THRISSUR ZOOLOGICAL PARK

WILDLIFE CONSERVATION AND RESEARCH CENTRE PUTHUR

(RELOCATION OF STATE MUSEUM AND ZOO THRISSUR)

Master Plan

2013-14 – 2032-33

Kerala Forest Department
Government of Kerala

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(RELOCATION OF STATE MUSEUM AND ZOO THRISSUR)

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Government of Kerala

CERTIFICATE

Certified that the Master Plan has been prepared by C. S. Yalakki, IFS, Addl. Principal Chief Conservator of Forests, Forest Head Quarters, Vazhuthacaud, Thiruvananthapuram – 14 based on the Master Layout Plan and technical inputs provided by Mr. Jon. Coe, M/s Jon Coe Designs Private Limited, Healesville, Victoria, Australia.

V. Gopinathan, IFS
Principal Chief Conservator of Forests (Wildlife) &
Chief Wildlife Warden, Kerala

CERTIFICATE

Certified that I C.S. Yalakki, IFS, Addl. Principal Chief Conservator of Forests, Forest Head Quarters, Vazhuthacaud, Thiruvananthapuram-14 have prepared the Master Plan for Thrissur Zoological Park based on the Master Layout Plan and technical inputs provided by Mr. Jon Coe, M/s Jon Coe Designs Private Limited, Healesville, Victoria Australia.

C.S.Yalakki
Addl. Principal Chief Conservator of Forests

PREFACE

The Trichur Zoo established in 1885 originally at Viyyur and subsequently in Thrissur township has been one of the old generation Zoos characterized by display of animals in small cramped cages with grossly inadequate space for the animals to move around freely. The zoo as well as museums are functioning in the very same piece of 13 acres of land located in the midst of the township making it almost impossible for further expansion of the zoo. Therefore, the Central Zoo Authority, a statutory body overseeing the management of zoo in the country, has issued directions to the State Government to shift the zoo to alternate suitable location. As the Department of Cultural Affairs under whose control the Museums & Zoos have been functioning since their establishment had some bottlenecks in shifting the zoo, the State Government has issued orders to the Kerala Forest Department for establishment of new zoo at Puthur near Thrissur for relocation of the existing Thrissur zoo.

Accordingly, this Master Plan has been prepared by me with inputs provided by Mr. Jon Coe, a renowned expert in zoo designs who visited the proposed site and gathered the required details during March, 2012. In fact, he had organized interactive sessions with the local people as well as stake holders, scientists, zoo vets, zoo managers etc. to seek their suggestions for completing the Master Plan. Therefore, I feel that this Master Plan is one of the documents prepared very democratically with the participation of all concerned.

The Master Plan has provided for an attractive display of balanced mix of animals and birds in tune with the guidelines issued by the Central Zoo Authority from time to time. Besides the display of animals in professionally and scientifically designed enclosures with immersion effect, Walk-through Aviary with multiple species display of birds, Biodiversity Centre with specialized display of reptiles, fishes and nocturnal animals, are expected to provide rewarding experience to Zoo visitors.

It is envisaged in the Master Plan to develop the proposed Zoological Park into Wildlife Research and Captive breeding Centre besides creating naturalistic display of animals. The Master Plan is comprised of two Parts – This narrative part and another having relevant maps including the Master Layout Plan.

C.S.Yalakki
Addl. Principal Chief Conservator of Forests

FOREWORD

In accordance with the directions from the Central Zoo Authority the Government of Kerala has initiated steps for modernization of both its Zoos at Thiruvananthapuram and Thrissur.

The Thiruvananthapuram Zoo which was established in 1857, probably oldest zoo in the country functioning in its original site has been subject to modernization since 1998 and more than half of the Zoo has already been remodeled. The State Government upon taking similar call from the Central Zoo Authority with regard to the Thrissur Zoo has issued orders to the Kerala Forest Department to pursue action for setting up of a good modern Zoological Park at Puthur near Thrissur over a large forest land identified for the purpose, for relocation of the existing zoo at Thrissur town.

Mr. C. S. Yalakki, IFS, who has worked as the Director of Thiruvananthapuram Zoo was entrusted with the task of completing the Master Plan for the proposed Zoological Park with the technical assistance of Mr. Jon Coe, a renowned expert in Zoo designs from Australia. Mr. Jon Coe visited Thrissur, camped for a week in the month of March 2012, perambulated the site several times and enabled completion of the Master Plan. The Master Plan provides for display of right mix of both indigenous and exotic animals and birds in the professionally designed enclosures having ' immersion effect'. The Plan has emphasized captive breeding of selected animals and birds endangered and endemic to the Western Ghats besides focusing on Wildlife education and research.

The Master Plan upon its execution in the field is poised to give birth to one of the most unique and modern Wildlife Education and Conservation Centres in the country.

V. Gopinathan, IFS,
Principal Chief Conservator of Forests (Wildlife) &
Chief Wildlife Warden, Kerala.

ACKNOWLEDGEMENT

I would like to place on record my sincere gratitude to Sri. K. B. Ganesh Kumar, the former Minister for Forests, Sports and Cinema who gave life to the proposal for shifting Thrissur Zoo which was lying dormant for years. But for his consistent review and follow up, the proposal would nor have seen this stage.

I immensely thank Sri. T. M. Manoharan, IFS (Rtd) for correcting the first draft and guiding me through the process of its preparation.

My thanks are due to Sri. V. Gopinathan, IFS, Principal Chief Conservator of Forests (Wildlife) and Chief Wildlife Warden, Kerala for guiding me and providing all assistance for successful completion of the Master Plan.

I thank Mr, Jon Coe for providing all the essential technical details and drawings including the Master Layout Plan based on which I could prepare the Master Plan Report.

I also thank Sri. S. Sheikh Hyder Hussain, Deputy Conservator of Forests and staff, Dr. P.O. Nameer, College of Forestry, Mr, Biley Menon and Mrs. Chitra, Landscape Architects, Kochi for their help and assistance in completing the task.

I thank Dr. K. Udhayan Varma, Director, Dept. of Museum & Zoo, Sri. K. Sadasivan Pillai, Superintendant, Thrissur Zoo, Sri. S. Abu. Superintendant, Natural History Museum, Thiruvananthapuram for sharing their experience in finalizing the report.

I thank Smt. N. Krishnamma, Smt. K. Jalaja, Sri. H. Venkitesh, Kumari C.B. Divya for rendering their services in typing the report at various stages till its completion. Thanks are due to Sri. Shaji Balamohan for designing the cover page and picture plates.

Finally, I remain grateful to the local people who always volunteered to extend all help and cooperation in fulfilling this task.

C.S.Yulakki
Addl. Principal Chief Conservator of Forests

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Executive Summary

1.0 The Central Zoo Authority, a statutory body working under the Ministry of Forests and Environment, overseeing the management of Zoos in the country had called upon the state Government to shift the existing Thrissur zoo functioning in a congested site of 5.26 ha. in Thrissur township to an alternate spacious site outside to enable display of animals in spacious and naturalistic setting. Considering the suggestions of the Central Zoo Authority, the State Government has issued orders vide the G.O(MS) 16/2012/F&WLD dated 24..02..2012 according approval for establishment of a new Zoological Park in Paravattani Reserved Forests by the Forest Department winding up the existing Thrissur Zoo. In the said order, sanction was also issued for engaging services of Mr. Jon Coe, an Australian expert of international repute in zoo designing for preparation of Master plan for the new Zoological Park.

Accordingly, detailed Master plan and Master layout was prepared and submitted to the Central Zoo Authority through Government of Kerala vide State Government letter No. 5342/D2/2012/F&WLD dated 03.05.2012 for approval. A team of officials led by the Member Secretary, Central Zoo Authority had visited Thiruvananthapuram on 07.06.2012 and had a detailed discussion on the Master plan and suggested certain modifications in the layout. Accordingly, the revised Master layout together with animal collection plan was submitted to Central Zoo Authority by the Chief Wildlife warden, Kerala on 13.08.2012. The Central Zoo Authority has communicated their approval of the Master Layout plan vide their letter

F.No. 19-113/92-CZA (140)(M) 1618 dated 31.08.2012. In the said letter the Central Zoo Authority has informed that the Master Plan (text) may be revised according to the Master Layout approved by them and submit the same for formal approval. Accordingly, the Master Plan (text) has been revised in tune with the Master layout for submission to the Central Zoo Authority. The highlights of this revised Master plan are furnished below

2.0 Objectives

2.1 Ex-situ conservation of endangered and endemic species of animals and birds with special focus on animals and birds endemic and threatened in Western Ghats.

2.2 Complimenting in-situ national conservation efforts through co-ordinated planned breeding of animals and birds endemic and Threatened in Western Ghats, and augmenting depleting populations in Wild.

2.3 Enlisting public support in favour of protection and conservation of wildlife and their habitats through wildlife education and interpretation.

2.4 Promoting wildlife research aimed at scientific management of wildlife and their natural habitat on long term sustainable basis.

2.5 Rescue and rehabilitation of injured and strayed animals and birds.

2.6 Providing wholesome nature-based entertainment and educational opportunities to zoo visitors, without losing sight of the core objectives listed above.

3.0 Mission

"Collection and display of wild animals and birds in accordance with the modern concept of zoo management aimed at accomplishing the vision set for the zoological park".

4.0 Vision

"A zoological park and wildlife conservation centre where wild animals and birds are displayed in their natural surroundings, fruitful research and captive breeding of animals and birds endemic and endangered in Western Ghats aimed at in-situ conservation are pursued and where people visit and get enlightened about biodiversity conservation and its uses".

5.0 Display of Animals

5.1 The animals presently under display in Thrissur Zoo will be shifted to the new Zoological Park. Altogether it is proposed to display 32 species of mammals including deers, antelopes, monkeys, hippo, zebra, giraffe, lion, tiger etc, 19 species of reptiles including crocodiles, turtles, tortoises, snakes etc. and, 33 species of birds including birds of both indigenous and exotic origin. The most modern 'immersion enclosure' concept is provided for display of outdoor and nocturnal exhibits.

5.2 A walk through aviary is proposed to be constructed in an area of about one acre for display of both aquatic and terrestrial birds. Cascading water features, naturalistic perches, nesting places, flight space are proposed to be provided in the Aviary. The visitors will be allowed to walk inside the Aviary to see and learn about the birds.

5.3 A biodiversity centre is envisage to be constructed for naturalistic display of nocturnal animals such as bats, porcupines, owls, jungle cats, etc, reptile including snakes, turtles and tortoise and, a collection of fishes. Facilities for

captive breeding of lesser known invertebrates of Western Ghats are also proposed in the bio diversity centre. The research and conservation breeding facilities will be provided in this structure.

6.0 Conservation breeding of species

For accomplishing one of the major objectives of present day Zoological Parks, captive breeding of lion-tailed macaque, nilgiri tahr and invertebrates which are rare and endemic to Western Ghats is envisaged in the project. Unlike most existing zoos in the country, the project provides for carrying out research on lesser fauna of Western Ghats too.

7.0 Infrastructure for feeding animals

It is proposed to construct zoo store and kitchen with most modern facilities for storage, preparation and distribution of animal feed on scientific basis. Construction of a service road exclusively for the purpose of transport of animal feed from zoo store and kitchen to each and every animal on display is envisaged in the project. Purchase of suitable vehicle for transport of feed is also provided therein.

8.0 Infrastructure for health care of animals

8.1 Modern infrastructure, equipment and methods lead by a full time veterinarian will be ensured for the animals and birds on display.

8.2 Veterinary hospital with all facilities including inpatient wards, operation theatre, laboratories, squeeze cages etc. together with most modern hospital equipments and appliances will be made available.

8.3 Incubation and hatchery facilities shall be provided in the hospital or adjacent vivarium or conservation research centre.

8.4 Services of experienced, competent veterinary surgeons and assisting staff shall also be made available in the hospitals.

8.5 Post-mortem facilities and appropriate biological disposal sites will be provided.

8.6 Zoological specimens of dead zoo animals will be preserved as appropriate for use by interested universities and museum taxidermists.

9.0 Quarantine Facility

9.1 Quarantine facility is proposed for screening animals reaching the zoological park either by acquisition from other zoos or through rescue. This facility is located away from main display areas and designed appropriately. The quarantine facility wi l meet all basic requirements for housing, monitoring health, treatment and environmental enrichment of smaller animals arriving at the park. Similarly for quarantining large animals such as hippopotamus, gaur or giraffe and large herds of deer or antelope or troops of primates facilities will have to be created here.

10.0 Visitor Amenities

10.1. Although the area chosen for establishment of Zoological Park is undulating and uneven in topography, efforts shall be made to lay roads and walkways meant to be used by visitors along contours so that all visitors irrespective of young or old can walk through the park at ease.

10.2. A covered walkway (for protection from sun and rain) will

connect the entry plaza with the Biodiversity Centre and Great Aviary.

10.3 Appropriately shaded rest places (most with drinking water points) will be provided every 200 metres or less and at convenient places along steeper pathways

10.4 Ample and clean restrooms (five locations).

10.5 Convenient zoo tram stations (five locations) are proposed for visitors. These are often grouped with restrooms.

10.6 Appropriate signage systems will aid in way finding and visitor information (such as directions and walking distances) will be provided to enable visitors to move at ease and learn more about animals and birds under display and the need to conserve them.

11.0 Administrative infrastructure

It is proposed to construct Administrative building to house office of the director, heads of garden, security etc, residential accommodation facilities for officials and staff engaged in management of zoological park

12.0 Proposed staffing pattern

Considering the size of the proposed zoological park, it is found that the following posts are required to be provided for the smooth functioning of the facility.

Total no. of posts to be created	No. of posts to be filled by redeployment from Department of Forests and Department of Animal Husbandry, etc.	No. of posts to be filled up by contract system	No. of post to be filled through PSC
39	**06**	**134**	**33**

13.0 Financial Forecast, Project period

Initially it was proposed to implement the project in five years starting from2013-14 at a total project cost of Rs.15015 lakhs. Presently, the budget is around 360 crore for implementing the project and the expenditure shall be met from the state Exchequer

14.0 Implementation of the Master Plan

Detailed Project Report (DPR) including detailed designing of enclosures, visitor facilities, administrative infrastructure, etc. together with preparation of detailed estimates will be undertaken by carefully chosen experienced and expert agency through established competitive process. Construction of the proposed zoological park shall also be arranged with the advice and assistance of Advisory Committee, Expert Committee and Empowered Committee constituted by the Government of Kerala. The Kerala Forest Department may entrust supervision of project implementation with a team of officials and staff led by an officer of the rank of Deputy Conservator of Forests/Assistant Conservator of Forests. The newly established zoological park will be managed by the Kerala Forest Department.

THRISSUR ZOOLOGICAL PARK

WILDLIFE CONSERVATION AND RESEARCH CENTRE, PUTHUR
(RELOCATION OF STATE MUSEUM AND ZOO, THRISSUR)

MASTER PLAN

PART – I

Chapter – 1

1.1. Introduction

Domestication of wild animals and birds is as old as human civilization. The present day domestic animals and birds being associated with us are the descendants of their wild ancestors. The wild animals such as elephant, lion, tiger, peafowl etc. have occupied prestigious and divine status in religious and cultural traditions of Indian societies besides playing key role in maintaining ecological equilibrium. In the fitness of things, it is necessary that the wild animals sharing the ecosystems with us are protected and conserved for posterity. While conservation efforts are consistently being made at national level and state level to protect and conserve wild animals and plants in their natural habitat, it has become necessary to pursue our continued efforts to conserve wild animals and plants in zoological parks and botanic gardens as well, to cover their risk of being lost from wild. Therefore, it is relevant to protect and conserve wild animals and birds in captivity so as to compliment national initiatives in ex-situ conservation.

1.2 History

The Thrissur Zoo was built in the year 1885 by Dewan Peshkar Shankarayya of erstwhile Cochin State. It was named Viyyur Park. Spotted deer, sambar deer, leopard, wild boar and selected species of monkeys were the first to feature in the collection of the zoo. As this zoo was located slightly away from the township, the number of visitors started dwindling with passage of time. By 1898, the zoo was incurring a huge loss to the Government exchequer and soon it was decided to shutdown. The animals were thereupon shifted to the Madras People's Park. The Viyyur central jail was built in this area later on.

In 1912, the Cochin state museum was inaugurated. It was also decided to set up a zoo in the same premises. In 1914, the existing Thrissur zoo was inaugurated. Sambar deer (2 pairs), spotted deer (5 pairs), wild boar (3 pairs) and Malabar giant squirrel (2 pairs) were the first inhabitants of the new Zoo. These animals were donated by the Maharaja of Cochin from Trippunithura Palace. One leopard, one rock

python and two tigers were soon added to this group. In 1915, modern cages were built. A hyena and a lion from Bordeaux Zoo (in exchange for a black panther), 2 male lions and a 15 feet long king cobra were also added to the collection. The reptile house in Thrissur Zoo then had remarkable collection of snakes.

1.3 Present status

Today the existing zoo, having more than 40 species of animals and birds in its collection, is facing acute shortage of space. This has caused series of problems for the animals and birds under display as well as the zoo managers. There is a need for providing new spacious and naturalistic living facilities for these animals. Hence, it is proposed to shift the facility to a larger site at Puthur. Plate -1, 2, 3 and 4 given in the next page show the congested old cages in which animals are displayed in the existing Thrissur Zoo.

The Central Zoo Authority, New Delhi has also recommended shifting of the existing Thrissur Zoo to another site where sufficient space is available for rehabilitating the animals. In compliance of the directions of the Central Zoo Authority, the state government has decided to establish a zoological park at Puthur which is 12 kilometres from Thrissur town to accommodate the animals under display in Thrissur Zoo.

1.4 National Zoo Policy Goal

Establishment and management of captive facility at Puthur are aimed at achieving the goals envisaged in the National Zoo policy, 1998. The said goals are listed below.

1.4.1 Captive breeding of endangered species of wild animals and birds for augmenting their depleting populations in wild.

1.4.2 Enlisting public support and empathy in favour of national

conservation efforts through conservation education and awareness programmes to zoo visitors and general public.

1.4.3 Promoting wildlife research aimed at evolving improved management strategies for in- situ wildlife conservation.

1.5 Features of the area proposed for establishment of the new Thrissur Zoological Park at Puthur

Legal Status

1.5.1 The total extent of the proposed site is 136.85 hectares and the legal status of the area is reserved forest notified under the provisions of Kerala Forest Act' 1961. The land falls within the territorial jurisdiction of Pattikkad Range of Thrissur Forest Division. The said area supports bamboo and cashew plantations. The entire area is surrounded by cultivated fields and human habitations. Its boundary is consolidated by construction of cairns. The nature of the site selected for the park is reflected in the photographs provided in the pages ahead.

1.5.2 **Geology**

The site is underlain with dense Archaean metamorphic material (Curiosulus gneiss) which is frequently and conspicuously exposed as black boulders and outcrops, some

Plate 1 - Old dilapidated structure housing precious birds

PLate 2 - Critically endangered LTM imprisoned

Plate 3 - Old type congested cage

Plate 4 - Cage that is suffocating

of considerable size. These are ideal scenic features for displaying large carnivores and cliff dwelling species like Nilgiri tahr and for developing public overlooks and vantage points. However this material is difficult to excavate and much on-site probing and design adjustment will be required.

1.5.3 **Topography**

The entire area is comprised in three inter connected hillocks characterised by steep side slopes with more gentle slopes on hill tops and bases. These steep slopes make development and management more difficult, but also add considerably to the beauty and uniqueness of the site.

1.5.4 **Hydrology**

No natural water bodies are found in the area. There is a small (3000 m2) quarry used as a reservoir which is partially on zoo property which the State hopes to acquire. There are minor drainage systems radiating from the central ridges and two well developed drainages (one north and one southeast) which form sloping valleys and will be used as major development areas and for water harvesting. While normally dry, these systems can be expected to carry considerable flows during monsoons. There is a 1300 m long village irrigation channel which must be maintained. However local farmers only need this during the dry season. During the monsoon it serves as a collection point for runoff from approximately 30% of the site and thus is a valuable asset for storm water harvesting.

1.5.5 **Flora and Fauna**

Out of 136.85 hectares of area, 65.29 hectares supports almost

pure crop of bamboo planted in 1982. Importantly, these extensive bamboo stands are likely to mature, seed and die in the next few years and planning for their removal and replacement with indigenous species is a priority.

Sparse growth of natural regeneration of local species is also seen coming up here and there. The remaining 71.56 hectares of area supports cashew plantation raised in 1960 originally and augmented in 1981. The cashew growth is quite thick with canopy density of approximately 0.7. While not tall, (10-12 m) the horizontal branching character and dense canopy of cashew makes it ideal for display of primates, leopards and other arboreal species.

Miscellaneous growth comprising of teak (*Tectona grandis*), Anjili (*Artocarpus hirsuta*), Dhaman (*Grewia tilaefolia*), silk cotton (*Bombax ceiba*), Irul (*Xylia xylocarpa*), Blackboard tree (*Alstonia scholaris*), Belliric myrobalan (*Terminalia bellerica*), Indian Kino (*Pterocarpus marsupium*), Kindal, (*Terminalia paniculata*) etc. can also be seen in this site. Photographs given in plate - 5, 6, 7 and 8 in the next page indicate the site features.

There is enough evidence confirming the presence of wild boar, porcupines, jungle cat, mongoose etc. in the area. Peafowl, spotted dove. Common myna, jungle myna, crow pheasant, bulbul, tree pie, barn owl are also sighted in the area.

The site provides valleys and uplands for carving out naturalistic enclosures

A portion of the site also supports cashew too

The site supports predominantly Bamboos

Rock outcrop suitable for Nilgiri Tahr

1.5.6 **Climate**

Because of the proximity to the Arabian Sea, Thrissur enjoys a tropical climate with least climatic variations. The temperature varies between minimum of 24 degree Celsius and maximum of 38 degree Celsius throughout the year.

The first monsoon showers of the year usually start during late May and slowly increase and intensity and merge with the South West Monsoons. The South West monsoon lasts from June–September followed by a short dry spell. The North East monsoon starts in October and extends up to the beginning of December. Heavy showers generally occur during this season. The average annual rainfall in Thrissur is 2800 mm.

1.5.7 **Approach**

The site is located 12 km east of Thrissur town. It can be approached by road. However, the existing road which passes through the village near the proposed zoological park is too narrow to accommodate expected attendance and must be widened. The nearest airport is Cochin International Airport, Nedumbassery, which is located 55 km away from the site.

1.5.8 **Pollution**

The area where the zoological park is proposed to be established does not have any industries in its vicinity. Pollution due to vehicular traffic is also negligible. There were stone quarries in the vicinity but none of them is operational now. Good greenery found in and around the area helps in keeping pollution under check.

Chapter – 2

Appraisal of Present Arrangement and Constraints

2.0 Thrissur zoo has been functioning in a small area of just 5.4 hectares located in the heart of the town. The existing area is grossly inadequate for modernizing the captive facility. Further development of the zoo at its existing location is not possible as a set of museums is also functioning in the very same premises.

Besides lack of sufficient land, the Zoo also requires expert and trained manpower for its effective management. As management of museums as well as the zoo has been looked after by one and the same set of staff and supervisors, specialization or expertise in the field of zoo management is not given due importance. Although it is very necessary to have specialized team of personnel separately for managing zoo as well as museum such arrangement is not in existence in Thrissur Zoo. This has affected management of both museums as well as the zoo.

2.1 Present Collection Plan

As such no collection plan as to the animals and birds on display in Thrissur Zoo exists at present. The facility primarily caters to the tourist needs and is not much concerned with the very objectives that any present day zoo should function for. The details of animals and birds displayed in the zoo are enclosed as **Annexure – III**.

2.2 Present Research

No research activities are carried in the field of wildlife biology, animal nutrition, animal behavioural aspects etc. by Zoo

personnel or any outside agencies. It may not happen until professional and scientific temperament is infused into the zoo management and appropriate infrastructural facilities are put in place.

2.3 Present Conservation Breeding

No efforts are made in this line as the area available for the Zoo is not enough and appropriate. Existence of breeding records for many species, especially hoofstock, are doubtful and a degree of inbreeding can be expected.

2.4 Education and Awareness

The job is required to be attended by the education officer who is meant for both zoos in Trivandrum as well as in Thrissur without any assistance in terms of man power or infrastructural facilities.

Therefore, structured conservation education and awareness programmes are not being organized in the Zoo.

PART – II

C h a p t e r – 1

FUTURE OBJECTIVE INCLUDING MISSION STATEMENT/THEME

3.0 The proposed Zoological Park, being one of the latest captive animal facilities in the country, will be developed as **Wildlife Conservation and Research Centre** instead of a mere zoological garden. This will make the Zoological Park distinct and different from most of the Zoos in India. Contrary to traditional displays focused upon mega species such as elephants, tigers and lions alone, it is proposed to introduce lesser known fauna of Western Ghats, especially, the endemic and threatened fauna belonging to lower taxa, in the proposed display. This will help promote conservation and research programmes in respect of such lesser known fauna of Western Ghats. It becomes expedient to embark on wildlife research in the proposed Zoological Park as premier scientific and professional institutions such as Kerala Forest Research Institute, Peechi, Veterinary College at Mannuthi and Forestry College at Vellanikkara etc. are located in the vicinity of the proposed park. This is primarily aimed at conservation of the lesser known endemic and threatened animals and birds of the Western Ghats. Similarly, research works involving such animals and birds on various biological, nutritional, behavioural aspects are proposed to be carried out. Besides this, coordinated and scientifically planned captive breeding programmes of the above mentioned fauna of Western Ghats are also proposed to be taken up as one of the core objectives of the proposed new zoological park. When the park is fully established, it can further extend its activities to the actual habitats of the above mentioned fauna of Western Ghats for field studies and re-stocking natural populations with the captive bred stock, as it is done in certain zoos abroad. This will go in

tune with the National Zoo Policy of 1998 as well as the Wildlife (Protection) Act 1972 amended in 1991 and guidelines issued by the Central Zoo Authority from time to time.

To accomplish the aspirations mentioned above, it is required to put up scientifically designed infrastructural facilities for pursuing conservation and breeding programme of selected fauna belonging to invertebrates, fish, reptiles, amphibians, etc. It goes without saying that competent and expert scientific hands are also required to be recruited and employed in the Zoological Park for pursuing conservation and research programmes in the required scientific temperament. Thus, the proposed zoological park will be developed in tune with Jersey Zoo in the U.K. which is involved in research, captive breeding and restocking of threatened fauna in Madagascar and Round Islands.

For carrying out coordinated and planned captive breeding of selected species, it is required to capture animals to establish founder stock in cases where animals are not available in captive facilities.

3.1 Objectives

3.1.1 Ex-situ conservation of endangered and endemic species of animals and birds with special focus on animals and birds endemic and threatened in Western Ghats.

3.1.2 Complimenting in-situ national conservation efforts through coordinated planned breeding of animals and birds endemic and Threatened in Western Ghats and augmenting depleting populations in Wild.

3.1.3 Enlisting public support in favour of protection and conservation of wildlife and their habitats through wildlife education and interpretation.

3.1.4 Promoting wildlife research aimed at scientific management of wildlife and their natural habitat on long term sustainable basis.

3.1.5 Rescue and rehabilitation of injured and strayed animals and birds.

3.1.6 Providing wholesome nature-based entertainment and educational opportunities to zoo visitors, without losing sight of the core objectives listed above.

3.2 Mission

"Collection and display of wild animals and birds in accordance with the modern concept of zoo management aimed at accomplishing the vision set for the zoological park".

3.3 Vision

"A zoological park and wildlife conservation centre where wild animals and birds are displayed in their natural surroundings, fruitful research and captive breeding of animals and birds endemic and endangered in Western Ghats aimed at in-situ conservation are pursued and where people visit and get enlightened about biodiversity conservation and its uses".

3.4 Conservation message intended to be communicated to zoo visitors.

CONSERVATION OF BIODIVERSITY INEXTRICABLEY LINKED TO SUSTENANCE OF HUMAN LIFE

Chapter– 2

FUTURE ACTION PLAN

4.1 Themes followed for display of animals in Thrissur Zoological Park

While the zoo aspires to promote the breeding and conservation of indigenous species, many of which inspire little present popular interest, it is also important to display some popular exotic species such as African plains species to enhance attendance and thus educational opportunities for more visitors as well as earned income. Of course, animal behavioural and habitat needs, as well as site considerations must also be considered. Therefore, a thoughtful mix of themes should be developed. These include taxonomic, biome, habitat and behavioural themes. The following theme areas are suggested.

4.1.1 **Biodiversity Centre**

Small Animals of the Western Ghats – generally indoor taxonomic or habitat presentations of invertebrates, fishes, amphibians, reptiles, small mammals and birds, including nocturnal and aquarium displays.

4.1.2 **The Great Aviary** with both indigenous and exotic compatible birds.

4.1.3 **Rainforest of the Western Ghats**

4.1.4 **Deciduous Forests of the Western Ghats**

4.1.5 **Mountain grass lands of the Western Ghats**

4.1.6 **Plains and Wetlands of Africa**

4.1.7 **Nature Conservation Areas**

4.2 Architectural Theme

The traditional architecture of Kerala State is beautiful, well adapted to tropical conditions and uses renewable local materials and construction techniques. Thus it is a model for sustainable design going forward. Importantly it is also iconic of the region. Since the new Thrissur Zoological Park will strive to celebrate and conserve local biodiversity, it is appropriate that it also celebrates and supports local architectural traditions against the homogenising effects of ever-changing international architectural whims and trendy but less sustainable imported materials. However modern evolutions of traditional Kerala architecture are suggested rather than recreations of royal or religious heritage buildings. Emphasis will be placed upon building clusters forming useful courtyards and overlooks, rather than ornamental buildings for their own sakes. Functional structures, such as service buildings, animal support structures such as kraals and the like should be entirely hidden from public view. In all cases the "landscape", either ornamental at the zoo entry or bio-regional throughout the zoo, will be the dominant theme.

4.3 Animal Collection Plan

It is necessary that the wild animals and birds selected for display in Puthur conform to the objectives, mission and vision set for the zoological park. Therefore, the animal collection should necessarily have animals and birds of Western Ghats which are endemic and threatened and which can be displayed in suitable natural setting. It is also important that certain mega species including exotics are displayed in the park so that large number of visitors is attracted to the park to enable zoo management to organize nature awareness and education programmes to more and more people. Considering

various factors governing display of animals and birds and their acquisition and husbandry, the collection plan is required to be refined and finalized. The collection plan proposed for the Thrissur Zoological Park at Puthur is enclosed separately as **Annexure – II.** The Existing Collection of animals in the present Thrissur Zoo is enclosed as **Annexure III** and a list of Animals of the Western Ghats is placed in **Annexure IV.**

4.4 Captive Breeding of Endemic, Rare and Threatened Wildlife

4.4.1 **Nilgiri tahr** (*Hemitragus hylocrius*)

Nilgiri tahr, the South Indian mountain goat inhabiting high attitude mountains & cliffs in selected habitats in the South Indian States of Kerala and Tamil Nadu is an endangered species endemic to Western Ghats. It is confined to very few populations in the wild. The largest population of the goat is protected in high altitude grasslands of Rajamalai Hills at Munnar in Idukki District of Kerala State. The Rajamalai Hills have been declared to be National Park viz Eravikulam National Park in 1978 with an extent of 97 Sq. Km and protection given to the species.

The Nilgiri tahr is found in small isolated populations in similar mountainous habitats located in the States of Kerala and Tamil Nadu also and these populations are dwindling year by year due to various biotic pressures. Therefore, it is necessary to take up captive breeding of the species in the proposed zoological park at Puthur with the aim of building up captive population to explore the possibilities of augmenting the dwindling in-situ populations. It is pertinent to mention that Nilgiri tahr was successfully bred in captivity in Thrissur Zoo during the

period from 1962–1975. The relevant records reveal that 23 births had taken place during this period. It is also seen mentioned in the said record that a good number of animals were transferred to West Germany in 1972. Going by the success in captive breeding of tahr in the past, and the abundance of steep rocky slopes and well drained upland sites at the proposed Zoological Park, Nilgiri tahr could become an iconic species for the new park. A site with extensive, steep rock outcrops of about 1.75 ha is identified in the master plan for this species, while many similar sites are available for expansion and off-exhibit breeding for possible future reintroduction programs.

4.4.2 **Lion-tailed macaque** *(Macaca silenus)*

Lion-tailed macaque *(LTM)* is one of the highly threatened macaques in the world. Its natural populations being confined to limited habitat ranges in the evergreen and semi-evergreen forests of Kerala, Karnataka and Tamil Nadu, its long term survival is greatly threatened. Considering the conservation status of the species, the Central Zoo Authority has designated Thiruvananthapuram Zoo, Mysore Zoo and Vandalur Zoo for implementation of co-ordinated captive breeding programme for lion-tailed macaque. The Central Zoo Authority has been funding the programme for a decade. The Thiruvananthapuram Zoo has successfully bred the species since 2000. It is only appropriate that the ongoing captive breeding programme for lion-tailed macaque is extended to the proposed new Thrissur Zoological Park also, as it is located within the natural habitat range of the species. The founder population of LTM can be built up from out of the existing captive stock

in South Indian zoos and rescue centres, perhaps with additional new stock from international zoos. The assistance of the Central Zoo Authority in terms of finance, technical input and co-ordination among concerned zoos can be sought.

4.4.3 Mammals, Reptiles and birds of lesser taxa endemic and endangered in the Western Ghats can be taken up for captive breeding in zoological park with the objective of restocking their dwindling populations in the wild. The list of such species is enclosed as **Annexure - IV.**

4.4.4 **Fresh water Fishes**

The fishes rare and endemic in Kerala are to be taken up for captive breeding programme.

4.4.5 **Invertebrates**

Similarly, in species rare, endemic and threatened species, especially in Western Ghats will be considered for captive breeding.

4.5 Master Layout Plan (Master Layout drawings approved by CZA are separately bound and made available with this master plan report)

The Master Layout Plan is prepared as per the guidelines prescribed by the Central Zoo Authority on a contour map of the site where the new park is proposed to be set up at Puthur. The following key features are shown in the plan.

4.5.1 Proposed entry-exit plaza

4.5.2 Circulation of pedestrians, trams and service vehicles

4.5.3 Proposed display of animals and birds

4.5.4 Visitor amenities

4.5.5 Feed, water & electricity supply

4.5.6 Veterinary health care facilities

4.5.7 Quarantine facility for new arrivals

4.5.8 Administration infrastructure (buildings)

4.6 Area Selected for Zoo

The total extent of the forest land earmarked and selected for establishment of zoo at Puthur is 136.85 hectares. The entire area is comprised of three interconnected steep "islands" of green surrounded on all sides by human habitations and farms. The area selected is undulating, rugged with moderate to steep slopes and large rock outcroppings. There are hardly any flat locations or water bodies in the site. Therefore, it is proposed to limit developmental activities to the foothill region of one of the three "islands". The remaining areas will be managed as conservation areas and some areas may be suitable for future expansion, including a possible future safari park.

A privately owned parcel of about 2.4 hectares of flat low-lying on the northern border of the area proposed for the park and a similar area comprised in quarried pond located on the southeast portion of the site can be effectively put to use. It will be very useful if the government acquires these land parcels for the zoo as they are lying fallow and are very suitable for zoo development, including display of aquatic fauna. Such level land is in very short supply on the zoo development site.

4.7 Projected Attendance

Attendance at small and antiquated present Thrissur Zoo is estimated to be 800,000 per annum. Given the new greatly enlarged

site and local interest and the overall popularity of zoos in India, annual attendance at the new zoo is expected to exceed one million during initial development (first five years) and could reach 2.5 million annual visitors within ten years. Specific market studies will be required to verify and refine these projections, but these figures should serve for master planning. Please see **Annexure – V** for further information on attendance, design-day, parking and other visitor requirements.

4.8 Arrival and Parking

Arrival, drop-off, and parking for automobiles, motor cycles and coaches and entry-exit facilities will be located on the north-western side of the property opposite to the existing Kainur village office. While vehicle access from the highway to the site is generally sufficient, the last section of road through the village is inadequate for the expected traffic and must be widened. Also, about 600 m of roadway fronting the zoo site must be widened by taking a small amount of land from the site.

Initial development will require about 4.66 ha for parking about 335 private autos, 26 coaches and about 300 motorcycles. The sloping land is somewhat inefficient for parking, but the terraced and treed lots will be quite attractive. Based upon topography, the plan favours visitors arriving by coach, a more energy efficient means of transit than private automobile. Additional relatively level land, such as the adjacent private parcel, must be acquired for future expansion including for parking to meet longer term needs.

4.9 Entry and Exit plaza and Orientation Overlook

Entry-exit arrival plaza, six ticket counters (with areas for expansion), ticket area shelter and gateway, security room, public toilets, interpretation centre, zoo shop, wheelchair and stroller hire

etc. are located among dramatic boulders and rock outcrops with beautiful vistas of surrounding forested hills and distant temples and church spires. The overlook area will include appropriate audio-visual programmes enabling park visitors to gain maximum understanding about the regional animals and plants on display in the zoological park and current threats and conservation opportunities with regard to their ecological, economic and cultural significance and necessity to conserve them. It is also important to sensitize the public to follow rules and regulations of the zoological park and to help making their visit memorable.

4.10 The Central and Butterfly Gardens

This park area (about 8000 square metres) immediately inside the entry will feature a 1200 m^2 crocodile pond (also a water harvesting feature) and plantings featuring Western Ghats endemic or long established plant species with special emphasis on attracting butterflies and other useful insects. A special technical team and budget will support this important objective. Local free ranging birds will also be encouraged. An additional theme will be the education of the public on the benefits of conservation of wildlife and their natural habitat besides using local plant species judiciously.

4.11 Pedestrian Circulation

4.11.1 Primary pathways from 2.5 to 3.5 m wide and with slopes of no more than 1:15 and meeting disability access codes (appropriate unit paving suggested to facility access to underlying utilities and to encourage percolation of rainwater). The main purpose of primary pathways is to facilitate movement of large crowds between primary attractions (including grand vistas of dramatic landscapes and animals) and amenities such as toilets, tram stations

and food and beverage kiosks, if so required.

4.11.2 Secondary pathways 1.5 to 2.5 m wide with slopes of no more than 1:15 and meeting disability access codes, Stabilized, packed earth is suggested where appropriate. These are the primary animal viewing routes for close-up and intimate views of plants and animals within immersing natural habitat landscapes.

4.11.3 Tertiary trails are narrow, and may be steep and winding and use local materials such as earth, stone and the like and may include suspension bridges and other features of a more adventuresome nature, providing these do not compete with or distract from the animals. Tertiary trails should be handicapped accessible where possible or provide access to features which are accessible by other means. But recognition is given to the need to provide a range of opportunities for access and discovery.

4.11.4 Total pedestrian circulation is estimated to be about 2.0 km during first phase development and about 3.5 km upon completion of phase two. Note this includes a considerable amount of up and down travel as well.

The proposed pedestrian in circulation is shown in the master layout separately bound and annexed to this master plan report.

4.12 Zoo Tram Circulation

While the walking distances suggested are within the norms of larger zoos, the warm humid climate, frequent and abundant rainfall and steep climbs make provision of some form of zoo transport essential.

4.12.1 The most flexible system in common use in zoos internationally is a tram system of up to three trailers (two trailers are safest on steep sites) pulled by a tractor and using common roadways.

4.12.2 These can be themed in many ways and are usually powered by LPG gas or diesel fuel. An example of this type of conveyance is used in three Indonesian safari parks operated by Taman Safari Indonesia with trams build in Indonesia. So similar units should be available which are made in India. This can be an option to be considered. Alternatively, electric powered or battery powered trams can be given preference, as such a mechanism will be eco-friendly and pollution free.

4.12.3 These trams must be robustly built to withstand the energy and braking requirements of steep sites.

4.12.4 The layout plan shows approximately 4 km of tram road (maximum slope 1:15 with heavy duty road surfacing) which also serve as service roads, but are entirely separate from pedestrian routes other than a few unavoidable crossings.

4.12.5 Operating high powered trams on steep slopes also used by pedestrians is very dangerous is not recommended. Also slow moving pedestrians greatly delay trams.

4.12.6 Covered tram stations will be located between 300m and 500m apart related to principal viewing, rest and drinking water supply areas. There will also be covered yard (about 1200 m^2) for servicing the trams and other park vehicles.

4.13 Zoo Service Vehicle Circulation

It is also necessary to separate zoo service vehicles from the public wherever possible.

4.13.1 The layout plan shows about 2 km of service road (maximum slope 1:10) in addition to areas of the tram road used by service vehicles. This is required by the need to locate animal holding facilities such as kraals above the hillside exhibits.

4.13.2 These roads should be paved with heavy duty road surfacing. Roads and roadside drainage should be designed as part of the water harvesting system.

4.13.3 In some cases tram and service roads are combined for greater efficiency.

4.13.4 Site utilities will be located along service and tram roads whenever possible.

4.14 Display of Animals – Landscape Immersion

Outdoor and some nocturnal exhibits will be of the "landscape or habitat immersion' style. That is, viewers will be immersed in the same simulated natural habitat landscape as the animals they are viewing. The goal is to recreate a similar emotional response as one would feel in meeting the same animal unexpectedly in its own native habitat. All animal barriers will be hidden or will closely resemble natural features or human artefacts appropriate to the themed setting. A1 support structures such as kraals also will be appropriately designed. In order to demonstrate and teach respect for wildlife, visitors will be physically positioned below the animals viewed whenever possible, and looking up to them. Exceptions

include the nearly unavoidable looking down at aquatic animals. Where views of barriers are unavoidable (such as overhead mesh in walk-thru aviaries), mesh and support structures should be as fine and inconspicuous as practicable.

4.14.1 It is proposed to put up a nature and environment friendly non-invasive structure named the ***'Biodiversity Centre'*** at the low lying, valley bottom identified in the field for display of the following animals and birds.

4.14.1.1 Reptiles (375 m^2) : Attractive display of variety of snakes, tortoises and turtles, forest lizards amphibians etc. will be put up for display in the reptile house.

4.14.1.2 Nocturnal display (1000 m^2): animals such as jungle cat, mongoose, civets, porcupine, owls, bats etc. will be displayed in the nocturnal section of the proposed Biodiversity Centre.

4.14.1.3 Aquarium display (200 m^2) : The biodiversity centre will house an attractive display of fishes which are both attractive as well as endangered and endemic to the Western Ghats.

4.14.1.4 The biodiversity centre is expected to provide for off-exhibit breeding and conservation facilities (1050 m^2) for fauna of lesser taxa endemic and endangered to Western Ghats, nature education facilities, public amenities etc.

4.14.2 **Walk –through Aviary**

A wide variety of indigenous and birds which are compatible will be displayed in the large walk-through

and free-flight Great Aviary (overall size about 4500 m^2). Perching and nesting facilities will be provided to the different types of birds at different vertical spaces. Cascading flow of water with intermediary ponds for housing aquatic birds will be appropriately designed.

4.14.2.1 Iconic species in adjacent displays would include hornbills.

4.14.2.2 Other smaller separate aviaries will be developed along visitor paths along the western side of the site near where it returns to the entry/exit area (proposed for phase two)

4.14.3 **Deer and Antelope Species (Deciduous Forests)**

Suitable location earmarked for provision of spacious enclosures for deer and antelope are indicated on the Layout Plan. Each enclosure will be more than 2000 m^2 in extent with appropriately designed barriers. Separate holding areas, night shelters, feeding platforms will be designed for each enclosure in addition to spacious display area. The enclosures can be used to house spotted deer, sambar deer, hog deer as well as antelopes such as black buck, nilgai etc. Populations must be maintained at levels within the carrying capacity of the land to avoid plant destruction and soil erosion. Environmental enrichment features will be provided.

4.14.4 **Lion-Tailed Macaques and Nilgiri Langurs (Rain Forests)**

As shown in the Master Layout Plan, an enclosure of

about 5000 square meters is proposes to contain a mixed display of lion tailed macaques, nilgiri langurs, giant squirrels and barking deer in a dense existing cashew orchard. The proposed multiple display will be done only if the animals are compatible with one another. Surrounding barriers will be 5m high galvanized steel mesh fence topped with a painted sheet metal overhang inclining inward. Maintain at least 6 m from the top of the viewing arbour to the top of the overhang where it passes through the perimeter barrier.

Separate night shelters, feeding cubicles, keepers' gallery, etc. will be constructed for each of the species. Naturalistic environmental enrichment suitable for each species will be maintained.

4.14.5 Deciduous Forests-Lions and Tigers

Two enclosures of about 2250 m^2 each are meant to display lion, royal Bengal tiger. Dry moats will be provided as barrier at the viewer side and chain link fence will be constructed as barrier on remaining sides. However, the barrier design vary depending upon the site conditions. Naturalistic environmental enrichment suitable for each species will be maintained.

4.14.6 Leopards

The proposed leopard display will include an enclosure with approximately an area of 800 -1000 m^2. It will be totally enclosed in inconspicuous mesh structures. Viewing shelters with glass viewing for close ups and with interpretation will also be provided for all big cat displays. Keepers' gallery, night shelter, feeding cubicle,

kraals, squeeze cage and transfer raceways will also be provided, as will naturalistic enrichment features. Suitable naturalistic environmental enrichment will be maintained.

4.14.7 Indian gaur

The site proposed for display of Indian gaur is comparatively plain and is about 2800 m2 in extent. The enclosure will be designed with appropriate barriers, night shelter etc.

4.14.8 Display of Macaques

A small hill top is chosen for display of macaques. About 10000 m2 of area is earmarked for this purpose in the master layout plan. Bonnet macaque, rhesus macaque and other similar monkeys will be display with appropriately designed enclosures.

4.14.9 African plains

It is necessary to display exotic animals such as zebra, giraffe, eland and birds such as ostrich which are crowd pullers to provide more people the opportunity to become enlightened about wildlife conservation through education and interpretation.

Generally level area of about 7200 m^2 will be developed for display of popular African hoofstock such as giraffe, eland, zebra and ostrich in mixed herds. This will be developed as African grass land theme area. Comparisons will be made with Indian grassland species. This display will employ a combination of wet

and dry moats, fencing and hidden ditches. Each species will have separate kraal areas and display ground. Exhibiting the Giraffe, Zebra, Eland and Ostrich together may be attempted.

4.14.10 **African Wetlands Theme Area**

Hippopotamus will be displayed in an area of about 1250 m^2, about 50% of which will be pool area. Solar-powered water filtration systems (including reedbed biofiltration, about 1000 square metres) and recirculation systems will be provided as will appropriately designed kraal areas. This area would also display African wading birds such as crane and storks

4.14.11 **Bears**

Enclosures proposed for displaying sloth bear, Himalayan black bear etc. are shown in the master lay out. The site selected for the display is sloppy hillside and construction of enclosure should be done with utmost caution to ensure the landscape is not altered much. An area of approximately 7000m2 is available for the purpose. Each enclosure will be designed with sufficient space for meeting the biological, physiological and behavioural requirements of the animals including active environmental enrichment programs and ability to dig in selected areas.

4.14.12 **Nilgiri Tahr (Mountain grass lands)**

An excellent site suitable for the display of Nilgiri Tahr which is an endangered and endemic mountain goat

found in the Western Ghats is earmarked in the layout. The site has ideal habitat features including wide spread rock out crops, steep terrain, grassy area etc. and is around 10000 m^2 in extent.

4.14.13 **Birds of Prey**

Vultures, eagles and such birds of prey will be displayed in the high grassland zone in a large free-flight aviary (about 3000 m2) built around a 15 metre-high west-facing boulder-capped slope. This should be an ideal location for raptors. The aviary should be at least ten metres higher than the topography. Feeding and hacking chambers will be provided as well as drinking water sources and a variety of perches and enrichment features.

4.14.14 **Terrestrial Birds**

Pheasants, bustards and other ground birds of the grasslands will be displayed in aviaries in that thematic zone. Sufficient area of about 1200 m2 is set apart for the display of grass land birds.

4.14.15 **Exotic Birds**

The proposed display includes exhibition of attractive birds such as cockatoos, macaws, pheasants etc. in appropriately designed individual naturalistic aviaries.

4.14.16 **Display of small carnivores**

Display of small carnivores such as Jackal, Wolf, Hyena, wild dog etc. is proposed to be put up and the conclusion of the visitor circulation. An area of 1600 m^2 to 8000 m^2 is earmarked for display of each of these

carnivore species will be designed with appropriate barriers providing display areas, night shelters etc. required for them.

4.15 Common Features of Night Quarters for Mammals.

The husbandry requirements of animal species and individuals vary greatly. Nevertheless, there are common guidelines that can be generalized and must be met.

4.15.1 It is necessary to house most zoo animals in special off-display quarters after closing hours for the animals' safety, to monitor their well being, insure proper feeding and to reduce damage to display areas.

4.15.2 However, since most zoo animals spend up to sixteen hours a day in night quarters often including natural morning and evening activity periods, night quarters must be as well suited to the animals needs as their display areas.

4.15.3 Animals must not be kept in small feeding pens for more than an hour at a time and these small enclosures are not to be used as overnight quarters except for medical necessities sanctioned by veterinary staff. Feeding pens may be used as temporary shift cages while kraals are being clean.

4.15.4 Except for small animals that are both housed and displayed indoors (aquariums or reptile collections for example), it is not necessary to build heavy concrete or masonry holding buildings for indigenous and climate adapted animal species. These facilities need frequent washing (wasteful of water and labour), often remain

damp and malodorous and fail to use the disinfecting qualities of sunlight.

4.15.5 Preference is made for spacious galvanized steel mesh enclosed pens ("kraals") with mesh tops and sufficient roof area for sun and rain protection. Partial partitions provide wind protection and seclusion.

4.15.6 Small den or nest boxes with organic bedding conserve body warmth on cool nights and serve as elevated sleeping perches on warm nights. Nest boxes and transfer gates for arboreal species will be suitably elevated.

4.15.7 Flooring substrate may be crushed stone (hoofed animals), sand or organic mulch (or a combination), depending upon species needs, all with sufficient underdrainage and anti-dig and rodent barriers. Large and deep sand pits are provided for digging species and mud wallows for wallowing species.

4.15.8 Elevated perches areas, ideally providing distant views, shall be provided for all but the most terrestrial species.

4.15.9 Clean, potable drinking water will be made available to all animals on an ad lib basis. Drinking sources shall be elevated for arboreal species. Sufficient drinking outlets will be provided so dominant individuals cannot exclude subordinate individuals.

4.15.10 Night quarters will be provided with lighting for night inspections and security.

4.15.11 Fans and evaporative coolers may be provided for animal

comfort which can be automatically activated and deactivated by the animal's presence using simple motion detector technology.

4.15.12 Social species should be night housed as natural social groups whenever possible.

4.15.13 All night quarters will be provided with a scientific program of environmental and behavioural enrichment as a normal and routine part of husbandry activities and keepers will be trained and supported in this essential dimension of animal husbandry for all species.

4.15.14 Large gates will be provided with service road access for changing or renewing substrate and for providing and removing large enrichment items like log.

4.15.15 Kraals may be directly connected to exhibit and feeding areas or may be connected by enclosed raceways.

4.15.16 Night quarters will be hidden from public view using planting or natural site features like boulders and a combination of natural features. Such plantings may require irrigation to flourish.

4.16 Features Common to All Bird Enclosures.

4.16.1 All the bird enclosures will be rodent proofed.

4.16.2 All the aviaries will have double door entry mechanism to prevent escape of birds.

4.16.3 Breeding facilities will be located behind the displays.

4.16.4 Appropriately designed water pools will be provided in aviaries housing water birds.

4.16.5 Nest boxes and hiding places will be provided in all aviaries.

4.16.6 Appropriate perches shall be provided through actual planting of small trees, shrubs/providing dead branches or wood etc.

4.16.7 The aviaries should have adequate shade and protection from rains.

4.16.8 Naturalistic environmental enrichment suitable for each species will be maintained.

4.17 Exhibit Barrier Guidelines

Design of exhibit barriers will be finalized carefully considering the site conditions with a view to preserve the existing natural landscape of the site.

4.18 Plantings and Botanical Estate

4.18.1 Nearly all of the new 80ha site will be reforested with appropriate indigenous species.

4.18.2 Nurseries for presently unavailable native species must be established. A permanent nursery for growing of browse and fodder for animals must also be established.

4.18.3 Extensive soil testing and perhaps treatment will be required.

4.18.4 Systematic removal of existing bamboo plantings, integrated with staged construction of infrastructure (roads, water features and utilities, all must be integrated with planting operations.

4.18.5 Accurate records must be kept (with species and GPS locations for all tree plantings) for future use.

4.18.6 All these works must also be timed with the monsoons and with care taken to minimize soil erosion or flooding.

4.18.7 This will require a detailed planting strategy and guideline program which will be undertaken upon approval of the master plan.

4.18.8 Thereafter detailed planting will be undertaken with the construction of the various zoo projects based upon the established theme subjects and areas along with supporting needs like irrigation and drainage.

4.18.9 Over time, as new trees mature and ground and under storey become shaded large scale replacement plantings will be required.

4.18.10 Also plants damaged by zoo animals and visitors must constantly be replaced.

4.19 Nature Education Trail

The site selected for establishment of zoological park at Puthur provides ample opportunities for organizing trekking programmes for interested public, especially, younger generation, on guided routes. A well laid trek path with informative and interpretative signs can be provided for taking the interested persons through the forest area and onto the hilltop conservation areas which are not used for display of animals and birds. Taking trekkers through forest areas supporting different types of vegetation, topography, will provide them with enriching and rewarding experience.

4.20 Visitor Amenities

Although the area chosen for establishment of Zoological Park is undulating and uneven in topography, efforts shall be made to lay roads and walkways meant to be used by visitors along contours so that all visitors irrespective of young or old can walk through the park at ease.

4.20.1 A covered walkway (for protection from sun and rain) will connect the entry plaza with the Biodiversity Centre and Great Aviary.

4.20.2 Appropriately shaded rest places (most with drinking water points) will be provided every 200 metres or less and at convenient places along steeper pathways.

4.20.3 Ample and clean restrooms (five locations).

4.20.4 Convenient zoo tram stations (five locations) are proposed for visitors. These are often grouped with restrooms.

4.20.5 Appropriate signage systems will aid in way finding and visitor information (such as directions and walking distances) will be provided to enable visitors to move at ease and learn more about animals and birds under display and the need to conserve them.

4.20.6 An elevated covered view point will be provided looking into the Great Aviary with terraces overlooking the Central Garden and Biodiversity Centre.

4.21 Animal Health and Zoo Service facilities

The Animal Health and Zoo Service facilities, located along an existing village road situated at the South – Eastern portion of the

zoo site will have the veterinary hospital, quarantine area, zoo store and kitchen block, rescue centre, postmortem and waste disposal facilities. The sites earmarked for the said facilities are shown in the master layout plan.

4.21.1 Modern infrastructure, equipment and methods lead by a full time veterinarian will be ensured for the animals and birds on display.

4.21.2 Veterinary hospital with all facilities including inpatient wards, operation theatre, laboratories, squeeze cages etc. together with most modern hospital equipments and appliances will be made available.

4.21.3 Incubation and hatchery facilities shall be provided in the hospital or adjacent vivarium or conservation research centre.

4.21.4 Services of experienced, competent veterinary surgeons an assisting staff shall also be made available in the hospitals.

4.21.5 Post-mortem facilities and appropriate biological waste disposal sites will be provided.

4.21.6 Zoological specimens of dead zoo animals will be preserved as appropriate for use by interested universities and museum taxidermists.

4.22 Handling of Rescued Animals

Incidences of wild animals and birds straying out into human habitations have increased with shrinkage of their natural habitats due to uncontrolled urbanization. Unusual and unexpected appearance of strayed animals and

birds amid humans has always created situations unpleasant to each other resulting untold sufferings and hardships to the former. Most human encounters with straying animals and birds end up with serious injuries or even death to such animals and birds. It is generally seen that the strayed animals are dealt with badly due to inherent fear in human beings about the animals, especially, snakes due mainly to their ignorance about such animals.

Monkeys, snakes, turtles & tortoises barn owls, elephant calves, monitor lizards, leopards, tigers etc. are found to have frequent interface with human beings in this part of the country, and it is appropriate to be in preparedness to attend to such animals and birds under distress to rescue and rehabilitate them suitably. The Thrissur Zoological Park should therefore aim at.

4.22.1 **Creation of Awareness among public**

This should be one of the thrust areas for Zoo education wing to focus. The issues associated with rescue and rehabilitation of animals in distress should be included in the syllabus being followed for nature education camps for school and college students organized by Kerala Forest Department. The Zoo education wing may even organize outreach programmes in this regard to members of nature clubs existing in various educational institutions in Kerala.

4.22.2 **Rescuing and nurturing them in Zoological Park**

Rescuing should be limited to only those animals and birds which necessarily warrant human interventions. Unnecessary capturing of animals or birds should not be encouraged at all. The Kerala Forest Department, The Zoological Park and animal

welfare organizations should take rescue calls from public in the most coherent manner. In spite of who takes the call, the injured animals and birds should be brought to rescue centre in the Zoological Park for treating them. Only animals and birds which require medical intervention need only to be physically captured, nurtured in the Zoo, and released into their natural habitat. Adequate infrastructural facilities such as incubators, treatment cages, squeeze cages for monkeys, cats, medicines, dispensing appliances, surgery facilities, post operative care facilities etc. should be put in place in the Rescue Centre attached to the Zoological Park. A detailed account of animals rescued, nurtured and released should be maintained at the Rescue Centre on daily basis.

4.22.3 Rehabilitation of Rescued Animals

All rescues made should end up with rehabilitation in the wild so that wild animals are reverted back to ecosystems. To ensure that the rehabilitation efforts made are successful, interventions made should be minimum and non –invasive. Protocols should be developed and meticulously followed for rehabilitation of animals and birds in their natural habitats so as to ensure long term success of such efforts. Veterinary wing and animal upkeep and management wings in the Zoological Park should jointly shoulder this responsibility.

4.23 Measures for prevention of infectious/contagious diseases

Experience in zoo management suggests that the healthcare of wild animals in captivity is better managed with least medical interventions. Preventive medicine is the most fundamental aspect of the medical care of captive wild animals. In zoological parks, the

value of the old adage: 'an ounce of prevention is worth a pound of cure' is magnified by the difficulty of applying extensive medical treatments to many wild animals and the tendency for clinical science to conceal symptom manifestation until a disease is well advanced.

4.23.1 Foot and Mouth Disease, Feline Panleucopenea, Tuberculosis, Avian influenza, swine fever, etc. are some of the infectious diseases which at times become epidemics in zoos. Preventive medicine has many components. Obvious measures are required to be taken by the zoo veterinarians, such as vaccination of each species against appropriate diseases (e.g. large felids may be vaccinated against Feline Panleucopenea). Routine examination for parasites, especially endo-parasites should be performed in most instances on regular basis. Many parasites may be commensal or non – pathogenic in the wild, whereas they may produce diseases in captivity due to repeated exposure and stress. Control of vermin in preventing transmission of diseases within a captive population is very crucial.

4.23.2 Newly acquired animals should be isolated from the established collection in such a manner as to prevent physical contact, transmission via fomites, and contamination via aerosols and drainage. Such separation should be obligatory for primates, small mammals, birds and reptiles and should be attempted wherever possible with larger mammals. Generally, the new arrivals will be quarantine for a minimum of 30 days. The keepers attending to the quarantine should not be working for the main collection. Similarly, the utensils being used at quarantine should not be used for serving main collection

under display.

4.23.3 The ground staff including keepers, veterinary assistants should be vigilant keeping close vigil on all the zoo animals to immediately identify incidences of any healthcare problems of animals in the zoo, so that such animals can be isolated then and there for appropriate treatment. This will help in effectively preventing spread of diseases among other animals in the zoo thereby preventing such diseases to assume the dimension of epidemics.

4.24 Quarantine Facility

4.24.1 For screening animals reaching the zoological park either by acquisition from other zoos or through rescue. This facility is located away from other animal areas and drained separately.

4.24.2 The quarantine facility will meet all basic requirements for housing, monitoring health, treatment and environmental enrichment of smaller animals arriving at the park. However large animals such as hippopotamus, gaur or giraffe and large herds of deer or antelope or troops of primates will need to be quarantined elsewhere.

4.25 Zoo Stores and Kitchen Block

4.25.1 This ground level building contains facilities for receiving, storing, preparing and distributing food for animal diets and bedding.

4.25.2 This will include both cool and cold storage.

4.25.3 It will include a vivarium for production of insects, rodents and other special foods needed by zoo animals.

4.25.4 Special attention will be given in design and operations to minimize waste caused by vermin.

4.26 Administrative infrastructure facilities

The two level administrative building houses offices of the Director of Zoological Park, Assistant Director, and offices of education, human resources, garden, marketing and public relations, accounting and security. Space is also provided for meeting rooms and archival space. Residential accommodation facilities for officers, staff and workers are required to be created in the same premises where the directorate is proposed. The site proposed for developing these facilities is located at North – Eastern portion as shown in the master lay-out plan.

A Guest House with required facilities is also proposed in the Master Plan. The guest house will be constructed outside the Zoo premises.

4.27 Horticulture Centre

4.27.1 The two-level structure located adjacent to directorate shall be provided for the horticulture in charge, senior staff and records.

4.27.2 Equipment and tool maintenance and storage areas are provided on the lower floor.

4.27.3 Small plant propagation centre and nursery including well designed green house.

4.27.4 Scientific (active) composting centre, including bio-gas generation if feasible.

4.27.5 Recycle Centre and incinerator if needed.

4.28 Conservation Zone

In keeping with Central Zoo Authority requirements and good practice, about approximately 95 ha of land (60%) of the full site is set aside for reforestation, land conservation and research.

4.28.1 This land will be reforested using only indigenous plant species.

4.28.2 However suitable areas also will be used for growing animal fodder and browse to help assure the zoo's food security. Appropriate soil and water conservation works shall be carried out to protect the conservation zone.

4.28.3 Researchers, maintenance personnel and escorted groups will have access.

4.28.4 No permanent structures will be built in this area (other than hidden water tanks).

4.28.5 Up to 70% of the site will be considered for zoo expansion in future, leaving 30% (41.6 ha) as a permanent conservancy.

4.29 Replacement of bamboo with indigenous species

4.29.1 Almost the entire area proposed for development of the new Zoological Park now supports 30 year old bamboo plantation. The present stock of the thorny bamboo is fairly good and dominates other miscellaneous growth. As gregarious flowering of the existing bamboo crop is likely soon, its gradual replacement with suitable local natural species of plants assumes greater significance. If timely replacement of bamboo does not take place, implementation of Master Plan becomes difficult. The bamboo when flowered would pose a dangerous fire

hazard. The suggested plan of action could be as given here under.

4.29.2 **Production of seedlings of suitable species**

Local native species including evergreen, semi-evergreen species shall be chosen and tall seedlings of around 2 meters height shall be raised in big containers ready for planting by 2015-16. Tree species which are harmful to captive animals in whatever form, should not be chosen for planting. No ornamental plants, shrubs, herbs shall be planted either. The first batch of seedling should be ready for planting by 2015-16, when civil works proposed during the first phase of zoo development is completed. This will help in landscaping of the zoo premises before the zoo is open to visitors at the end of first phase of the zoo getting over.

4.29.3 **Clear felling bamboo and planting native species**

The existing bamboo growth has to be extracted either departmenta ly or through the Hindustan News Print Ltd. Company in phased manner from the year 2013-14 to 2017-18. Whereas the bamboo growth over the area intended for first phase development of zoo during 2013-14 to 2015-16 is to be clearfelled from 2013-14 to 2014-15, the bamboo growth over the areas intended for second phase of zoo development needs to be clearfelled during 2016-17 to 2017-18. It is also required to carry out complete uprootal of bamboos over the area intended for zoo development. Lest smooth execution of civil works may not be possible. Thus actual planting of miscellaneous species carefully chosen shall be

undertaken twice during 2015-16 and 2017-18.

The bamboo growth over the hilltops which are proposed to be protected as "conservation zone" in the Master Plan can be tackled during the later years of zoo development. However, it is desirable to replace bamboo before it flowers. This will also help in preventing the imminent risk of population explosion of rats as also fire hazard in the area. It is suggested that the Social Forestry Wing of the Forest Department may undertake nursery as well as planting and maintenance works in the zoo area with the technical support of Tropical Botanical Garden and Research Institute, Palode and the Kerala Forest Research Institute, Peechi. However, necessary financial provision has been included in the Master Plan for the Zoological Park.

4.30 Feed, Water Supply and Electricity Supply

The primary responsibility of the park management is to ensure scientific and nutritive diet, potable water, timely health care and naturalistic housing for all the animals and birds on display in the park so as to keep them healthy and to enable visitors to see and enjoy healthy animals in natural settings. The park management will have no stone unturned to accomplish this responsibility. Required number of transport vans for transport and distribution of feed, water, medicines etc are required to be purchased and operated on daily basis.

4.30.1 Water Supply

Water is the most important resource required for running a zoological park. Ensuring round the clock uninterrupted supply of

water both for drinking purpose and for upkeep and maintenance of enclosures, gardens etc. needs to be given topmost priority. For meeting the water requirement of the proposed zoological park, the following water sources are identified.

4.30.1.1 Puthur/Manali River.

4.30.1.2 Wells/Bores drilled at park site (if feasible).

4.30.1.3 Quarry sites storing water

4.30.1.4 Peechi reservoir

4.30.1.5 Fetching water from Peechi reservoir through the existing community irrigation channel into storage ponds or ground water storage during monsoon periods when village farmers no longer need this water is one option.

4.30.1.6 Fetching water from Puthur/Manali river by laying pipelines, construction of storage tanks at zoo site is another option.

4.30.1.7 Rain water harvesting (and treatment) from car parks, roof areas, park areas and dry moats.

4.30.1.8 Water conservation measures like minimizing wash down through uses of mulch or sand bedding, use of dry or water conserving toilets and many other methods.

4.30.1.9 It is proposed that the required quantity of water from the above sources is filtered and pumped to large storage tanks hidden on the central hilltops.

4.30.1.10 A suitable gravity distribution network will deliver water

from the storage tanks to use points.

4.30.1.11 Booster pumps can be installed wherever needed to ensure required water pressure.

4.30.1.12 The supply network will seek to use a loop configuration following service roads to equalize pressure and as a fire hydrant system.

4.30.1.13 A separate “grey water” System will also be provided

4.30.2 Electricity Supply

4.30.2.1 Wherever feasible power will be generated on site through solar collectors, bio-fuel generation and other sustainable means

4.30.2.2 Power-supply lines will be buried along service and tram roads whenever possible

4.31 Waste Water Treatment

Keeping in view increasing scarcity of water with passage of time, it is proposed to install waste water treatment plants.

4.31.1 For treatment of huge quantity of waste water generated from animals such as hippos, crocodiles, water fowl and wading birds.

4.31.2 The feasibility of using bio-engineered naturalistic reed bed treatment systems supplemented with conventional filtration if needed will also be tested.

4.31.3 Water used for cleaning animal enclosures, hospital, quarantine facility, public toilets etc. also needs to be treated.

4.31.4 The "grey water" so treated can be reused for all purposes other than drinking i.e. cleaning enclosures, filling pools of aquatic animals and birds, irrigation and garden maintenance, fire fighting and so on.

4.31.5 Potable water treatment systems will also be installed.

4.31.6 These water treatment plants will be professionally designed and the work executed under complete supervision of expert hands in the field so as to ensure proper supply of water without any interruption on long term basis.

4.32 "Green" Design

The new Thrissur Zoo will embrace long-term sustainable design and operational practices not only to help prepare the park for coming global and local trends in climate change and future water, energy and food scarcity, but also as a popular and highly visible model of international best practice and conservation action.

4.33 Development Phasing

The new Thrissur Zoological Park will be developed in two primary phases as envisioned within the scope of this master plan.

4.33.1 **Phase One** (approximately 27.5 ha)

4.33.1.1 Overall site grading and installation of roads, primary path, perimeter barrier and utilities.

4.33.1.2 Bamboo removal and reforestation.

4.33.1.3 Zoo Service Centre.

4.33.1.4 Temporary animal holding for moving animals from present zoo

4.33.1.5 Parking, entry facilities and orientation overlook.

4.33.1.6 Phase 1 tram road and stations, toilets and rest shelters.

4.33.1.7 Central Gardens and crocodile displays.

4.33.1.8 Biodiversity Centre (reptile, nocturnal, aquarium and conservation building).

4.33.1.9 Great Aviary

4.33.1.10 Spotted Deer Terrace.

4.33.1.11 Sambar deer display.

4.33.1.12 Rainforest display (lion-tail macaque, Nilgiri langur, giant squirrel and leopard exhibits).

4.33.1.13 Tiger and lion displays.

4.33.1.14 Gaur, nilgai and hog deer display.

4.33.1.15 African grasslands and wetlands areas etc.

4.33.2 Phase Two (approximately 38 ha)

4.33.2.1 Ongoing bamboo removal and reforestation.

4.33.2.2 Additional tram road and station construction.

4.33.2.3 Additional visitor path, rest shelter and toilet construction.

4.33.2.4 Bear display

4.33.2.5 Nilgiri tahr display.

4.33.2.6 Vulture aviary.

4.33.2.7 Grasslands ground birds display.

4.33.2.8 Wild dog (dhole) display.

4.33.2.9 Wolf and hyeana

4.33.2.10 Pheasant and exotic bird aviaries etc.

4.33.3 Phase Three (size to be determined in the future).

4.33.3.1 Expansion of parking area

4.33.3.2 Aquatic exhibits including Otter display in acquired private land

4.33.3.3 Expand visitor amenities.

4.33.3.4 Develop safari park on adjacent hill area (Approximate 60 ha Mannur Reserve Forest site) etc.

4.33.3.5 Offsite captive breeding of species

4.33.3.6 Development of fodder resources

Chapter – 3

PERSONNEL PLANNING

5.1 This chapter deals with the human power, skill and expertise required to run the zoological park smoothly towards realizing the objective, mission and ultimately vision set for the park. The Zoological Park should have the following divisions for smooth functioning.

5.1.1 Administration

5.1.2 Animal upkeep and Management

5.1.3 Conservation Breeding and Research

5.1.4 Veterinary Health Care

5.1.5 Animal Housing & Maintenance

5.1.6 Zoo Education

5.1.7 Security

5.1.8 Horticulture, Gardening and Plantation

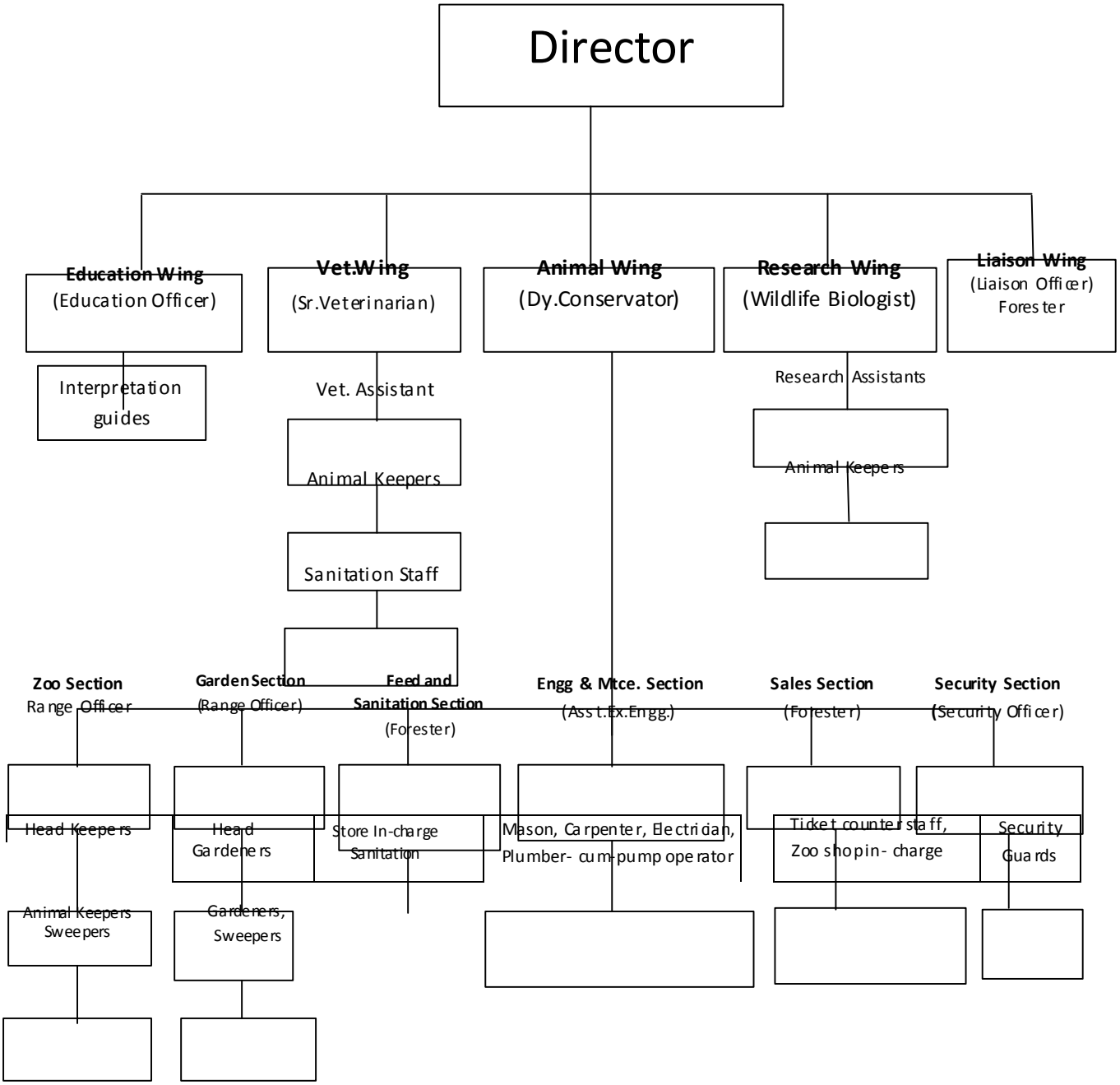
5.1.9 An officer of and above the rank of Conservator of Forests as decided by the Government may be appointed as the Director of the Zoological Park. He shall be assisted by a team of ministerial staff in the Directorate. The administrative set up proposed for the Zoological Park is given in the next page.

5.1.10 The animal upkeep and management, Conservation Breeding & Research, Veterinary Health Care, Animal Housing and Maintenance, Zoo Education, Security, Horticulture, Gardening & Plantation divisions will be headed by the officials as shown in the administrative set up given as above. The staffing pattern proposed in the Directorate of Zoological park as well as for various divisions in the Zoological Park is detailed in **Annexure – I.**

Considering the extent and nature of various works required to be attended to in the proposed Zoological Park, it is estimated that a minimum of 173 number of personnel at various levels including supervisory and cutting edge staffs are required to be employed for smooth functioning of the park, once the Zoological Park starts functioning in full-fledged manner. However, half of this strength needs to be put in place at the end of completion of the first phase of Park development i.e. from 2016-17.

Out of the said 173 positions, 134 are proposed to be employed under contract system, 33 by recruitment from PSC against new posts to be created and the balance 06 positions to be filled by redeployment from the Kerala Forest Department and Kerala Animal Husbandry Department as shown in Annexure – I.

PROPOSEDADMINISTRATIVESETUP



Chapter – 4

DISASTER MANAGEMENT

6.0 The forest area chosen for establishing Puthur Zoological Park is of hilly nature having *steep* undulating topography. By and large developmental activities including display of animals and birds, visitor roads and pathways, rest place and toilets, service facilities etc. are proposed in hill slopes having comparatively smoother gradient. Steeper slopes of hillocks are proposed to be protected and maintained as such without much disturbance as conservation areas in order to protect and preserve the entire site.

To ensure protection to the entire zoo area including the conservation Zone which provides natural setting for the Zoo per se, appropriate measures have to be taken against likely incidences of fires, floods and cyclones or, earthquakes. The following measures are therefore, proposed to tackle the above eventualities.

6.1 Fires

6.1.1 **Creating fire control lines in the Conservation Zone:** Fire lines having 6 meter width should be created and maintained from December to May every year in the traditional manner it has been practiced in natural forests of Kerala. The fire lines should be aligned along contours dividing the entire hillocks into effective blocks. This is achieved by removal of undergrowth and all inflammable material in a strip of 6 meter width along contours. These fire lines have to be maintained throughout the fire season.

6.1.2 **Installation of fire extinguishers:**

Fire extinguishers should be installed in all the keeper

galleries of animal enclosures, hospital premises, offices and other central places where they can be used to extinguish fires if take place in Zoo premises. All the zoo staff should be trained in operating the fire extinguishers.

6.1.3 A system of **fire hydrants** will be built along service roads.

6.1.4 On noticing fires inside the zoo, there should be a system of sound alarm to gather required number of staff who are trained in operating fire equipment installed at every keeper's gallery in the animal enclosures and arrange to douse the fire.

6.1.5 Concurrently, inform the fire service immediately about the fire break in the zoo. Conduct the fire force to the exact spot of fire occurrence for dousing fire, on their arrival.

6.1.6 Stop entry of visitors temporarily into zoo to enable the zoo management to carry out fire prevention measures smoothly. Direct the visitors who are already inside the Zoo to move to safer location.

6.1.7 As far as possible drive all animals into the night shelters for safety.

6.1.8 Keep round the clock watch and ward to ensure that fires have been completely put off and the zoo is safe.

6.1.9 Document all the events and take corrective steps if required for tackling similar contingencies in future.

6.2 Floods and Cyclones

Considering the topography of the zoo site, and its location away from water sources such as rivers, lakes, seas etc, incidences of floods are unlikely. However, incidences of cyclones and excessive downpour of rains due to cyclones are not ruled out. While aligning and designing animal enclosures, special care should be taken to

see that the natural course of rain water drainage is not obstructed so as to pave way for smooth drainage. During cyclones or heavy rains, the animals under display should be taken to night shelters for safety and zoo management may consider closure of the park for visitor till such time the situation is normal.

6.3 Earthquake

It is a well documented and established fact that animals sense earthquakes ahead of human being and display abnormal behaviour. As soon as the Management comes to know about such incidences, the animals should be released to open paddock areas from closed door confinements such as night shelters. This will afford more safety to animals. This aspects shall also be kept in mind while selection of construction materials and construction of enclosures.

6.4 Law and Order Breakdown

Going by experience of zoo management for decades, law and order breakdown in zoo premises has never been a serious problem. However it is suggested that the Director of the proposed Thrissur Zoological Park, Puthur deploys efficient security system so as to enable the zoo management to meet any small problems that may arise in the park. It is also suggested that a good liaison is maintained with the local police authorities to tackle such possible situations.

6.5 Chain of Command

A team of zoo staff/officials comprised of around 10 members drawn from different cadres such as animal keepers, veterinary, security, research, horticulture faculties led by an Assistant Curator of Zoo should be designated as 'Disaster Management Squad' and existence of such a squad is notified for the entire zoo

management. The squad should be trained in reputed expert institutions for tackling any disaster that may happen in the zoo – fire, cyclones/floods, earthquakes etc. In the absence of the designated Asst. Curator leading the squad, another Asst. curator should also be designated to shoulder the responsibilities.

6.6 Conducting mock drill

Our experience reveals that procedures are written, system are put in place, but, it all remains on paper, if it is not put to use. Therefore, to ensure the chain of command works at all times of need, frequent mock drill exercises for each of the most probable natural disasters such as fire should be conducted in the Zoo. Such frequent exercises should improve the preparedness of zoo management to tackle untold problems happening in the zoo.

Chapter – 5

CONTINGENCY PLANS

7.0 Zoo management calls for round the clock attention and care of managers as it involves precious speechless lives. Any delay or laxity on the part of the management for whatever reasons will cost heavily and therefore, a definite mechanism should be in place to deal with any contingency that may arise in Zoos. Thus, it is absolutely necessary to be in preparedness always to tackle the contingencies listed below.

7.1 Escape of Animals from Enclosures

7.1.1 As a preventive measure, all animals, especially, tiger, lion, panther, rhino, bears, bisons should be secured in night shelters on daily basis after the zoo is closed for visitors. Proper registers should also be maintained recording entries with regard to taking delivery and handing over of keys for each and every enclosure every day. The keys should be kept in suitable place under proper security.

7.1.2 Zoo management should ensure that no external disturbance is caused to animals in the zoo. Fire crackers, load speakers, load music and the like disturbances should be avoided in the vicinity of zoos.

7.1.3 As a curative measure curator/asst. curator of zoo should get the zoo inspected by security staff and ensure that no animal under display has come out of the enclosure before the zoo visitors are allowed entry in to the zoo.

7.1.4 If any animal (s) is found to have come out of enclosure (s), the Asst. curator should immediately inform the security

and the veterinarian. He should concurrently try to re-direct the animal in to their respective enclosures with the help of zoo staff.

7.1.5 If big cats, rhino or bison are involved, such animals should be tranquilized captured and released into the respective enclosures, if it is convinced that no better alternative is workeable.

7.1.6 The following appliances and equipments should be kept under safe custody of the zoo veterinarian and used at times of need.

- Tranquilizing kit including blow pipe/gun and drugs
- Public address system
- Emergency lights

7.2 Snake bite

7.2.1 As a preventive measure, keepers trained in snake handling should be employed at reptile house. Adequate measures should be taken to safeguard zoo visitors from likely event of snake bites by providing adequate warning sign boards at all sites of snake display. Effective stand of barriers should be installed to provide safer distance to visitors.

7.2.2 In case of snake bites,first aid treatment should be given to the patient, in case it is a poisonous snake.

7.2.3 The zoo should procure snake anti-venom vials and keep under the custody of zoo veterinarian for use when need arises.It is desirable to have good liaison with a local medical practioner so as to facilitate use of anti venom immediately on the patient without loosing time.

7.2.4 The following appliances and equipments should be kept at the disposal of the zoo veterinarians for use in case of snake bites.

- Anti venom vials – 5 Nos.
- Fridges – 1 No
- First aid box – 1 No.

7.3 Break down of power supply

7.3.1 There should be back up arrangement in the zoo either in the form of inverter or similar alternate arrangement. Such arrangement should be available in important locations such as zoo store, nocturnal house and other selected locations where availability of power is required always.

7.3.2 There should be adequate number of torch lights, emergency lights or solar powered lighting equipments available to meet emergency requirements.

7.3.3 The asst. curator in charge of animal housing and maintenance should be in charge of the above mentioned equipments.

7.4 Arrangement of food in case of contingency

Going by the experience of zoo management at least since 10 years in the state, supply of diet for zoo animals and birds has never been severely affected except on selected days of strikes/hartals and so on. However the following measures are suggested to overcome the problem of breakdown of feed supply if happens.

7.4.1 Required extent of land will be identified and used for raising fodder/grasses. Fodder species of shrubs and trees such as jack, grewia (chadachi), caryota palm, grasses etc. including bamboo shall be raised and protected as 'feed reserve'. This should serve as alternate feed source.

7.4.2 Steps may be pursued by the Director of Zoological Park for fetching dietary items when required to be procured from neighbouring states of Tamil Nadu or Karnataka. The

assistance of the local zoo officials in the concerned state may be sought to ensure that quality items are procured.

7.4.3 Cold storage facilities should also be installed in zoo store for stocking dietary articles for carnivore animals.

7.4.4 Feeding carnivores on alternate days or providing reduced diet without affecting animal health can be examined and practised during contingency period.

7.4.5 Use of artificial supplements can be resorted to during contingent period, if feasible.

7.4.6 The following tools and appliances shall be kept under the custody of the Asst.Curator in-charge of Animal Upkeep and Management division.

Aluminium ladder-2
Bill hooks-5
Sickles for cutting grass-12
Ropes for tying grass/fodder
Hand cart for transport of feed-1

7.5 Fighting among animals

7.5.1 Fighting among wild animals is more common on captive conditions, but, it is life threatening in case of tiger, lion, rhinoceros, etc, as these animals fight to death. This happens when incompatible animals are put together either without knowing about them or by mistakes on the part of the ground staff attending on them. Generally, such errors happen when more than one person is engaged in handling such animals in the enclosures – transferring the animals from cubical to cubical. Hence, the role of supervisory staff in carrying out such animal transfers is of paramount importance.

7.5.2 Incompatible animals should be socialized and made familiar with each other by keeping them in adjacent but separate cubicles for a long time.

7.5.3 When animals are already found fighting with each other, they should be separated by directing water spray with high pressure towards them. In certain cases it is possible to separate them by distracting their attention by physically disturbing them by whatever best means at a given situation.

7.5.4 Visitors may be kept away from such locations where infighting among animals is encountered so that the contingency situation can be managed by the zoo staff smoothly.

7.5.5 High pressure water sprayers, Bamboo culms etc. should be kept under the custody of Asst. Curator in-charge of Animal Upkeep and Management Division.

7.6 Monkey and Dog menace

Menace of monkeys and dogs is commonly encountered in most of the zoos functioning adjacent to or within the forest areas. Since the proposed Thrissur Zoological Park is located adjacent to a large block of forest land, the problem of free-ranging monkeys, mongooses, dogs, etc. are likely to be encountered. The following measures are suggested to keep this problem under check.

7.6.1 All the gates opening into the zoological park including the entry – exist plaza should be kept under constant vigil by the security staff to ensure that no animals from outside enter in.

7.6.2 No waste including the leftover food from the animal enclosures or the food items carried by the visitors should be allowed to be left in the zoo premises.

7.6.3 Visitors should be cautioned/educated through education and interpretation programmes not to feed animals inside the zoo, especially free ranging animals like monkeys.

7.6.4 Free ranging animals such as dogs and monkeys should be captured as and when they are seen inside the zoo premises by appropriate methods of capture and they should be subjected to population control measures.

7.6.5 The following tools and equipments may be kept ready for tackling the menace of monkeys and dogs.

Capture cage for monkeys - 2 nos.

Rubber bullets and guns - 2 nos.

Chapter – 6

CAPACITY BUILDING

8.0 The Zoological Park should be managed based on most advanced scientific principles. No captive facility can be run, therefore, without equipping and empowering every member involved in park management with updated knowledge and skills in zoo management. Therefore capacity building training programmes should be planned and implemented as a priority, beginning even before zoo construction commences.

8.1 Professionalizing Zoo Workers

Zoo employment at all levels must become more professional, more respected, better paid and more sought after. While zoo animals and visitors will be the greatest beneficiaries, elevation of skills and respect will certainly benefit everyone and is essential for providing an international standard of care and service.

8.2 Out-of-State and International Training

Selected officials entrusted with the matters connected with designing and construction of animal enclosures, health care infrastructure, captive breeding, research and education facilities, necessarily require exposure to recent developments in the said fields. Hence, it is suggested that selected officials are sent to most modern zoos in India and abroad for gaining firsthand knowledge, experience and exposure.

8.3 Recruitment of Women at all Levels

The entry of professional women into the zoo industry labour force

forty years go in North America had a very substantial beneficial impact on the quality of animal care and all other areas of the work. Today there are many women serving as zoo directors and presidents of national zoo organizations. Thrissur Zoological Park shall recruit and train women to join the staff at all levels for which they are qualified.

8.4 Induction Training Programmes

Presently, there is no system of imparting training to zoo personnel at the time of their entry to service. As Zoological Parks are institutions where staff and officers are required to handle both speechless animals and birds on the one hand and zoo visitors coming from different backgrounds on the other, the staff and officials in the Zoological Park should necessarily be given induction training at the time of their entry to the institution. The duration of training programmes, institutions where training programmes have to be organized etc. should be worked out by the Director, Zoological Park.

Since the new zoo will take several years to build, keeper training should be organized at once so that key staffs are fully prepared for their duties when the park opens.

8.5 In-Service Training Programmes

It is also necessary to organize in-service training courses to all the staff and officers working in the Zoological Park such as animals keepers, supervisory staff, garden staff, veterinary surgeon, educational officers and others so as to enable them to understand and use developing technology in the field of management of animals and birds in terms of their housing, nutrition and Health care, and management of zoo visitors etc. In-service training programmes may also expose the zoo staff to the advanced

protocols followed for captive breeding of endangered animals and birds. The training programmes can be availed from both institutions within the country and as well as outside. It is desirable to depute selected zoo staff to visit well maintained zoos in the World with the objective of bringing home and follow the best practices.

Chapter – 7
FINANCIAL FORECAST FOR
IMPLEMENTATION OF THE MASTERPLAN

The project may require a minimum of five years for implementation in the field, if everything goes well including finance. As it is not possible to forecast the project cost accurately due to the reasons such as unconventional nature of works, remote worksite, drastic variations in cost of construction materials etc., the financial forecast given hereunder may be taken as only indicative. However, as per the forecast given hereunder, it would require Rs.29612 lakhs of funds for implementing the plan.

Phase I

Sl. No	Particulars of Works	Amount in Crores
1.	Arrival and Parking Zone	23.2737
2	Orientation Centre	11.3178
3	Biodiversity Centre	24.9774
4	Great Aviary Exhibit	18.1999
5	Nilgiri Langur Exhibit	5.4403
6	Lion Tailed Macaque Exhibit	5.0699
7	Gaur Exhibit	7.1921
8	Crocodile & Gharial exhibit	6.0676
9	Deer Exhibit1	5.5180
10	Deer Exhibit 2	5.6161
11	Deer Exhibit 3	7.3566
12	Leopard Exhibit	9.0525
13	Tiger Exhibit	9.2139
14	Asiatic Lion Exhibit	9.9271
15	Common Roads & Tram Service	6.2904
16	Common Amenities	4.7796
17	Conservation Area	2.5017
	Total	**161.7946**

Sl. No	Particulars of Works	Amount in Crores
1	Giraffe, Zebra , Eland and Ostrich Exhibits	26.37
2	Hippopotamus Exhibit	7.52
3	Dhole Exhibit	4.51
4	Raptor Birds Aviary	5.60
5	Himalayan Black bear Exhibit	16.18
6	Sloth Bear Exhibit	17.52
7	Nilgiri Tahr Exhibit1	13.10
8	Nilgiri Tahr Exhibit2	12.91
9	Grass land Bird Exhibits	5.49
10	Golden Jackal Exhibit	4.77
11	Hyena Exhibit	4.51
12	Common Amenities	4.42
13	Conservation Area	0.87
14	Zoo compound wall	10.55
	Sub Total	**134.32**
(B)	**Water Supply and Drainage**	**19.50**
(C)	**Power supply and Distribution**	**20.00**
(D)	**Land Acquisition**	**10.00**
	Total	**183.82**

Other works

Sl. No.	Particulars of work	Amount in Crores
1	Zoo Services and Administration	13.4354
2	Animal shifting	0.95
	Total	**14.3854**

Grand total: 360 Crore

Chapter – 8

ACTION PLAN FOR IMPLEMENTATION OF MASTERPLAN

The year-wise income and expenditure statement of Puthur Zoo is detailed below.

10.1 Year-1

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
1	Visitor entry fee-adults	50	800000	40000000	
2	Visitor entry fee- children	20	200000	4000000	
3	Visitor entry fee- groupsof studenst from schools	500	1000	500000	
4	Usage charges of camera	100	200000	20000000	
5	Usage charges of handycameras	200	100000	20000000	
6	Video camera shooting charges	25000	750	18750000	
7	Tramway ticket charges	25	800000	20000000	
8	Special charges for photo session	200	300000	60000000	
9	Income from cafeteria	150	800000	120000000	
10	Income from curio shop	100	400000	40000000	
11	Income from Zoo Dormitory	200	6000	1200000	
	Total			**344450000**	
12	**Expenses @ 60 percent of the income**			**206670000**	
13	**Net income**			**137780000**	
14	Income from life Membership Collection	5000	10000	50000000	
15	Income from zoo sponsorship	100000	100	10000000	
16	**Annual Net Income**			**197780000**	

10.2 Year - 2

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
1	Visitor entry fee-adults	50	1000000	50000000	

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
2	Visitor entry fee- children	20	300000	6000000	
3	Visitor entry fee- groupsof studenst from schools	500	2000	1000000	
4	Usage charges of camera	100	250000	25000000	
5	Usage charges of handycameras	200	150000	30000000	
6	Video camera shooting charges	25000	1000	25000000	
7	Tramway ticket charges	25	1000000	25000000	
8	Special charges for photo session	200	400000	80000000	
9	Income from cafeteria	150	850000	127500000	
10	Income from curio shop	100	500000	50000000	
11	Income from Zoo dormitory	200	10000	2000000	
	Total			**421500000**	
12	**Expenses @ 60 percent of the income**			**252900000**	
13	**Net income**			**168600000**	
14	Income from life Membership Collection	5000	20000	100000000	
15	Income from zoo sponsorship	100000	100	10000000	
16	**Annual Net Income**			**278600000**	

10.3 Year – 3

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
1	Visitor entry fee-adults	50	1200000	60000000	
2	Visitor entry fee- children	20	400000	8000000	
3	Visitor entry fee- groupsof studenst from schools	500	2000	1000000	
4	Usage charges of camera	100	300000	30000000	
5	Usage charges of handycameras	200	200000	40000000	
6	Video camera shooting charges	25000	1200	30000000	
7	Tramway ticket charges	25	1200000	30000000	
8	Special charges for photo session	200	500000	100000000	
9	Income from cafeteria	150	900000	135000000	
10	Income from curio shop	100	500000	50000000	

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
11	Incoem from Zoo dormitory	200	12000	2400000	
	Total			**486400000**	
12	**Expenses @ 60 percent of the income**			**291840000**	
13	**Net income**			**194560000**	
14	Income from life Membership Collection	5000	25000	125000000	
15	Income from zoo sponsorship	100000	150	15000000	
16	**Annual Net Income**			**334560000**	

10.4 Year – 4

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
1	Visitor entry fee-adults	75	1400000	105000000	
2	Visitor entry fee- children	30	500000	15000000	
3	Visitor entry fee- groupsof studenst from schools	800	2500	2000000	
4	Usage charges of camera	150	350000	52500000	
5	Usage charges of handycameras	250	300000	75000000	
6	Video camera shooting charges	35000	1500	52500000	
7	Tramway ticket charges	50	1300000	65000000	
8	Special charges for photo session	300	600000	180000000	
9	Income from cafeteria	200	1000000	200000000	
10	Income from curio shop	200	600000	120000000	
11	Income from zoo dormitory	300	13000	3900000	
	Total			**870900000**	
12	**Expenses @ 60 percent of the income**			**522540000**	
13	**Net income**			**348360000**	
14	Income from life Membership Collection	10000	25000	250000000	
15	Income from zoo sponsorship	100000	150	15000000	
16	**Annual Net Income**			**613360000**	

10.5 Year – 5

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
1	Visitor entry fee-adults	75	1500000	112500000	
2	Visitor entry fee- children	30	600000	18000000	
3	Visitor entry fee- groupsof studenst from schools	800	3000	2400000	
4	Usage charges of camera	150	400000	60000000	
5	Usage charges of handycameras	250	350000	87500000	
6	Video camera shooting charges	35000	1700	59500000	
7	Tramway ticket charges	50	1500000	75000000	
8	Special charges for photo session	300	700000	210000000	
9	Income from cafeteria	200	1200000	240000000	
10	Income from curio shop	200	650000	130000000	
11	Income from Zoo dormitory	300	14000	4200000	
	Total			**999100000**	
12	**Expenses @ 60 percent of the income**			**599460000**	
13	**Net income**			**399640000**	
14	Income from life Membership Collection	10000	30000	300000000	
15	Income from zoo sponsorship	100000	175	17500000	
16	**Annual Net Income**			**717140000**	

10.6 Year – 6

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
1	Visitor entry fee-adults	75	1550000	116250000	
2	Visitor entry fee- children	30	650000	19500000	
3	Visitor entry fee- groupsof studenst from schools	800	3500	2800000	
4	Usage charges of camera	150	600000	90000000	
5	Usage charges of handycameras	250	375000	93750000	
6	Video camera shooting charges	35000	1800	63000000	

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
7	Tramway ticket charges	50	1600000	80000000	
8	Special charges for photo session	300	750000	225000000	
9	Income from cafeteria	200	1400000	280000000	
10	Income from curio shop	200	700000	140000000	
12	Incoem from Zoo dormitory **Total**	300	15000	4500000 **1114800000**	
12	**Expenses @ 60 percent of the income**			**668880000**	
13	**Net income**			**445920000**	
14	Income from life Membership Collection	10000	30000	300000000	
15	Income from zoo sponsorship	100000	175	17500000	
16	**Annual Net Income**			**763420000**	

10.7 Year – 7

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
1	Visitor entry fee-adults	100	1575000	157500000	
2	Visitor entry fee- children	40	700000	28000000	
3	Visitor entry fee- groupsof studenst from schools	1000	3500	3500000	
4	Usage charges of camera	200	650000	130000000	
5	Usage charges of handycameras	400	400000	160000000	
6	Video camera shooting charges	45000	1800	81000000	
7	Tramway ticket charges	75	1700000	127500000	
8	Special charges for photo session	350	800000	280000000	
9	Income from cafeteria	300	1500000	450000000	
10	Income from curio shop	250	750000	187500000	
11	Income from zoo dormitory	400	15000	6000000	
	Total			**1611000000**	
12	**Expenses @ 60 percent of the income**			**966600000**	
13	**Net income**			**644400000**	
14	Income from life Membership Collection	15000	30000	450000000	

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
15	Income from zoo sponsorship	200000	175	35000000	
16	**Annual Net Income**			**1129400000**	

10.8 Year – 8

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
1	Visitor entry fee-adults	100	1600000	160000000	
2	Visitor entry fee- children	40	750000	30000000	
3	Visitor entry fee- groupsof studenst from schools	1000	3500	3500000	
4	Usage charges of camera	200	700000	140000000	
5	Usage charges of handycameras	400	450000	180000000	
6	Video camera shooting charges	45000	2000	90000000	
7	Tramway ticket charges	75	1800000	135000000	
8	Special charges for photo session	350	900000	315000000	
9	Income from cafeteria	300	1700000	510000000	
10	Income from curio shop	250	750000	187500000	
11	Incoem from Zoo dormitory	400	15000	6000000	
	Total			**1757000000**	
11	**Expenses @ 60 percent of the income**			**1054200000**	
12	**Net income**			**702800000**	
13	Income from life Membership Collection	15000	30000	450000000	
14	Income from zoo sponsorship	200000	175	35000000	
15	**Annual Net Income**			**1187800000**	

10.9 Year – 9

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
1	Visitor entry fee-adults	100	1600000	160000000	
2	Visitor entry fee- children	40	750000	30000000	

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
3	Visitor entry fee- groupsof studenst from schools	1000	3500	3500000	
4	Usage charges of camera	200	700000	140000000	
5	Usage charges of handycameras	400	450000	180000000	
6	Video camera shooting charges	45000	2000	90000000	
7	Tramway ticket charges	75	1900000	142500000	
8	Special charges for photo session	350	950000	332500000	
9	Income from cafeteria	300	1900000	570000000	
10	Income from curio shop	250	750000	187500000	
11	Income from Zoo dormitory	400	15000	6000000	
	Total			**1842000000**	
12	**Expenses @ 60 percent of the income**			**1105200000**	
13	**Net income**			**736800000**	
14	Income from life Membership Collection	15000	30000	450000000	
15	Income from zoo sponsorship	200000	175	35000000	
16	**Annual Net Income**			**1221800000**	

10.10 Year – 10

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
1	Visitor entry fee-adults	150	1600000	240000000	
2	Visitor entry fee- children	50	750000	37500000	
3	Visitor entry fee- groupsof studenst from schools	1200	3500	4200000	
4	Usage charges of camera	250	700000	175000000	
5	Usage charges of handycameras	500	450000	225000000	
6	Video camera shooting charges	50000	2000	100000000	
7	Tramway ticket charges	100	1900000	190000000	
8	Special charges for photo session	400	950000	380000000	
9	Income from cafeteria	350	1900000	665000000	
10	Income from curio shop	300	750000	225000000	

Sl. No	Item	Rate (Rs)	Number	Amount (Rs)	Remarks
11	Income from Zoo dormitory	500	16000	8000000	
	Total			**2249700000**	
12	**Expenses @ 60 percent of the income**			**1349820000**	
13	**Net income**			**899880000**	
14	Income from life Membership Collection	20000	30000	600000000	
15	Income from zoo sponsorship	300000	175	52500000	
16	**Annual Net Income**			**1552380000**	

10.11 Source of Finance

The Central Zoo Authority generally advance 100 percent financial assistance for putting up open enclosures for endangered species of animals and birds as also for improving animal nutrition and health care etc. subject to availability of funds with them.

10.12 Implementing Agency

The State Government has decided to implement the master plan as approved by the competent authority through the Kerala Forest Department. As the works involved in developing the Zoological Park are unconventional in nature and have to be executed very carefully without damaging the naturality of the site and the works have to be carried out and completed within the stipulated time, an appropriate mechanism has to be put in place for implementation of the plan. It is suggested that the most competent agency is entrusted with the implementation of the plan so as to ensure best end results. As the zoological park being proposed is the latest one in the country, the park when established should have the most modern enclosure designs and facilities for animals and birds in the park.

Although, the locations at which enclosures for animals and birds are to be constructed has been indicated in the master layout plan, each enclosure/aviary has to be carefully designed by expert and experienced zoo designers. Designing individual enclosures is extremely crucial and

extraordinarily important in the context of the site selected for establishing the zoological park being sloppy and undulating in nature. If due importance is not given to this aspect, it may result in total destruction of the naturality and aesthetics of the site selected for the zoological park. Therefore, it is suggested that actual designing of individual enclosures/aviaries should be done by expert and experienced zoo designers. The Master layout approved by the Central Zoo Authority shall be followed in locating animal enclosures, visitor facilities, animal health care facilities, administrative infrastructure etc. However, minor deviations shall always be permitted in this regard subject to actual field conditions.

Management of Zoological Park involving feeding, healthcare and upkeep of wild animals and birds has been a challenge to park management as slightest laxity on its part at any time will result in far reaching consequences. Park management cannot afford to take chance; whether it is a matter of animal housing or it is a matter of supply of feed and water or, a matter dealing with healthcare. Safety of visitors in the park can never be ignored either. At every step, timely action has to be initiated and problems of any sort arising in the park solved then and there. Park management cannot postpone any work for want of routine sanction or approval of competent authority required as per rules. Keeping in mind the peculiar and emergent nature of works and contingencies that arise in Zoological Parks, it is advisable to put in place an appropriate mechanism which enables park management to run the park smoothly. Therefore, it is suggested that a committee may be constituted with full delegation of powers for granting of sanction/approval for works required to be carried out in connection with the park. This arrangement will avoid inordinate delay generally encountered by park management in obtaining government sanction/approval in a routine manner for carrying out works. The proposed committee may be designated as Empowered Committee having the following composition as the Government may deem fit. Separate orders may be issued by the Government for constitution of the

following committee with appropriate delegation of powers.

1	Hon'ble Minister for Forests, Cinema and Sports, Government of Kerala	Chairman
2	Local Member of Parliament	Member
3	Local MLA	Member
4	Representative of the CZA, Govt. of India	Member
5	Principal Secretary, Forests & Wildlife	Member
6	Principal Secretary, Finance	Member
7	PCCF & Chief Wildlife Warden	Member
8	Secretary, Planning & Economic Affairs	Member
9	Chief Engineer (Buildings & Local Works)	Member
10	Chief Engineer, Kerala Water Authority	Member
11	Director, Department of Museums and Zoos	Member
12	Director, Animal Husbandry Department	Member
13	Director, KFRI	Member
14	Director, Thrissur Zoological Park	Member Convener

10.12.1 Experience in hand on management of zoos reveals that larger involvement of local people, people's representatives, local experts; NGO's, all stakeholders, scientists etc. will help zoo management in running the zoological park more efficiently. It would also give rise to mutually harmonious and friendly working atmosphere in smooth functioning of zoological park as well. Therefore, it is suggested that the following committees involving the above mentioned individuals/agencies are constituted by the Government of Kerala.

10.12.2 The Advisory Committee for advising the zoo management

10.12.3 The Expert Committee for advising the zoo management on technical matters.

10.12.4 The State Government may decide about the constitution and

mandate of the above committees and orders issued separately.

10.12.5 The State Government may entrust a team of officials and staff drawn from the Forest Department on redeployment with the implementation of the Master Plan. The team may be comprised of an officer of the rank of Assistant Conservator of Forests, a Range Forest Officer, two Foresters, a Civil Engineer and other technical hands the government may deem necessary.

C.S.Yalakki.IFS,
Addl. Prl. Chief Conservator of Forests
(Vigilance) &
Special Officer, Zoological Park, Thrissur.

Counter Signed

V.Gopinathan, IFS,
Prl. Chief Conservator of Forests (Wildlife) &
Chief Wildlife Warden, Kerala.

Annexure – I

Proposed staffing pattern

1. Administration Division

Sl. No	Designation	No. of posts	Pay scale	Suggested mode of appointment	
				Direct	Out sourcing
1	2	3	4	5	6
1.	Director (Conservator of Forests)	1	37400 - 67000, GP 8900		Redeployment from KFD
2.	Senior Superintendent	1	18740 - 33680	PSC	
3.	Head Accountant	1	14620 - 25280	PSC	
4.	U.D. Clerk	4	13210 - 22360	PSC	
5.	L.D. Clerk	4	9940 - 16580	PSC	
6.	U.D. Typist	1	13210 - 22360	PSC	
7.	L.D. Typist	1	9940 - 16580	PSC	
8.	Driver	2	10480 - 18300		Contract
9.	Peon	2	8730 - 13540	PSC	
	Total	**17**		**14**	**3**

2. Animal upkeep and Management Division

Sl. No.	Designation	No. of posts	Pay scale	Suggested mode of appointment	
1	2	3	4	5	6
1	Curator of Zoo (Deputy Conservator of Forests)	1	15600-39100		Redeployment from KFD
2	Assistant Curator (Range Officer)	3	20740 - 36140	PSC	
3	Research scientists specialized in reptiles, amphibians etc.	1	24040 - 38840		Contract
4	Foresters	3	13900 - 24040	PSC	
5	Accountant	1	16180 - 29180	PSC	
6	U.D.Clerk	1	13210 - 22360	PSC	
7	L.D. Clerk	1	9940 - 16580	PSC	
8	Store in charge	1	9940 - 16580	PSC	
9	Zoo kitchen staff	6	8960-14260		Contract
10	Animal Keepers	40	8960 - 14260		Contract
11	Zoo Supervisor (Head Keepers)	4	9190-15780		Contract
12	Sanitation workers	5	8500 - 13210		Contract
13	Drivers	2	10480 - 18300		Contract
14	Peon	2	8730 - 13540	PSC	
15	Ticket counter staff	3	13210 – 22360	PSC	
16	Zoo Shop keeper	1	13210-22360		Contract
	Total	**75**		**15**	**60**

3. Conservation Breeding and Research Division

Sl. No.	Designation	No. of posts	Pay scale	Suggested mode of appointment	
1	2	3	4	5	6
1	Scientific Officer	1	Rs.30,000/- (Consolidated sum)		Contract
2	Wildlife Biologist	2	Rs.30,000/- (Consolidated sum)		Contract
3	Research Assistants	4	Rs.10480-18300/-		Contract
	Total	**7**			**7**

4. Veterinary Wing

Sl. No.	Designation	No. of posts	Pay scale	Suggested mode of appointment	
1	2	3	4	5	
1	Sr. Veterinarian	1	20740 – 36140		Deputation from Animal Husbandry Department
2	Jr. Veterinarian	1	20740 – 36140		
3	Compounder	1	10480 – 18300		
4	Lab Assistant	1	10480 – 18300		Contract
5	Animal Keepers	3	8960 – 14260		Contract
6	Sanitation worker	1	8500 – 13210		Contract
7	Sweeper	1	8500 – 13210		Contract
8	Peon	1	8730 – 13540	PSC	
	Total	**10**		**1**	**9**

5. Zoo Education Division

Sl. No.	Designation	No. of posts	Pay scale	Suggested mode of appointment	
1	2	3	4	5	6
1	Education Officer	1	21240 – 37040	PSC	
2	Education Assistant	2			Contract
	Total	**3**		**1**	**2**

6. Animal Housing & Maintenance Division

Sl. No.	Designation	No. of posts	Pay scale	Suggested mode of appointment	
1	2	3	4	5	6
1	Assistant Conservator of Forests	1	24040-38840		Redeployment from KFD
2	Range Officer	1	20740-36140	PSC	
3	Junior Engineer (Civil)	1			Contract
4	Electrician	1	9940 – 16580		Contract
5	Mason	2	8730 – 13540		Contract
6	Plumber cum Pump Operator	1	8960 – 14260		Contract
	Total	**7**		**1**	6

7. Security section

1	Security Supervisor	2	Rs. 500/day		Contract
2	Security guards	8	Rs. 400/day		Contract
	Total	**10**			**10**

8. Horticulture, Gardening & Plantation Division

Sl. No.	**Designation**	**No. of posts**	**Pay scale**	**Suggested mode of appointment**	
1	2	3	4	5	6
1	Range Officer	1	20740-36140	PSC	
2	Garden Supervisor	3	9940-16580		Contract
3	Gardeners	20	8960-14260		Contract
4	Sweepers	20	8960-14260		Contract
	Total	**44**		**1**	**43**

Abstract

Total no. of posts to be created	No. of posts to be filled by redeployment from Department of Forests and Department of Animal Husbandry, etc.	No. of posts to be filled up by contract system	No. of post to be filled through PSC
39	**06**	**134**	**33**

Annexure –II

THRISSUR ZOOLOGICAL PARK, PUTHUR

Animal Collection Plan

Sl. No	Species	Present stock with the Zoo				Proposed collection				Animals to be acquired or removed				Remarks
		M	F	U.S	**Total**	M	F	U.S	**Total**	M	F	U.S	**Total**	
1	Spotted deer	23	105	0	**128**	6	14	0	**20**	17	91	0	**108**	Excess deers to be released
2	Hog deer	14	22	0	**36**	6	14	0	**20**	6	14	0	**20**	Animals in stock are hybrids
3	Sambhar deer	18	45	13	**76**	6	14	0	**20**	12	31	13	**56**	Excess animals to be released
4	Nilgiri Tahr	0	0	0	**0**	3	6	0	**9**	3	6	0	**9**	Animals to be acquired
5	Black buck	0	0	0	**0**	3	6	0	**9**	3	6	0	**9**	Animals to be acquired
6	Nilgai	0	0	0	**0**	2	4	0	**6**	2	4	0	**6**	Animals to be acquired
7	Indian Gaur	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**	Animals to be acquired
8	Himalayan black bear		1	0	**1**	1	2	0	**3**	1	2	0	**3**	Animals to be acquired, the existing animal is blind

9	Sloth bear	0	0	0	**0**	1	2	0	**3**	1	2	0	**3**	Animals to be acquired.
10	Leopard	2	1	0	**3**	2	2	0	**4**	0	1	0	**1**	Animals to be acquired
11	Tiger	1	0	0	**1**	2	2	0	**4**	1	2	0	**3**	Animals to be acquired
12	Asiatic lion	1	0	0	**1**	2	3	0	**5**	1	3	0	**4**	Animals to be acquired
13	Cheetah	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**	Animals to be acquired
14	Dhole	0	0	0	**0**	2	3	0	**5**	2	3	0	**5**	Animals to be acquired
15	Hyaena	0	0	0	**0**	2	3	0	**5**	2	3	0	**5**	Animals to be acquired
16	Jackal	2	6	0	**8**	2	6	0	**8**	0	0	0	**0**	Existing animals can be displayed
17	Hippopotamus	1	1	0	**2**	1	2	0	**3**	0	1	0	**1**	One animal to be acquired
18	Zebra	0	0	0	**0**	1	2	0	**3**	1	2	0	**3**	Animals to be acquired
19	Giraffe	0	0	0	**0**	1	2	0	**3**	1	2	0	**3**	Animals to be acquired
20	Eland	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**	Animals to be acquired

21	Bonnet Monkey	47	54	0	**101**	3	6	0	**9**	44	48	0	**92**	92 Excess animals to be released in wild
22	Rhesus monkey	2	0	0	**2**	2	4	0	**6**	0	4	0	**4**	4 female to be acquired
23	LTM	1	0	0	**1**	2	4	0	**6**	1	4	0	**5**	5 Animals to be acquired
24	Nilgiri langur	0	0	0	**0**	2	4	0	**6**	2	4	0	**6**	6 Animals to be acquired
25	Common langur	0	0	0	**0**	2	4	0	**6**	2	4	0	**6**	6 Animals to be acquired
26	Porcupine	1	1	4	**6**	1	1	4	**6**	0	0	0	**0**	Existing animals can be displayed in Nocturnal Home
27	Jungle cat	2	2	0	**4**	2	2	0	**4**	0	0	0	**0**	Existing animals can be displayed in Nocturnal Home
28	Palm civet	5	1	0	**6**	5	1	0	**6**	0	0	0	**0**	Existing animals can be displayed in Nocturnal Home
29	Small Indian civet	0	0	0	**0**	2	3	0	**5**	2	3	0	**5**	Animals to be acquired for Nocturnal Home

30	Slow loris	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**	Four animals to be acquired for Nocturnal Home
31	Fruit bats	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**	Animals to be acquired for Nocturnal Home
32	Giant squirrel	0	0	0	**0**	2	3	0	**5**	2	3	0	**5**	Animals to be acquired
									REPTILES					
33	Mugger crocodile	1	0	0	**1**	2	2	0	**4**	1	2	0	**3**	3 Animals to be acquired
34	Gharial crocodile	3	0	0	**3**	1	3	0	**4**	2	3	0	**5**	Animals to be acquired/ exchanged
35	Minitor lizard	0	0	1	**1**	2	2	0	**4**	0	2	1	**3**	3 Animals to be acquired
36	Chamelion	0	0	3	**3**	0	0	0	**0**	0	0	3	**3**	Animals to be removed
37	Star tortoise	1	0	0	**1**	3	3	0	**6**	2	3	0	**5**	Animals to be acquired
38	Travancore tortoise	0	0	7	**7**	0	0	7	**7**	0	0	0	**0**	Existing animals to be display Reptile House

39	Soft shelled turtle	0	0	2	**2**	0	0	2	**2**	2	0	2	**4**	Two turtles to be acquired in reptile House
40	Python	0	0	3	**3**	0	3	3	**6**	0	0	0	**0**	To be displayed in Reptile House
41	King cobra	0	0	2	**2**	0	0	2	**2**	0	0	0	**0**	To be displayed
42	Cobra	0	0	7	**7**	0	0	4	**4**	0	0	3	**3**	Three snakes to be removed
43	Sand boa	0	0	5	**5**	0	0	5	**5**	0	0	0	**0**	The existing snakes can be displayed
44	Rat snake	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**	Two more to be acquired
45	Checkered keel back	0	0	1	**1**	0	0	4	**4**	0	0	3	**3**	Three more to be acquired
46	Russel's viper	0	0	2	**2**	0	0	4	**4**	0	0	2	**2**	Two more to be acquired
47	Trinket snake	0	0	1	**1**	0	0	3	**3**	0	0	2	**2**	Two more to be acquired
48	Vine snake	0	0	0	**0**	0	0	4	**4**	0	0	4	**4**	To be acquired
49	Krait	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**	To be acquired
50	Saw scaled viper	0	0	0	**0**	2	2		**4**	2	2	0	**4**	To be acquired

51	Anaconda	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**	To be acquired
						BIRDS								
52	Brahminy kite	0	0	5	**5**	0	0	5	**5**	0	0	0	**0**	To be displayed
53	Black kite	0	0	1	**1**	2	2	1	**5**	2	2	0	**4**	4 birds to be acquired
54	Barn owl	0	0	8	**8**	0	0	8	**8**	0	0	0	**0**	Existing birds to be displayed in Nocturnal House
55	Brown fish owl	0	0	10	**10**	0	0	10	**10**	0	0	0	**0**	Existing birds to be displayed
56	Mottled wood owl	0	0	3	**3**	0	0	6	**6**	0	0	3	**3**	Three birds to be acquired
57	Peal fowl	0	0	2	**2**	2	2	2	**6**	2	2	0	**4**	4 birds to be acquired
58	Rose ringed parakaet	0	0	22	**22**	0	0	22	**22**	0	0	0	**0**	To be displayed
59	Alexandria Parakeets	0	0	0	**0**	5	10	0	**15**	5	10	0	**15**	Birds to be acquired
60	Spotted doves	0	0	0	**0**	5	10	0	**15**	5	10	0	**15**	Birds to be acquired

61	Malabar grey horn bill	0	0	0	**0**	5	10	0	**15**	5	10	0	**15**	Birds to be acquired
62	Great Indian Hirnbill	0	0	0	**0**	2	4	0	**6**	2	4	0	**6**	Birds to be acquired
63	Spoonbill	0	0	0	**0**	3	7	0	**10**	3	7	0	**10**	Birds to be acquired
64	Black ibis	0	0	0	**0**	5	10	0	**15**	5	10	0	**15**	Birds to be acquired
65	Grey Heron	0	0	0	**0**	3	6	0	**9**	3	6	0	**9**	Birds to be acquired
66	White stork	0	0	1	**1**	3	7	0	**10**	3	7	0	**10**	Nine birds to be acquired
67	White necked stork	0	0	2	**2**	3	7	0	**10**	3	5	0	**8**	Birds to be acquired
68	Painted stork	0	0	1	**1**	3	7	0	**10**	3	6	0	**9**	Birds to be acquired
69	Rosy pelican	0	0	2	**2**	3	5	2	**10**	3	5	0	**8**	Eight birds to be acquired
70	Purple Heron	0	0	1	**1**	0	0	0	**0**	0	0	1	**1**	To be shifted to Trivandrum Zoo
71	Little cormorant	0	0	3	**3**	0	0	0	**0**	0	0	3	**3**	To be shifted to Trivandrum Zoo
72	Night heron	0	0	1	**1**	0	0	0	**0**	0	0	1	**1**	to be released

73	Adjutant Stork	0	0	0	**0**	2	4	0	**6**	2	4	0	**6**	Birds to be acquired
74	Ostrich	0	0	0	**0**	3	5	0	**8**	3	5	0	**8**	Birds to be acquired
75	Cockattoo	0	0	0	**0**	3	5	0	**8**	3	5	0	**8**	Birds to be acquired
76	Hyacinth Macaw	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**	Birds to be acquired
77	Scarlet Macaw	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**	Birds to be acquired
78	Greenwinged Macaw	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**	Birds to be acquired
79	Blue and gold macaw	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**	Birds to be acquired
80	Golden Pheasant	0	0	0	**0**	2	2	0	**4**	2	2	0	**4**	Birds to be acquired
81	Silver pheasant	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**	Birds to be acquired
82	Khaleej pheasant	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**	Birds to be acquired
83	Lady amhrest Pheasant	0	0	0	**0**	3	3	0	**6**	3	3	0	**6**	Birds to be acquired

84	Emu	1	2	0	**3**	1	2	0	**3**	1	2	0	**3**	The existing birds can be displayed
85	Mascovi ducks	0	0	20	**20**	0	0	0	**0**	0	0	20	**20**	All birds to be removed
List of Animals Proposed for Conservation Breeding														
MAMMALS														
1	Nilgiri Langur	0	0	0	**0**	2	4	0	**6**	2	4	0	**6**	Animals have to be acquired
2	Lion -Tailed Monkey	0	0	0	**0**	2	4	0	**6**	2	4	0	**6**	Animals have to be acquired
3	Nilgiri Tahr	0	0	0	**0**	3	6	0	**9**	3	6	0	**9**	Animals have to be acquired
BIRDS														
1	Malabar grey hornbill	0	0	0	**0**	3	6	0	**9**	3	6	0	**9**	Birds have to be acquired
2	Nilgiri laughing thrush	0	0	0	**0**	3	6	0	**9**	3	6	0	**9**	Birds have to be acquired
3	Amphibians endemic to Western Ghats	Nil			The species which can be bred in captivity will be selected for captive breeding. The breeding will be carried out in the proposed Bio-diversity Centre appropriately designed for the purpose									To be collected from the Wild
4	Reptiles of lesser taxa endemic to Western Ghats	Nil												To be collected from the Wild

Annexure - III

Present collection of animals in Thrissur Zoo

Sl. No.	Name of Animals	Male	Female	Unsexed
1	Bear Himalayan Black	1	1	0
2	Black Buck	1	0	0
3	Calotes	0	0	1
4	Cat Jungle	1	2	0
5	Civet Common Palm – cat	2	1	3
6	Civet Indian Small	0	1	0
7	Cobra Indian (spectacled)	0	0	9
8	Collared Dove	0	0	1
9	Cormorant Little	0	0	4
10	Crocodile (Ghanial)	4	0	0
11	Crocodile Marsh (Mugger)	1	0	0
12	Deer Hog	8	8	15
13	Deer Sambar	13	26	13
14	Deer Spotted	32	98	26
15	Heron Night	0	0	1
16	Hippopotamus	1	1	0
17	Jackal	2	6	0
18	Kite Brahminy	0	0	2
19	Kie Pariah/Black Kite	0	0	7
20	Koel	1	0	0
21	Leopard (Panther)	4	0	0
22	Leopard (Black)	1	0	0
23	Lion	1	0	0
24	Macaque Bonnet	12	20	34
25	Macaque Lion Tailed	1	0	0
26	Macaque Rhesus	0	1	0
27	Mithun	2	1	0
28	Tortoise (Star)	0	0	1

Sl. No.	Name of Animals	Male	Female	Unsexed
29	Owl Barn	0	0	9
30	Owl Brown Fish	0	0	10
31	Owl Mottled wood	0	0	2
32	Parakeet Rose ringed	0	0	26
33	Peafowl	5	9	2
34	Pelican Rosy/White	0	0	2
35	Pigeon	0	0	24
36	Porcupine Indian	1	1	0
37	Python Indian –Rock	0	0	2
38	Sand Boa	0	1	2
39	Snake Rat / Dhaman	0	0	1
40	Stork Adjutant	0	0	1
41	Stork Painted	0	0	1
42	Stork white	0	0	1
43	Stork White Neck	0	0	1
44	Lesser whistling Teal	1	1	0
45	Tiger	2	0	0
46	Tortoise (Travancore)	0	0	2
47	Turtle (unidentified)	0	0	1

Annexure – IV

List of Animals endemic to Western Ghats

(After Wilson and Reeder, 2005)

Mammals

Scientific name	Common name	IUCN status
Semnopithecus hypoleucos	Black-footed Gray Langur	VU
Semnopithecus thersites	Gray Langur	EN
Trachypithecus johnii	Nilgiri Langur	VU
Funambulus tristriatus	Jungle Palm Squirrel	LC
Platacanthomys lasiurus	Spiny Tree Mouse	VU
Mus famulus	Servant Mouse	EN
Rattus ranjiniae	Ranjini's Rat	EN
Rattus satarae	Sahyadris Forest Rat	VU
Vandeleuria nilagirica	Nilgiri Vandeleuria	EN
Suncus dayi	Day's Shrew	EN
Latidens salimalii	Salim Ali's Fruit Bat	EN
Paradoxurus jerdoni	Jerdon's Palm Civet	LC
Viverra civettina	Malabar Civet	CR
Martes gwatkinsii	Nilgiri Marten	VU

4.3.2 Birds

Common Name	Scientific Name
Nilgiri Wood-Pigeon	*Columba elphinstonii*
Blue-winged Parakeet	*Psittacula columboides*
Malabar Grey Hornbill	*Ocyceros griseus*
Crimson-throated Barbet	*Megalaima rubricapillus*

Malabar Crested Lark	*Galerida malabarica*
Hill Swallow	*Hirundo domicola*
Nilgiri Pipit	*Anthus nilghiriensis*
Malabar Woodshrike	*Tephrodornis sylvicola*
Grey-headed Bulbul	*Pycnonotus priocephalus*
Flame-throated Bulbul	*Pycnonotus gularis*
Square-tailed Black Bulbul	*Hypsipetes ganeesa*
Nilgiri Thrush	*Zoothera neilgherriensis*
Nilgiri Blue-Robin	*Myiomela major*
White-bellied Blue-Robin	*Myiomela albiventris*
Wynaad Laughingthrush	*Garrulax delesserti*
Nilgiri Laughingthrush	*Trochalopteron cachinnans cachinnans*
Jerdon's Laughing-thrush	*Trochalopteron cachinnans jerdoni*
Kerala Laughing-thursh	*Trochalopteron fairbanki fairbanki*
Blanford's Laughingthrush Indian Rufous Babbler	*Trochalopteron fairbanki merdionale* *Turdoides subrufus subrufus*
Indian Rufous Babbler	*Turdoides subrufus hyperythrus*
Broad-tailed Grass-Warbler	*Schoenicola platyura*
Black-and-Orange Flycatcher	*Ficedula nigrorufa*
Nilgiri Flycatcher	*Eumyias albicaudata*
White-bellied Blue-Flycatcher	*Cyornis pallipes*
Nilgiri Flowerpecker	*Dicaeum concolor*
Small Sunbird	*Nectarinia minima*
Black-throated Munia	*Lonchura kelaarti*
Blyth's Starling	*Sturnus malabaricus blythi*
White-bellied Treepie	*Dendrocitta leucogastra*

4.3.3 Amphibians

Common Indian Toad - *Duttaphrynus melanostictus*
Indian Bull frog - *Hoplobatrachus tigerinus*
Common Kaloula - *Kaloula taprobanica*
Common gliding Frog - *Polypedates maculates*
Malabar Gliding Frog - *Rhacophorus malabaricus*
Menon's Caecilian - *Uraeotyphlus menoni*

4.3.4 Reptiles

a. Forest turtles and terrapins

Indian black turtle - *Melanochelys trijuga*
Indian star tortoise - *Geochelone elegans*
Travancore tortoise - *Indotestudo travancorica*
Indian flapshell turtle - *Lissemys punctata*
Cochin forest cane turtle - *Vijayachelys silvatica*

b. Marine Turtles:

Green sea turtle - *Chelonia mydas*
Hawksbill sea turtle - *Eretmochelys imbricata*
Olive ridley sea turtle - *Lepidochelys olivacea*
Leatherback sea turtle - *Dermochelys coriacea*

c. Lizards

Common green forest lizard - *Calotes calotes*
Bengal monitor - *Varanus bengalensis*

Annexure – V

5. Attendance Projections, Design Day, Parking and Other Visitor Requirements

These are conceptual projections based upon the popularity of zoos nationally and heightened local interest and are intended to give order of magnitude guides to facility planning

5.1. Estimated annual attendance at present small Thrissur Zoo: 800,000

5.2 Estimated first year annual attendance at new Thrissur Zoo: 1,000,000

5.3 Estimated annual attendance at completion of phase one: 1,500,000

5.4 Estimated annual attendance at completion of phase two: 2,500,000

5.5 Super peak attendance day: 20,000

5.6 Typical peak attendance day (average of 15 most popular days): 12,000

5.7 Design day (ideal busy day) attendance (85% of 12,000): 10,200 design day in-park (simultaneous) attendance (66% of 10,200): 7,600

5.8 Average daily attendance at completion of phase two: 7000

5.9 Parking assumption: 50% private cars (4 per car), 25% coaches (30 per coach), 25% motorcycles (2 per motorcycle),and parking turnover 1.5 times per day.

5.10 Parking demand phase one: 400 cars, 20 coaches, 400 motorcycles

5.11 Additional parking demand completion of phase two: 600 cars, 30 coaches, 600 motorcycles.

5.12 Toilet Requirements

Based upon North American zoo and theme park industry standards for Rest Room Requirements, the number of persons in the project at the same time during the near peak period (design day) determines the rest room requirements for a major attraction. Industry standards indicate a need for one fixture (toilet or urinal) per 65 to 100 persons. (One fixture per 80 would provide a close midway point)

The resulting number of fixtures will normally exceed most local or regional code requirements. Also cultural differences must be considered. However having sufficient toilets is an essential aspect of proper quest services and hospitality.

The final ratio of toilets to urinals to lavatories (including handicapped facilities) can be determined through the normal code ratios for the area. Family restrooms should also be considered.

In the US, the resultant number of fixtures is then divided among men's rest rooms (35 percent) and women's rest rooms (65 percent). For your project you would need about:

5.1.1 Phase one: Total annual attendance 1 million, design day in park attendance 3000 divided by 80 equals need for 40 toilet fixtures at these locations.

5.1.1.1 Entry 12 fixtures (5 male and 7 female).

5.1.1.2 Bio – Diversity Centre and tea house 16 fixtures (6 male and 10 female).

5.1.1.3 Africa 12 fixtures (5 male and 7 female).

5.1.2 Phase two: Total annual attendance 1.5 million, design day in park attendance 4500 divided by 80 equals 56 toilet fixtures at these locations.

5.1.2.1 Entry 20 fixtures (7 male and 13 female).

5.1.2.2 Biodiversity Centre and tea house 24 fixtures (10 male and 14 female).

5.1.2.3 Sambar area 20 fixtures (7 male and 13 female).

5.1.2.4 Africa 20 fixtures (7 male and 13 female).

5.1.2.5 Vulture Aviary 16 fixtures (6 male and 10 female).

The total is 95 toilets with 33 mens' and 62 womens' based on the US model.

ANNEXURE - VI

GOVERNMENT OF KERALA

ABSTRACT

Forest and wildlife Department- Establishment of Zoological Park in Paravattani Reserve at Puthur - *in principle* sanction – accorded - orders issued

FOREST &WILD LIFE(D) DEPARTMENT

GO(MS) 16/2012/F&WLD Dated,Thiruvananthapuram24.02.2012.

Read:- 1.Letter No.19-113/92/CZA dated,27.12.1996 of the Central Zoo Authority.
2.Letter No. 11-66/2004-FC dated, 13.11.2007 from the Government of India , Ministry of Environment and Forests.
3.Letter No.WL3-7551/95 dated,18.11.2011 and 06.01.2012 from the PCCF(WL) &Chief Wildlife Warden .
4.Letter No.WL3-7551/95 dated,17.01.2012 from theAPCCF(BDC)

ORDER

The existing zoo at Thrissur that houses nearly 40 species of animals and birds was established in 1912 and the same is facing acute shortage of space. The Central Zoo authority as per their letter read as 1st paper above had recommended to shift the Zoo to another location as per the norms prescribed under the Wild Life Protection Act 1972.

2.At the meeting held by the Hon'ble Chief Minister with the Minister(Forests,Sports&Cinema) and Minister(Welfare of Scheduled Tribes,Youth Affairs &Zoo) and the people's representatives of Thrissur on 8.07.2011 it was decided that "a zoological park can be established in the proposed land in Paravattani Reserve by the Forest Department to which the animals and birds of Thrissur zoo can be shifted for which the Principal Chief Conservator of Forests will prepare a detailed project to establish the park in phases after getting necessary clearance from the Central Zoo Authority(CZA) and the Ministry of Environment and Forest with an IFS officer in charge of the same". Accordingly Sri. C.S.Yalaki, Additonal Principal Chief Conservator of forests(BDC)was entrusted with the task of preparing a Master Plan for the purpose.

3.Sri. C.S.Yalaki, Additional principal Chief Cconservator of forests(BDC) submitted the draft Master Plan for the purpose incorporating the suggestions received at the meeting held under the chairmanship of the Minister(Forests,Sports&Cinema) at Guest House Thrissur on 13.12.2011.

4.As per the letter read as 4th paper above the Additonal Principal Cchief Conservator of forests(BDC) has also requested sanction of the Government for engaging Dr. John Coe , an internationally repowned expert in designing Zoos for consultancy services for finalising the Master

Plan of the proposed Zoological Park at an estimated cost of Rs. 3.50 lakhs(Rupees Three Lakhs Fifty Thousand only).

5.The Government have considered the draft Master Plan and are pleased to order the following:

1. *In principle* approval is accorded for establishing a Zoological park in the proposed land in Paravattani Reserve near Thrissur Town by the Forest Department winding up the Thrissur zoo.

2.Sanction is accorded for taking up the proposal for the establishmynt of Zoological Park in the forest land with Government of India for getting necessary clearances.

3.Sanction accorded to incur an expenditure of Rs. 3.5 lakh(Rupees Three Lakhs and fifty thousand only) towards consultancy charges in engaging Mr. John Coe an expert of international reputation in designing zoos, for finalising the Master Plan of the proposed Zoological Park.

4. Sanction is accorded for entrusting a competent agency for preparing the Draft Project Report of the project in tune with the activities proposed in the Master Plan following a competitive bidding route.

By order of the Governor

Sajen Peter,
Principal Secretary to Government.

The Principal Chief Conservator of Forests, Thiruvananthapuram
The Principal Chief Conservator of Forests (Wildlife) &CWW, Thiruvananthapuram
The Additional Principal Chief Conservator of Forests(BDC).
The Cultural Affairs Department.
The Accountant General(A&E/Audit), Thiruvananthapuram
The Finance Department(Vide:12817/AW-B1/12/Fin dated, 17.02.2012)
The Director, Information and Public Relation Department.
SF/OC.

Forwarded/By order

Section Officer

ANNEXURE – VII

जहाँ है हरियाली।
वहाँ है खुशहाली।।

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS
Central Zoo Authority

THROUGH REGISTERED POST

F. No. 19-113/92-CZA(140)(M)/1618 **DATE: 29.08.2012** 31

To

The Principal Chief Conservator of Forests (WL)
and Chief Wildlife Warden
Government of Kerala,
Thiruvananthapuram (Kerala).

Sub:- Master (layout) Plan of the relocation State Museum and Zoo to Puthur (Thrissur Zoological Park, Puthur), Kerala.

Ref:- (i) This office letter No. 19-113/92-CZA(140)(M)/1267 dated 24.07.2012.
(ii) Your office letter No. WL.3-7551/95 dated 14.08.2012.

Sir,

Reference is invited to above cited correspondence.

A copy of the approved Master (layout) Plan of the relocation State Museum and Zoo to Puthur (Thrissur Zoological Park, Puthur), Kerala duly authenticated by the Member Secretary on behalf of the Central Zoo Authority is enclosed herewith for your records.

You are requested to ensure that all the developmental activities in the Thrissur Zoological Park, Puthur must be in conformity with the approved Master (layout) Plan.

Yours faithfully,

29/08/12

(B.S. Bonal)
Member Secretary

Encl: as above

Bikaner House, Annexe VI, Shahjahan Road, New Delhi-110011
Phone : 011-23381585, 23073072, 23070375 (EPABX), Fax : +91-11-23386012
E-mail : cza@nic.in Website : http://www.cza.nic.in

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ANNEXURE - VIII

जहाँ है हरियाली।
वहाँ है खुशहाली।।

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS
Central Zoo Authority

THROUGH SPEED POST

F. No. 19-113/92-CZA(140)(Vol. I)(M)/2235 **DATE: 20.02.2013**

To

The Principal Chief Conservator of Forests (WL)
& Chief Wildlife Warden
Government of Kerala,
Thiruvananthapuram (Kerala).

Sub:- Master Plan of the Zoological Park at Puthur (Relocation of State Museum and Zoo, Thrissur).

Sir,

The Master Plan of the Zoological Park at Puthur (Relocation of State Museum and Zoo, Thrissur) was scrutinized by Expert Group on Zoo Designing of the Central Zoo Authority. Subsequently, the Master Plan was placed before 64th Meeting of the Technical Committee held on 5th February 2013 for its approval. The Technical Committee of the Central Zoo Authority had approved the Master Plan of the Zoological Park at Puthur (Relocation of State Museum and Zoo, Thrissur) as recommended by the Expert Group on Zoo Designing of the Central Zoo Authority subject to the condition that:-

(a) the responsibility of mobilizing the financial resources for implementation of the Master Plan will be the sole responsibility of the State Government or respective Zoo Operator, and
(b) the State Government or respective Zoo Operator should quantify the resources available for the implementation of Master Plan.

In order to send you a copy of the duly signed and approved Master Plan of the Zoological Park at Puthur (Relocation of State Museum and Zoo, Thrissur), you are requested to submit final version of Master Plan (three copies) which should contain the signatures with stamp of the Chief Wildlife Warden, Kerala and Director, of the Zoo incorporating copy of this letter too.

The soft copy of the digitized and amended Master Plan in any of the format i. e. AUTOCAD/ COREL DRAW/JPEG/TIFF/PDF files on a CD/DVD may also be submitted to this office at the earliest for uploading in website.

Please ensure that any development activities undertaken has to be in consonance with the approved Master (layout) Plan & Master Plan.

Yours faithfully,

(B. S. Bonal)
Member Secretary

Copy to Sh. C. S. Yallaki, Chief Conservator of Forests (Protection), Office of the Principal Chief Conservator of Forests, Government of Kerala, Thiruvananthapuram – 695 014 (Kerala).

(B. S. Bonal)
Member Secretary

Bikaner House, Annexe VI, Shahjahan Road, New Delhi-110011
Phone : 011-23381585, 23073072, 23070375 (EPABX), Fax : +91-11-23386012
E-mail : cza@nic.in Website : http://www.cza.nic.in

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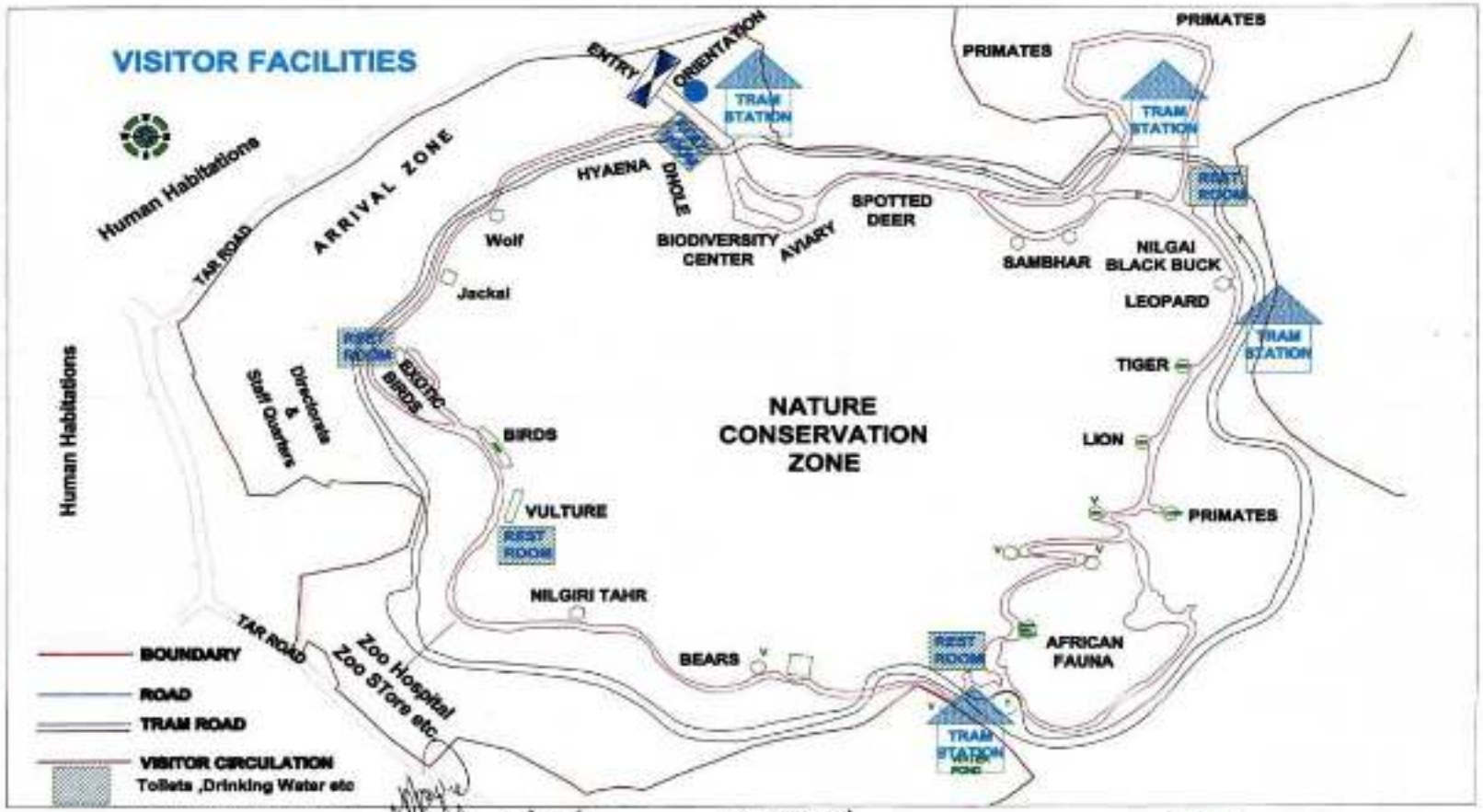
LOCATION PLAN
LEGENDS
KERALA
Thrissur
PALAKKAD DISTRICT
PALAKKAD DISTRICT
ZOO SITE
COIMBATORE DISTRIC (TAMIL NADU)
ERNAKULAM DISTRICT
IDUKI DISTRICT
N

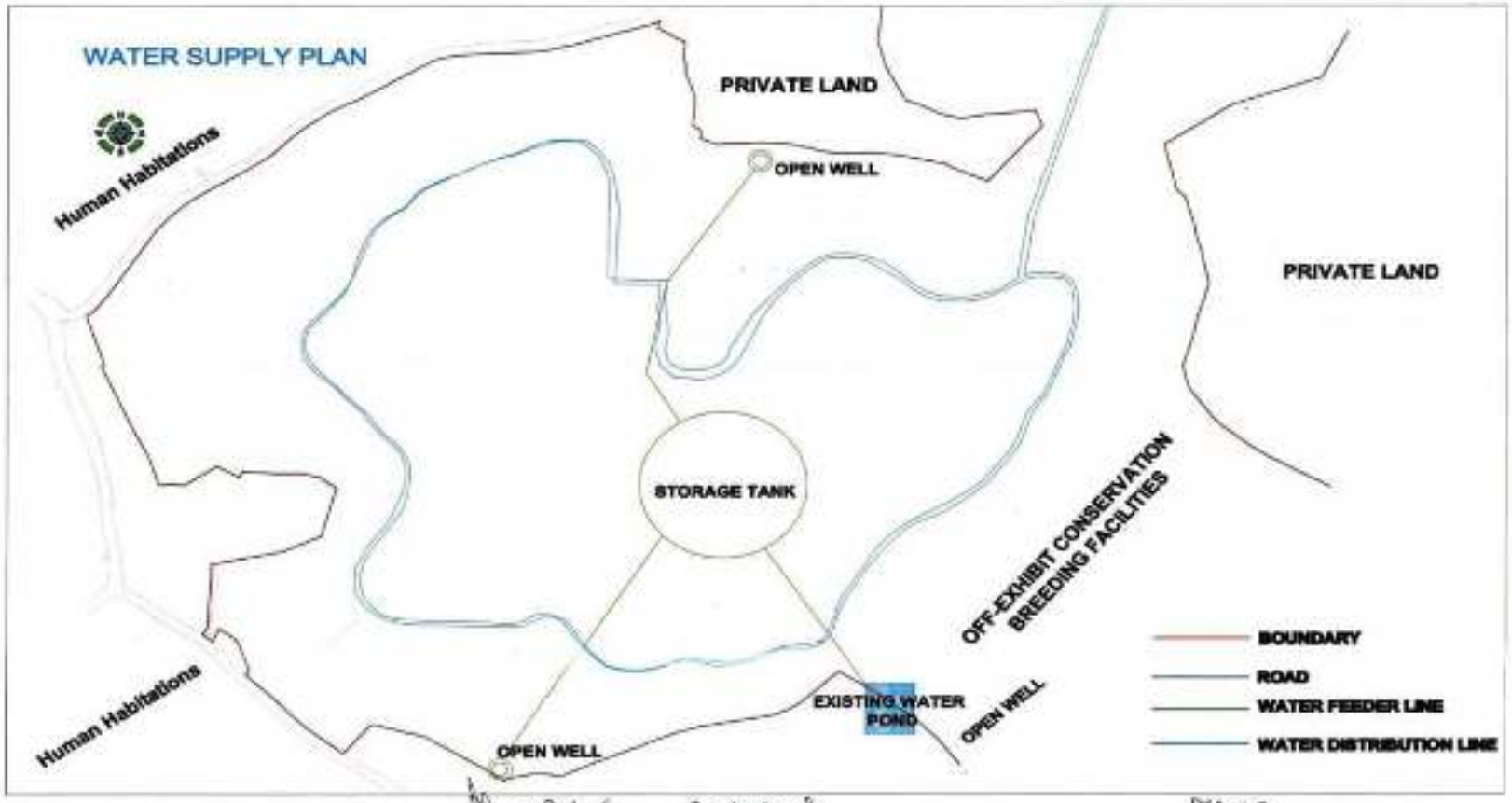

THRISSUR ZOOLOGICAL PARK
(Relocation of State Museum and Zoo, Thrissur)
FOREST AREA
Master Layout Plan
Scale1m = 40 mts
Dwg Ref No. 2819 - MR - 130809



B. S. BONAL
Member Secretary
Central Zoo Authority
(Ministry of Environment & Forest)
Govt. of India, New Delhi

V. GOPINATHAN, IFS.
Principal Chief Conservator of Forests (Wildlife) &
Chief Wildlife Warden
Forest Headquarters
Vazhuthacaud, Thiruvananthapuram-14

C.S. Yelshi, IFS
Additional Principal Chief Conservator of Forests
(Biodiversity Cell)
Thiruvananthapuram-14


WATER SUPPLY PLAN
Human Habitations
PRIVATE LAND
OPEN WELL
PRIVATE LAND
STORAGE TANK
OFF-EXHIBIT CONSERVATION BREEDING FACILITIES
Human Habitations
EXISTING WATER POND
OPEN WELL
OPEN WELL
BOUNDARY
ROAD
WATER FEEDER LINE
WATER DISTRIBUTION LINE
B. S. BORAL
Member Secretary
Central Zoo Authority
Ministry of Environment & Forests
Govt. of India, New Delhi
V. GOPINATHAN, IFS.
Principal Chief Conservator of Forests (Wildlife) &
Chief Wildlife Warden
Forest Headquarters
C.S. Yelakki IFS
Additional Principal Chief Conservator of Forests
(Biodiversity Cell)