month in four year old plantation, applying fertilizer and pesticide/insecticide.
7th yr		April – June	Handing over plantation done during ----- i.e. ----- kms. to MoRTH/NHAI,

*** Plantation agency shall ensure that the survival should be more than 90% from and onwards 2nd year and also the average size and growth. The funds for 2nd year and subsequent year shall be released after fulfil the said condition.*

General Maintenance of plantation work:

The scope of the contract covers all landscape maintenance work in respect of existing landscape features which includes plants, shrubbery beds , topiary and shrubs, trees, in the specified areas, avenue plantation and then maintenance of ornamental plants and removal of rank vegetation and bushes etc. within a planted area. The maintenance shall include watering, manuring, fertilising, plant protection for pests and diseases, sweeping, weeding, and disposal of garden refuse, cultivation and cutting of edges, pruning and clipping of hedges, etc. and stacking, minor repair works and all other landscape operations necessary for the proper growth for horticulture features and maintaining them in proper standard of maintenance. The quoted rates will be inclusive of cost of all materials like water, labour, tools, plants, equipment, transportation, taxes & levies etc. Contractor/Agency will execute the work as per IRC specification. However where specification is not available, work shall be executed as per schedule of adjoin forest department. If the agency fails to arrange the sufficient quantities of material/ manure /pesticides/manpower/equipment (in good working condition) required to maintain the work in good condition within 7 days of its notification, then Owner / Employer reserve the right to get it arranged at their risk and cost and will charge extra 20% on the actual expenditure incurred in house or outsource (material, manpower, machinery. In exceptional cases, RO/PD, MoRTH/NHAI may consider to extend the time limit mentioned above. The decision of RO/PD, MoRTH/NHAI shall be final and binding on the contractor in respect of extension of time for rectification of defects. However, all complaints will

be attended promptly and within the time limit specified by RO/PD, MoRTH/NHAI

Submission of progress report as per following schedule:

The authorized representative of the plantation agency shall submit the report as per format with videography. RO of MoRTH/NHAI or authorized representative of MoRTH/NHAI shall carry out the site visit for field verification once every quarter to inspect survival, growth and size of plantation and maintenance of the same. The interim Quarterly Report is also to be submitted as per the following format within 15 Days from the end of quarter. The physical verification and recommendation of RO/MoRTH for the release of fund in time to meet the expenditure of ongoing and necessary works and continuity is maintained. In this regard, the project specific Payment Terms & Conditions will also be ensured

Period	Monitoring parameter	Monitoring by
October [first year]	Survival percent and size/growth	Team consisting (_____) & _____
March [second year]	Survival percent and size/growth	Team consisting (_____) & _____
October [second year]	Survival percent and size/growth	Team consisting (_____) & _____
March [Third year]	Survival percent and size/growth	Team consisting (_____) & _____
October [Third year]	Survival percent and size/growth	Team consisting (_____) & _____
March [Fourth year]	Survival percent and size/growth	Team consisting (_____) & _____
October [Fourth year]	Survival percent and size/growth	Team consisting (_____) & _____
March [Fifth year]	Survival percent and size/growth	Team consisting (_____) & _____
October [Fifth year]	Survival percent	Team consisting (_____) & _____
March [Sixth year]	Survival percent and size/growth	Team consisting (_____) & _____
October [Sixth	Survival percent	Team consisting (_____) & _____

year]		
March [Seventhyear]	Survival percent and size/growth	Team consisting (_____) & _____
October [Seventh year]	Survival percent	Team consisting (_____) & _____

Equipments: The following equipments to be deployed by the plantation agency for the 10 km stretch.

Tractor Trolley - 1
Truck mounted with water tanker (10000 lit) - 1
Tractor Attached with water tanker (5000-6000 lit) - 1

(Note: The bidder must produce the documentary evidence in support of his (owning/leased or rented) for the above equipments).

Technical personnel, Qualifications and Experience will be as follows:

The Technical Personnel are:

S.No.	Personnel	Min qualification & Experience	Experience Required	No. of persons
1	Horticulturist	B.Sc. (Ag)) + 10 year Exp in field of horticulture	10 year Experience as horticulturist on development & maintenance of horticulture work for road projects	1
2	Supervisor	B.Sc. (Ag)) + 3 Years Exp. in field of horticulture	3 year Experience as horticulturist on development & maintenance of horticulture work for road projects	1
3	Project Coordinator	B.Sc. with Botany	2 year Experience as horticulturist on development & maintenance of horticulture work for road projects	1

Experience of the Firm – The agency to submit the documentary proof for successful completion of horticulturist on development & maintenance of horticulture work for two number of road projects

Project Length– A stretch of 8-10 km or as otherwise suggested by experts, based on local requirement, will be taken up as one project for this purpose.

Number of plants per kilometre should be site specific as per availability of land considering all the safety aspects mentioned in IRC Guidelines. The details are to be filled by the plantation agency as per format:

	One side of highway	Both side of highway i.e. total plants/Km.
First row		
Second row		
Third row		
Last row		
Bougainvilleas at outer chain link fencing		
Median (total plants per km)		
Total		

Sometimes, species composition and plantation technique may change according to site requirement in terms of road alignment, soil type, and elevation of embankment, climatic variations and availability of area for plantation.

The Project Coordinator of the plantation agency shall coordinate with the PD/RO of MoRTH/NHAI on regular basis

Any manpower whether from within or without, deployed by the _____ [Name of the executing agency] shall have no relationship of master and servant with _____ [Name of the nodal agency], and _____ [Name of the executing agency] alone shall be solely responsible for discharging various statutory obligations in regard to such manpower. Any death or injury to any person deployed by _____ [Name of the executing agency] shall be the responsibility of _____ [Name of the executing agency] and _____ [Name of the nodal

agency] shall not be responsible therefor and shall not be responsible for any liability whatsoever.

The Monitoring Team consisting MoRTH/NHAI_____ or his representative and the plantation agency _____ or his representative will settle disputes, if any, coming up during execution of project. The said team may suggest unforeseen changes incidental to successful and better implementation of the project.

MoRTH/NHAI _____ shall allow the movement of labourers in plantation area or the registered labour/worker of the plantation agency. The plantation agency may be allowed for construction of temporary huts, labour sheds, pipelines, water storage tanks, etc., purely temporary in nature which are required for raising the plantations. _____ [Name of the executing agency] will consult _____ [Name of the nodal agency] before construction of such temporary structures, and will do so only in agreement with _____ [Name of the nodal agency]. On duty, all staff of the executing agency are to wear distinctive standard jackets having company LOGO, with night visibility. They are to deal with public and hence should be well trained to be courteous and helpful.

_____ [Name of the plantation agency] will hand over the plantations to _____ [Name of the nodal agency] in years detailed below: **[please give actual schedule]**

Year of raising of plantation	Month and year in which plantation will be handed over to NHAI
	First week of April _____
	First week of April _____
	First week of April _____

_____ [Name of the executing agency] will ensure that the survival of plants should be 90% at the time of handing over the plantation to _____ [Name of the nodal agency]. In case the survival is less than 90%, casualties will be replaced by the _____ [Name of the nodal agency] at their own cost before handing over. The casualties will be replaced by plants of height not less than the average height of plantation. Average height of the plants should not be less than height achieved by the

same species growing naturally in that area, except for the reasons beyond human control.

MoRTH/NHAI _____ [Name of the nodal agency] will maintain the plantation once it is handed over to them. _____ [Name of the plantation agency] will not be responsible for any damage of plantation, once it is handed over to _____ [Name of the nodal agency]. If _____ [Name of the nodal agency] wishes to get these plantations maintained further by _____ [Name of the plantation agency], they may approach the _____ [Name of the executing agency]. The _____ [Name of the plantation agency] may take up the maintenance works of the plantations on the mutually agreed term and conditions at that point of time. The further work shall be awarded with the approval of the competent authority of the nodal agency (MoRTH/NHAI).

_____ [Name of the Plantation agency] will not be responsible for any damage to plantation due to unforeseen natural calamities like cyclone, flood, severe drought, etc.

Rates suggested in the project are for budgeting purpose. Amount unutilized in one item may be utilized for another item within overall budget limit.

MOU will enter force upon signature by the _____ _____ [Name of the competent official of nodal agency] and _____ _____ [Name of the competent official of plantation agency]. The essence of this MOU is to implement the plantation activity in the most effective manner using the expertise, knowledge and resources of both the organizations in furtherance of their common objectives.(Copy of MOU at annexure-II)

Payment

i) 25% of the total project cost i.e. raising of plantation and 5-years maintenance as an advance to the successful agencyon furnishing of Bank Guarantee.
ii) 20% towards First year maintenance after ensuring the survival at least 90%;

iii) 10% each for the Second, Third, Fourth and Fifth year maintenance (i.e. total 40%) after ensuring the 90% survival with normal growth and size of the plants;
iv) The balance 15% shall be released during handing-over/taking over with 90% survival of normal growth and size of plants;
v) Payment shall be released only after the physical verification and recommendation of PD/RO in time to meet the expenditure of ongoing and necessary works and continuity is maintained.

_____ [name of the nodal agency] will release the funds in advance of 25% of the total project cost [modify as per applicability] and the balance amount in equal instalment after recommendation of nodal agency at site(, RO/PD, MoRTH/NHAI).

Funds will be released preferably through online baking, or by demand draft in the name of _____Plantation agency__. _____ will open a savings bank account in any nationalized bank and operate the fund through that account. Interest accrued on the fund would be utilized if necessary on the plantation and its maintenance activities with consent of the _____ [name of the competent official of nodal agency].

There will be no cost escalation due to increase in minimum daily wage rate announced from time to time by Government of State or rise in rate of equipments or raw material

[Name of the plantation agency]

Annexure III

MODEL ESTIMATE FOR ROAD SIDE PLANTATION OF 1000 PLANTS/Km.

District---------- Block----------

Gram Panchayat---------

Plantation on the road----------from (name of place & Km) ----------to (name of place &Km)

S. No. Work Detail

S.No.	Item/Work Detail	Quantity	Rate	Amount
1	Excavation of Pits	1000 for 2 m height sample 60x60x60 Cm		
2	Purchase of sample/Nursery development	1000 samples		
3	Developing water source, Hand pump/ Farm pond	……Km stretch		
4	Manure/ Fertilizer/ Insecticide	……Km stretch		
5	Maintenance, Watch & Ward for first 2 years	……Km stretch		
6	Maintenance, Watch & Ward for subsequent 3 years			
7	Protection measure with single iron/brick/cement/bamboo guard for single row	1000 plants		
8	Protection measure with barbed wire fencing as per IRC-Sp-21, 2009 for multiple row	Per Km		
9				
10				

MODEL ESTIMATE FOR MEDIAN PLANTATION OF 666 PLANTS/Km.

District----------, Block----------, Gram Panchayat---------,

Plantation on the road----------from (name of place & Km) ----------to (name of place &Km)

S. No. Work Detail

S.No.	Item/Work Detail	Quantity	Rate	Amount
1	Excavation of Pits	666 for 1 m height sample 30x30x30 Cm		
2	Purchase of sample/Nursery development	666 samples		
3	Developing water source, Hand pump/ Farm pond	……Km stretch		
4	Manure/ Fertilizer/ Insecticide	……Km stretch		
5	Maintenance, Watch & Ward for first 2 years	……Km stretch		
6	Maintenance, Watch & Ward for subsequent 3 years			
7				
8				
9				
10				