

A MONUMENTAL FOLLY

NITI Aayog's Development Plans for
GREAT NICOBAR ISLAND

(An evolving archive of reports, information and documents)

PANKAJ SEKHSARIA

A MONUMENTAL FOLLY

NITI Aayog's Development Plans for
GREAT NICOBAR ISLAND

(An evolving archive of reports, information and documents)

PANKAJ **SEKHSARIA**



Flt. No. 05, 2nd Floor, Shri Dutta Krupa, 908, Deccan Gymkhana,
Pune 411 004, Maharashtra, India

Email: kalpavriksh.info@gmail.com | **Website:** www.kalpavriksh.org
psekhsaria@gmail.com

Credits:

Cover Photo: Pankaj Sekhsaria

A 2006 image of the earthquake and tsunami ravaged east coast of Great Nicobar Island

Design: Naveed Dadan

CONTENTS

Annexures [iv](#)

Introduction note [vi](#)

- [1. Leatherback nesting sites could be overrun by Andaman project](#) [01](#)
 - [2. NITI Aayog vision for Great Nicobar ignores tribal, ecological concerns](#) [04](#)
 - [3. Citizens file RTI applications on NITI Aayog plans for the Andaman & Nicobar islands](#) [07](#)
 - [4. Green panel allows Great Nicobar plan to advance](#) [09](#)
 - [5. Mystery deepens: NITI Aayog says it has no vision document for Great Nicobar](#) [12](#)
 - [6. Location, port design could spell doom for turtles at Galathea Bay: experts](#) [14](#)
 - [7. Experts concerned over centre's tourism, development plans for A&N Islands](#) [17](#)
 - [8. After approving Nicobar sanctuary denotification, WII says no expertise](#) [19](#)
- [Timeline of Developments](#) [21](#)

ANNEXURES

1. Swaminathan, A., Namboothri, N., and Shanker, K. (2019). Tracking Leatherback Turtles from Little Andaman Island, *Indian Ocean Turtle Newsletter* 29, p. 8-10
2. Swaminathan, A., Thesorow, S., Watha, S., Manoharakrishnan, M., Namboothri, N., and Chandi, M. (2017). Current Status and Distribution of Threatened Leatherback Turtles and Their Current Nesting Beaches in the Nicobar Group of Islands, *Indian Ocean Turtle Newsletter* 25, p. 12-18
3. NITI Aayog (undated). *Sustainable Development of Little Andaman Island - Vision Document*, NITI Aayog, New Delhi, p. 58
4. Sekhsaria, P. (2021, 01 Feb). NITI Aayog's megacity plan for Little Andaman alarms conservationists', *The Hindu*
5. A&N Administration (1956, 2004). *Andaman and Nicobar Protection of Aboriginal Tribes Regulation (ANPATR) – 1956 including all amendments until 2004*, A&N Administration, Port Blair, p. 41
6. Swaminathan, A. (2018, June). Tracking a Hundred-Million-Year-Old Giant, *Hornbill* April-June 2018, Bombay Natural History Society, Mumbai, p. 66-69
7. MoEFCC (2021). *National Marine Turtle Action Plan (2021-2026)*, Ministry of Environment, Forest & Climate Change, Government of India, New Delhi, p. 24
8. MoEFCC (2021). *Minutes of 60th Meeting of the Standing Committee of National Board for Wildlife dated 22 January 2021*, Ministry of Environment, Forest and Climate Change (Wildlife Division), Government of India, New Delhi, p. 4
9. A&N Administration (2021a). *Notification for the denotification of the Galathea Bay Wildlife Sanctuary dated 25 January 2021*, A&N Administration Department of Environment & Forests, Port Blair
10. PMB (2015). *Expression of Interest Document for 'Establishment of Transshipment Port & Free Trade Warehousing Zone in Andaman & Nicobar Islands*, Document No. 5000/PMB/PL/2015, Port Management Board, A&N Islands, p. 8
11. A&N Administration (2020). *Order No. 198 dated 04 September 2020 referring to ANIIDCO being Implementing Agency for the Great Nicobar Project*, A&N Administration, Directorate of Tribal Welfare, Port Blair
12. A&N Administration (2020). *Order No. 198 dated 04 September 2020 constituting special committee to discuss denotification of tribal reserves in Little Andaman and Great Nicobar Islands for NITI Aayog plans*, A&N Administration, Directorate of Tribal Welfare, Port Blair
13. A&N Administration (2015). *Policy on Shompen Tribe of Great Nicobar Island*, A&N Administration, Directorate of Tribal Welfare, p. 11
14. MoEFCC (2021a). *Minutes of 44th Meeting of the Expert Committee for the Declaration of Eco-sensitive Zone (ESZ) around Protected Areas (Wildlife Sanctuaries/National Parks/Tiger Reserves)*, Ministry of Environment, Forest and Climate Change, Government of India, New Delhi, p. 4
15. MoEFCC (2021b). *Notification for ESZ for Galathea National Park*, Ministry of Environment, Forest and Climate Change, Government of India, New Delhi, p. 33
16. Palni, L.M.S., and Rawal, R.S. (2012). *Compendium on Indian Biosphere Reserves - Progression During two Decades of Conservation*, GB Pant Institute of Himalayan Environment & Development

17. Sivakumar, K. (2007). *The Nicobar Megapode - Status, Ecology and Conservation: Aftermath Tsunami*, Wildlife Institute of India, Dehradun p. 49
18. WAPCOS Ltd. (2019). *Tender Document for Traffic Study for 'Creating Transshipment Port at South Bay, Great Nicobar Island of A&N Islands*, Tender No. WAP/PH&IW/PMB/TRAFFIC/2019-20, WAPCOS LIMITED, Gurgaon, p. 29
19. EERI (2005). *The Great Sumatra Earthquake and Indian Ocean Tsunami of December 26, 2004, Report#3: The Effects in Mainland India and in the Andaman-Nicobar Islands*, Earthquake Engineering Research Institute, p. 12
20. A&N Administration (2021b). *Meeting Notice and Agenda Note to discuss denotification of part of the Onge Tribal Reserve, Little Andaman Island for various projects proposed by NITI Aayog*, A&N Administration, Directorate of Tribal Welfare, Port Blair.
21. EAC-I, MoEFCC (2021a). *Minutes of the 258th meeting of Expert Appraisal Committee held on 17th-18th March, 2021 through Video Conferencing for projects related to Infrastructure Development*, Expert Appraisal Committee (Infrastructure - I), Ministry of Environment, Forest and Climate Change, Government of India, New Delhi
22. EAC-I, MoEFCC (2021b). *Minutes of the 260th meeting of Expert Appraisal Committee held on 5th - 6th April, 2021 through Video Conferencing for the projects related to Infrastructure Development*, Expert Appraisal Committee (Infrastructure - I), Ministry of Environment, Forest and Climate Change, Government of India, New Delhi
23. AECOM (2021). *Holistic Development of Great Nicobar Island at Andaman & Nicobar Islands: Pre-Feasibility Report*, AECOM India Private Ltd., Gurgaon, p. 125
24. NITI Aayog (2020). *Selection of Technical Consultant: Request for Proposals for Preparation of Master Plan for Holistic Development of Great Nicobar Island in Andaman & Nicobar Islands*, NITI Aayog, New Delhi, p. 201
25. NITI Aayog (2021). *Response to RTI application Reg. No. PLCOM/R/E/21/00145, dated 29.03.2021*, NITI Aayog, New Delhi
26. A&N Administration (2020). *Order No. 198 dated 04 September 2020 constituting special committee to discuss denotification of tribal reserves in Little Andaman and Great Nicobar Islands for NITI Aayog plans*, A&N Administration, Directorate of Tribal Welfare, Port Blair
27. Roe, J.H., Clune, P.R., and Paladino, R.V. (2013). *Characteristics of a Leatherback Nesting Beach and Implications for Coastal Development*, *Chelonian Conservation and Biology*, 12(1) : 34-43 <https://doi.org/10.2744/CCB-0967.1>
28. Letter dated 14 June 2021, by turtle researchers and organisations addressed to multiple authorities expressing concern on impact of NITI Aayog support infrastructure, port and tourism projects in the Andaman and Nicobar Islands.
29. WII (2021). *Letter No. WII/RTI/CPIO/2021-22 (Qtr-I)/12, dated 07 June 2021: RTI response to Online RTI Query No. WLIOI/R/E/21/00038 dated 26/05/2021*
30. Shanker, K., Choudhury, B.C. and Aggarwal, R.K. (2011). *Conservation genetics of marine turtles on the mainland coast of India and offshore islands*. Final Project Report. Wildlife Institute of India, Dehradun and Centre for Cellular and Molecular Biology, Hyderabad, p. 40

INTRODUCTION NOTE

In a set of developments that have unfolded with unprecedented speed and uncharacteristic co-ordination over the last few months, there has been a huge push for a mega development plan for Great Nicobar, the southern-most island in the Andaman and Nicobar group. Piloted by the NITI Aayog under a very misleading framing of 'Holistic Development', the plan comprises an international container transshipment terminal, a greenfield international airport, a power plant and a township complex that will need an area of 166 sq kms - mainly pristine coastal systems and tropical forests. The estimated cost of the project is a whopping Rs. 75000 crores.

In two meetings held in quick succession in March and April earlier this year, the Ministry of Environment Forest and Climate Change's (MoEFCC) Environment Appraisal Committee (EAC) Infrastructure - I "recommended" the project "for grant of terms of reference (TOR)" for undertaking environmental impact assessment (EIA) studies. This in the first instance will include baseline studies to be conducted over a period of only three months.

The EAC recommendation was the latest in a concerted and co-ordinated effort to smoothen out the regulatory and legal processes to facilitate the implementation of these projects - the formation in mid-September 2020 of a committee for denotification of tribal reserves in the islands; the denotification in January 2021 of the Galathea Bay Wildlife Sanctuary for locating the port in the bay; the notification also in January 2021 of a 'zero' extent ecosensitive zone (ESZ) of the Galathea National Park to allow for the low lying coastal area to be made available for the projects and the release in March 2021 by AECOM India Pvt Ltd of the 126 pre-feasibility report titled 'Holistic Development of Great Nicobar Island at Andaman and Nicobar Islands' with the NITI Aayog being the client for the same.

Starting February 2021, I began writing a series of news features investigating the different aspects of this mega proposal, the processes that were being followed and the serious impacts this could have. These were based on important documents that were made available by concerned officials and researchers, an analysis of a range of complimentary reports, research material and formal communication that we were able to access through multiple channels and finally via a series of RTI applications that were filed by concerned citizens. Published in *The Hindu*,

Mongabay India and *The Wire*, the features provide an important account of this larger story that is still unfolding. The series of reports also generated a lot of interest in the proposal/s for Great Nicobar along with concern for the place, its ecology and its human and non-human denizens.

A Monumental Folly is a compilation in the form of a dossier (and an evolving archive) that puts together all these published accounts and the related information for quick and easy access. The first part is comprised of the eight stories as they were published between February and June in the publications mentioned above. The second part, the more substantial one, is a set of 30 detailed annexures - meeting agenda notes, committee meeting minutes, administration notifications, call for proposals, the pre-feasibility report, scientific assessments, RTI responses and much more. This is the evidence on which my reports were based and the background of how the big story has played out. The hope is that this compilation will help the reader get a quick and reasonably comprehensive account of what has happened thus far and also help us, hopefully, to anticipate what we should be expecting in the months to come.

The Andaman and Nicobar Island system lies at a very fragile and vulnerable intersection of the geological, ecological and socio-cultural. NITI Aayog's Great Nicobar plan is deeply ignorant of these multiple realities even as it aggressively pursues a completely illusory agenda of economic growth and development. To go ahead with it will be to perpetuate a monumental folly the price paid for which cannot even be comprehended.

This compilation as I have mentioned is being put together in the form of an evolving archive. It will be updated as and when substantial new information becomes available or when there are important developments in the matter. The hope, however is that will not be needed and that better sense will indeed prevail...

- Pankaj Sekhsaria
01 December 2021

01

Leatherback nesting sites could be overrun by Andamans project

The Hindu, 15 February 2021

Article link: <https://tiny.cc/o96juz>

Photo: Adhith Swaminathan



A Giant leatherback nesting on the coast of Little Andaman Island

Proposals for tourism and port development in the Andaman and Nicobar (A&N) Islands ([Annexures 3 & 23](#)) have conservationists worried over the fate of some of the most important nesting populations of the Giant Leatherback turtle in this part of the Indian Ocean. The largest of the seven species of sea turtles on the planet and also the most long-ranging, Leatherbacks are found in all oceans except the Arctic and the Antarctic. Within the Indian Ocean, they nest only in Indonesia, Sri Lanka and the Andaman and Nicobar Islands and are also listed in Schedule I of India's Wildlife Protection Act, 1972, according it the highest legal protection.

Surveys ([Annexure 1, Annexure 2](#)) conducted in the A&N Islands over the past three decades have shown that the populations here could be among the most important colonies of the Leatherback globally. There is concern now, however, that at least three key nesting beaches — two on Little Andaman Island and one on Great Nicobar Island — are under threat due to mega “development”

plans announced in recent months. These include NITI Aayog's ambitious tourism vision for Little Andaman ([Annexure 3, Annexure 4](#)) and the proposal for a mega-shipment port at Galathea Bay on Great Nicobar Island. ([Annexure 23](#))

Little Andaman in focus

The Little Andaman plan, which proposes phased growth of tourism on this virtually untouched island, has sought the de-reservation of over 200 sq. km of pristine rainforest and also of about 140 sq. km of the Onge Tribal Reserve ([Annexure 5](#)). Two sites where key components of the tourism plan are to be implemented are both Leatherback nesting sites — South Bay along the southern coast of the island and West Bay along its western coast. South Bay is proposed to be part of the “Leisure Zone” where a film city, a residential district and a tourism special economic zone are to come up. West Bay is to be part of West Bay Nature Retreat with



Proposed plan for Little Andaman (see Annexure 3 for details)

theme resorts, underwater resorts, beach hotels and high-end residential villas.

The roughly 7-km-long beach at West Bay has been the site of ongoing marine turtle research projects. Set up post-2004 by the Andaman and Nicobar Environment Team (ANET), Dakshin Foundation, the Indian Institute of Science and the A&N Forest Department to monitor how turtle populations have responded after the devastating earthquake and tsunami, it has thrown up new information on turtles

and their behaviour. Not only are the numbers of females nesting here significant, satellite telemetry has revealed hitherto unknown migration patterns.

Waning protection

For the Leatherback, perhaps even more important is Great Nicobar Island, the

Satellite-tagged female turtles have been tracked swimming up to 13,000 km after nesting on West Bay, towards the western coast of Australia and southwest towards the eastern coast of Africa. One of the tagged turtles travelled to Madagascar, covering 12,328 km in 395 days while another travelled 13,237 km in 266 days to the Mozambique coast.

southernmost of the A&N group. Large numbers have been recorded nesting here — mainly on the long and wide beaches at the mouth of the Dagmar and Alexandira rivers on the west coast and at the mouth of the Galathea river along its south eastern coast. Galathea Bay was, in fact, proposed as a wildlife sanctuary in 1997 for the protection of turtles and was also the site of a long-term monitoring programme. The monitoring was stopped after the tsunami devastation of

2004, but it provided the first systematic evidence of numbers and importance of these beaches.

The A&N Islands are prominent in the National Marine Turtle Action Plan (Annexure 7) released on February 1, 2021, by the Ministry of Environment, Forest and Climate Change. The plan notes that “India has identified all its important sea turtle nesting

habitats as 'Important Coastal and Marine Biodiversity Areas' and included them in the Coastal Regulation Zone (CRZ) - 1".

South Bay and West Bay on Little Andaman and Galathea on Great Nicobar, along with other nesting beaches in the islands, find a specific mention here as "Important Marine Turtle Habitats in India" and the largest Leatherback nesting grounds in India.

The plan identifies coastal development including construction of ports, jetties, resorts and industries, as major threats to turtle populations. It also asks for assessments of the environmental impact of marine and coastal development that may affect marine turtle populations and their habitats.

Developments in the A&N Islands indicate, however, that even as the action plan was being finalised, decisions were being made in violation of its basic concerns and premises. Not only has the mega-tourism plan in Little

Andaman been pushed in spite of serious objections by the A&N Forest Department, a major decision was also made recently on the Galathea Bay Wildlife Sanctuary. The Standing Committee of the National Board for Wildlife, at its 60th meeting on January 5 under the chairmanship of the Environment Minister, agreed to its denotification for the "construction as well as operational phases of the International Shipment Project". (Annexure 8, Annexure 9)

The A&N Port Management Board had in 2019 floated an expression of interest (Annexure 10) for the container transshipment terminal here, along with that for a free trade warehousing zone, and the Prime Minister announced in August 2020 that a transshipment project would come up here on an investment of Rs.10,000 crore.

The scale of the project and the investment proposed indicate it could signal the end of a crucial Giant Leatherback nesting site.



Post nesting migratory route of Leatherback Turtles fitted with satellite trackers in West Bay, Little Andaman. (See Annexure 6 for more details)

02

NITI Aayog vision for Great Nicobar ignores tribal, ecological concerns

The Hindu, 21 March 2021

Article link: <http://tiny.cc/0slkuz>

Photo: Pankaj Sekhsaria



Large parts of Campbell Bay on the eastern coast of Great Nicobar were submerged in the aftermath of the earthquake and tsunami of December 2004

In what appears to be a re-run of recent developments in Little Andaman Island ([Annexure 3](#), [Annexure 4](#)) more than 150 sq. km. of land is being made available for Phase I of a NITI Aayog-piloted 'holistic' and 'sustainable' vision for Great Nicobar Island, the southernmost in the Andaman and Nicobar group. This amounts to nearly 18% of the 910 sq. km. island, and will cover nearly a quarter of its coastline. The overall plan envisages the use of about 244 sq. km. – a major portion being pristine forest and coastal systems.

Projects to be executed in Phase I include a 22 sq. km. airport complex, a transshipment port (TSP) at South Bay at an estimated cost of Rs. 12,000 crore¹, a parallel-to-the-coast mass rapid transport system and a free trade zone and warehousing complex on the south western coast.

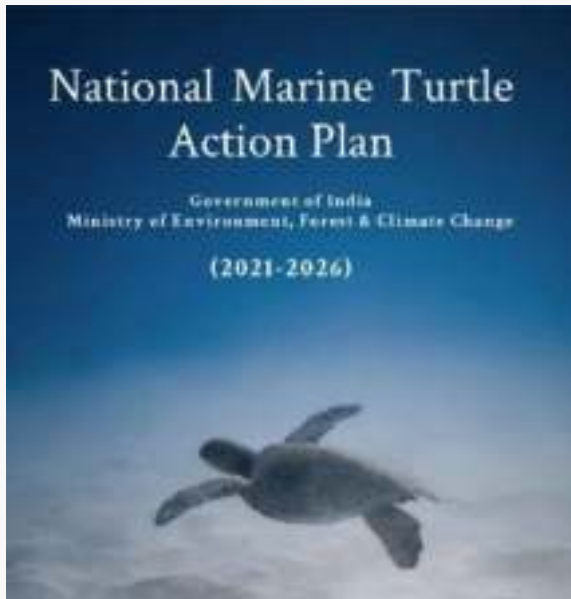
What stands out prominently in the whole process, starting with the designation in mid-2020 of the Andaman and Nicobar Islands Integrated Development Corporation

(ANIIDCO) as the nodal agency ([Annexure 11](#)), is the speed and co-ordination with which it has all unfolded. The other is the centrality of the NITI Aayog. First, on September 4, 2020, the Director, Tribal Welfare, A&N Islands, constituted an empowered committee to examine NITI Aayog's proposals for various projects in Little Andaman and Great Nicobar Islands. ([Annexure 12](#)). A copy of the 2015 'Policy on Shompen Tribe of Great Nicobar Island' ([Annexure 13](#)) was part of the communication sent out, giving an indication of the aims of the committee. Significant changes have also been effected to the legal regimes for wildlife and forest conservation.

Ecological uniqueness

In its meeting on January 5, 2021, the Standing Committee of the National Board for Wildlife (NBWL) denotified the entire Galathea Bay Wildlife Sanctuary to allow for the port there. ([Annexures 8](#), [Annexure 9](#)).

¹ The pre-feasibility report for the proposal that was published subsequently estimates an investment of about Rs. 35,000 crores for the TSP ([Annexure 23](#))



The NBWL committee seemed unaware that India's National Marine Turtle Action Plan (Annexure 7) that was under preparation then (it was released on February 1, 2021) had listed Galathea Bay as one of the 'Important Coastal and Marine Biodiversity Areas' and 'Important Marine Turtle Habitats' in the country. It is included in Coastal Regulation Zone (CRZ)-I, the zone with maximum protection.

Then, on January 18, another Environment Ministry expert committee approved a "zero extent" Ecologically Sensitive Zone (ESZ) (Annexure 14) for the Galathea NP to allow use of land in the south-eastern and south-western part of the island for the NITI Aayog plan. The October 2020 draft notification (Annexure 15) for this zero extent ESZ had ironically listed out in great detail the park's ecological uniqueness – that it is part of a UNESCO World Heritage Site (Annexure 16), houses a range of forest types, has one of the best preserved tropical rainforests in the world, is home to 648 species of flora and hosts 330 species of fauna including rare and endemic ones such as the Nicobar wild pig, Nicobar tree shrew, the Great Nicobar crested serpent eagle, Nicobar paradise flycatcher and the Nicobar megapode. It also notes

Similar concerns exist about the impact on the Shompen community. The proposed project areas are important foraging grounds for this hunter-gatherer nomadic community and the official Shompen Policy of 2015 specifically noted that the welfare and integrity of these people should be given priority "with regard to large-scale development proposals in the future for Great Nicobar Island (such as trans-shipment port/container terminal etc.)". Now, large forest areas here could become inaccessible and useless for the Shompen.

that the park is home to the indigenous Shompen community.

The notification says that an ESZ is needed to protect the park from an ecological, environmental and biodiversity point of view, but goes on in the very next para to propose a zero extent ESZ for nearly 70% of the periphery of the park. It is almost as if the unique diversity of life just listed suddenly disappeared because of an arbitrary line drawn to allow a slew of high value projects.

This is illustrated in the case of the Giant leatherback turtle and the Nicobar megapode, two charismatic species for whom Great Nicobar is very important. The beaches here, like at the mouth of the river Galathea in South Bay are among the most prominent nesting sites globally of the Giant leatherback. It for this reason that the bay was declared a wildlife sanctuary in 1997, but has now been denotified to allow for the transshipment port.

In his 2007 study of the Nicobar megapode (Annexure 17), the globally endangered bird unique to the Nicobars, K. Sivakumar of the Wildlife Institute of India documented 90% of this ground nesting bird's nests to be within a distance of 30 m from the shore. He notes that the existing protected area network in Great Nicobar is not designed for the protection of the megapode and recommends that the entire west and southern coast of Great Nicobar – precisely

the area sought for the NITI Aayog proposals – be protected for the megapode and other wildlife like nesting marine turtles. This is also in stark contrast to the current move to create a zero extent ESZ for the Galathea National Park.

Threat to Shompen

Available evidence suggests that issues of the geological volatility of these islands are also not being factored in. The December 26, 2019, tender document by WAPCOS Limited for a 'Traffic Study for Creating Transshipment port at South Bay, Great

Nicobar Island' (Annexure 18) justifies the port here by noting that “the topography of the island is best suited, which has not been damaged much even by the tsunami on 26.11.2004 (sic)”.

Yet, a 2005 Earthquake Engineering Research Institute (EERI) Special Earthquake Report by a multi-disciplinary team from the Indian Institute of Technology (IIT) Kanpur (Annexure 19), recorded witness accounts of 8-metre-high tsunami waves hitting the Great Nicobar coast on December 26, 2004. “The lighthouse at Indira Point, the southernmost tip of the Great Nicobar Island, which was on high ground before the earthquake,” the report notes, “is now under water, indicating a land subsidence of about 3-4 m.”

Loss of life and property then was limited because the Great Nicobar coast is largely uninhabited. This raises questions over safety of life, property and the investments in this zone and that too without accounting for the complex ecological, social and geological vulnerabilities here. Little, if anything, is also known of the NITI Aayog vision document itself – What is its rationale? What was the process of its creation? Which agencies/individuals were involved? What impact assessments, if any, have been done at all?

Neither the NITI Aayog nor the agencies that are facilitating it with zeal and efficiency have made this available.

Photo: Pankaj Sekhsaria



The Nicobari Megapode in the Galathea Bay Wildlife Sanctuary

03

Citizens file RTI applications on NITI Aayog plans for the Andaman & Nicobar islands

Mongabay India, 12 April 2021

Article link: <http://tiny.cc/1slkuz>

Photo: Pankaj Sekhsaria



A 2006 image of the damaged infrastructure along the eastern coast of Great Nicobar Island

Following several media reports published recently, a number of Right to Information (RTI) applications have been filed seeking information on various aspects of the NITI Aayog's development plans for Little Andaman and Great Nicobar Islands.

While no mechanism exists to get a comprehensive account of all such applications, information gathered from multiple sources, most prominently youRTI.in, a public interest initiative that helps citizen file RTI applications anonymously and for free, suggests that at least nine applications have been filed between March 1 and 27, at various offices across the country. In Port Blair these include one application each at the offices of the Lieutenant Governor (LG) and Chief Secretary (CS) of the islands and two at the A&N Island (ANI) Administration's Department of Environment and Forests (DEF). In Delhi, applications have been filed at the NITI Aayog and the Union Ministries of Environment, Forest and Climate Change (MoEFCC) and Shipping, Port and Waterways (MoSPW) respectively.

The earliest RTI in Port Blair was filed at the office of the CS seeking minutes of meetings of the empowered committee set up in September 2020 to examine proposals for denotification of tribal reserves in pursuance of the NITI Aayog's vision plans ([Annexure 20](#)). Held on February 4, the most recent meeting of the committee chaired by the CS, reportedly agreed to denotify about six sq. kms of the tribal reserve on Little Andaman. No formal communication or minutes of the meeting are yet available in the public domain, however.

The application in the LG's office, filed via youRTI.in on March 16 lists three sub questions related to the 'Techno-feasibility reports of transshipment ports in Andaman and Nicobar Islands'. The two filed in the DEF also via youRTI.in are focussed explicitly on the NITI Aayog's plan for Great Nicobar Island – one seeking details of the comment(s)/recommendation(s) made by the Principal Chief Conservator of Forests – Wildlife of the islands in the matter and the second seeking more granular details of the

recommendations regarding the same set of projects but by the Divisional Forest Officer – Nicobar Division.

Of the five applications filed in Delhi, three are via youRTI, while the others – one each at the NITI Aayog and the MoSPW – have been filed directly by interested citizens. Filed on the 1st of March, the application at the Shipping ministry seeks comprehensive techno-feasibility details of all sites considered for the construction of the transshipment port in the islands since 2010. The application was transferred to the office of the CS, A&N Islands and then transferred again on March 17 to the PIO in Harbour Masters Office in Port Blair.

The initial RTI application in the NITI Aayog's office had a list of four detailed questions also related to the plans for Great Nicobar Island – on the blueprint of the vision document for the island and on the 'techno-economic-feasibility' reports of the transshipment port here. An objection was raised that too many questions were being asked following which the application with just one question was refiled on March 19.

It is perhaps the two applications filed at MoEFCC, both on 10th March via youRTI, that are the most detailed and diverse. The first seeks details of the integrated management plan, the integrated coastal zone management plan and the coastal zone impact assessment for Little Andaman and Great Nicobar as prepared by the National Centre for Sustainable Coastal Management (NCSCM). It also asks for all reports on the conservation of the coastal and marine resources of these islands prepared by the NCSCM including those on social aspects and economics.

The second application is related specifically to the Zoological Survey of India's (ZSI) February 2021 survey for an environment impact assessment report of the Great Nicobar development plans. It has eight questions seeking details of the terrestrial, inter-tidal and marine life listed in Schedule I

The information sought via these multiple RTIs," he continued, "also show us the range of institutions and issues involved and the scale of the questions that need answering. That RTIs have to be filed to get such basic information of plans and proposals of such magnitude and impact is indeed a grim reminder of the sorry state of affairs."

of India's Wildlife Protection Act – 1972 and the IUCN endangered species list that are found in the project areas on the island. It also seeks information on Galathea Bay, the site of the transshipment port and the centrepiece of the plans for Great Nicobar.

Little is known of what the ZSI survey of February 2021 recorded but an illustrative example of what might be in store was on offer in the February 10 issue of the Port Blair based newspaper *Andaman Chronicle*. The ZSI

team recorded a nesting giant leatherback female while on survey here, confirming that the site continues to be an important nesting ground of this endangered turtle and the reason why this beach is listed as an important marine turtle habitat in India's National Marine Turtle Action Plan ([Annexure 7](#)).

Even more striking (and a find that set conservation circles abuzz) was that this was the same female who had been tagged in 2014 while nesting on the beach at West Bay on Little Andaman – the site for the other huge NITI Aayog development plan. It is the first such record of the species using different beaches for their nesting activities here. "This should be an important reminder to us," a senior research remarked on conditions of anonymity, "of the complex interlinkages and what the NITI Aayog plans put at stake."

04

Green panel allows Great Nicobar plan to advance

The Hindu, 10 May 2021

Article link: <http://tiny.cc/3slkuz>

Photo: Pankaj Sekhsaria



Large areas of coastal forests in the Nicobar islands were damaged by the earthquake and tsunami of December 2004

The Environment Appraisal Committee (EAC) - Infrastructure I of the Ministry of Environment, Forest and Climate Change (MoEFCC) has flagged serious concerns about NITI Aayog's ambitious project for Great Nicobar Island. The committee has, however, removed the first hurdle faced by the project. It has "recommended" it "for grant of terms of reference (TOR)" for Environmental Impact Assessment (EIA) studies, which in the first instance will include baseline studies over three months.

Documents uploaded recently on the MoEFCC's Parivesh portal show that the 15-member committee headed by marine biologist and former director, Bombay Natural History Society (BNHS), Deepak Apte, made the decision following two meetings held on March 17 and 18 and April 5 and 6. ([Annexure 21](#), [Annexure 22](#)) The EAC was responding to the 126 page 'pre-feasibility' report, 'Holistic Development of Great Nicobar Island at Andaman and Nicobar Islands' ([Annexure 23](#)), prepared for the NITI Aayog by the Gurugram-based consulting agency AECOM

India Private Limited. The proposal includes an international container transshipment terminal, a greenfield international airport, a power plant and a township complex spread over 166 sq. km. (mainly pristine coastal systems and tropical forests), and is estimated to cost Rs. 75,000 crore.

Concerns on site

The committee's concerns were both procedural and substantive. A discussion on the proposal in the March meeting was deferred because of delayed and incomplete submission of documents. The missing information included, the minutes of the meeting note, details of the township to be developed over 149 sq. km., a note on seismic and tsunami hazards, freshwater requirement details (6.5 lakh people are envisaged to finally inhabit the island when the present population is only 8,500; the current total population of the entire island chain is less than 4.5 lakh), and details of the impact on the Giant Leatherback turtle.



The coastal forests along the eastern coast of Great Nicobar will be deeply impacted by if the proposed plan goes ahead

The committee also noted that there were no details of the trees to be felled — a number that could run into millions since 130 sq. km. of the project area has some of the finest tropical forests in India. A point-wise response to concerns was submitted by the project proponent, the Andaman and Nicobar Island Integrated Development Corporation (ANIIDCO), on April 5, the very day the committee convened for its next meeting. Yet, the proposal was taken up for consideration and even recommended for grant of ToR to go ahead.

This, despite the fact that the committee raised a number of additional issues, including about Galathea Bay, the site of the port and the centrepiece of the NITI Aayog proposal. Galathea Bay is an iconic nesting site in India of the enigmatic Giant Leatherback, the world's largest marine turtle — borne out by surveys done over three decades by the island's Forest Department and research agencies like the Andaman and Nicobar Environment Team, Dakshin Foundation and the Indian Institute of Science (IISc) ([Annexure 1](#), [Annexure 2](#), [Annexure 6](#))

The committee noted that the site selection for the port had been done mainly on technical and financial criteria, ignoring the environmental aspects. It has now asked for “an independent study/evaluation for the suitability of the proposed port site with specific focus on Leatherback Turtle, Nicobar Magapod (sic) and Dugong”.

Action points

This, in fact, is only one of over a 100 specific points of action listed out by the committee. They include, among others, the need for an independent assessment of terrestrial and marine biodiversity, a study on the impact of dredging, reclamation and port operations, including oil spills (to be carried out by nationally recognised institutions such as the Wildlife Institute of India, IISc or the Salim Ali Centre for Ornithology and Natural History), the need for studies of alternative sites for the port with a focus on environmental and ecological impact, especially on turtles, analysis of risk-handling capabilities, a seismic and tsunami hazard map, a disaster management plan, details of labour, labour

camps and their requirements, an assessment of the cumulative impact, and a hydro-geological study to assess impact on ground and surface water regimes.

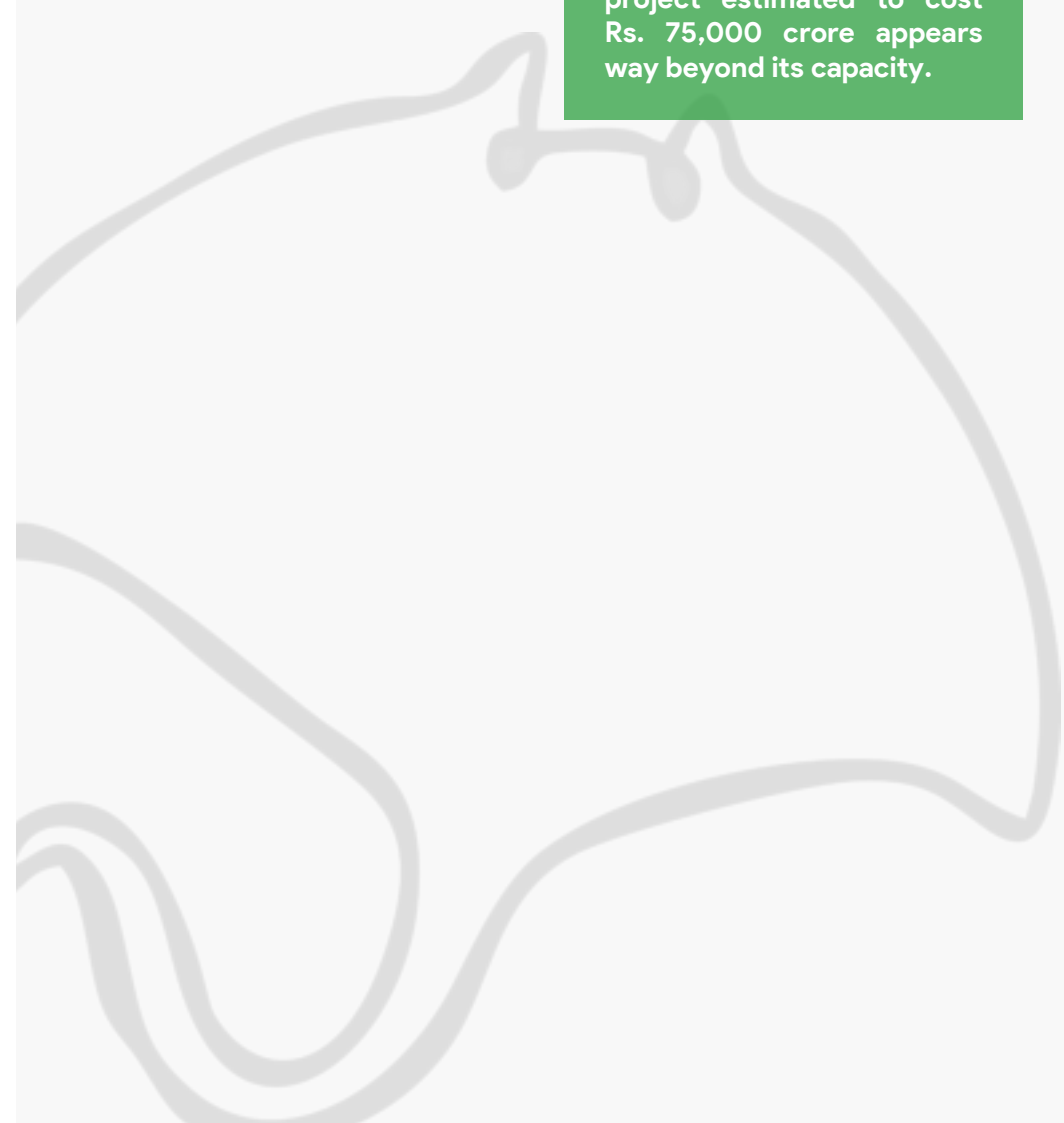
Corporate policy

AECOM's pre-feasibility report has proposed 2022-23 for the commencement of work on the site. "How is that possible," asks an island expert, requesting anonymity. "One year is simply not enough if the government and project proponents follow the EAC's recommendations in letter and spirit. And how can extensive baseline studies be carried out in just three months?"

The committee has also asked for details of the corporate environment policy of the implementing agency — whether the company has an environment policy, a prescribed standard operating procedure to deal with environmental and forest violations, and a compliance management system. ANIIDCO, the Port Blair based project proponent, is a government undertaking involved in activities such as tourism, trading (iron and steel, milk, petroleum products, and liquor) and infrastructure development for tourism and fisheries. Its annual turnover for 2018-19 was Rs. 379 crore, and handling a mega infrastructure project estimated to cost Rs. 75,000 crore appears way beyond its capacity.

Ecological surveys in the last few years have reported a number of new species, many restricted to just the Galathea region. These include the critically endangered Nicobar shrew, the Great Nicobar crane, the Nicobar frog, the Nicobar cat snake, a new skink (*Lipinia sp.*), a new lizard (*Dibamus sp.*) and a snake of the *Lycodon sp* that is yet to be described.

"None of these are even mentioned in AECOM's pre-feasibility report or the EAC's observations," he notes. "We don't even fully know what exists here, leave alone understanding the many fragile inter-linkages of the Great Nicobar's complex systems."





The Great Nicobar coastline which is the location for the proposed plans being pushed by the NITI Aayog

In response to an RTI application, the NITI Aayog has said it has no vision document for the development of Great Nicobar Island, of the Andaman & Nicobar Islands. The reply is baffling because of the timing.

It comes nine months after the NITI Aayog issued a request for proposals (RfP) ([Annexure 24](#)) for 'Preparation of Master Plan for Holistic Development of Great Nicobar Island', two months after Gurgaon-based AECOM India Pvt. Ltd. submitted a 126-page proposal for a Rs-75000-crore plan ([Annexure 23](#)), and a month after the environment ministry's Environment Appraisal Committee – Infrastructure I raised serious concerns over it but also recommended the 'grant of terms of reference' to undertake environmental impact assessments ([Annexure 22](#)).

"As far as NRE Vertical [of] NITI Aayog is concerned, no vision document has been prepared for proposed development plans in Great Nicobar Island, A&N Island," the advisory think-tank said in response to an application (reg. no. PLCOM/R/E/21/00145). The reply is dated May 6, 2021, and is signed

by L. Gopinath, senior research officer, NITI Aayog's environment and forest division ([Annexure 25](#)). It is in response to a query filed by a private citizen.

The plan

The 126-page pre-feasibility report ([Annexure 23](#)) that AECOM India created for NITI Aayog is entitled 'Holistic Development of Great Nicobar Island at Andaman and Nicobar Islands'. It is available to read on the environment ministry's 'Parivesh' portal. It was prepared in response to an extensive (201-page) RfP for a 'master plan' to 'holistically develop' Great Nicobar Island, which NITI Aayog issued in September 2020 ([Annexure 24](#)).

According to the report, its purpose is to provide "a framework for development of a new 'greenfield city' with a diverse and robust economy based on maritime services and tourism, amongst other drivers". It goes on to propose a stunning Rs 75,000 crore plan that includes an international container

transshipment terminal, a greenfield international airport, a power plant and a township complex.

The plan also envisions accommodating 6.5 lakh people on the island by 2050 over an area of 166 sq. km. This land is mainly occupied today by pristine coastal systems and tropical forests.

Facilitating the process

The last few months have seen hectic activity on the policy and regulation fronts towards implementing this proposal. This in turn makes NITI Aayog's denial to the RTI query more mystifying.

The government had created a special committee under the chairmanship of the chief secretary, Andaman & Nicobar Islands, in September 2020 to facilitate the denotification of tribal reserves on the Little Andaman and Great Nicobar Islands (Annexure 26), to acquire the land.

In January 2021, the National Board for Wildlife, India's apex body for wildlife conservation, denotified the Galathea Bay Wildlife Sanctuary in its entirety explicitly for the port in the bay (Annexure 8, Annexure 9). This bay is India's most iconic nesting site for giant leatherback turtles. The environment ministry's National Marine Turtle Action Plan (Annexure 7), released in February 2021, also included the bay with other sites on these islands as important marine turtle habitats.

A few weeks later, another expert committee of the ministry okayed a proposal to declare a zero extent eco-sensitive zone (Annexure 14) for the Galathea National Park, thus availing the entire low-lying coastal area along the island's east coast for projects proposed under the plan.

Experts have also raised concerns of the impact all of these activities will have on the rich forests and coastal and marine ecosystems of Great Nicobar. The island hosts a UNESCO World Heritage Site,

The general pattern of responses to nearly a dozen RTI applications filed by citizens in the last two months to various offices – lieutenant governor; chief secretary and the island administration's department of environment and forests, Port Blair; and the NITI Aayog, and ministries of environment and shipping in New Delhi – has been striking. In each of these cases, the officials concerned have consistently denied information to the applicant.

multiple forest types and one of the best-preserved tropical rainforests in the world. It is also home to 648 species of flora and 330 species of fauna, including rare and endemic ones like the Nicobar wild pig, Nicobar tree shrew, the Great Nicobar crested serpent eagle, Nicobar paradise flycatcher and the Nicobar megapode.

The denial

While senior members of NITI Aayog have denied to journalists that the body has plans for the islands, what stands out in the RTI response is that it is from the same division – Natural Resource and Environment

(NRE) Vertical, Island Development – that issued the RfP last year. Emails sent to Gopinath, who signed the RTI response, and to Saloni Goel, a specialist in the NRE vertical who had issued the 201-page RfP, hadn't elicited a response at the time of publishing this article.

"One cannot even say that we have a case here of the right hand not knowing of what the left is doing," a senior researcher on the island who has been following these developments said on condition of anonymity.

"Those who file RTIs need to be more careful of the language and the terminology in their requests to avoid such responses and denials," Pratik Kumar, of the Yugma Environmental Justice Clinic, and who has filed many RTI applications in the matter of NITI Aayog's plans, said. "This RTI response might be correct in the limited technical sense, but it is certainly not in line with the spirit of the RTI Act."

"Not just a vision – a full-fledged 126-page report exists and a plan of Rs 75,000 crore has already been drawn out for Great Nicobar in response to the call from the NITI Aayog," the senior researcher quoted earlier said. "What we have here now, however, is the Aayog telling us nothing exists at all. It can't get more Kafkaesque than this."



A Giant leatherback returns to the sea after having nested on the beach of the Galathea Bay Wildlife Sanctuary; a 2002 image

In its 60th meeting, held on January 5, 2021, the standing committee of the National Board for Wildlife (NBWL), India's apex body for wildlife conservation, took a decision that baffled many in the legal and conservation communities. The Galathea Bay Wildlife Sanctuary is located along the southeast coast of Great Nicobar island, over an area of 11.44 sq. km. It is India's most iconic nesting site for leatherback turtles. And the NBWL denotified it in its entirety ([Annexure 8](#), [Annexure 9](#)).

The NBWL has a mandate to conserve and develop forests and wildlife. But it provided no justification for its decision except, ironically, that the area was needed for an "international shipment project".

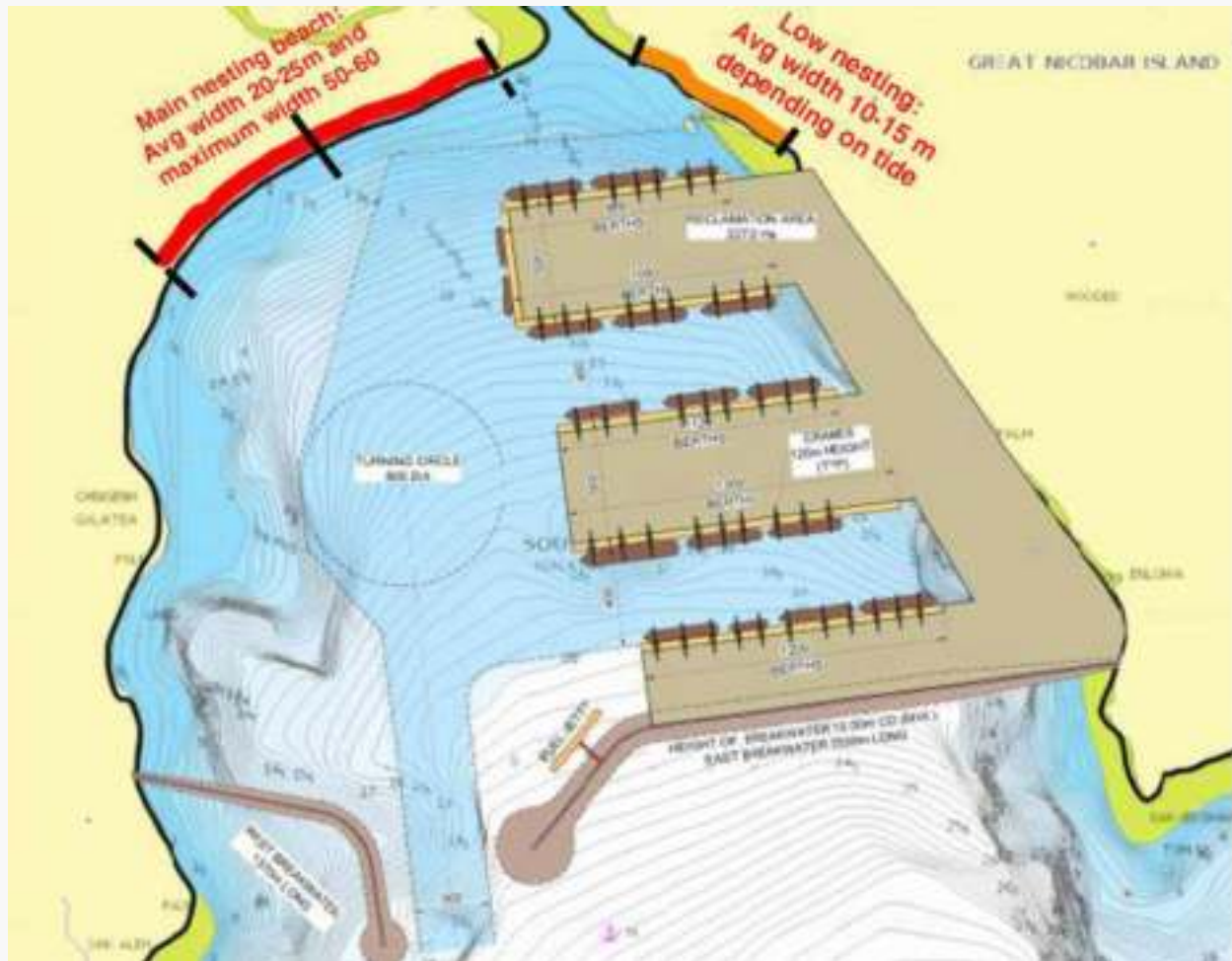
In an obvious acknowledgement that the project would adversely impact the turtle nesting here, the standing committee also directed the Andaman and Nicobar Islands' administration to prepare a "comprehensive management plan for conservation and protection of leatherback turtles in Great

Nicobar". According to the meeting's minutes, the director of the Wildlife Institute of India, Dehradun, said a mitigation plan was needed to ensure marine turtles continue to nest here during the construction and operation of the project.

Port site issues

There are two related issues researchers have raised about the site the government has proposed for the port.

First: The meeting itself specified no specific mitigation measures, presumably because the project's details weren't available until March, when the 126-page pre-feasibility report came out. This document, entitled 'Holistic Development of Great Nicobar Island at Andaman and Nicobar Islands', was prepared by AECOM India Pvt. Ltd., Gurugram, for NITI Aayog ([Annexure 23](#)). An official body called the Environment Appraisal Committee – Infrastructure I, in the



Proposed port plan for Galathea Bay from Prefeasibility report, Map annotated by researchers from Dakshin Foundation; see Annexure 23 for details

Union environment ministry, discussed this report in March and April. It then recommended the grant of 'terms of reference' for the work to continue and to conduct an environment impact assessment (Annexure 22). The pre-feasibility report recommends Galathea Bay as the most feasible of five sites to construct the port.

"India is currently president of the Convention of Migratory Species. We are in a leadership position to support conservation of these leatherback turtles and this does not include denotifying protected areas which are their breeding sites," Neha Sinha, head of conservation and policy at the Bombay Natural History Society, said. "Galathea Bay should be restored and managed as the wildlife sanctuary that it was until recently."

Aarathi Sridhar, a coastal researcher, asked, "What might be reasons for denotifying the sanctuary even prior to concrete project feasibility and clearances?" According to her, the NBWL's decision suggests

"pre-judgement of clearance outcomes and values, and signals lack of interest in the legally mandated process of examination of diverse ecological, economic and social reasons."

Nesting site characteristics

The second issue is more directly related to the specific site and the port design the pre-feasibility report proposes. Turtle biologists who have looked at the plan said that if the port is built as such, it could mark the end of Galathea Bay's status as a nesting site. This in turn seriously calls into question the NBWL's claim that the mitigation plans will actually mitigate the problem.

The leatherback turtle can grow up to six feet long and weigh as much as 900 kg. There hasn't been much research worldwide on the ideal characteristics of a leatherback's nesting site. However, factors that seem to matter include "offshore bathymetry and

obstructions, slope and elevation of the beach,” according to one paper published in 2013 (Annexure 27). The same paper also notes that nesting is negatively impacted by “removal of natural vegetation and construction of jetties, seawalls, buildings and other structures [as this] disrupts natural beach accretion and erosion cycles, ultimately leading to a reduction in beach width, slope and elevation from loss of sand.”

“We know that leatherbacks prefer sloping beaches with deep offshore waters,” says Muralidharan Manoharakrishnan and Adhith Swaminathan, turtle biologists at the Dakshin Foundation monitoring turtle populations in the islands for many years.

“This is most likely the same reason why Galathea Bay is good for turtles as it is also for a port.”

The port design

The leatherback turtles currently approach the bay through a mouth-opening more than 3 km wide. After the port comes up, they will

The design for the port at Galathea Bay envisages a 6-km berth for the port and two breakwaters 2.53 km and 1.37 km long. To “provide round-the-year wave tranquillity,” the pre-feasibility report writes, the idea is to restrict the width of the port’s entry to 300 metres.

“This can reduce access and the chances of nesting quite dramatically because of the alternation of the fundamental characteristics of the nesting beach,” Kartik Shanker, associate professor at the Centre for Ecological Sciences, Indian Institute of Science, Bengaluru, said.

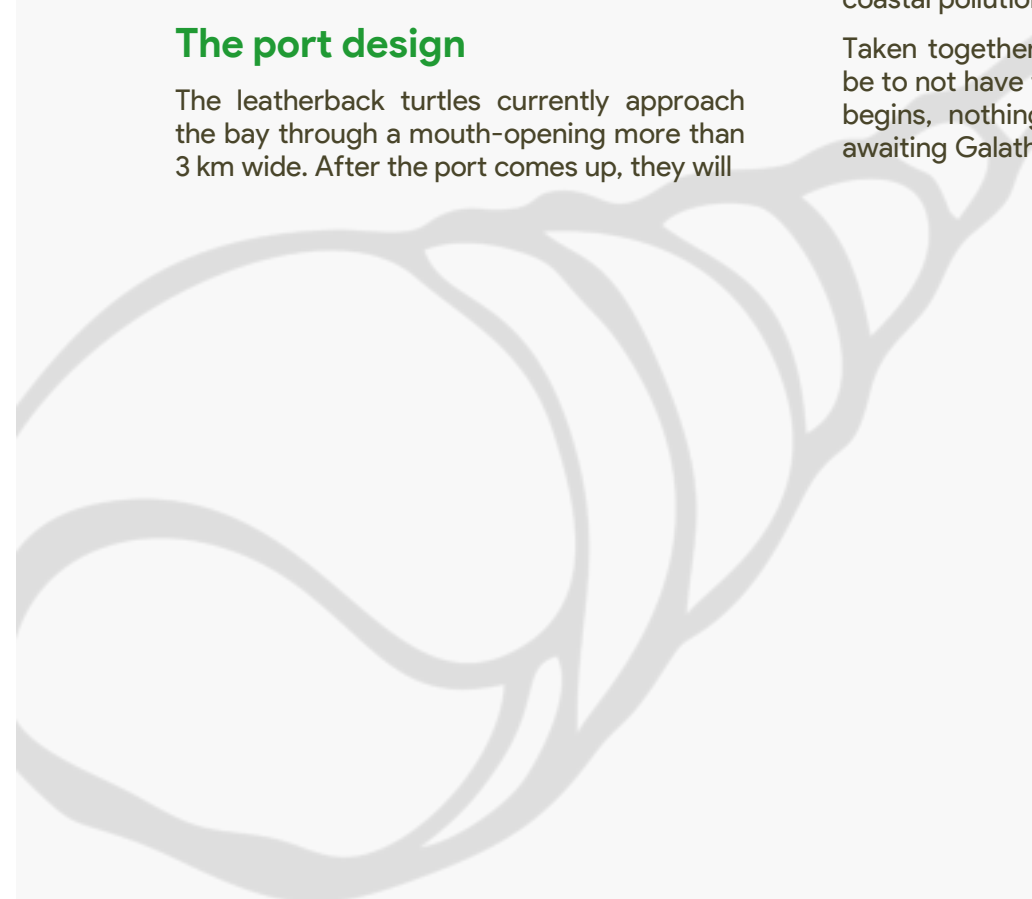
have to force themselves through only a gap of 300 m, between the breakwaters.

“Galathea isn’t a very wide bay, and with the breakwaters constructed on both sides narrowing the entry into the bay and the adjacent beaches, I doubt leatherbacks will continue nesting there,” Manoharakrishnan said. “The breakwaters and the construction will only erode the beach and the associated disturbance from dredging, lights and increased human presence will dissuade leatherbacks from nesting,” since these reptiles are very sensitive to lights during nesting.

The recommended port site, the proposed design and the breakwaters are only some of the issues that will impact the turtles.

There’s also the disturbance during construction, if and when it begins, the eventual shipping traffic and the ever-possible threats in the form of toxic spills and coastal pollution.

Taken together, the best mitigation plan will be to not have the project at all. If the project begins, nothing can mitigate the disasters awaiting Galathea Bay and its turtles.



07

Experts concerned over centre's tourism, development plans for A&N Islands

The Wire, 10 July 2021

Article link: <http://tiny.cc/8slkuz>

Photo: Pankaj Sekhsaria



Nicobari macaque, Galathea Bay Wildlife Sanctuary

Marine turtle researchers and organisations from across India have expressed concerns over the tourism and infrastructure plans that NITI Aayog has proposed for the Andaman and Nicobar Islands. They have referred in particular to the tourism and township plan over 240 sq. km of Little Andaman Island ([Annexure 3](#)) and the Rs-75,000-crore plan for Great Nicobar Island, including a transshipment port at Galathea Bay, an important nesting site of giant leatherback turtles ([Annexure 23](#)).

These and other concerns were enumerated in a recent letter ([Annexure 28](#)) that experts sent to a host of government officials, including the chairperson of the expert appraisal committee of the environment ministry, the ministry secretary, its inspector general (wildlife) and NITI Aayog vice-chairman. It was also sent to the islands' chief wildlife warden, the lieutenant governor and the chief secretary. "Both Little Andaman Island and Great Nicobar Island," the letter notes, "host vital and important nesting grounds for leatherback turtles, being one of the few global hotspots and India's index leatherback nesting sites."

Those who signed the letters include Kartik Shanker, associate professor, Indian Institute of Science and Rom Whitaker of the Madras Crocodile Bank Trust. Other signatories to the letter are affiliated with, among others, Dakshin Foundation, Bengaluru; Project Swarajya, Odisha; Green Habitat, Kerala; and Prakruti Nature Club, Gujarat.

Akila Balu and Aruv V., founder trustees of Chennai-based Students' Sea Turtle Conservation Network, put the letter together; the group itself has been at the forefront of many turtle awareness and conservation campaigns. "I feel pained, helpless and angry at watching this mindless destruction in the name of development," Arun said. "We have to realise that we are not the sole inheritors and inhabitants of this planet."

The two sites of specific concern on Little Andaman are the beaches at South and West Bay, both important leatherback nesting sites. South Bay is proposed to be part of a 'Leisure Zone' where a film city, a residential district and a tourism-related special economic zone are to come up. West Bay is

to be part of a 'West Bay Nature Retreat' with themed resorts, underwater resorts, beach hotels and high-end residential villas. (Annexure A3)

Importantly, the roughly 7-km-long beach at West Bay is the site of a pioneering long-term monitoring and satellite tracking project of the nesting turtles. Carried out jointly by the Andaman and Nicobar Environment Team, Dakshin Foundation, the Indian Institute of Science and the islands' forest department, the project has revealed hitherto unknown migration patterns.

Satellite-tagged female leatherbacks have been found swimming up to 13,000 km after nesting at West Bay, towards the western coast of Australia and southwest towards Africa's east (Annexure 6). This is evidence, the letter notes, that these sites are "globally significant and internationally important for marine ecological health and global leatherback numbers in the Indian Ocean and the Western Pacific Ocean."

Great Nicobar Island

For Great Nicobar Island, the principal concern is related to the Rs-75,000-crore integrated project that includes an international transshipment port at Galathea Bay plus an airport, a power plant and a township. The letter notes that not only was Galathea Bay a wildlife sanctuary, it is also listed as an 'Important Coastal and Marine Biodiversity Area' and 'Important Marine Turtle Habitat' by the National Marine Turtle Action Plan (Annexure 7), which the Union environment ministry released in February 2021.

Yet the standing committee of the National Board for Wildlife denotified it in its entirety in January 2021 for the "construction as well as operational phases of the International Shipment Project." (Annexure 8). The letter notes that "the scale of the project and the investment proposed could signal the end of a crucial leatherback nesting site, and the ecological richness of the last remnants of untouched tropical forests and marine ecosystems in India." The letter also points to the fact that in January 2021, the environment



Tree ferns in the Galathea Bay National Park

ministry agreed to a zero-extent ecologically sensitive zone for the Galathea National Park to make additional forest land available for the project (Annexure 14).

The Great Nicobar proposal, like the one for Little Andaman, seeks over 240 sq. km of coastal and forest land over two phases of development, and seeks to bring 6.5 lakh people here by 2050. The current total population of this 910 sq. km island is only 8,500.

"These projects will have a significant negative impact on the leatherback turtles in these islands, which is the only location in South Asia where they nest in significant

numbers," B.C. Choudhury, one of the letter's signatories and the IUCN- Species Survival Commission Marine Turtle Specialist Group's current regional vice-chair for South Asia, told *The Wire Science*. "India is a signatory to the memorandum of understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia, and it is our responsibility to do everything possible to safeguard such important nesting sites."

Noting that NITI Aayog's proposals run the risk of destabilising and disintegrating these sensitive ecological zones, the letter asks for the Galathea Bay Wildlife Sanctuary to be renotified. It concludes by pointing to the current challenges of the "pandemic, resource scarcity and a climate crisis" and appeals to the Indian government to reconsider the proposed plans.

08 | After approving Nicobar sanctuary denotification, WII says no expertise

The Wire, 16 July 2021

Article link: <http://tiny.cc/9slkuz>

Photo: Pankaj Sekhsaria



Tracks of a leatherback, Galathea Bay Wildlife Sanctuary

Six months after the National Board for Wildlife (NBWL) justified denotifying a significant nesting site for Giant leatherback turtles in the Andaman and Nicobar Islands based on an expert's opinion, the expert's institute – a premier wildlife research body – has said it has no expertise on these reptiles in this area.

The Indian government created the Galathea Bay wildlife sanctuary in 1997, and recently, in February this year, listed it in India's National Marine Turtle Action Plan (Annexure 7) as an important nesting site for giant leatherback turtles, a vulnerable species. But a month earlier, the Union environment ministry had already denotified all 11.44 sq. km of it to facilitate NITI Aayog's proposal for a mega transshipment port in the area at an estimated cost of Rs 35,000 crore.

However, the WII itself has said that it has no expertise on or experience with leatherback turtles research in the Andaman and Nicobar Islands. In a June 7 response to a Right to Information (RTI) application filed by legal researchers in Bengaluru, the institute said it has never by itself or in collaboration with other institutions conducted "any study exclusively on leatherback turtles of ANI"

A standing committee of the NBWL approved the denotification in January 2021. The minutes of the committee's meeting (Annexure 8) included the following statement by Dhananjai Mohan, director of the Wildlife Institute of India (WII): "If the Government would like to de-notify the Galathea Bay WLS, then it is strongly urged that the concerned authorities develop and implement a mitigation plan to facilitate leatherback and other turtles to continuously nest for which the connectivity

between the Galathea River and the Bay should be ensured. The mitigation plan needs to be developed through a detailed study so that marine turtles continue to nest on the beaches near the Galathea Bay during both construction as well as operational phases of the International Shipment Project."

Lack of expertise

The only turtles-related study that the RTI response refers to is a 30-page report entitled 'An assessment of the environmental sensitiveness of sea turtle nesting beaches of the Great Nicobar Island'. But this report is based on a survey undertaken after the director recorded his opinion at the standing committee meeting in January.

Curiously, B.C. Choudhury, a former scientist with the WII, said the WII has in fact undertaken research involving leatherback turtles at the Andaman and Nicobar Islands – including one under his supervision a decade ago. "This was a collaborative project with the Centre for Cellular and Molecular Biology, Hyderabad," (Annexure 30) Choudhury, who is the South Asia regional vice-chair for the IUCN Species Survival Commission's Marine Turtle Specialist Group, said. "I also collaborated on another project with the Indian Institute of Science and the Dakshin Foundation for the first satellite-tagging study on leatherback turtles here. I am not sure why WII has taken the stand that it has not studied the leatherback in the islands."

Ecological rationale

Another senior turtle researcher aware of the issue said on condition of anonymity that "the WII director's statement never made ecological sense". According to him, "The logic for connectivity between the Galathea River and the bay where it enters the sea and where the turtles nest was not clear. It is also not clear what mitigation plan is being proposed or how it will be implemented."

Choudhury agreed, adding that director Mohan's statement – that "connectivity between the river and the bay needs to be maintained" – is akin to the WII giving its professional and scientific okay for the port development project.

A Gurugram-based company called AECOM India Pvt. Ltd. had prepared a pre-feasibility report for NITI Aayog, entitled 'Holistic Development of Great Nicobar Island at Andaman and Nicobar Islands' (Annexure 23). This report proposed two breakwaters 2.53 km and 1.37 km long to "provide round-the-year wave tranquillity," for the port's benefit. If these breakwaters are built, they will reduce the width of Galathea Bay's opening from 3

km today to just 300 metres. This reduction would render it virtually impossible for the turtles to access their nesting sites – the beaches.

"Galathea isn't a very wide bay, and with breakwaters constructed on both sides narrowing the entry into the bay and the adjacent beaches, I doubt leatherbacks will continue nesting there," Muralidharan Manohar Krishnan, a turtle biologist with the Dakshin Foundation, said. "Unfortunately, I can't think of any example – where once developmental activities were given clearance over a critical habitat and care was taken to ensure that the habitat survived afterwards – to use as precedent."

An email to WII's Mohan requesting his comment on his institute's RTI reply hadn't elicited a response at the time of publishing this article.

No compelling grounds

Lawyer and legal researcher Sreeja Chakraborty's team had filed the RTI application with the WII. She said the sanctuary's "denotification is illegal as per sections 18 and 26A of the Wildlife Act and Article 48A of the Constitution." Chakraborty added that the stand committee meeting's minutes "indicate" that the islands' administration was acting under the Centre's orders, and had failed to "apply its mind and ask ... as to why the intent to notify a sanctuary in 1997 should be overturned now in 2021.

"What are the compelling grounds? Where are the documents and the research to back this decision?"

TIMELINE OF DEVELOPMENTS

- 1997** Draft notification for Galathea Bay Wildlife Sanctuary
- Dec 2004** Massive earthquake off the coast of Sumatra followed by the giant South and South East Asian tsunami
- 2005** Report of the Earthquake Engineering Research Institute (EERI), by Indian Institute of Technology recording subsidence of 3-4 of land in Great Nicobar due to the earthquake of 26 December 2004 ([Annexure 19](#))
- 2007** WII study by K Sivakumar on impact of tsunami on coastal flora and fauna in Great Nicobar; the study had recommended that the entire west and southern coast of Great Nicobar be brought under the protected area network. ([Annexure 17](#))
- 2010-2014** Satellite telemetry studies by the Dakshin Foundation, Indian Institute of Science and the A&N Forest Department show that Leatherbacks nesting on Little Andaman Island swim as far as Australia and Madagascar. ([Annexure 6](#))
- 2015** Publication of the 'Policy on Shompen Tribe of Great Nicobar Island'. ([Annexure 13](#))
- 2019** Call for Expression of Interest floated by the A&N Port Management Board for a container transshipment terminal and free trade warehousing zone at Galathea Bay ([Annexure 10](#))
- Dec 2019** Tender document by WAPCOS Limited for a 'Traffic Study for Creating Transshipment port at South Bay (Galathea Bay), Great Nicobar Island ([Annexure 18](#))
- Mid- 2020** The Andaman and Nicobar Islands Integrated Development Corporation (ANIIDCO) is designated the nodal agency for the implementation of the Holistic Development plan for Great Nicobar Island ([Annexure 11](#))
- Aug 2020** PM Narendra Modi announces a transshipment project in Great Nicobar involving an investment of Rs. 10,000 crore
- Sep 2020** NITI Aayog issues a 201 page request for proposal (RfP) for 'Preparation of Master Plan for Holistic Development of Great Nicobar Island' ([Annexure 24](#))
Constitution of an empowered committee by Director, Tribal Welfare, A&N Islands, to examine NITI Aayog's proposals for Little Andaman and Great Nicobar Islands ([Annexure 12](#), [Annexure 26](#))
- Oct 2020** Publication of draft notification of the ESZ for the Galathea National Park ([Annexure 15](#))
- 05 Jan 2021** Denotification of the Galathea Bay WLS approved by the Standing Committee of the National Board for Wildlife ([Annexure 8](#))
- 18 Jan 2021** Notification by the MoEFCC of a 'zero extent' ESZ for a major part of the Galathea National Park to allow use of land in the south-eastern and south-western part of the island for the NITI Aayog plan ([Annexure 14](#))
- 01 Feb 2021** Release of National Marine Turtle Action Plan by MoEFCC ([Annexure 7](#))
- 04 Feb 2021** Meeting of the empowered committee to discuss denotification of the six sq. kms of the Onge Tribal Reserve, Little Andaman Island ([Annexure 20](#))

- Feb 2021** Survey by the Zoological Survey of India to assess the biodiversity of Great Nicobar Island
- Mar 2021** A number of RTIs filed by concerned citizens seeking information on the NITI Aayog plans for Little Andaman and Great Nicobar Islands
- Early Mar 2021** Publication by AECOM India Pvt. Lid of a 126 page pre-feasibility report titled: 'Holistic Development of Great Nicobar Island at Andaman and Nicobar Islands. The client for the same is NITI Aayog ([Annexure 23](#))
- 17-18 Mar 2021** Meeting of the Environment Appraisal Committee (EAC)- Infrastructure I of the MoEFCC to discuss the proposal for Great Nicobar Island. The EAC did not take any decision citing lack of enough information from the same ([Annexure 21](#))
- 05 Apr 2021** ANIIDCO, the project implementing agency submits the additional detail sought in the March meeting of the EAC.
- 05-06 Apr 2021** Meeting of the EAC where it 'recommended' the Great Nicobar proposal for "grant of terms of reference (ToR)" for EIA studies ([Annexure 22](#))
- 06 May 2021** NITI Aayog says in response to a right to information (RTI) application that "no vision document has been prepared for proposed development plans in Great Nicobar Island' ([Annexure 25](#))
- Jun 2021** Leading turtle researchers and research organisations send a letter of concern to concerned authorities on impact of development projects in Little Andaman and Great Nicobar Islands
- 07 Jun 2021** WII says in response to RTI application that it has never by itself or in collaboration with other institutions conducted "any study exclusively on leatherback turtles of ANOI' ([Annexure 29](#))

ANNEXURE 01

studies on Sri Lanka's turtles, but should not be the last. The results pose more questions than they answer. Researchers in Sri Lanka, India and elsewhere are encouraged to develop partnerships and share resources to develop more telemetry and genetics studies on the countries' turtle populations. These should aim to fully determine the ecology, range and behaviours of these populations with a view to better informing future conservation efforts.

ACKNOWLEDGEMENTS

These figures are from Richardson *et al.* (2013) and I encourage anyone interested in a better understanding of this paper to visit www.seaturtle.org/mtrg/pubs/. I thank my co-authors for their invaluable contributions to that paper, and for the numerous Turtle Conservation Project staff and volunteers for supporting the tracking project. I also thank Dr BC Choudhury for sending me a copy of the note by Sivakumar *et al.* (2010).

Literature cited:

Coyne, M.S. & B.J. Godley. 2005. Satellite Tracking and Analysis Tool (STAT): An integrated system for archiving, analysing and mapping animal tracking data. *Marine Ecology Progress Series* 301: 1-7.

Ekanayake, E.M.L., K.B. Ranawana, T. Kapurusinghe, M.G.C. Premakumara & M.M. Saman. 2002. Marine turtle conservation in Rekawa turtle rookery in southern Sri Lanka. *Ceylon Journal of Science (Biological Science)* 30: 79-88.

Godley, B.J., J.M. Blumenthal, A.C. Broderick, M.S. Coyne, M.H. Godfrey, L.A. Hawkes & M.J. Witt. 2008. Satellite tracking of sea turtles: Where have we been and where do we go next? *Endangered Species Research* 4: 3-22.

Kapurusinghe, T. 2006. Status and conservation of marine turtles in Sri Lanka. In: *Marine Turtles of the Indian Subcontinent*. (eds. Shanker, K & B.C. Choudhury). Pp 173-187. Universities Press, Hyderabad, India.

Lal, A., R. Arthur, N. Marbà, A.W.T. Lill & T. Alcoverro. 2010. Implications of conserving an ecosystem modifier: Increasing green turtle (*Chelonia mydas*) densities substantially alters seagrass meadows. *Biological Conservation* 143: 2730-2738.

Rajagopalan, M., K. Vijayakumaran & E. Vivekanandan. 2006. Marine fishery-related mortality of sea turtles in India: An overview. In: *Marine Turtles of the Indian Subcontinent*. (eds. Shanker, K & B.C. Choudhury). Pp 227-237. Universities Press, Hyderabad, India.

Richardson, P.B., A.C. Broderick, M.S. Coyne, L. Ekanayake, T. Kapurusinghe, C. Premakumara, S. Ranger, M.M. Saman, M.J. Witt & B.J. Godley. 2013. Satellite telemetry reveals behavioural plasticity in a green turtle population nesting in Sri Lanka. *Marine Biology* 160: 1415-1426.

Sivakumar, K., B.C. Choudhury & S.R.B. Dissanayake. 2010. Joint turtle conservation programme of Sri Lanka and India: Sea turtles of Sri Lanka, also breeds in India and Maldives. *Wildlife (Journal of Department of Wildlife Conservation, Sri Lanka)* 2010: 18-24.

TRACKING LEATHERBACK TURTLES FROM LITTLE ANDAMAN ISLAND

ADHITH SWAMINATHAN#, NAVEEN NAMBOOTHRI & KARTIK SHANKER

Dakshin Foundation, Bangalore, Karnataka, India

#adhith.me@gmail.com

INTRODUCTION

Leatherback nesting in India is currently restricted to the Andaman and Nicobar Islands (Andrews *et al.*, 2006). A long-term monitoring programme was established in 2008 at Little Andaman Island, and two index beaches, South and West Bay (Figure 1) were chosen to study the recovery of leatherback turtles after the earthquake and tsunami of December 2004 (Swaminathan *et al.*, 2011, 2017). Over the years, the objectives evolved to include monitoring of leatherback nesting at the index

beaches through a capture-recapture programme. The data indicate that leatherback nesting on Little Andaman Island has recovered substantially after the 2004 tsunami and seems stable with some fluctuations (Swaminathan *et al.*, 2017). One of the components of the project was to identify the post-nesting migratory routes of leatherback turtles nesting in this region. For the first time in India, leatherback turtles were tagged with satellite transmitters to understand their migratory routes and foraging sites (Namboothri *et al.*, 2012).



Figure 1. Map of Little Andaman.

METHODS

Between 2011 and 2014, ten nesting leatherback turtles were tagged with Platform Transmitter Terminals (PTT), model Kiwisat 202 (specially designed for leatherback turtles by Sirtrack Wildlife Tracking Solutions Ltd.), on West Bay beach. All satellite transmitters were equipped with a saltwater switch, programmed to transmit continuously for the first three months and every alternate day for the rest of the period. The PTTs were attached surgically onto the carapace of nesting females using the direct attachment method (Fossette *et al.*, 2008; Byrne *et al.*, 2009).

All tagged turtles were monitored regularly based on the data received through ARGOS and the data were analysed using the Satellite Tracking Analysis Tool (STAT; Coyne & Godley, 2005; www.seaturtle.org/STAT).

RESULTS

All the turtles tagged on West Bay, Little Andaman, initially travelled south and then predominantly in two directions: South East (five turtles) towards the western coast of Australia, and South West (four turtles) towards the eastern coast of Africa (Figure 2). Data about one turtle was not transmitted.

One of the tracked turtles (PTT ID No. 113335 tagged on 3rd February 2013) travelled southeast to the coast of Western Australia (6,713km) before transmission stopped (Figure 2). Another turtle (PTT ID No. 113336, tagged on 5th January 2014) travelled southwest to the Northeastern coast of Madagascar in 395 days, swimming 12,328km.

Similarly, PTT ID No. 113337 (tagged on 8th January 2014) travelled close to the western coast of Mozambique in 266 days, covering 13,237km; this turtle also travelled to the north-west coast of the Andaman and Nicobar Islands during the inter-nesting period and remained in the Andaman Sea for several weeks (post-nesting) before heading southwest. Turtle No. 113337 travelled an average distance of 49.8km per day (Figure 2; Table 1).

DISCUSSION

The patterns of movements demonstrated by adult female turtles tagged in 2013 and 2014 was consistent with those previously tagged in 2011 and 2012 (Namboothri *et al.*, 2012). They traverse much of the Indian Ocean during their foraging migrations, ranging as far east as Western Australia, and as far west as Mozambique and Madagascar. The migration strategy appears to be direct with open ocean crossing or indirect with movements along the coastal shelf. The average distance covered in a day by the nine turtles was 43.5 ± 13.8 km (StDev; Range 15.6-60.2km).

While we now have some insight into the migratory patterns of leatherbacks in the Indian Ocean, more satellite telemetry studies need to be carried out in subsequent years to assess if there are other migratory routes taken by the turtles nesting at Little Andaman. Additional data on dive behaviour and oceanography will help us better understand their migratory behavior and identify 'hot spots' where leatherbacks are vulnerable to fishing activities.



Figure 2. Post-nesting migratory routes of leatherback turtles nesting at Little Andaman. Turtle icons represent the tagging location and the last known locations for each individual turtle. For coloured tracks, see the pdf version, available on-line.

Literature cited:

Andrews, H.V., S. Krishnan & P. Biswas. 2006. Distribution and status of marine turtles in the Andaman and Nicobar Islands. In: *Marine Turtles of the Indian Subcontinent* (eds. K. Shanker & B.C. Choudhury). Pp 33-57. Universities Press: Hyderabad, India.

Byrne, R., J. Fish, T.K. Doyle & J.D.R. Houghton. 2009. Tracking leatherback turtles (*Dermochelys coriacea*) during consecutive inter-nesting intervals: Further support for direct transmitter attachment. *Journal of Experimental Marine Biology and Ecology* 377: 68-75.

Coyne, M.S. & B.J. Godley. 2005. Satellite Tracking and Analysis Tool (STAT): An integrated system for archiving, analyzing and mapping animal tracking data. *Marine Ecology Progress Series* 127: 1-7.

Fossette, S., H. Corbel, P. Gaspar, Y. Le Maho & J. Georges. 2008. An alternative technique for the long-term satellite tracking of leatherback turtles. *Endangered Species Research* 4: 33-41.

Namboothri, N., A. Swaminathan, B.C. Choudhury & K. Shanker. 2012. Post-nesting migratory routes of leatherback turtles from Little Andaman Island. *Indian Ocean Turtle Newsletter* 16: 21-23.

Swaminathan, A., N. Namboothri & K. Shanker. 2011. Post-tsunami status of leatherback turtle nesting at Little Andaman Island. *Indian Ocean Turtle Newsletter* 14: 5-10.

Swaminathan, A., S. Thesorow, S. Watha, M. Manohar Krishnan, N. Namboothri & M. Chandi. 2017. Current status and distribution of threatened leatherback turtles and their nesting beaches in the Nicobar group of islands. *Indian Ocean Turtle Newsletter* 26: 12-18.

Table 1. Satellite telemetry data of 10 female leatherback turtles tagged in West Bay, Little Andaman, from 2011-2014.

Turtle ID	Release Date yyyy-mm-dd	# Days Transmitted	Total Distance Travelled (km)	Average Distance Per Day (km)
103333	2011-01-04	179	7,312	40.85
103334	2011-01-04	69	1,077	15.60
103335	2011-01-05	92	4,600	50.00
103402	2012-02-13	77	4,634	60.20
113332	2012-01-23	183	6,998	38.24
113333	2012-01-23	51	2,690	52.75
113334	2012-01-23	-	-	-
113335	2013-02-03	125	6,713	53.70
113336	2014-01-05	395	12,328	31.20
113337	2014-01-08	266	13,237	49.80

ANNEXURE 02

Derville S., C. Jean, M. Dalleau, J.Y. Le Gall, S. Ciccione & J. Bourjea. 2015. Long term monitoring of green turtle nesting on Tromelin Island demonstrates stable reproduction and population parameters. *Chelonian Conservation & Biology* 14: 11-20.

Dubois. 1669. L'escadre de Perse. In: *Sous le signe de la tortue. Voyages anciens à l'île Bourbon (1611-1725)* (ed. A. Lougnon). Pp. 75-93. Library Gérard, Saint Denis, Reunion Island, France.

Jean C. & S. Ciccione. In Press. Restauration des plages de ponte de tortues vertes *Chelonia mydas* à La Réunion. Actes

du séminaire des Gestionnaires de la Conservation de la Biodiversité à La Réunion GECOBIO 2, 18 Nov. 2016.

Jean, C., S. Ciccione, E. Talma, K. Ballorain & J. Bourjea. 2010. Photo-identification method for green and hawksbill turtles and first results from reunion. *Indian Ocean Turtle Newsletter* 11: 8-13.

Lauret-Stepler, M., J. Bourjea, D. Roos, D. Pelletier, P.G. Ryan, S. Ciccione & H. Grizel. 2007. Reproductive seasonality and trend of *Chelonia mydas* in the SW Indian Ocean: A 20-yr study based on track counts. *Endangered Species Research* 3: 217-227.

CURRENT STATUS AND DISTRIBUTION OF THREATENED LEATHERBACK TURTLES AND THEIR NESTING BEACHES IN THE NICOBAR GROUP OF ISLANDS

ADHITH SWAMINATHAN^{1#}, SAW THESOROW², SAW WATHA², MURALIDHARAN MANOHARAKRISHNAN¹, NAVEEN NAMBOOTHRI¹ & MANISH CHANDI²

¹Dakshin Foundation, Bangalore, Karnataka, India

²Andaman and Nicobar Environmental Team, Port Blair, Andaman and Nicobar Islands, India

[#]adhith.me@gmail.com

INTRODUCTION

Nesting of leatherback turtles was first observed in the Andaman and Nicobar Islands by Satish Bhaskar while conducting surveys for the Madras Crocodile Bank Trust in 1979 (Bhaskar, 1979a, 1979b), with his first sighting on West Bay beach of Little Andaman Island on 31st December of that year (Bhaskar, 1979c). Since Bhaskar's reports, additional surveys and reports have confirmed that the beaches of the Andaman and Nicobar Islands are an important nesting ground for leatherback turtles in India (Andrews *et al.*, 2001; Andrews *et al.*, 2006a; Andrews *et al.*, 2006b; Namboothri *et al.*, 2011; Swaminathan *et al.*, 2011; Swaminathan *et al.*, 2016). There are earlier records of sporadic leatherback nesting from the Indian mainland (Kar & Bhaskar, 1982); however, the current nesting populations are restricted to the Andaman and Nicobar Islands.

Many nesting sites for sea turtles in the Andaman and Nicobar Islands were severely affected by the December 2004 Indian Ocean earthquake and the subsequent tsunami. The coastline and the shore topography were severely altered in many of these islands, with the

Nicobar group of islands undergoing submergence (Ramachandran *et al.*, 2005), while coastal plates in some of the Andaman Islands were uplifted (CORDIO/IUCN, 2005; Kulkarni, 2005). In 2008, a long-term monitoring programme was initiated at Little Andaman Island to monitor the post-tsunami recovery of nesting leatherback turtles. The observations made at South and West Bay of Little Andaman suggested that leatherback nesting had recovered substantially after the 2004 tsunami, and the population appeared stable with some fluctuations (Swaminathan *et al.*, 2011; Swaminathan *et al.*, 2016).

Poor infrastructure and challenging logistics have limited sea turtle monitoring and conservation efforts in the Nicobars since the 2004 tsunami. Barring a few reports and surveys that indicated some beaches have re-formed, there is little information on the recovery of these nesting beaches and populations (Namboothri *et al.*, 2011; IOSEA, 2012; Jadeja *et al.*, 2015). Here, we report on our rapid surveys of nesting beaches throughout the Nicobar group that are being used by the four sea turtles found in this region (leatherback, green, olive ridley and hawksbill turtles), with a primary focus on leatherback turtle nesting on Great and Little Nicobar Islands.

METHODS

Between 2nd March and 18th April 2016, the first three authors visited the entire Nicobar group of islands (Figure 1), to understand the recovery of previously described nesting beaches, identify new nesting beaches, and document nesting intensities on all visited beaches.

Local fishing boats were used to survey the coastline of islands, and the team carried out surveys by foot during daylight hours when a sandy beach was encountered. Upon encountering turtle tracks, the species was identified established based on track characteristics (Pritchard

& Mortimer, 1999). While it is possible to misidentify olive ridley and hawksbill tracks, we classified each track to species using basic information such as the known seasonality of the different species and characteristics of the nesting habitat (Pritchard & Mortimer, 1999; Shenoy *et al.*, 2011). Olive ridley turtles are known to nest from November to April and prefer wide-open beaches, similar to leatherback turtles; while hawksbill turtles are known to nest from July to December and prefer beaches with offshore reefs and typically nest near or in vegetation (Pritchard & Mortimer, 1999; Andrews *et al.*, 2006a; Shenoy *et al.*, 2011). After a thorough visual inspection of every nest mound, depth of body pits, abandoned body pits and nest chambers, we categorised each crawl as

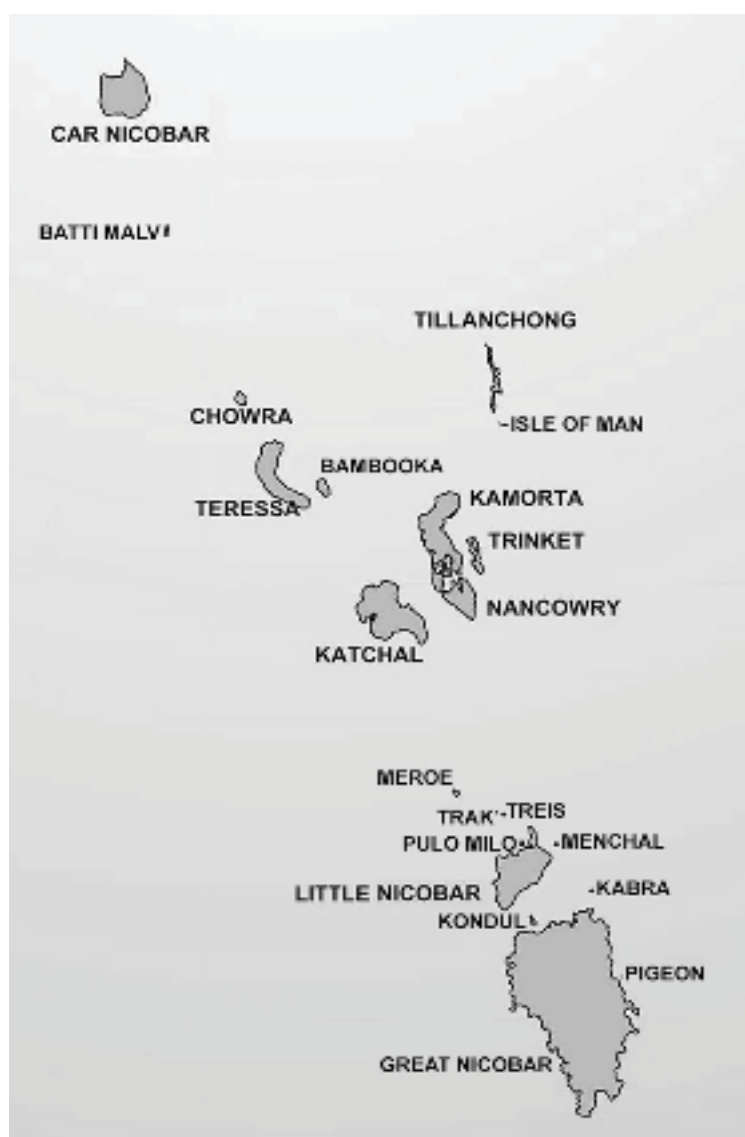


Figure 1. Nicobar Islands.

either a nest or a false crawl (Shenoy *et al.*, 2011; Dodd, 2016). The location of each nest was recorded using a GPS.

All nests were examined for evidence of predation based on tracks and other signs. Wherever possible, the identity of the predator was established based on tracks. The surveys were non-invasive and did not involve any direct handling of the turtles, eggs or hatchlings. The surveys were conducted during the day and there were no instances of nesting directly observed. This was done due to logistical feasibility for conducting a survey over a large area and non-availability of necessary permits for the direct handling of nests and eggs.

RESULTS

Of the 21 islands in the Nicobar group, three islands (Pigeon, Kabra and Isle of Man) did not have any sandy beaches and three islands (Trak, Meroe and Batti Malv) were not accessible due to unfavorable sea conditions. We surveyed the remaining fifteen islands of the Nicobar group for sea turtle nesting activity. We recorded 2140 nests and 21 false crawls were recorded on 12 islands. The highest number of nests for all the four species were recorded on the Great Nicobar Island followed by the Little Nicobar Island.

Leatherback turtles

A total of 1,068 leatherback nests were found on five of the fifteen islands surveyed (Table 2). The islands of Great Nicobar and Little Nicobar together comprised 94% of the total nests found in the Nicobar region. No nests were found on Teressa and Tillanchong Islands where leatherback nesting had been reported in the past (Andrews *et al.*, 2006a; Chandi, pers. comm.).

Earlier studies in the region indicated that leatherback turtles nest 4.9 times a year on average (Bhaskar, 1993; Andrews *et al.*, 2001). Based on this, the estimated number of leatherback turtles nesting in this region during the 2015-2016 nesting season would be approximately 200 individuals.

Other sea turtles

Green turtles were found to be the most widespread species nesting in this region. The study identified 519 nests on 12 of the 15 islands surveyed (Table 1), including on Chowra, where green turtle nests had not been previously documented (Chandi, pers. comm.).

Hawksbill tracks were only found on Great Nicobar Island, though the species has previously been reported to nest on beaches of Tillanchong, Teressa, Trinket, Katchal, Meroe, Treis, Trak, Kabra, Pulo Milo, Little Nicobar and Menchal Islands (Andrews *et al.*, 2001).

Four hundred and eighty two olive ridley nests were observed on Great Nicobar, Little Nicobar, Trinket, Teressa, Katchal and Car Nicobar Islands. Almost 97% of the nests observed were found on Great Nicobar Island.

DISCUSSION

Seasonality

The surveys were designed to be conducted towards the end of the peak nesting season of leatherbacks and olive ridleys. The leatherback nesting season in the Nicobar Islands is October through March, with a peak in December/January (Andrews *et al.*, 2006a). Olive ridley nesting runs from November through April, with a peak in January (Andrews *et al.*, 2006a). The reported

Table 1. Sea turtle nesting data for the Nicobar Islands.

Island	Sea Turtle Species				Total
	Leatherback	Green	Olive Ridley	Hawksbill	
Great Nicobar	775 (1)	322 (4)	472 (6)	71	1640 (11)
Little Nicobar	229	4	6	0	239
Katchal	57	40	1	0	98
Car Nicobar	0	72 (4)	1	0	73 (4)
Teressa	0	42 (2)	1	0	43 (2)
Trinket	0	19 (1)	1	0	20 (1)
Kamorta	6	2	0	0	8
Chowra	0	6 (1)	0	0	6 (1)
Tillanchong	0	5	0	0	5
Nancowry	1	4	0	0	5
Treis	0	2	0	0	2
Bambooka	0	1 (2)	0	0	1 (2)
Menchal	0	0	0	0	0
Pulo Milo	0	0	0	0	0
Kondul	0	0	0	0	0
Grand Total	1068 (1)	519 (14)	482 (6)	71	2140 (21)

() represents false crawls

Table 2. Leatherback turtle nest and predation data for the Nicobar Islands.

Location	No. of Nests	No. of Nests Predated (%)
Great Nicobar Island	775	673 (86.8%)
East of Indira Point	2	2
Koshindon	2	0
Laxmi Nagar	1	0
North of Alexandria	46	42
South of Alexandria	20	15
North of Dagmar	123	113
South of Dagmar	43	33
Pulo Bed	16	10
Pulo Kunji	57	45
Re Pinsuöt	7	2
Renhong	17	9
Safed Balu	3	2
Patatiyö	6	0
Galathea	410	388
South of Galathea to Rock	2	0
West of Indira Point	20	12
Kamorta Island	6	1 (16.6%)
Pilpilo	6	1
Katchal Island	57	7 (12.2%)
South	21	7
West	36	0
Little Nicobar Island	229	53 (23.1%)
Bahua	40	0
Kiyang	99	43
Muhincohn	88	10
Thavithö	2	0
Nancowry Island	1	0 (0%)
Katholö	1	0
Grand Total	1068	734 (68.7%)

nesting season for green turtles for this region is May to September, peaking in June and July (Namboothri *et al.*, 2012). The nesting season for hawksbill sea turtles commences in July and end by early December (Andrews *et al.*, 2006a). Nests of both green and hawksbill turtles were documented during our survey period, suggesting that they may nest year round in this region, as green turtles do in nearby Thailand (Yasuda *et al.*, 2008) and on Tromelin Island in the western Indian Ocean (Derville *et al.*, 2015). Nevertheless, as our surveys were limited to a seven week stretch in the early part of the year, it is likely that we did not fully characterise nesting effort of green and hawksbill turtles in the region.

Nesting beaches and nesting

Prior to the 2004 tsunami, the islands of Great and Little Nicobar were important nesting sites for leatherback turtles (Andrews *et al.*, 2006a). Harboursing 87% of all turtle nesting in the region, the beaches of Great and Little Nicobar Islands continue to be crucial nesting sites in the region for all four sea turtle species. The most important nesting sites include Galathea, Alexandria and Dagmar Bay on Great Nicobar Island and Pulo Kiyang and Bahua (previously referred to as Dahayu/Dahvu by Bhaskar (1994) and Andrews *et al.* (2006a)) on Little Nicobar Island. The current surveys revealed that most of the beaches in this region have formed again and leatherbacks

Table 3. Records of leatherback nests laid per year in Great and Little Nicobar Islands.

	Survey Period (Source)												
	Apr 1979 (Namboothri et al., 2012)	Feb 1981 (Namboothri et al., 2012)	Nov 1991-Mar 1992 (Namboothri et al., 2012)	Mar 1993-Apr 1994 (Namboothri et al., 2012)	Dec 1995-Feb 1996 (Andrews et al., 2006a)	Dec 1997-Feb 1998 (Andrews et al., 2006a)	Nov 2000-Apr 2001 (Andrews et al., 2006a)	Oct 2001-Apr 2002 (Andrews et al., 2006a)	Nov 2003-Apr 2004 (Andrews et al., 2006b)	Nov 2004 (Andrews et al., 2006b)	Feb 2011 (Namboothri et al., 2011)	Feb 2015 (Jadeja et al., 2015)*	Mar 2015-Apr 2016 (current study)
	Great Nicobar Island												
Galathea	-	-	158	237	282	124	524	425	575	84	146	7*	410
Alexandria	80	55	343	-	-	-	866	-	-	-	-	-	66
Dagmar	80	8	171	-	-	-	362	-	-	-	-	-	166
	Little Nicobar Island												
Pulo Kiyang	-	-	-	115	-	-	-	-	-	-	-	-	99
Bahua	-	-	-	50	-	-	-	-	-	-	-	-	40

*Jadeja *et al.* (2015) only reported 7 nests in Galathea, Great Nicobar Island. This was probably as a result of non-detection of older nests and nesting evidences. Namboothri *et al.* observed 146 nests in 2011 and Swaminathan and Chandi conducted a survey in 2012, which was abandoned as a result of an earthquake and subsequent tidal wave, observed more than 2 nests every meter.

continue to nest in high numbers (Table 3). The numbers for Alexandria and Dagmar from 2016 indicate a decline in comparison to the data from the 1978 to 2001.

However, regions which were severely damaged by the 2004 tsunami still have dead trees and tree debris along the coast, particularly on Great Nicobar Island, which is likely obstructing sea turtles from accessing the nesting beach and also reducing the nesting area. Several previously known nesting beaches were either partially or fully inundated during high tide, forming creeks along the coast.

Predation

Of the 2,140 nests that were recorded in the Nicobar region, 57% (1,223 nests) were predated by either feral dogs, water monitor lizards or in some cases feral pigs. While monitor lizards are natural predators of leatherback nests and occur on many beaches, predation by feral dogs and pigs that once belonged to the Nicobari settlements that existed prior to the 2004 tsunami was found to be particularly high on the Great Nicobar Island. Namboothri *et al.* (2011) also observed that approximately 70% of the nests on Galathea were predated by feral pigs during the 2011 survey.

RECOMMENDATIONS

The ongoing leatherback monitoring programme in Little Andaman has revealed a stable increase in the nesting population, with over hundreds of nests laid every season, and also reformation of the nesting beaches (Swaminathan *et al.*, 2016). The satellite telemetry study of ten leatherback turtles nesting in Little Andaman has indicated two corridors for migration, one on the southeastern corridor towards Papua New Guinea and Australia, and one along the southwestern corridor towards Madagascar and east coast of Africa (Namboothri *et al.*, 2012; Swaminathan *et al.*, 2016). A long-term monitoring programme should be re-established at Galathea Bay to monitor the nesting beach and to understand long-term trends in nesting and reproductive efforts. Further studies on remigration intervals through tagging, genetic studies on population structures, and satellite telemetry studies to understand migration patterns of leatherback turtles nesting are required in this region. Accessibility of the nesting sites remains an issue, but the roads are in the process of being re-laid and should reach the nesting beach in the coming years. Several rapid and intensive surveys need to be carried out on prime nesting beaches where regular monitoring efforts are logistically impossible. In regions where predation

from feral dogs and pigs are high, the feral animals need to be either controlled or culled to reduce the pressure.

ACKNOWLEDGEMENTS

We thank the Forest Department of Andaman and Nicobar Islands, including G.N. Sinha, PCCF (WL) Dr. K. Ravichandran CF (WL), Jabestin (Divisional Forest Officer), Great Nicobar Islands; all the rangers and forest staff for the logistical support; and the local staff and fishermen who accompanied us for our surveys. We also thank the Wildlife Trust of India, Rapid Action Projects, staff for awarding the grant and supporting us in conducting this survey; the International Seafood Sustainability Foundation (ISSF) and the Marine Turtle Conservation Act Fund of the US Fish and Wildlife Services for the additional financial support for running the program activities.

Literature cited:

- Andrews, H.V., S. Krishnan & P. Biswas. 2001. The status and distribution of marine turtles around the Andaman and Nicobar archipelago. A GOI-UNDP national sea turtle project report, IND/97/964. Centre for Herpetology/ Madras Crocodile Bank Trust, Tamil Nadu, India.
- Andrews, H.V., S. Krishnan & P. Biswas. 2006a. Distribution and status of marine turtles in the Andaman and Nicobar Islands. In: *Marine Turtles of the Indian Subcontinent* (eds. Shanker, K. & B.C. Choudhury), pp. 33-57. Universities Press, Hyderabad, India.
- Andrews, H.V., A. Tripathy, S. Aghue, S. Glen, S. John & K. Naveen. 2006b. The status of sea turtle populations in the Andaman and Nicobar Islands. In: *Towards an integrated and collaborative sea turtle conservation programme in India: a UNEP/CMS-IOSEA Project Report* (eds. K. Shanker and H.V. Andrews). Centre for Herpetology/Madras Crocodile Bank Trust, Post Bag 4, Mamallapuram, Tamil Nadu.
- Bhaskar, S. 1979a. Sea turtle in the South Andaman Islands. *Hamadryad* 4: 3- 6.
- Bhaskar, S. 1979b. Sea turtle survey in the Andaman and Nicobars. *Hamadryad* 4: 2- 26.
- Bhaskar, S. 1979c. Letters from the Andamans. *Hamadryad* 4: 3-6.
- Bhaskar, S. 1993a. The Status and Ecology of Sea Turtles in the Andaman and Nicobar Islands. ST 1/93. Centre for Herpetology, Madras Crocodile Bank Trust, Tamil Nadu, India.
- Bhaskar, S. 1994. Andaman & Nicobar sea turtle project, Phase V. The Centre for Herpetology, Madras Crocodile Bank & the Forest Department, Andaman & Nicobar Islands.
- Bustard, R. 1972. Sea Turtles: Their Natural History and Conservation. Taplinger Publishing Co., New York NY, USA.
- CORDIO/IUCN. 2005. Tsunami Damage: Second CORDIO/IUCN report of rapid response surveys of coral reefs and related ecosystems of the central and eastern Indian Ocean. Assessment of tsunami damage in the Indian Ocean; Second Report.
- Derville S, C. Jean, M. Dalleau, J-Y Le Gall, S. Ciccione & J. Bourjea. 2015. Long-term monitoring of green turtle nesting on Tromelin Island demonstrates stable reproduction and population parameters. *Chelonian Conservation & Biology* 14: 11-20.
- Dodd C.K. 2016. Reptile ecology and conservation: A handbook of techniques. Oxford University Press, Oxford, England.
- Indian Ocean–South-East Asian (IOSEA) Marine Turtle Memorandum of Understanding. 2012. Assessment of the Conservation Status of the Leatherback Turtle in the Indian Ocean and South- East Asia.
- Jadeja, S.J., S.S. Gole, D.A. Apte & A. Jabestin. 2015. First nesting record of leatherback sea turtles on the west coast of Galathea bay, Great Nicobar Island, after the 2004 Indian Ocean tsunami with notes on nest predation. *Indian Ocean Turtle Newsletter* 23: 7-10.
- Kar, C.S. & S. Bhaskar. 1982. The status of sea turtles in the Eastern Indian Ocean. In: *The Biology and Conservation of Sea Turtles*. (ed. Bjorndal, K.) Pp. 365-372. Smithsonian Institution Press, Washington, D.C., USA.
- Kulkarni, S. 2005. Interim Report on Tsunami Impact assessment of coral reefs in the Andaman and Nicobar Submitted to CORDIO. Pp. 1-7.
- Namboothri, N., S. Watha, M. Chandi & K. Shanker. 2011. Post-tsunami status of leatherback nesting in the south-east coast of the Great Nicobar island. Report submitted to the Forest Department, Andaman and Nicobar Islands.
- Namboothri, N., A. Swaminathan & K. Shanker. 2012. A compilation of data from Satish Bhaskar's sea turtle surveys of the Andaman and Nicobar islands. *Indian Ocean Turtle Newsletter* 16: 4-13.
- Namboothri, N., A. Swaminathan, B.C. Choudhury & K. Shanker. 2012. Post-nesting migratory routes of leatherback turtles from Little Andaman Island. *Indian Ocean Turtle Newsletter* 16: 21-23.
- Pritchard, P.C.H. & J.A. Mortimer. 1999. Taxonomy, external morphology, and species identification. pp. 21-38. In: Eckert, K.L., K.A. Bjorndal, F.A. Abreu-Grobois, and M. Donnelly (Editors). 1999. Research and Management Techniques for the Conservation of Sea Turtles. IUCN/SSC Marine Turtle Specialist Group Publication No. 4.
- Ramachandran, S., S. Anitha, V. Balamurugan, K. Dharanirajan, K. Ezhil Vendhan, M. Irene, P. Divien, A. Senthil Vel, I. Sujahad

Hussain and A. Udayaraj. 2005. Ecological impact of tsunami on Nicobar Islands (Camorta, Katchal, Nancowry and Trinkat). *Current Science* 89: 195-200.

Shenoy, S., T. Berlie and K. Shanker. 2011. *Sea turtles of India. A comprehensive field guide to research, monitoring and conservation.* Dakshin Foundation, Bangalore and Madras Crocodile Bank Trust, Mamallapuram, India. 148 p.

Swaminathan, A., N. Namboothri, and K. Shanker. 2011. Post-tsunami status of leatherback turtle nesting at Little Andaman Island. *Indian ocean Turtle Newsletter* 14: 5-9.

Swaminathan, A., N. Namboothri, M. Chandi and K. Shanker. 2016. A monitoring programme for leatherback turtles at South Bay and West Bay, Little Andaman (2008-2016). Report submitted to the Forest Department, Andaman and Nicobar Islands.

Yasuda, T. K. Kittiwattanawong, W. Klom-in, and N. Arai. 2008. Seasonal changes in reproductive output of a year-round nesting population of the green turtle *Cheloniemydas* at Huyong Island, Thailand. *Amphibia-Reptilia* 29: 559-566.

CELEBRATING A MARINE TURTLE SANCTUARY IN MADAGASCAR

JÉRÉMIE BOSSERT^{1#}, MAYEUL DALLEAU¹, SANTISY ANDRIAMIRAVO ABDOUL² & STÉPHANE CICCIONE³

¹CEDTM, Centre d'Étude et de Découverte des Tortues Marines, Saint Leu, La Réunion, France

²Wildlife Conservation Society, Soavimbahoaka Antananarivo, Madagascar.

³Kélonia, l'observatoire des Tortues Marines, Saint Leu, La Réunion, France.

[#]jeremiebossert@cedtm-asso.org

The north-west coast of Madagascar is a hotspot for marine turtles (Humber *et al.*, 2016). The tiny archipelago of Nosy Iranja lies 40km south of Nosy Be (Figure 1), the largest island on the Malagasy coast. It is composed of two islets (Iranja Be and Iranja Kely) linked by a sand bank covered by water at high tide. Although both islands are only around half a square kilometre in area, their beaches host one of the most studied nesting sites in the country. Marine turtle nesting has been studied in Madagascar since the year 2000 (Bourjea *et al.*, 2006), when WWF Madagascar hired someone to monitor nesting activities and initiated baseline studies at the same time that the first hotel was built on the smaller islet, Iranja Kely. This was a turning point for marine turtles on Nosy Iranja.

Since 2004, with the support of Kelonia, the sea turtle observatory of Reunion island, multiple scientific projects have been conducted and sea turtle reproduction has been monitored on Iranja Kely. Tourism has developed on the island despite the political crisis and the indeterminate closure of the largest resort in 2013. Meanwhile, other hotels have been constructed on Iranja Be and the growing number of visitors have generated incomes for the local communities. The marine turtle poaching that used to be common is rarely reported on these islands nowadays.

Recently, two locally managed marine protected areas (MPAs) were created with the support of the Wildlife Conservation Society (WCS): “Ankivonjy”, that includes the Nosy Iranja islets, and “Ankarea” that encompasses the Mitsio archipelago in the north. Both MPAs were officially recognized by the Malagasy government in 2015.

To increase awareness about the importance of these protected areas for marine turtles, the first Marine Turtle Festival took place on the archipelago at the end of May 2016. It was organized by the Wildlife Conservation Society in partnership with Kelonia and was predominantly funded by Prince Albert II of Monaco Foundation. The festival lasted 3 days and the target audiences were local communities, regional authorities, and tourists. But the event's messages also reached the larger community thanks to regional and national media coverage. Activities such as sports and traditional song and dance contests, concerts, and public dancing helped to attract people. They were complemented by seminars given by representatives from Kelonia and the University of Marine Studies of Toliara, a photographic exhibition, and documentary screenings. Attendees also had the opportunity to observe a green turtle nest emergence. This, more than many speeches,

ANNEXURE 03



Sustainable Development of Little Andaman Island

Vision Document



NITI Aayog

Content

01

Project Background

- 1.1) About Andaman and Nicobar Islands
- 1.2) Island Potential
- 1.3) Development Issues
- 1.4) Global Benchmarking and Learnings
- 1.5) Key Principles and Objectives

02

Little Andaman Island

- 2.1) About Little Andaman Island
- 2.2) Island Profile
- 2.3) Existing Land Reservations

03

Vision

- 3.1) Development Vision
- 3.2) Investment Potential
- 3.3) Potential Development Zone +Port
- 3.4) Identified Development Area



04

Concept Plan

- 4.1) Development Anchors and Zones
- 4.2) Development Strategy
- 4.3) Phasing

01

Project Background

- 1.1) About Andaman and Nicobar Islands
- 1.2) Island Potential
- 1.3) Development Issues
- 1.4) Global Benchmarking and Learnings
- 1.5) Key Principles and Objectives



Background

“The Andaman and Nicobar Islands have considerable untapped economic potential and strategic advantage to India but have been neglected and ignored due to ecological and environmental constraints. While it is nobody's case that the entire land mass should be denuded of forest cover and the tribes relegated to the dustbin of history, there is surely a compelling case for clearing up some of the land for exploiting the economic and strategic potential of these islands. The most strategically situated island of Great Nicobar, which sits astride the 200-km-wide Six-Degree Channel dominating one of the most important international sea routes and close to the Malacca Strait, could be considered for partial opening with around 30% of the island area but keeping the core area of rich bio-diversity preserved. This would release an area for comprehensive development efforts, including deployment of strategic assets. To support this economic catalyst, there is also a need to open Little Andaman, which is as big as Singapore on the same principles of development as Great Nicobar. The opening of Great Nicobar and Little Andaman could generate a significant number of jobs over the next two decades by harnessing the development impulses which Singapore and other Southeast Asian countries have both harnessed and generated. It would not be far-fetched to visualise a second Singapore-like entity in the Bay of Bengal which would be a pivot for catering to the economic development of the littoral states/countries on the eastern seaboard, including Bangladesh, Myanmar, Thailand and the coastal states of West Bengal, Odisha, Andhra Pradesh and Tamil Nadu as well as their hinterland.”

These lines by Dr Vivek Rae, former chief secretary of Andaman and Nicobar Islands aptly capture the essence of this paper which focusses on outlining the need for development as well as a holistic development strategy for Little Andaman and Great Nicobar Islands.

Like the rest of the Andaman and Nicobar Island group, these Islands have long been neglected and isolated from the rest of the country. At best, there have been efforts at local and international tourism these have been largely disconcerted and till date there is no visionary comprehensive policy to tap the vast unexplored potential of these Islands. As landmasses they are comparable to Singapore in size and in the case

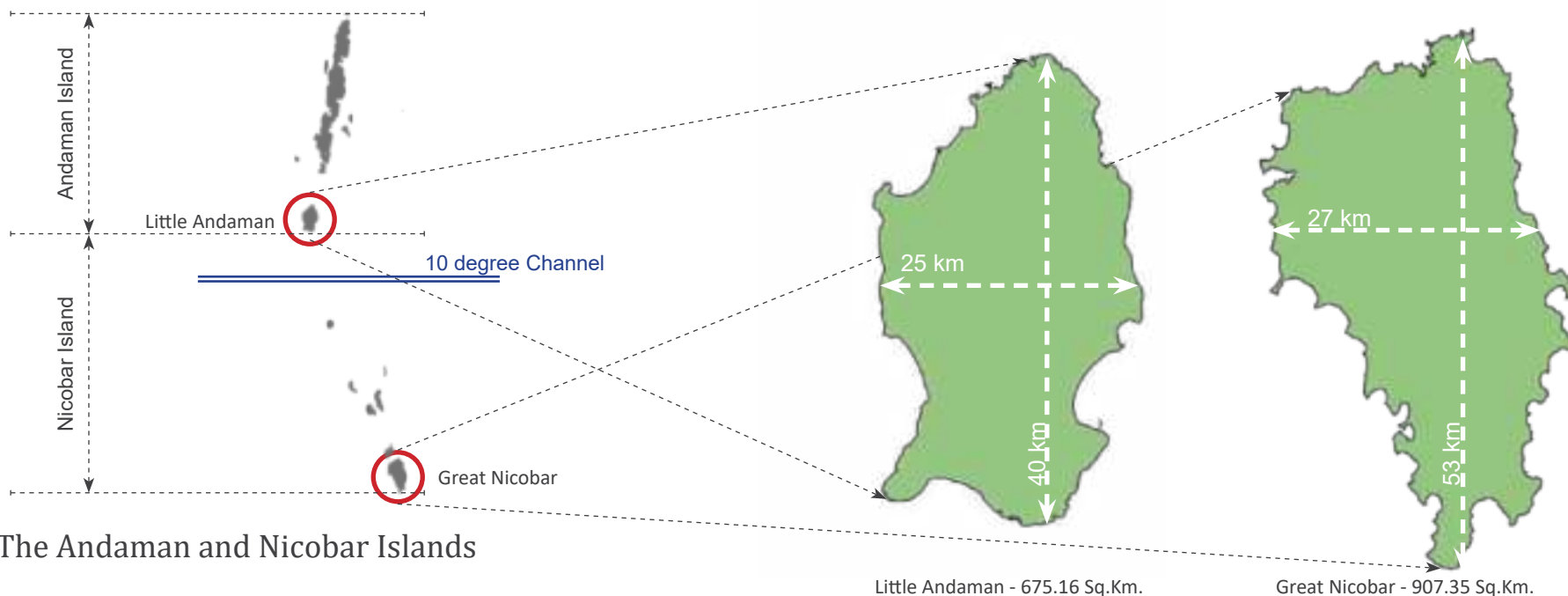
of Great Nicobar, it is even bigger than Singapore. However, the population density in Andaman and Nicobar is 47 people per sq. km while it's 7,615 persons per sq. km in Singapore. Its per capita income is \$1,789 compared to Singapore's \$55,182.

Then what is stopping us from developing these into veritable jewels for the country? According to Dr. Rae, “This is primarily due to benign neglect, misplaced priorities and absence of a long-term strategy for sustainable development.”

The Islands are facing several development issues and challenges. The most significant amongst these are Chinese consolidation in the Indian Ocean Region and the military and economic impacts of this consolidation, lack of good connectivity with Indian mainland and other global cities, a fragile biodiversity and natural ecosystems, need for strengthening of institutional arrangements for projects implementation and certain Supreme Court notifications which are posing to be an impediment to development.

Part of the reason that the development of the Andaman & Nicobar Islands has been delayed for such a long period of time is because there are opposing viewpoints on developing them. For decades, New Delhi has debated the costs and benefits of developing the islands and its utility. The financial costs are significantly high with serious environmental constraints. The presence of indigenous tribes and concerns for their welfare has been a key factor challenging island development. However, in recent times, the security environment in India's maritime domain has changed drastically. After years of neglect, therefore, the present government is finally making a push to develop the Islands. The need to develop these islands, their strategic importance, and their potential as a tourism hotspot has long been known and argued for.

This report proposes to free certain portion of the two largest islands within this group; Great Nicobar and Little Andaman for economic and strategic benefits to the country but at the same time ensure conservation of the rich bio-diversity and primitive tribal groups in the core of these islands. The focus in the report will be on development of Great Nicobar island.



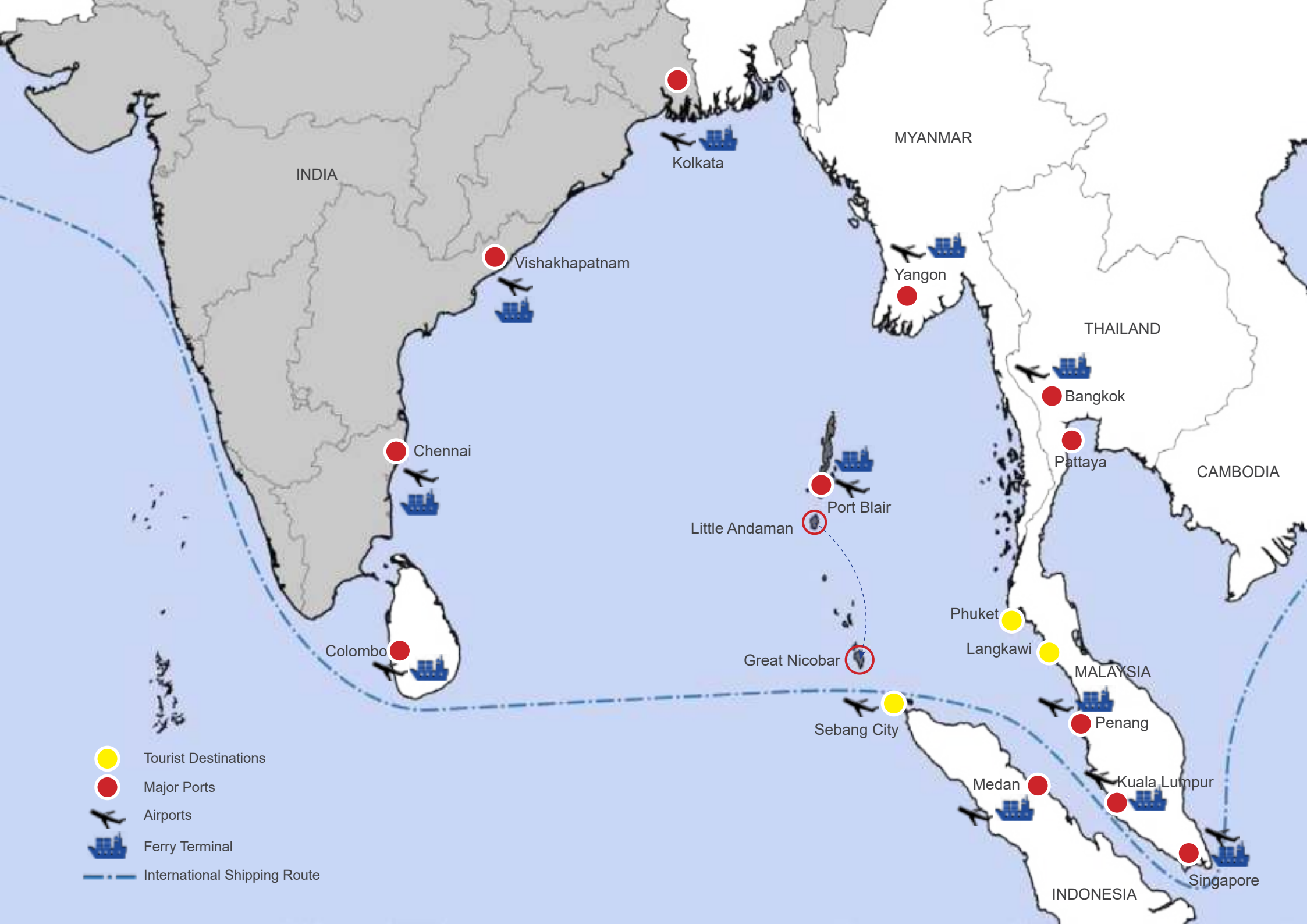
1.1) The Andaman and Nicobar Islands

1.1.1) Location and Connectivity

The Andaman and Nicobar Islands are a cluster of about 836 offshore islands of India located to the east of the Bay of Bengal and west of the Andaman Sea. The clusters comprises of two island groups, the Andaman Islands and the Nicobar Islands, separated by the 150 km wide Ten Degree Channel, with the Andaman Islands to the north and the Nicobars to the south. The Union Territory's capital city is Port Blair which is the current focal point of all development and connectivity in the Islands. The Little Andaman Island is the fourth largest of the group of Islands with an area of about 675.16 Sq.Km. The island is the southernmost island in the Andaman cluster and is located about 88 Kms south of Port Blair. The Great Nicobar Island is the largest of the cluster of islands with an area of about 907.35 Sq.Km and the southernmost of the group of Nicobar islands located at a distance of approximately 520 kms from Port Blair.

Presently there is limited connectivity of the Islands with the main-land, the only options being by air and sea routes. For Air routes, it takes approximately 2.5 hours

from the nearest airports in cities like Kolkata, Chennai, Vishakhapatnam and Bengaluru to reach the Veer Savarkar International Airport, located at Port Blair. For Sea routes, it takes approximately 3 days from the nearest ports in cities like Kolkata, Chennai, Vishakhapatnam to sail to the port located at Port Blair. Jetties at Phoenix Bay and Haddo wharf operate ferries connecting to islands. The Great Nicobar Island is connected to the Phoenix Bay and Haddo Wharf in Port Blair by ferries that take about 1 day. The Little Andaman Island currently has a 225 meter length wharf, capable of handling large size ship vessels and the Great Nicobar Island has a 106 meter length wharf capable of handling medium size ship vessels which is proposed to be extended by another 45 meter to handle large size ship vessels. Further, plans for sea plane connectivity to Little Andaman is under process under UDAN 4.1 and fixed wing aircraft connectivity to Great Nicobar (Campbel Bay) is under process in UDAN 4.1.



-  Tourist Destinations
-  Major Ports
-  Airports
-  Ferry Terminal
-  International Shipping Route



1.1.2) Strategic Importance

The Andaman and Nicobar Islands are located at a very strategic location in the Bay of Bengal. The international shipping route passing through the Malacca Strait passes very close to the Andaman and Nicobar Island cluster, just about 40 kms south of the Great Nicobar island. According to Xiaobo Qu, and Qiang Meng, Department of Civil and Environmental Engineering, National University of Singapore, Singapore, the route is one of the most important shipping waterways in the world from both an economic and a strategic perspective. It is the shortest shipping channel between the Indian Ocean and the Pacific Ocean, linking major economies such as Middle East, China, Japan, South Korea, etc. There are more than 200 vessels passing through the straits on a daily basis and this gives an annual throughput of approximately 70,000 ships, carrying 80% of the oil transported to Northeast Asia as well as one third of the world's traded goods. (The Economic Importance of the Straits of Malacca and Singapore: An Extreme Scenario Analysis, 2012).

Further, the islands are also located strategically from a defence perspective since there is a strong and growing presence of other countries and their alliances in the Indian Ocean like China, France, Australia, Oman, Mauritius, Seychelles and Madagascar.

Another locational advantage of the islands are their close proximity to international tourist island destinations like the upcoming Senang City, the Phuket Island and Langkawi Island. Thus, the islands present a great opportunity for a tourism oriented island development that would put Andaman and Nicobar on the global tourist destinations map.



Presence of Countries in the Indian Ocean



Unexplored Exquisite Nature



Unique combination of mountain and beaches



Best surfing beaches (Little Andaman)



Part of World Network of Biosphere Reserves (Great Nicobar)



Diverse Wildlife

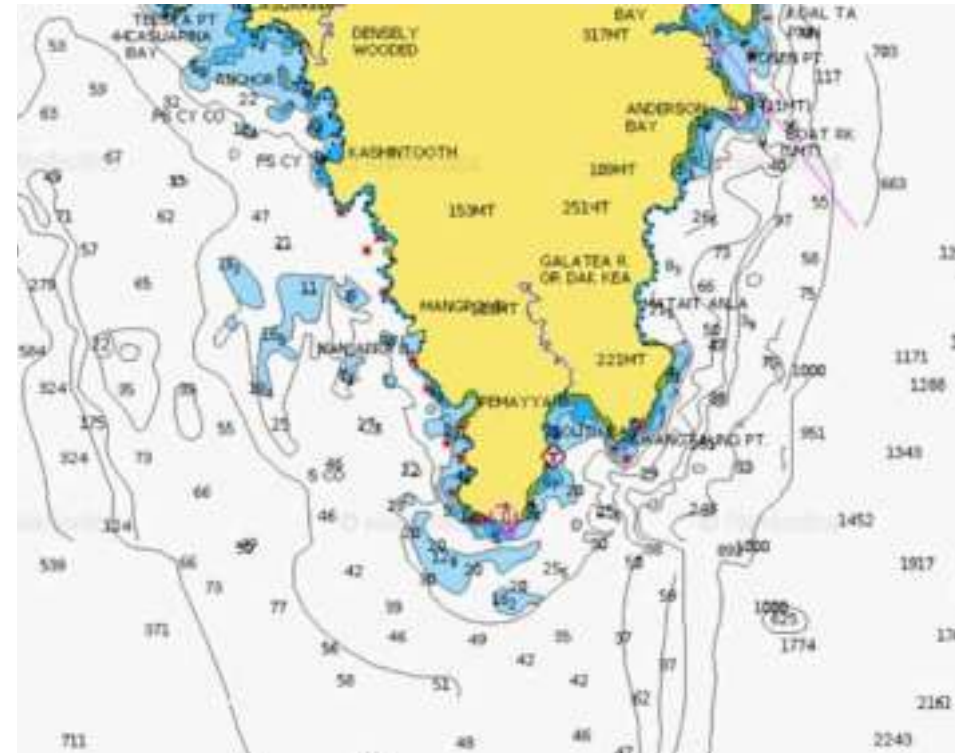


World's unique coral reserve

1.2) Island Potential

The Little Andaman and Great Nicobar Islands have great potential for a well rounded sustainable development based on tourism and industry economic drivers. The identified potential characteristics of the islands are as below:

1. **Potential for Development of Deep Berth Port:** The strategic positioning near to the international shipping route and available natural deep draft port, provide immense potential for development of a deep berth port/ transshipment terminal.
2. **Unexplored Exquisite Nature:** Both the islands have an exquisite quality of nature ecosystem which is unexplored to this day. This poses as a great opportunity for tourism as it provides a new unseen environment to be explored by enthusiasts and tourists.
3. **Unique combination of mountain and beaches:** The islands have a unique terrain and following from the above characteristic, have a unique combination of green forest covered mountains and sandy beaches. This is also a distinct feature of the islands waiting to be explored by tourists and nature enthusiasts.
4. **Best Surfing Beaches:** The Butler Bay Beach in Little Andaman is considered a surfer's paradise. Both the islands have a number of such remote beaches with waters suitable for surfing and have the potential to become an international destination for sea surfing.
5. **Part of World Network of Biosphere Reserves (Great Nicobar):** The Great Nicobar Island is covered with about 735 Sq.Km. (81% of Island area) of Biosphere Reserve. This was included in the World Network of Biosphere Reserves as part of the Man and Biosphere Programme of UNESCO in 2013 to promote sustainable development based on local community effort and science.
6. **Diverse Wildlife:** Both the islands both, covered with dense forest and the presence of the Biosphere reserve in Great Nicobar also witnesses the presence of a diverse wildlife in the islands. While it is critical that the wildlife species and their habitat are protected, this also presents an opportunity for nature based tourism.
7. **World's unique coral reserve:** Another notable feature of the islands is the abundant presence unique forms of corals at certain localities around the islands. This is also a great attraction for tourists looking for diving into the waters.



Great Nicobar Bathymetry Chart

Source: <https://webapp.navionics.com/?lang=it#boating/menu@8&key=w%7Drh%40cmr%7BP>

1.3) Development Issues

While the islands possess a number of favourable characteristics for development, they also present various development issues as below:



1. Recommendations of Prof. Shekhar Singh Committee accepted by Hon'ble Supreme Court on the conservation of Biodiversity and natural forest ecosystem:

The Prof. Shekhar Singh Committee report highlights that the major objective of forest and ecosystem management in these Islands should be biodiversity conservation and encroachment of forest areas is a threat to the forests of the Islands. This report discourages the introduction of new natural environs since it highlights that many exotic species of animals and plants have been introduced in the Islands, with a very destructive impact on forest regeneration. The introduction of oil palms in Little Andaman and of teak in various parts of the islands has also had a significant negative impact. For development of these islands, requisite permission from Hon'ble Supreme Court shall be required before development works can be initiated.

2. Applicability of Forest Conservation Act: The forest conservation act requires that for use of forest land for non-forestry purpose, compensatory afforestation is required on non-forest land. However, there is limited non-forest land available in A&N islands to fulfil the requirements of Compensatory Afforestation according to the act.

3. Presence of the Tribal Reserve: The interests of aboriginal tribes are protected through "Andaman & Nicobar Islands (Protection of Aboriginal Tribes) Regulation 1956 with amendments". Section 3(1) of the regulation empowers A&N Administration to declare any area which is predominantly inhabited by aboriginal tribes to be a reserved area and specify and change the limits of such area.

1.4) Key Principles

Owing to the aforementioned key constraints in development of the islands, a few key principles have been set to help realise the vision of a sustainable development in the islands as follows:



01

Preservation of maximum forest cover

It is proposed to convert only 6.63% (547 Sq.Km.) of total land area of A&N Islands to Developable Area for both the islands. This Developable area will also include all mandatory open, green, recreational, water bodies and other green areas which will be part of the holistic development approach.

Protection of Particularly



02

Vulnerable Tribal Groups

On the Little Andaman and Great Nicobar islands, it is proposed to conserve 70% of the tribal area. If required, the tribals can be relocated to other parts of island which is conserved and protected.



03

Tree cutting to be controlled and restricted

Detail planning shall ensure maximum trees to be preserved. The trees cut shall be utilised for domestic consumption and shall be processed on the islands. No tree cutting shall be allowed in the protected and conserved areas within development plan.



04

Conservation of Biodiversity in A&N Islands

The entire boundary of National park/ Wildlife sanctuary conserved. The inner core dense Eco sensitive zone shall remain conserved and protected. 750 mts from high tide line shall be restricted development. no building above the height of a coconut tree.



05

Development Plan and EIA

A Holistic Master Plan for the entire development area including Coastal Zone Management Plan will be prepared in consultation with Government appointed committee of experts which will include ecologist who is proficient with the ecology of ANI.

1.5) Global Benchmarking and Learnings



Bali, Indonesia, 5,780 Sq.km.

68% of Bali GDP is from tourism, International airport and cruise terminal, Presence of all international brands hotels due to ease of doing business policy.



Singapore, 766 Sq.km.

Amongst the 20 smallest countries in the world, 2018 GDP- USD 364 Billion Global Tourism and Business Destination



Langkawi, Malaysia, 478 Sq.km.

3.7 million tourist visited Langkawi in 2018, Free Port status, International airport. Government invested in 7 hotels in 1980's to jump start the development.

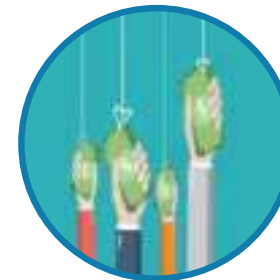


Phuket, Thailand, 576 Sq.km.

40 hotel rooms to 40,000 rooms in 40 year. 60% land is forest and vegetation. International airport. 12 million tourist visiting annually.

Case Comparisons and Studies were carried out with similar scale popular island tourist destinations like Bali, Singapore, Langkawi and Phuket Islands. The catalysts for their developments were identified and learnings from the cases were as below:

- 1. Connectivity and Infrastructure:** Air, rail, road and waterways makes the destination accessible to a global audience.
- 2. Policy Framework:** Creating a policy framework is required to caters to diverse communities, locals, tribes.
- 3. Sustainable Development:** Conserving natural resources is critical by using conserving fragile ecosystems and use of renewable energy sources.
- 4. Initial Capex from Government:** Government led initial capex is required to kickstart the development.
- 5. Diversifying the economic base:** Shifting towards multiple sectors of the economy by introducing a range of sectors and markets is essential for a well rounded development.
- 6. Built and Natural Heritage:** Adopting conservation techniques for preservation of the built and natural heritage and making them tourist attractions.



1.6) Objectives

The objectives for the development of the Islands of Little Andaman and Great Nicobar are identified as follow:



OBJECTIVE 1:
Building two new
Greenfield Coastal
Cities for India.



OBJECTIVE 2:
Having the cities to
be developed as Free
Trade Zones.



OBJECTIVE 3:
Having the two cities
to compete with global
cities like Hong Kong,
Singapore and Dubai



OBJECTIVE 4:
Leveraging the
strategic location and
natural features of the
islands to present a
unique experience to
the visitors.

02

Little Andaman Island

2.1) Island Profile

2.2) Existing Land Reservations





2.1) Island Profile

The Little Andaman Island has an area of about 675.16 Sq.Km. with a forest cover of about 95% of the island and total residential population of about 17,000 people. The topography of the island is hilly with the presence of the central range of hills in the southern part of the island and is relatively flat in the northern regions.

Majority of island area is notified as reserved forest. The forest is enriched with a diverse flora and fauna and hosts a concentration of thick mangroves on the north, north-east and north-west regions of the island. The island is home to 15 Sq.kms. of Red Oil Palm Plantation. The status of the ROP, as part of reserved forest or not, is to be confirmed. The rich biodiversity is mainly confined in the core areas of the island and areas along the coast line can be explored for development. Groups of corals are also observed in the waters near the southern and south-western coast of the island.

Further, 442.5 Sq.km. of area on Little Andaman island is designated as a tribal reserve for 120 Onges Tribes residing on the island. A revenue area of about 34 Sq.km. has been identified along the eastern coast of the island.

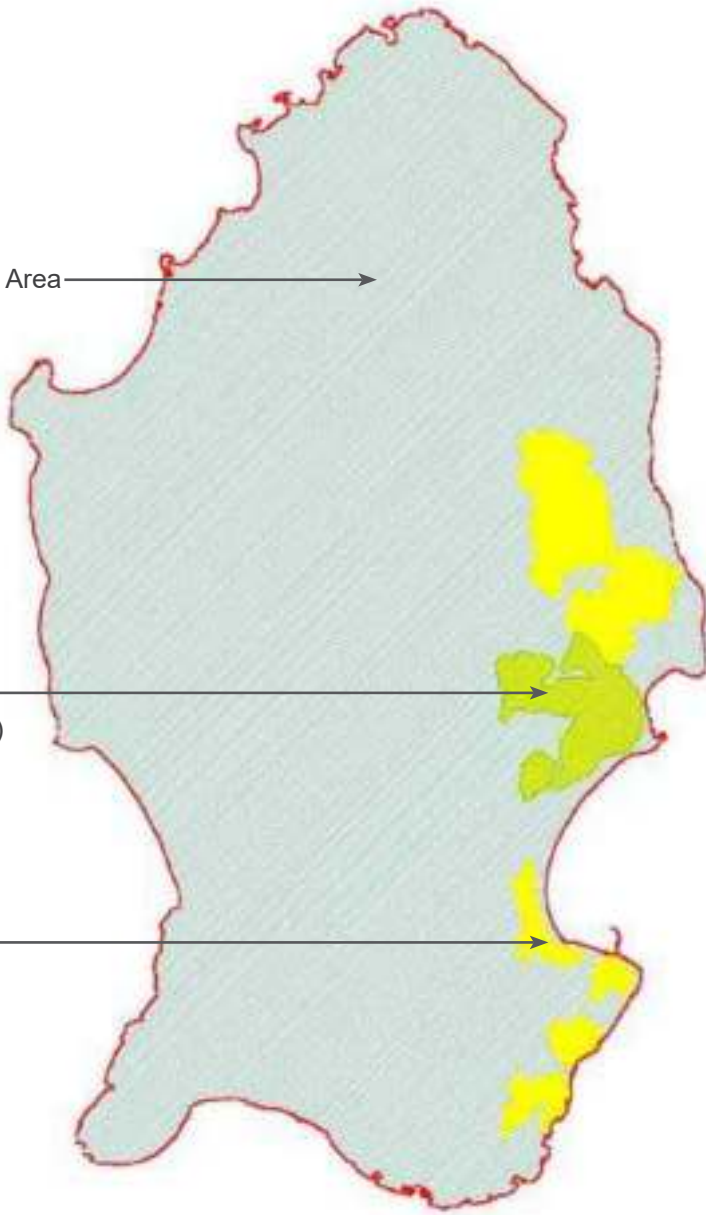


Reserved Forest Area
641 Sq.km.

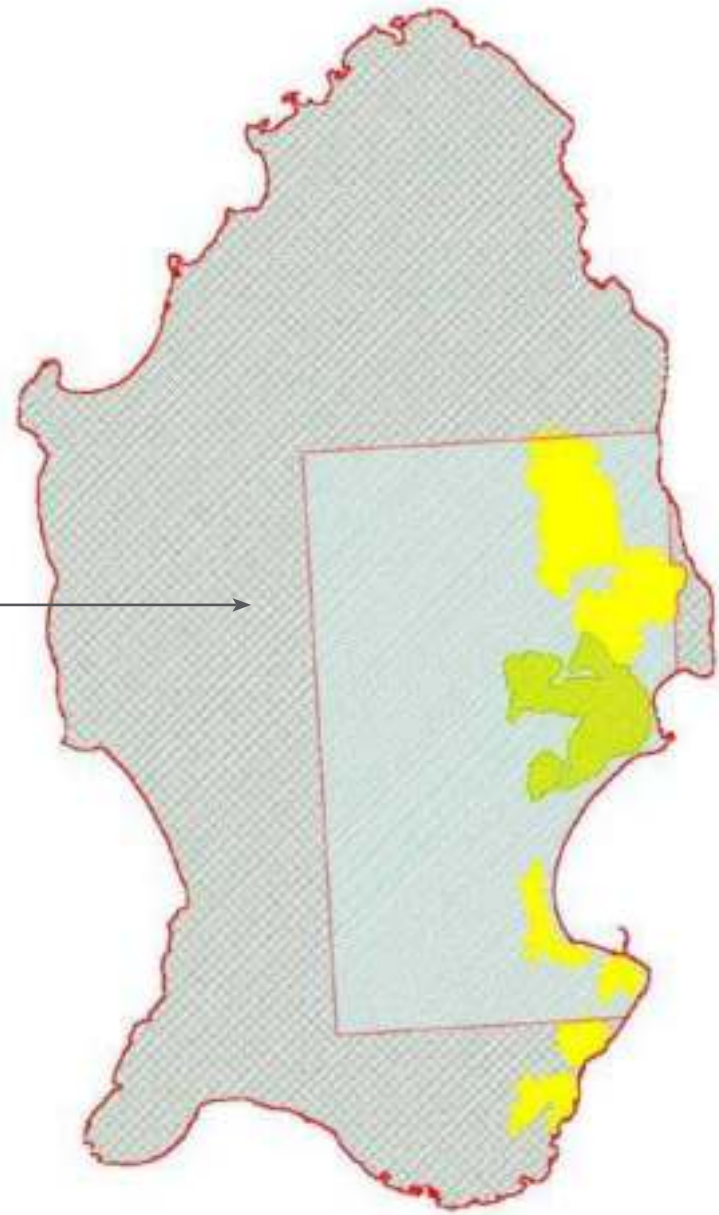
Red Oil Palm
Plantation (ROP)
Area
15 Sq.km.

Revenue Area
34 Sq.km.

Island Area
675.16 Sq.km.



Tribal Reserve
Area on land
442.5 Sq.km.



2.2) Existing Land Reservations

The Little Andaman Island has an eco-sensitive environment with the presence of the forests, mangroves and tribal reserve areas. Major portions of the island area (675.16 Sq.km.) have been reserved for the protection and conservation of these eco-sensitive zones to which careful consideration needs to be given while planning any development on the island. They are as follows:

- Reserved Forest Area: 641 Sq.km.
- Tribal Reserve Area: 442.5 Sq.km.
- Revenue Area: 34 Sq.km.
- Red Oil Palm Plantation Area: 15 Sq.km.

03

Vision

- 3.1) Development Vision
- 3.2) Investment Potential
- 3.3) Potential Development Zone
- 3.4) Identified Development Area



3.1) Development Vision

The vision has been inspired by studying the various inherent potentials of the island, and understanding the development opportunities they provide.

**Little Andaman –
THE PERFECT PARADISE**



“Jobs creation and economic upliftment by developing the island as Global Destination with focus also on Hospitality, Entertainment, IT-based industrial promotion and Healthcare.”

3.2) Investment Potential



01 Tourism & Hospitality

- Hotels
- Theme Resorts
- Villas
- Retail & Entertainment
- Underwater Resorts
- Golf Course
- Convention Center
- Wellness & SPA



02 Energy

- Solar Power Plants/ Towers
- Wind Turbines
- Aerial Turbines
- PV Fields



03 Entertainment

- Casinos
- Adventure Sports & Activities
- Theme Park
- Marine Life Observatory
- Nature Based Tourism
- Underwater Safari
- Wildlife Safari
- River Safari
- Ropeway & Skywalk



04 Finance

- Plug & Play office Complex
- R&D Centers
- Advanced Manufacturing (green industries)
- Drone port with fully automated drone delivery system



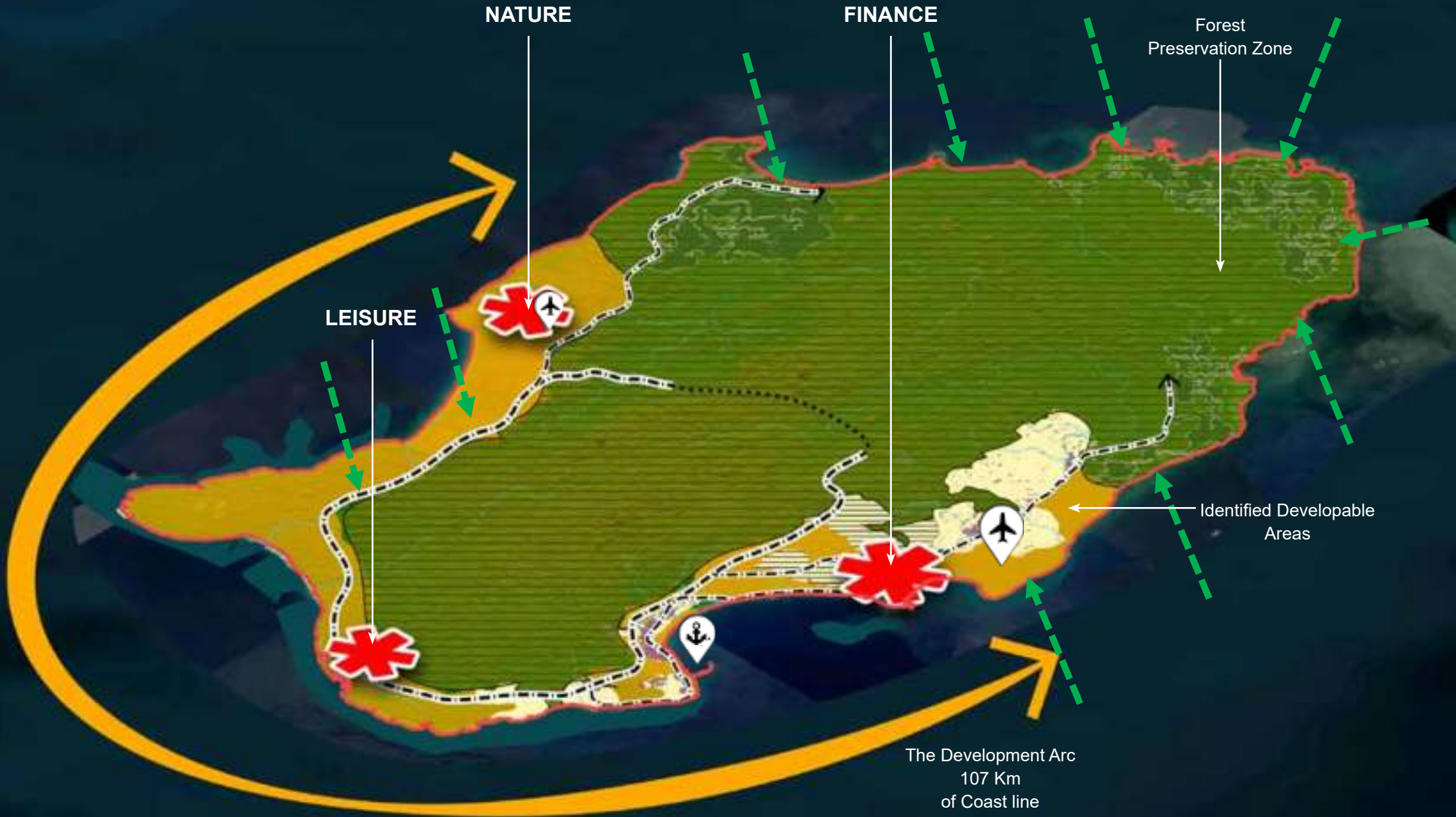
05 Healthcare & Wellness

- Nature Cure Institutes
- Ayurvedic Care Centers
- Wellness Institutes
- Health Centers
- Wellness Retreats
- Ayurvedic Medicinal Plantation



06 Connectivity

- Airport
- Cruise Terminal, Jetty & Marina
- Intra Island Connector- Monorail/ green transportation
- Integrated townships

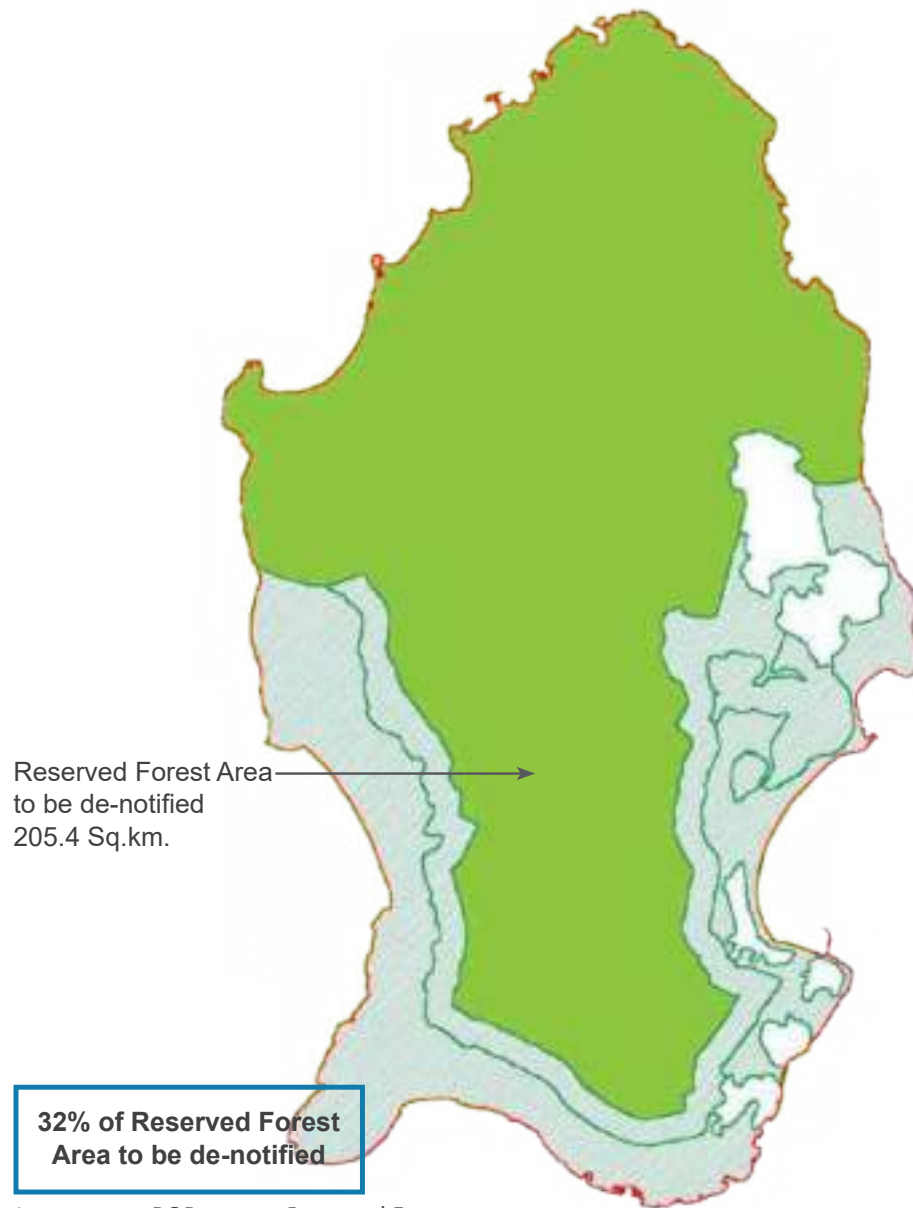


3.3) Potential Development Zone

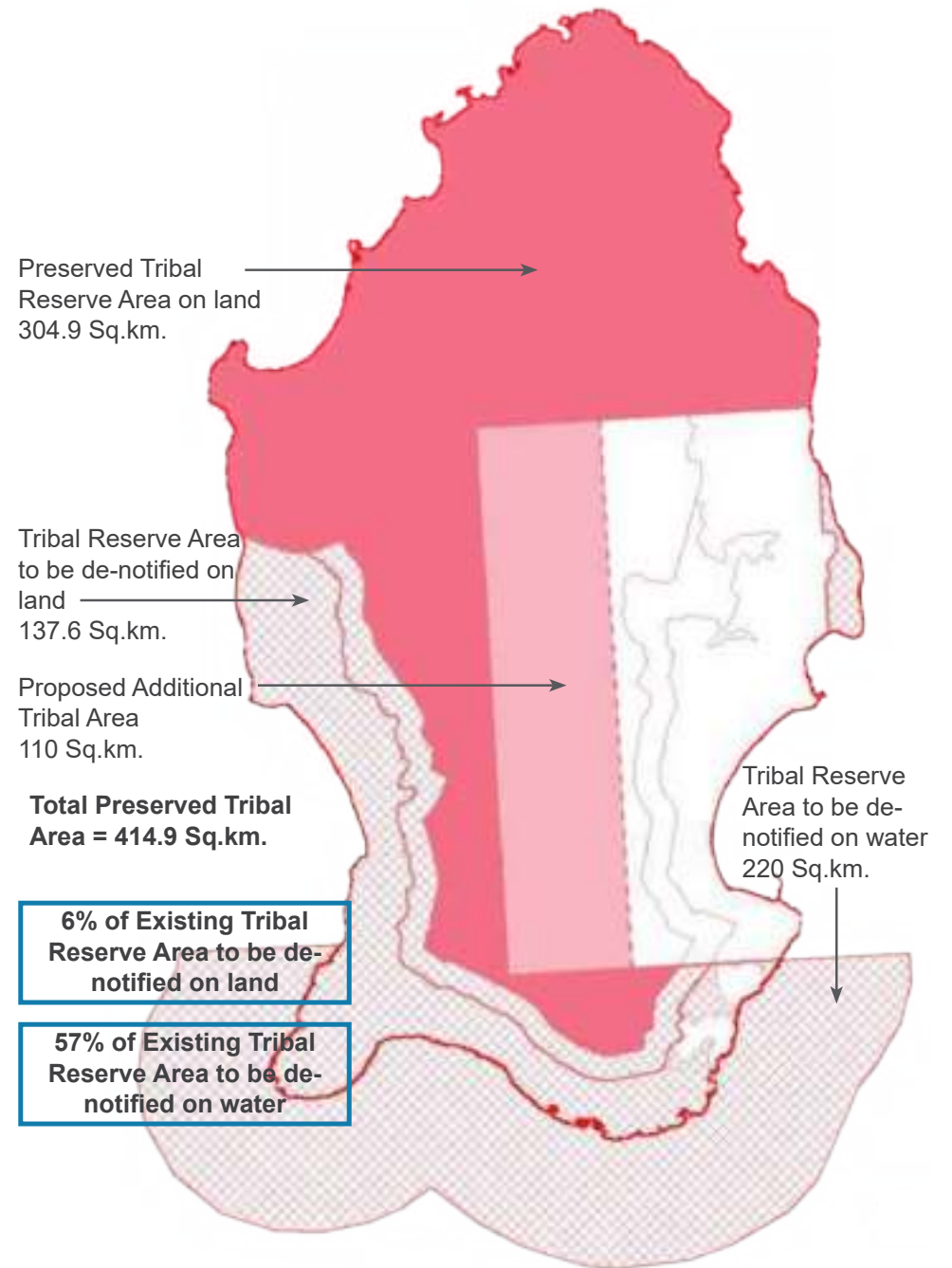
Developable areas on the island have been identified along the coastline in the eastern, southern and western areas of the island to ensure preservation of the mangroves and minimal interference with the ecological assets and core island area. This conserves a large portion of the reserved forest. Approximately 107 kms of coastline is proposed to be developed as part of the island development..

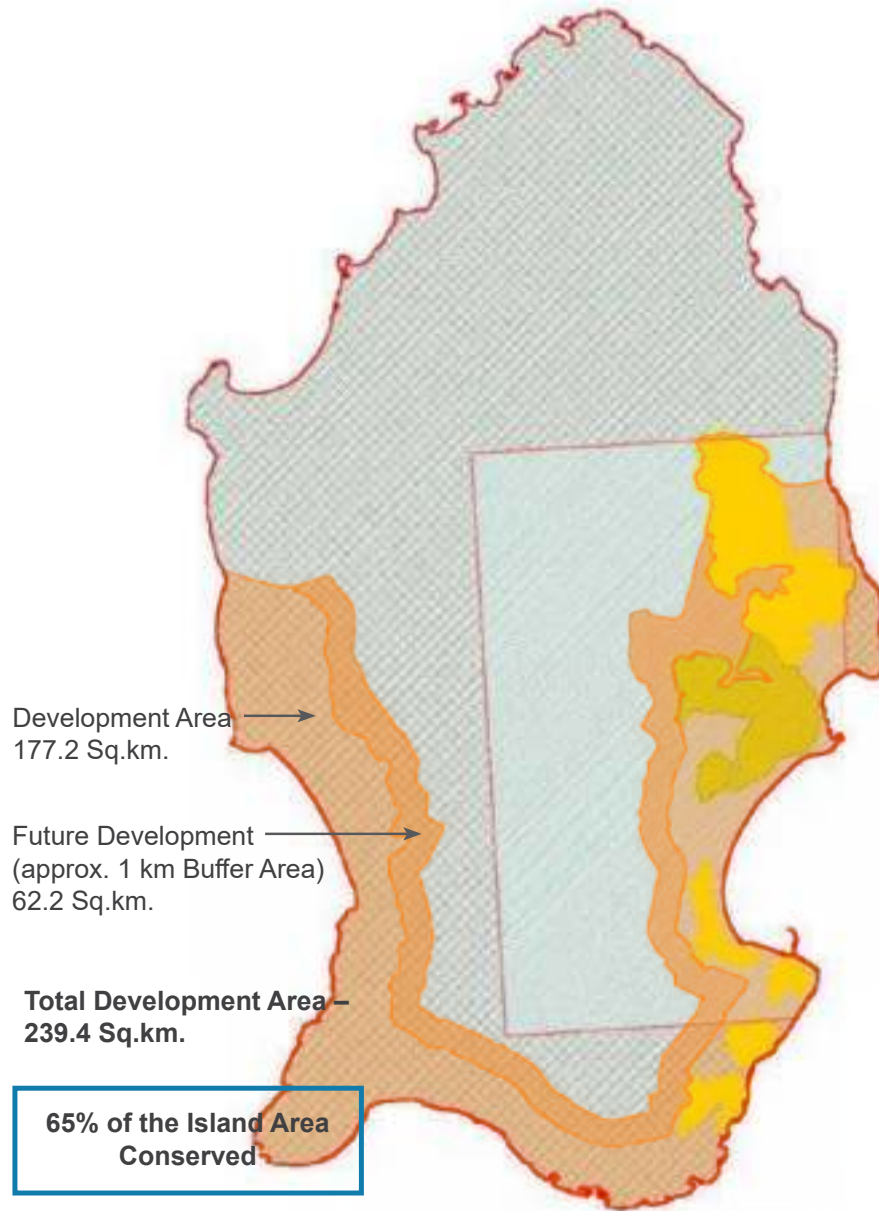
Since the existing settlement is majorly concentrated along the eastern coast of the island, this part is envisioned to be developed as the higher intensity “City Side” of the island with activities like finance district, healthcare institutes, tourism and hospitality, offices, entertainment and residential and social spaces. The southern coast of the island is observed to have the potential of being developed as a lesser intensity, entertainment zone with activities like sports institutes, water based sports activities and support housing areas. The western coast of the island is envisioned to have very low intensity developments like wellness nature-cure institutes, theme resorts and exclusive, super luxurious forest resorts. A ring road proposed parallel to the coastline would be the key connector of all the development areas and thus linking the entire development to each other.

Anchors of Development have been laid out of the identified areas which are envisioned to be catalysts of development of the areas. These are, the introduction of a Financial Zone to the east of the island, the introduction of the Leisure Zone in the south of the island and a Nature Zone to the western region of the island.



* Considering ROP area as Reserved Forest





3.4) Identified Development Area

A total development area of **239.4 Sq.km.** is proposed on the Little Andaman Island (675.16 Sq.km). The effects of the development area on the existing land reservations is as below:

- **65% of the Island Area Conserved**
Development Area: 177.2 Sq.km.
Future Development (approx. 1 km Buffer Area): 62.2 Sq.km.
- **32% of Reserved Forest Area to be de-notified.**
- **137.6 Sq.km or 31% of the Tribal reserve area on land to be de-notified**
- **220 Sq.km or 57% of the Tribal reserve area in water(385.5 Sq.km) to be de-notified**

However, Presently there are areas within reserved forest which are not Notified Tribal Reserve. In order to balance the tribal reserve, 110 Sq.km. of area falling within reserved forest may be notified as Tribal Reserve. With this, only **6% of the Tribal reserve area will be needed to be de-notified on land.**

04

Concept Plan

- 4.1) Development Anchors and Zones
- 4.2) Development Strategy
- 4.3) Phasing





ZONE 3
NATURE

ZONE 1
FINANCIAL DISTRICT
+ MEDI CITY

ZONE 2
LEISURE

4.1) Development Anchors and Zones

Three anchors for development have been identified for holistic development of Little Andaman based on the inherent island potential. These are Finance, Leisure and Nature. Based on these identified anchors and to promote sustainable development, the island is further divided in three Development Zones:

- I. **Zone 1 is the Financial District and Medi City** along the eastern coast of the island with the airport as the catalytic anchor. This zone consists of a total development land of **102 Sq.km.** and has been further sub-categorised into four districts:
 - a. The Aerocity,
 - b. The Medicity,
 - c. The Financial District and
 - d. Tourism and Hospitality District.
- II. **Zone 2 is the Leisure zone** located on the southern area of the island. The zone would house tourism attractive activities of entertainment and leisure such as casino strip, sports institutes, film city, water based recreation etc. This zone

consists of a total development land of **85.4 Sq.km.** and has been further sub-categorised into three districts:

- a. The Film City,
 - b. Residential District and
 - c. Tourism SEZ
- III. **Zone 3 is the Nature zone** located on the western coast of the island. This zone consists of a total development land of **52 Sq.km.** and has been further sub-categorised into three districts:
 - a. Exclusive Forest Resort,
 - b. Nature Healing District and
 - c. West Bay Nature Retreat.



4.2) Development Strategy

4.2.1) Port and Connectivity

The accessibility to Little Andaman is proposed to be improved in the following ways:

a) International Airport

All successful case studies and references have mentioned an international airport to be the key for development. For development of Little Andaman, it is proposed to develop an international airport capable of handling all fixed wing and rotor wing type aircraft in all weather.

This is one of the key prerequisite for catalysing the growth on this island. The airport is proposed adjoining to coast line to facilitate operations of sea planes and also to give direct connectivity to ferry terminal.

b) Dedicated Charter Flight Airstrip

An air strip is proposed in the western region for private and direct access to the Super Luxurious Forest resorts.

c) Hut Bay Jetty Expansion and Marina Development

Expansion of the existing Hut Bay Jetty is proposed. This is envisioned to be the main terminal for arrival of ferries and passenger ships from Port Blair and other islands to Little Andaman. The development of a Marina is also envisioned next to the tourist entertainment district.

d) Island Coastal road/ Ring road

An Island Coastal road is proposed to run parallel to the coastline from east to west. This will be critical in linking the entire land based development of the island together. To enhance the land development connectivity of the island, a Mass Rapid Transit Network with Stations at regular intervals is proposed along the ring road.



Alignment of the Mass Rapid Transit Network with Stations

Power Plant near port

Energy Pod





Wind Energy



Solar Energy



Hydro Energy

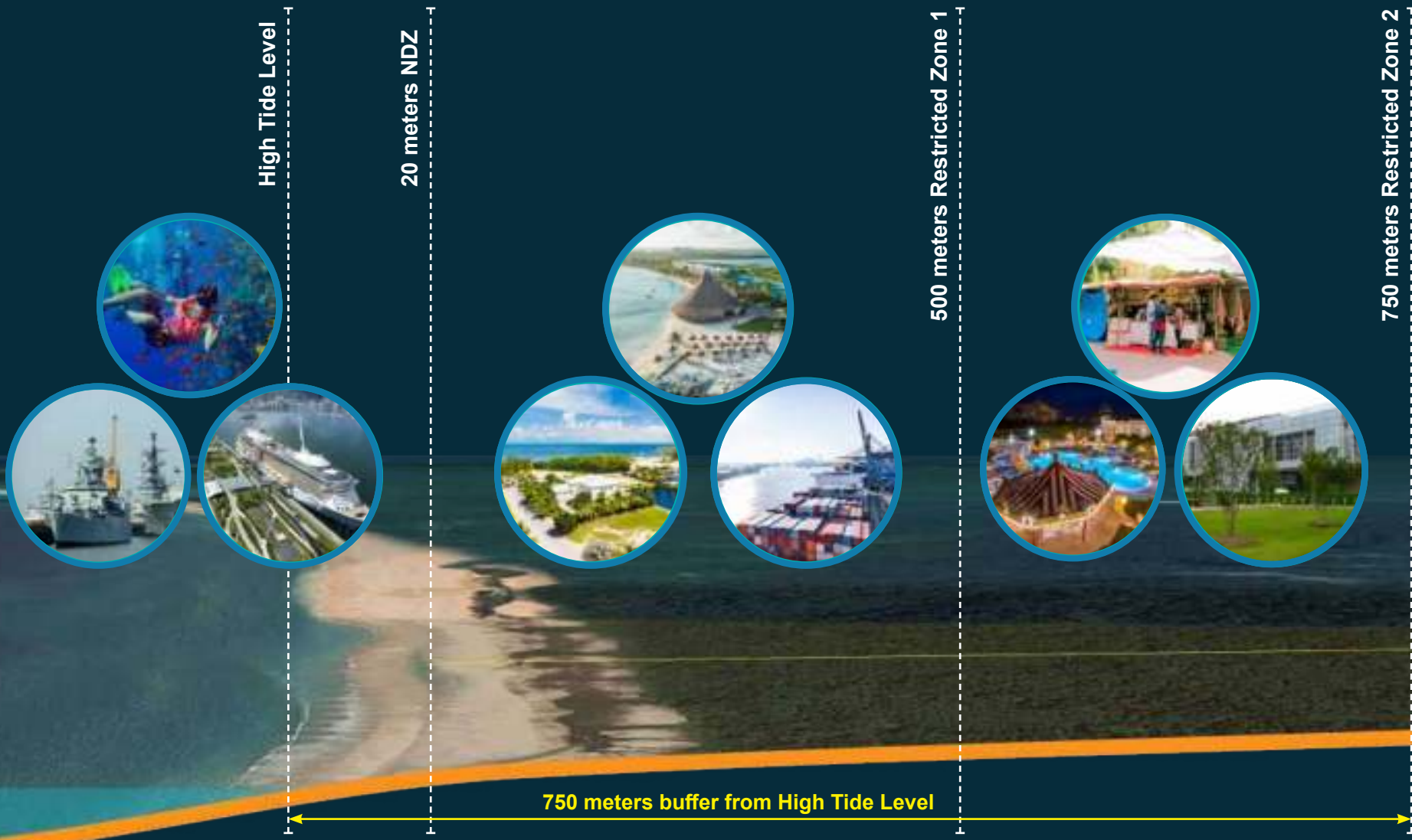


Gas/Diesel based Energy

4.2.2) Energy

Promoting Use of Renewable Resources for Power Generation:

A large Power Plant near the proposed extension of Hut Bay Jetty is proposed. This is proposed to be linked to various “Energy Pods” which would entail various forms of renewable energy generation like wind energy, solar energy, hydro energy to meet the demands of the proposed development. Gas/diesel based energy will only be used as a temporary power back-up option or at locations where use of renewable resources for energy generation is unfavourable.



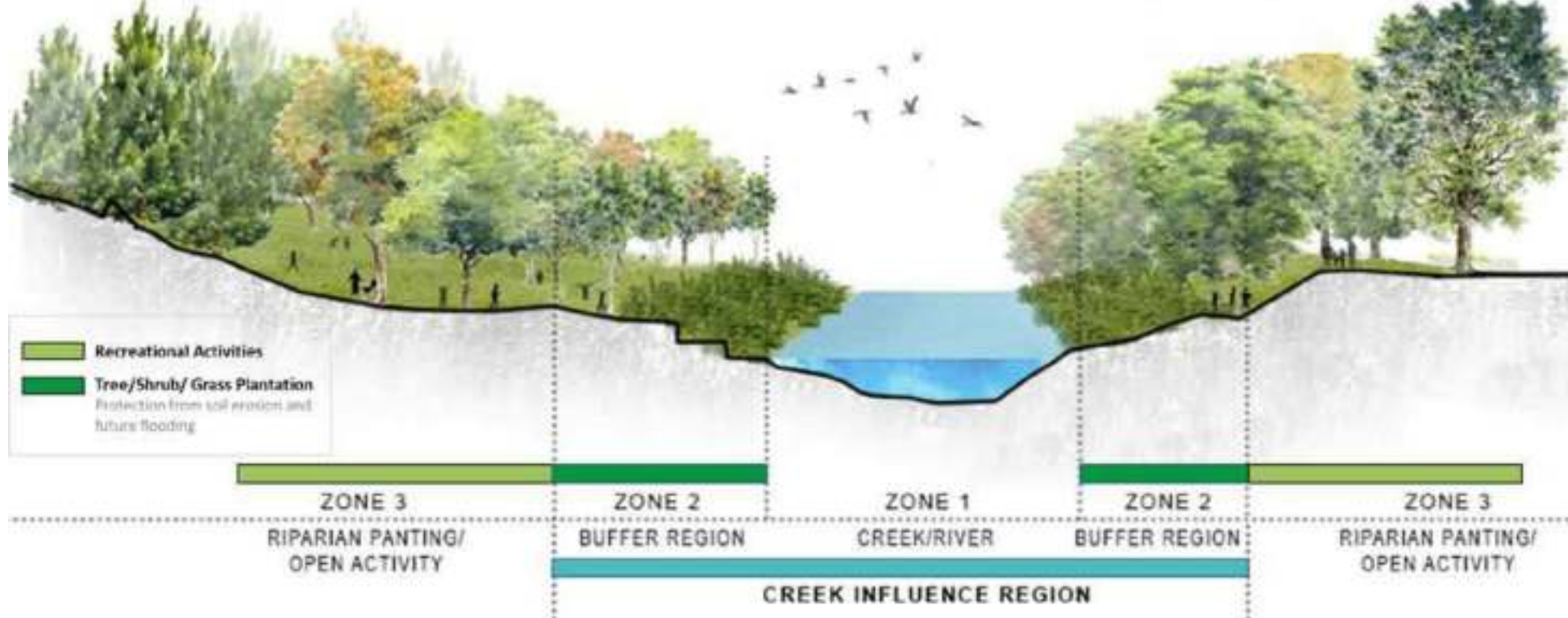
High Tide Level

20 meters NDZ

500 meters Restricted Zone 1

750 meters Restricted Zone 2

750 meters buffer from High Tide Level



4.2.3) Ecological Preservation

Development Regulations along Coastline and Water Bodies

A 750 meters buffer is proposed to be maintained from the high tide line for the development. The 750 meters buffer is broken into the 20 meters from HTL of No Development Zone, 500 meters from HTL of Restricted Zone 1 and 750 meters from HTL of Restricted Zone 2.

The permissible activities in the three zones are envisioned to be as follows:

1. Permissible Activities in No Development Zone

- Ports, Jetties, Cruise Terminal & Marina
- Strategic Defence related activities
- Water Sports and Water Recreation

2. Permissible Activities in Restricted Zone -1

- Eco-Sensitive Tourism and Hospitality, (G+1, IGBC Platinum Rated Buildings)
- Low Density Residential Zone (25 % Ground Coverage, G+2, IGBC Platinum Rated Buildings)
- Port Logistics

- Public Recreations and Parks
- Temporary Structures

3. Permissible Activities in Restricted Zone -2

- Open Bazaars, Markets and Entertainment
- Eco-Sensitive Tourism and Hospitality, (G+2, IGBC Platinum Rated Buildings)
- Institutional Campuses (G+2, IGBC Platinum Rated Buildings)
- Low Density Residential Zone (30 % Ground Coverage, G+3, IGBC Platinum Rated Buildings)

Buffer areas shall be identified along the rivers, water bodies and drainage channels after conducting detail watershed analysis and mapping the flood levels. The buffer areas shall be conserved and will only be used for recreation activities like parks, picnic spots, play areas etc. No tree cutting will be allowed in the buffer areas.



4.2.3) Ecological Preservation

Conserving Natural Hydrological Systems

Healthy hydrological systems are essential for the survival of the Island. The development strategises to protect the network of hydrological channels, lakes, rivers and other water bodies on the island by providing adequate conservation surfaces around these hydrologic features. This would protect the ecosystems that rely on natural habitats of reefs, mangroves, etc. and ensure that the catchments areas are obstruction-free. With the growing threat of rising water level, this sustainable strategy would prove to be most effective in making the Little Andaman Island city resilient.

4.2.4) Development Zones

1) Zone 1: Financial District and Medi City

a. The Aerocity

The Aerocity houses the International Airport which is the catalyst for development of the district. This district would also consist of tourist friendly activities like Airport hotels in the proximity to the airport catering to the national and international tourists. This district also consists of residences and supporting facilities and a nature reserve.



Nature Reserve



Residences and Supporting Facilities



Airport Hotels



International Airport

b. The Medicity

The Medicity consists of dedicated areas for global brand hospitals and various pharma research and development centres. The district also houses the residences and support facilities such as PSP/ Institutes/Admin.



Residences and Support Facilities (PSP/Institutes/Admin)



Pharma R&D Centres



Dedicated Area For Global Brand Hospitals

c. The Financial District

The Financial District consists of a concentration of Multi-tenanted offices and International Financial Centre. The ditrict would also have supporting facilities like retail and food & beverages.



Retail & F&B



Multi tenanted offices



International Financial Centre

d. Tourism and Hospitality District

The Tourism & Hospitality District is focussed to be tourism oriented with activities like beach hotels and exclusive resorts. Complementary activities like residences and supporting facilities and cultural markets, mixed use and retail also form a part of the district. An international convention centre would be the district landmark for tourists.



Residences and Support Facilities



Beach Hotels



Cultural Markets, Mixed use and Retail



Exclusive resorts



International Convention Centre

II) Zone 2: The Leisure Zone

a. The Film City

The Film City houses a range of film and music production activities like film and sound music studios and outdoor film shooting along with a National Film and Drama Institute. The district also consists of sports complexes and institutes while offering water based entertainment to tourists such as water sports and underwater safari.



Entertainment Zone with Water Sports/ Underwater Safari



Film Sound and Music Studios



National Film and Drama Institute



Outdoor film shooting locations



Sports Complex/Institute

b. Residential District

The Residential District consists of the residential core, residential apartments and beach front exclusive homes. The district also houses a dedicated education zone and dedicated healthcare zone along with ancillary activities like administration, social infrastructure and public recreational areas like city park.



Admin and Social Infrastructure



Residential Apartments



Dedicated Education Zone



Healthcare



City Park

c. Tourism SEZ

The Tourism SEZ is the hotspot for tourist attractions and offers various entertainment options like casinos, theme park and a district landmark building like Opera House. Beach hotels in close proximity to these tourist attractions also form an essential part of the district.



Casino Strip and Entertainment



Theme Park



Opera House/ Landmark Building



Beach Hotels



III) Zone 3: The Nature Zone

b. Exclusive Forest Resort and Nature Healing District

The Exclusive Forest Resort and Nature Healing District consists of very low density and sustainable super luxury forest resorts catering to very high end clientele. A dedicated Charter flight Airstrip is proposed within the district for private and direct access to these exclusive resorts. The district also houses Nature Cure Institutes and Wellness Institutes.



Nature Cure Institute



Super luxury Forest Resort



Dedicated Charter Flight Airstrip

c. West Bay Nature Retreat

The West Bay Nature Retreat District consists of a concentration of various theme resorts, floating/ underwater resorts and beach hotels. High end residential villas also form a part of the district.



Theme Resorts



Floating/ Underwater Resorts



Beach Hotels



High End Residential villas







4.3) Phasing

The development of the entire plan, 239.4 Sq.kms. is proposed in three Phases.

Phase 01 consists of an area of 102 Sq.km.

This forms the entire Zone - 1 of the envisioned plan to be developed in Phase 01. Out of 102 Sq.km., approximately 34 Sq.km is existing revenue area, 15 Sq.km. is Red Oil Palm Plantation and balance area is 52 Sq.km.

Phase 02 consists of an area of 85.40 Sq.km.

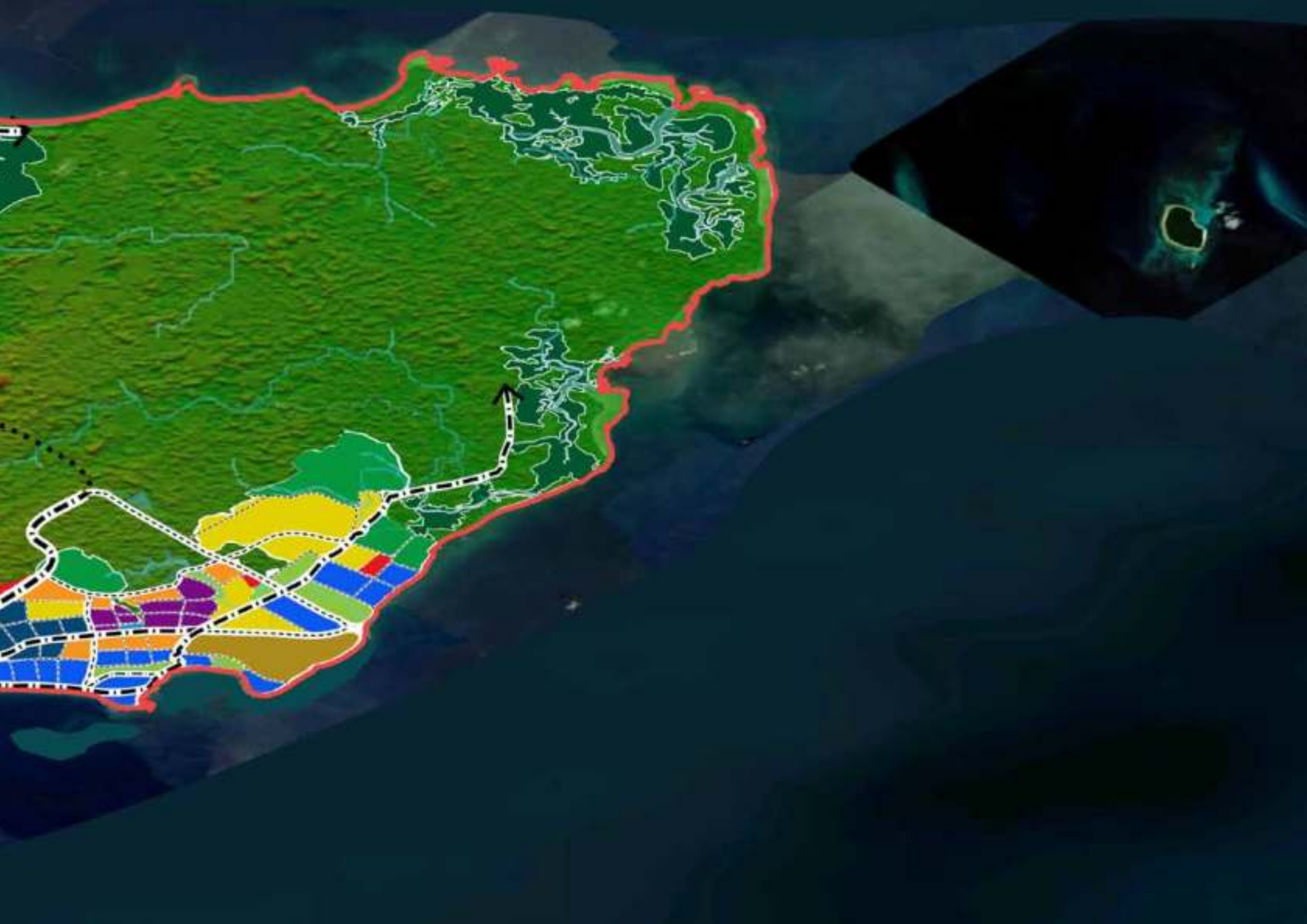
This forms the entire Zone - 2 of the envisioned plan to be developed in Phase 02.

Phase 03 consists of an area of 52 Sq.km.

This forms the entire Zone - 3 of the envisioned plan to be developed in Phase 03.

Phasing	Area in Sq.km.			
	Total area for development	Revenue area	Forest area to be De-notified	Tribal area to be De-notified on land
Phase I	102.0	32.5	69.5	6.00
Phase 2	85.4	1.5	83.9	79.6
Phase 3	52.0	-	52.0	52.0
TOTAL	239.4	34	205.4	137.6







सत्यमेव जयते

NITI Aayog

**Sustainable Development of
Little Andaman Island**
Vision Document

ANNEXURE 04

) 01 Feb 2021. 'NITI Aayog's megacity plan for Little Andaman alarms conservationists':

<https://www.thehindu.com/news/national/financial-tourist-complex-on-little-andaman-a-bullet-through-an-islands-heart/article33710255.ece>

NITI Aayog's megacity plan for Little Andaman alarms conservationists

[Pankaj Sekhsaria](#)

January 31, 2021 19:49 IST

Updated: February 01, 2021 10:05 IST

Share Article

The proposed construction of a mega financial-tourist complex on Little Andaman Island will place at risk a fragile ecosystem and result in habitat loss of the vulnerable Onge tribe and rare wildlife

A plan for the sustainable and holistic development of the 680 sq km, fragile Little Andaman Island in the Andaman and Nicobar group has raised the alarm among conservationists.

The 'Sustainable Development of Little Andaman Island - Vision Document', is the NITI Aayog's proposal to leverage the strategic location and natural features of the island. This, the vision says, will be done by building a new greenfield coastal city there, that will be developed as a free trade zone and will compete with Singapore and Hong Kong.

The proposal is pivoted along three development anchors and zones.

Zone 1 — spread over 102 sq km along the east coast of Little Andaman — will be the financial district and medi city and will include an aerocity, and a tourism and hospital district. Spread over 85 sq km of pristine forest, Zone 2, the leisure zone, will have a film city, a residential district and a tourism SEZ. Zone 3 — on 52 sq km of pristine forest — will be a nature zone, further categorised into three districts: an exclusive forest resort, a nature healing district and a nature retreat, all on the western coast.

There will be 'underwater' resorts, casinos, golf courses, convention centres, plug-and-play office complexes, a drone port with fully automated drone delivery system, nature cure institutes and more.

An international airport capable of handling all types of aircraft will be central to this development vision because "all successful case studies and references" studied by the visioning team indicate that an international airport is key for development.

The only jetty on the island will be expanded and a marina will be developed next to the tourist entertainment district. A 100 km greenfield ring road will be constructed parallel to the coastline from east to west and will be supplemented with a mass rapid transit network with stations at regular intervals.

The vision plan is not in the public domain, even though it is said to have been finalised months ago. The comparison with Singapore, for instance, is one key. It has a map of Little Andaman overlaid on Singapore's, along with the following statistics: "The population density of the Andaman and Nicobar is 47 people per sq km while it's (sic) 7,615 persons per sq km in Singapore. Its per capita income is \$1,789 compared to Singapore's \$55,182."

Blocks to development

There are certain factors, the vision document notes, that could prevent Little Andaman from becoming the new Singapore — factors that are "stopping us from developing these into veritable jewels for the country". These include lack of good connectivity with Indian mainland and global cities, a fragile biodiversity and natural ecosystems and certain Supreme Court notifications that pose an impediment to development. Another key factor is the "presence of indigenous tribes and concerns for their welfare".

There are other concrete obstacles that the vision takes note of: 95% of Little Andaman is covered in forest, a large part of it the pristine evergreen type. Some 640 sq km of the island is Reserve Forest under the Indian Forest Act, and nearly 450 sq km is protected as the Onge Tribal Reserve, creating a unique and rare socio-ecological-historical complex of high importance.

The vision needs 240 sq km (35%) of this land and the solutions suggested are simple and straightforward — de-reserve 32% of the reserved forest and de-notify 138 sq km or 31% of the tribal reserve. And if the tribals become an impediment, the vision suggests that they "can be relocated to other parts of the island".

Sloppy and inappropriate

The vision document has maps with no legends or explanations and uses inappropriate photographs plagiarised from the Internet. It talks of conservation of national park/wildlife sanctuary on Little Andaman when none exist here and it has no mention of the geological vulnerability of the place, which was amongst the worst-affected in the earthquake-tsunami combination in 2004. The waves hit Little Andaman so hard that on December 26 the breakwater there was not just breached, it was physically displaced and it's orientation changed. Ships could not berth for weeks thereafter.

The plan has no financial details, no budgeting, or inventorisation of forests and ecological wealth and no details of any impact assessment. The nature resort complex proposed at West Bay on the western coast is to have theme resorts, floating/underwater resorts, beach hotels, and high-end residential villas. It is today a secluded and difficult to reach part, one of the [most important nesting sites](#) of the globally endangered Giant Leatherback sea turtle which is being studied by the Dakshin Foundation, the Andaman and Nicobar Environment Team and the island administration's Forest Department.

Forest dept.'s concerns

In a note dated September 26, 2020, Divisional Forest Officer, Little Andaman, raised serious concerns about this vision on grounds of ecological fragility, indigenous rights and vulnerability to earthquakes and tsunamis.

The note said such large diversion of forest land would cause obvious environmental loss leading to irreversible damage (more than 2 million trees stand in the forest land sought for these projects), that habitats of various wild animals including endangered sea turtles would be affected, and that the impact could not even be assessed because

there was no environment impact assessment report and neither were there any detailed site layout plans for the proposed diversion.

This note of dissent was a minor irritant and was ignored in the plan and vision that seeks to alter the nature of an ancient island bigger than Chennai and Mumbai in area.

The vision document, described by conservationists as a first bullet through the heart of the island, is to be followed by a second one soon. A meeting is to be held under the chairmanship of the Chief Secretary on February 4 to initiate the [denotification of the Onge tribal reserve on Little Andaman](#).

ANNEXURE 05

Annexure I

Andaman and Nicobar Protection of Aboriginal Tribes Regulation (ANPATR) – 1956 including all amendments until 2004



The Andaman and Nicobar Gazette

EXTRAORDINARY

PUBLISHED BY AUTHORITY

NO. 4, PORT BLAIR, SATURDAY 30 JUNE 1956

*Office of the Chief Commissioner
Andaman & Nicobar Islands*

NOTIFICATION

Port Blair, 18 June 1956

No. 76/56: The following Regulation promulgated by the President under clause (2) of article 243 of the Constitution and published in the *Gazette of India*, Extraordinary, Part II, Section I, dated the 14 May 1956, is republished here for general information.

Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956

No. 3 of 1956: Promulgated by the President in the seventh year of the Republic of the India.

A Regulation to provide for the protection of the interests of socially and economically backward aboriginal tribes in the Andaman and Nicobar islands. In exercise of the powers conferred by clause (2) of article 243 of the Constitution, the President is pleased to promulgate the following Regulation made by him.

- 1** (1) This Regulation may be called the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956.
(2) It extends to the whole of the Andaman and Nicobar Islands.
(3) It shall come into force on such date as the Chief Commissioner may, by notification appoint.
- 2** In this Regulation, unless the context otherwise requires:
 - (a) 'aboriginal tribe' means any of the following tribes or tribal communities in the Andaman and Nicobar Islands, and includes parts of, or groups within, such tribes or tribal communities, namely; Andamanese, Jarawas, Onges, Sentinelese, Nicobarese and Shompens;
 - (b) 'Chief Commissioner' means the Chief Commissioner of the Andaman and Nicobar Islands;
 - (c) 'Deputy Commissioner' means the Deputy Commissioner of the Andaman and Nicobar Islands;
 - (d) 'notification' means a notification published in the Official Gazette;
 - (e) 'pass' means a pass granted under section 7; and,
 - (f) 'reserved area' means an area which the Chief Commissioner has, by notification under section 3, declared to be a reserved area.
- 3** (1) The Chief Commissioner may, by notification, declared any area which is predominantly inhabited by aboriginal tribes to be a reserved area and specify the limits of such area; and may, from time to time, in like manner, alter such limits.
(2) If any question arises whether any area falls within or without a reserved area, it shall be decided by the Chief Commissioner and his decision shall be final.

- 4** No waste or unoccupied land at the disposal of the Government in a reserved area shall be allotted for agricultural purposes to any person other than a member of an aboriginal tribe:
Provided that the Chief Commissioner may allot any such land to any person other than a member of an aboriginal tribe –
- (a) if the Chief Commissioner is satisfied that such land is not required by any such member; or
 - (b) if in his opinion the allotment of land to a person other than a member of an aboriginal tribe is necessary for the purpose of consolidation of land or is otherwise in the public interest.
- 5** (1) No member of an aboriginal tribe shall, except with the previous sanction of the Chief Commissioner, transfer by way of sale, exchange mortgage, lease or otherwise any land to any person other than a member of an aboriginal tribe.
(2) No land held or occupied by a member of an aboriginal tribe shall be liable to attachment or sale in execution of any decree or order of a civil or revenue court.
(3) Any transfer, attachment or sale of any land made in contra-vention of this section shall be void.
- 6** (1) No person other than a member of an aboriginal tribe shall, except with the previous sanction of the Chief Commissioner, acquire any interest in any land situated in a reserved area or in any product of, or crop raised on, such land, or shall, except under and in accordance with the terms and conditions of a licence granted by the Chief Commissioner, carry on any trade or business in any such area.
(2) The provisions of sub-section (1) shall apply to any person who, at the commencement of this Regulation, is carrying on any trade or business in any such area after the expiration of 60 days from such commencement.
- 7** The Chief Commissioner may, by notification, prohibit any person other than a member of an aboriginal tribe or any class of persons other than members of an aboriginal tribe from entering a reserved area except on the authority and subject to the observance of the conditions and restrictions of a pass granted by the Deputy Commissioner or by such other officers as the Deputy Commissioner may authorise in writing in this behalf.
- 8** (1) Whoever in contravention of the provisions of section 6, acquires any interest in or in any product of, or crop raised on, any land, or carries on any trade or business, in a reserved area, shall be punishable with imprisonment which may extend to one year; or with fine which extend to one thousand rupees, or with both; and the interest so acquired shall be disposed of in such manner as the Chief Commissioner may, after taking into consideration the circumstances of the case, direct.
(2) Whoever, in contravention of the notification issued under section 7, enters a reserved area shall be punishable with imprisonment which may extend to one year; or with fine which may extend to one thousand rupees or with both.
(3) Whoever, does anything in contravention of any of the conditions or restrictions subject to which a pass has been granted to him under section 7, shall be punishable with imprisonment which may extend to one year; or with fine which may extend to one thousand rupees, or with both.
- 9** (1) The Chief Commissioner, or any person authorised by him in this behalf, may arrest without a warrant any person who has committed, or is suspected of having committed, any offence punishable under this Regulation.
(2) Every person arrested under sub-section (1) shall be produced before the nearest magistrate within twenty four hours of such arrest excluding the time necessary for the journey from the place of arrest.
- 10** (1) The Chief Commissioner may, by notification make rules to carry out the purposes of this Regulation.
(2) In particular, and without prejudice to the generality of the foregoing power, such rules may provide for the form in which, the conditions and restrictions subject to which, and the fee not exceeding rupees fifty on payment of which, a pass under section 7 shall be granted.
- 11** The provisions of this Regulation and of any rule made thereunder shall have effect notwithstanding anything inconsistent there with contained in any other law for the time being in force or any instrument having effect by virtue of any such law, or in any usage or agreement, or in any decree or order of any court or other authority.

Rajendra Prasad, President

K.Y. Bhandarkar, Secretary to the government of India

By order

Ram Saran Das, Assistant Secretary (Judicial) to the Chief Commissioner, A & N Islands.

*Office of the Chief Commissioner
Andaman & Nicobar Islands*

NOTIFICATION

Port Blair, the 19th June 1956

No. ANPATR/1(3)/1: In exercise of the powers conferred by sub-section (3) of section 1 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1/56 No. 3 of 1956, the Chief Commissioner, Andaman and Nicobar Islands, is pleased to appoint the first day of July 1956 to be the date from which the said Regulation shall come into force.

C. Ramachandran, Chief Commissioner, A & N Islands [F. 1-89(1)/54-56] G.P. 77/56



The Andaman and Nicobar Gazette

EXTRAORDINARY

PUBLISHED BY AUTHORITY

No. 3, PORT BLAIR, TUESDAY 2 APRIL 1957

*Office of the Chief Commissioner
Andaman & Nicobar Islands*

NOTIFICATION

Port Blair, Tuesday 2 April 1957

No. ANPATR/3(1)/1: In exercise of the powers conferred by sub-section (1) of section 3 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956, (Regulation No. 3 of 1956), the Chief Commissioner, Andaman and Nicobar Islands, is pleased to declare each of the following areas to be a reserved area, namely:

(a) South Andaman

The part of South Andaman Islands situated in the west of the imaginary boundary line including coastal water upto 3km starting from the mouth of Constance Bay proceeds north upto north west corner of village Tirur and thence proceeds towards east-north and joins Andaman Trunk Road at a point 2km south of Miletalak from where the boundary proceeds towards north upto Middle strait point along the western side of Andaman Trunk Road having a 200 metre belt excluding village areas of Miletalak and all allotted land of Jirkatang area. From middle Strait point the boundary proceeds towards north via Needhan reach, enclosing Bluff and Spike Islands, to Yeratil Jig² [and New survey No. 2265/5 area measuring 1000 sq. metres situated at Aberdeen Village, Port Blair, Andaman District].

(b) Middle Andaman

The part of the Middle Andaman Islands situated in the western side of the imaginary boundary line including coastal water upto 3km starting from Yeratil Jig and proceeds towards north-east excluding village areas of Kadamtala and touches Andaman Trunk Road at a point 12km north of Uttara Jetty and passes alongside the road leaving 200 metre belt upto 24km point of the Andaman Trunk Road from Uttara Jetty and thence due north through jungle upto a distance of 6km and then towards north-east from a distance of 7km and further proceeds due north for 11km and then joins Wolaga Boilu Creek. Thereafter the boundary line proceeds north-west through the boundary Wolaga Boilu Creek upto the point 1/3km from the northern tip of the village Hanspuri and skirt around South West and southern side keeping the same half a km distance from village Hanspuri extending and culminating ultimately at Bush Police Camp No. 32 facing the luice Inlet including entire Wolaga Boilu, Melagar Boilu and Mar Boilu Creeks].

(c) The entire area comprised in, and enclosed within the coast line of each of the following Islands.

- (i) ⁴[***]
- (ii) North Sentinel
- (iii) Cinque
- (iv) Passage
- (v) Sisters
- (vi) Brothers
- (vii) South Sentinel and other islands and islets situated south wards in the territory of the Andaman and Nicobar Islands upto and including Little Andaman⁵ [except the area on the eastern coast of Little Andaman Island located within the following co-ordinates:
Longitude: between the longitude 92°28 minutes East and 92°35 minutes East.
Latitude: between latitude 10° 34 minutes North and⁶ [10° 45 minutes 30 seconds] North].
- (viii) ⁷[Strait Island]

(d) The entire area comprised in, and enclosed within the coast line of each of the following islands but excluding the area comprising the air-field in Car Nicobar and the ports of Camorta and Car Nicobar⁸ [and the area located between the co-ordinates mentioned below in the eastern coast of Great Nicobar Island.

Longitude: the area between longitude 93° 50 minutes East and 93° 57 minutes East.

Latitude: the area between latitude 6°53 minutes North and 7° 2 minutes North]

- (i) Car Nicobar
- (ii) Batti Malv
- (iii) Chowra
- (iv) Tillangchong
- (v) Teressa
- (vi) Bompoka
- (vii) Camorta
- (viii) Trinket
- (ix) Nancowry
- (x) Katchall
- (xi) Meroe
- (xii) Trak
- (xiii) Treis
- (xiv) Menchal
- (xv) Little Nicobar
- (xvi) Pulo Milo
- (xvii) Great Nicobar
- (xviii) Kondul
- (xix) Kabra

T.G.N. Ayyar
Chief Commissioner, A & N Islands
[E. 1-89(1)/56-G] G.P.43/57

- 1 Substituted vide Notification No.107/77/F.No. 40.243/78-TW dated 19th July 1979 for 'The area in South Andaman to the west of an imaginary line starting north-eastwards from the mouth of constance Bay along Bajalunta Jig to the Southern tip of Cholunga Range and then proceeding northwards to Mount Cadell and from there eastward to Pochange Creek and thence along the eastern coast of South Andaman Island proceeding to a point approximately 600228 (omitting James, Kyd and other islands and islets) and thence from that point northwards along an alignment to be aligned by the Andaman and Nicobar Islands Forest Department taking into consideration the suitability of terrain and water points to join Putatang Jig and thence northwards along Putatang Jig and Amitla Soicha Passage of Middle Strait along the east coast of South Andaman excluding Belle Island, Bonig Island, Oral Kaicha and Baby Island proceeding to Yeratil Jig via Needham Reach and Port Anson enclosing Bluff and Spike islands.'
- 2 Inserted vide Notification No. 1-467/86-TW dated 2nd November 1989.
- 3 Substituted vide Notification No.107/77/F.No. 40.243/78-TW dated 19th July 1979 for 'The area in Middle Andaman to the west of an imaginary line emerging from South Andaman and proceeding northwards from Yeratil Jig to 9 [Bush Police Post No.4 (Maps reference 772425) and thence due west to the coast below point June (Map reference 625029)] along the Bush Police Line subject to an adjustment that the line may coincide with an alignment to be aligned by the Andaman and Nicobar islands Forest Department in Porlob and Boroin Yol areas between the Yeratil Charalungta Bush Police posts provided that sufficient land is left to the west of such alignment on the eastern side of the Range to provide enough hunting ground to Jarawas while they are on the move and bearing in mind the suitability of such alignment, from the point of view of water and terrain, as a patrol path.'
- 4 The word 'Rutland' omitted vide Notification No. 65/73/F.No. 81-1/4/72-J.I dated 24th May 1973.
- 5 Inserted vide Notification No. 62/72/F.No. 81-9/71-J (1) dated 20th April 1972.
- 6 Substituted vide Notification No. 108/77/F.No.15-222/76-J.I dated 27th May, 1977 for '10° 44 minutes'
- 7 Inserted vide Notification No.95/72/81-15/72-J (1) dated 28th June 1972.
- 8 Inserted vide Notification No. 62/72/F.No. 81-9/71-J (1) dated 20th April 1972.
- 9 Substituted vide Notification No.AN PATR/3(1) I dated 1st December, 1959 for 'Ranger's Channel'



The Andaman and Nicobar Gazette

EXTRAORDINARY

PUBLISHED BY AUTHORITY

No. , PORT BLAIR, SUNDAY 21 APRIL 1957

*Office of the Chief Commissioner
Andaman & Nicobar Islands*

NOTIFICATION

Port Blair, 21st April 1957

No. ANPATR/7/1: In exercise of the powers conferred by section 7 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956, (Regulation No. 3 of 1956), the Chief Commissioner, Andaman and Nicobar Islands, is pleased to prohibit every person other than a member of an aboriginal tribe from entering a reserve area in the Andaman and Nicobar Islands except on the authority, and subject to the observance of the conditions and restrictions, of a pass granted by the Deputy Commissioner of the said islands or such other officer as the said Deputy Commissioner may authorise in writing in this behalf.

¹[The Chief Commissioner, Andaman and Nicobar Islands is pleased to order that all Government servants while proceeding on duty to a reserved area and the families of such government servants shall be exempted from taking out a pass or passes for entering a reserved area in the Andaman and Nicobar Islands. 'Family' means Govt. servant's wife, children, step children, parents and sisters and minor brothers if residing with and wholly dependable on him.]

²[The Chief Commissioner, Andaman and Nicobar Islands, hereby order that the employees of the Indian Rubber Board while proceeding on duty to a reserved area shall be exempted from taking out a pass or passes for entering a reserved area in the Andaman and Nicobar Islands subject to the condition that each such employee is provided with an Identity Card by the Rubber Board or its duly authorised officer.]

³[The Lieutenant Governor (Administrator) Andaman and Nicobar Islands has been pleased to order that all the Defence personnel while proceeding to a reserved area in the discharge of their specific duty in organized body shall be exempted from taking out a pass for entering in such area in the Andaman and Nicobar Islands. The Administration will be intimated about such movement so as to inform elements of Bush Police and forest employees working in the area.]

*T.G.N. Ayyar
Chief Commissioner, A & N Islands
[F. 1-89(1)/56-G]
G.P.52/57*

1 Inserted vide Notification No. 10/60 dated 18th January, 1960.
2 Inserted vide Notification No. 6/69/50-8/68-J. I dated 16th January, 1969.
3 Inserted vide Notification No. 181/90/F.No. 1-467/86-TW dated 9th November, 1990.



The Andaman and Nicobar Gazette

EXTRAORDINARY

PUBLISHED BY AUTHORITY

No. , PORT BLAIR, SUNDAY 21 APRIL 1957

*Office of the Chief Commissioner
Andaman & Nicobar Islands*

NOTIFICATION

Port Blair, 21st April 1957

No. AN/PATR/10/1: In exercise of the powers conferred by section 10 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (Regulation No. 3 of 1956), the chief commissioner, Andaman and Nicobar Islands, is pleased to make the following rules to carry out the purposes of the said Regulation, namely:

The Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Rules, 1957

CHAPTER I: PRELIMINARY

1 Short title and commencement

- (1) These rules may be called the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Rules, 1957.
(2) They shall come into force at once.

2 'Definitions: in these Rules, unless the context otherwise requires

- (a) 'Deputy commissioner' except in Sub-rule (2) of rule 13 includes an officer authorised by him under section 7 to grant passes;
(b) 'Form' means Form prescribed in the schedule appended to these rules;
(c) 'General trade or business' means the trade or business covered by the licence in Form 'F'.
(d) 'Licence' means a licence granted in Form 'F' or in Form 'H' by the Chief Commissioner under Sub-section (1) of section 6 to carry on in any reserved area general trade or business, or miscellaneous trade, as the case may be;
(e) 'Licensee' means a person, or a body of individuals including a member or member or members of an aboriginal tribe, to whom a licence has been granted;
(f) 'Person' does not include a member of an aboriginal tribe;

- (g) 'Miscellaneous Trade' means the following:-
- 1 Works relating to P.W.D. and I.A.F contracts;
 - 2 Stevedoring;
 - 3 Sale of timber;
 - 4 Import and Export trade; and
 - 5 Such other trade as may from time to time be specified by the Chief Commissioner.
- (h) 'Prescribed fee' in respect of any document or act means the fee payable thereon or therefore under rule 11;
- (i) 'Regulation' means the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (Regulation No. 3 of 1956);
- (j) 'Section' and 'sub-section' respectively mean a section of the Regulation and a sub-section of a section of the Regulation; and
- (k) 'Year' means a financial year.

CHAPTER II: PASSES

3 Period for which pass may be granted or renewed

A pass under section 7 may be granted for a period of one year or a part thereof and may, subject to the provisions of these rules, be renewed for a further period not exceeding one year.

4 Application for pass

An application for the grant of a pass shall be made in Form 'A'.

5 Grant or renewal of pass

- (1) On an application filed under rule 4, if the Deputy Commissioner, after such enquiry as he may deem fit to make, does not reject the application, he may, subject to the provisions of these rules, grant a pass to the applicant in Form 'B' for any period expiring on a date within the current financial year.
- (2) A pass granted under sub-rule (1), may on an application being made in Form 'D' to the Deputy Commissioner, be renewed by him for a period permitted under rule 3.

6 Register of passes

A register of passes granted or renewed under rule 5, shall be maintained by the Deputy Commissioner in Form 'C' and an extract therefrom containing the details of passes so granted or renewed during a calendar month shall after the close of such month, be sent by him to the Chief Commissioner.

CHAPTER III: LICENCES FOR TRADE OR BUSINESS

7 Application for licence

Every application for grant of a licence shall be in Form 'E' ²[or in Form 'G' as the case may be].

8 Grant of licence

On an application filed under rule 7, if the Chief Commissioner, after such enquiry as he may deem fit to make, does not reject the application, he may, subject to the provisions of these rules, grant a licence for a period not exceeding one year.

9 Form of licence

Every licence granted under rule 8 shall be in Form 'F' ²[or in Form 'H'].

10 Register of licences

A register of licences granted under rule 8 shall be caused to be maintained by the Chief Commissioner in ³[Form 'I'].

CHAPTER IV: MISCELLANEOUS

11 Fees for passes and licences

No pass or licence shall be granted unless the fee in respect thereof as indicated below has been paid to Government, namely:

Details of pass, etc	Rate of fee
(i) A Pass to be granted ⁴ [to a settler selected for settlement in Andaman and Nicobar islands under the Accelerated Development Programme of the Ministry of Labour, Employment and Rehabilitation (Dept. of Rehabilitation)] ⁵ [***]	⁶ [Nil]
⁷ [(ii) Subject to item (i) above, a pass to be granted for a period not exceeding one month.	Re. 1/-]
(iii) A pass other than a pass specified at item (i) or item (ii) above.	Rs. 5/-
(iv) Renewal of a pass	The same fee as for the original grant of pass.
(v) A licence ⁸ [for general trade or business]	Rs. 500/-
⁸ [(vi) A licence for miscellaneous trade	Rs. 500/-]

12 Purchase of local produce in reserved areas by licensee

- (i) A licensee ⁹[holding a licence in form 'F'] shall be authorised to purchase the various items of local produce from the aboriginal tribes of the reserved area for which he holds a licence.
- (ii) The extent to which, and the minimum rates at which, the various items of such produce may be purchased by a licensee shall be fixed by the Chief Commissioner from time to time.

13 Royalty payable to government on local produce exported from reserved areas

- (i) On all local produce purchased under rule 12 and exported from a reserved area, a royalty at such rate or rates as may be fixed by the Chief Commissioner from time to time shall be levied.
- (ii) The royalty levied under sub-rule (1) above shall be paid by the licensee to the Deputy Commissioner or to such other officers as may be appointed by the Deputy Commissioner in this behalf and shall be credited to Government.

14 Residual matters

Such matters as are not specifically provided for or are insufficiently provided for in these rules shall be regulated in such manner as may be directed by the Chief Commissioner:

- 1 Substituted vide Notification No.274/60/150-5/60-G dated 5th December 1960
- 2 Inserted vide Notification No.274/60/150-5/60-G dated 5th December 1960.
- 3 Substituted vide Notification No.274/60/150-5/60-G dated 5th December 1960 for "Form G".
- 4 Inserted vide Notification No. 61/69/F.No. 50-8/68-J(1) dated 31st May 1969.
- 5 The words 'for a period not exceeding one month' substituted vide Notification No. 274/60/150-5/60-G dated 5th December 1960 for 'to a Government servant while on duty or to a Government servant (and any member of his family) while proceeding on transfer' and later omitted vide Notification No. 61/69/F.No. 50-8/68-J(1) dated 31st May 1969.
- 6 Substituted vide Notification No. 61/69/F.No. 50-8/68-J(1) dated 31st May 1969 for 'Re.1/-' which was Substituted vide Notification No. 274/60/150-5/60-G dated 5th December 1960 for 'Nil'.
- 7 Omitted vide Notification No. 274/60/150-5/60-G dated 5th December 1960 and later inserted vide Notification No. 61/69/F.No. 50-8/68-J(1) dated 31st May 1969.
- 8 Inserted vide Notification No. 274/60/150-5/60-G dated 5th December 1960.
- 9 Substituted vide Notification No. 274/60/150-5/60-G dated 5th December 1960 for 'holding licence in form 'F''

SCHEDULE

FORM A

(See Rule 4)

Application for the grant of a pass under Section 7 of the Andaman & Nicobar Islands (Protection of Aboriginal Tribes), Regulation 1956

To,

The Deputy Commissioner,
Andaman & Nicobar Islands,

I, (name of the applicant), hereby apply for a pass under section 7 of the Andaman And Nicobar Islands (Protection Of Aboriginal Tribes) Regulation, 1956 and the rules made thereunder authorizing me to enter and remain in the following reserved area in the Andaman And Nicobar Islands for the period commencing from and ending on namely:

(Details of the Reserved Area)

2 The required particulars are as follows:

- (a) Applicant's father's or husband's name
(b) Applicant's nationality
(c) Applicant's height feet inches
(d) Colour of applicant's hair
(e) Colour of applicant's eyes
(f) Distinguishing marks
(g) Applicant's address
(h) Purpose of visit to the Reserved Area
(i) Details of employment proposed to be taken up in the Reserved Area and the name of the employer, if any
(j) No. of pass previously held, if any
(k) Details of any other kind of applicant's interest, if any, in the Reserved Area authorized under the Andaman and Nicobar Islands (Protection Of Aboriginal Tribes) Regulation, 1956 or the rules made there-under
(l) Has the applicant ever been convicted of an offence under the Andaman and Nicobar Islands (Protection Of Aboriginal Tribes) Regulation, 1956 or any other law, and if so, the details of the offence and the punishment awarded?
(m) Any other particulars

3 I agree to abide by the provisions of the Andaman And Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 and the rules made thereunder and also by the terms and conditions of the pass, if granted.

Dated at

Signature of applicant

theday of.....19.....

FORM B

(See Rule 5)

Pass for entering a Reserved Area in the Andaman & Nicobar Islands

Pass No

2 This Pass under section 7 of the Andaman And Nicobar Islands (Protection of Aboriginal Tribes Regulation, 1956 (herein-after referred to as 'the Regulation') is hereby granted to Shri/Shrimati/Kumari..... (hereinafter referred to as 'the pass holder') identifiable by the following particulars, namely:

- | | |
|-----------------------------------|-------------------------|
| (a) Father's or husband's name | _____ |
| (b) Nationality | _____ |
| (c) Height | _____ feet _____ inches |
| (d) Colour of hair | _____ |
| (e) Colour of eyes | _____ |
| (f) Distinguishing marks | _____ |
| (g) Address | _____ |
| (h) Signature or thumb impression | _____ |

Subject to the provisions of the Regulation and the Andaman And Nicobar Islands (Protection of Aboriginal Tribes) Rules 1957 (hereinafter referred to as 'the said Rules') and also to the conditions set forth in the following statement, this PASS authorizing the pass holder to enter and remain in* _____ (hereinafter referred to as 'the said reserved area'), shall be valid and remain in force from _____ to _____, namely: _____

STATEMENT OF CONDITIONS

- 1** The pass-holder may visit the said reserved area and remain therein during the period of validity of this PASS for the following purpose shall, alter the expiry of such period, surrender this PASS to the Officer-in-Charge of the nearest police station or to the nearest Magistrate and, if this PASS is lost, a report of such loss shall be made by the pass-holder forthwith to the said Officer-in-Charge or the said Magistrate, namely: _____
- 2** The pass-holder shall not carry on or engage himself in any trade or business in the said reserved area except to the extent, if any, authorized by this PASS.
- 3** The pass-holder shall not collect any forest produce from the said reserved area, and shall not carry to or from the said reserved area any book, diary, manuscript, map, picture, photograph, film, curio or article of scientific interest, which is likely to be against public interest or may affect the security of the State.
- 4.** The pass-holder shall not introduce or attempt to introduce into the said reserved area any of the following articles, namely:
 - (i) beer, wine or other spirituous fermented liquor;
 - (ii) opium, Bhang, ganja or other hurtful or intoxicating drug ;
 - (iii) arms, weapons gun powder; or other explosive or highly inflammable substance except to the extent permitted by the Chief Commissioner of the Andaman And Nicobar Islands (hereinafter referred to as 'the Chief Commissioner') or by any law for the time being in force; and
 - (iv) such other articles may be prohibited by the Chief Commissioner from time to time.
- 5.** The PASS shall be liable to be cancelled if the pass-holder is convicted of an offence punishable under the provisions of the Regulation or the said rules or any other law for the time being in force or is shown to the satisfaction of the Chief Commissioner to be leading a scandalous or notoriously evil mode of life conducive to breach of the public peace or prejudicial to the maintenance of the public safety in the said reserved area.
- 6.** The Deputy Commissioner may, and shall when so required by the Chief Commissioner, at any time after recording his reasons in writing but without assigning to the pass-holder any reasons for so doing, by order in writing cancel this PASS. The PASS shall be void from the date of receipt by such order by the pass-holder: Provided that where this PASS is so cancelled by the Deputy Commissioner; he shall forthwith send a copy of his recorded reasons for doing so to the Chief Commissioner and the Chief

Commissioner may, on his own motion or on application by the pass-holder or otherwise reverse the order of the Deputy Commissioner and thereupon the PASS shall come again into force and be valid.

- 7. Any breach of the provisions of the Regulation or the said Rules or of the conditions for this PASS, shall, in addition to nay other penalty, render the pass-holder disqualified for being granted any pass under section 7 of the Regulation.

Dated at

theday of.....19.....

*Deputy Commissioner
Andaman & Nicobar Islands*

* Details of the reserved area for which PASS has been granted

RENEWALS

This PASS is hereby renewed and rendered valid under rule 5 (2) of the Andaman and Nicobar Islands (Protection Of Aboriginal Tribes) Rules 1957 for the period:

1 Commencing from _____ and ending on _____

*Deputy Commissioner
Andaman & Nicobar Islands*

2 Commencing from _____ and ending on _____

*Deputy Commissioner
Andaman & Nicobar Islands*

3 Commencing from _____ and ending on _____

*Deputy Commissioner
Andaman & Nicobar Islands*

FORM C*(See Rule 6)***Register of passes granted under Section 7 of the Andaman & Nicobar Islands
(Protection of Aboriginal Tribes) Regulation 1956**

I * Number of pass.	
2	Pass holder's name, father's name and address.
3	Nationality.
4	Height.
5	Colour of hair.
6	Colour of eyes.
7	Distinguishing marks.
8	Signature or thumb impression.
9	Description of the reserved area for which the pass has been granted.
10	Purpose of visit to the reserved area.
11	Date of grant of pass.
12	Date upto which pass has been granted.
13	Challan No and date of payment of prescribed fee for
14	Date of renewal of pass.
15	Date upto which pass has been renewed.
16	Challan No and date of payment of prescribed fee for renewal of pass.
17	Name of the person, if any with whom the Pass holder is employed in the reserved area
18	Remarks

P
A
S
S
H
O
L
D
E
R
SR
E
N
E
W
A
L
S

* Each pass shall be given a separate number serially

FORM D

(See Rule 5(2))

**Application under Rule 5(2) of the Andaman & Nicobar Islands
(Protection of Aboriginal Tribes) Rules, 1957 for the renewal of Pass
for entry into the Reserved Area**

To

*The Deputy Commissioner
Andaman & Nicobar Islands*

I, _____ (name of the applicant), was granted Pass No _____
authorizing me to enter the following reserved area in the Andaman and Nicobar Islands and to remain therein from the period
commencing from _____ and ending on _____, namely;

1 (Details of the Reserved Area)

2 The aforesaid pass was renewed from time to time and rendered valid up to the _____. As the
pass since expired, I hereby apply for its renewal, on the same terms and conditions, for further period commencing from the
_____ and ending _____ on the _____. The required particulars are as follows:

- (a) No. of the *expired/ expiring pass _____
- (b) Date of grant of the *expired/ expiring pass _____
- (c) Date of last renewal, if any, of the *expired/ expiring pass _____
- (d) Names and addresses of the persons by under whom the applicant was employed
or engaged in the reserved area during the last period _____
- (e) Name and address of the person by or under whom the applicant was employed
or engaged in the reserved area at the close of the last period _____
- (f) Name and address of the person by or under whom the applicant was proposed to be employed or
engaged during the period for which the pass is to be renewed _____
- (g) Has the applicant been convicted of any offence during the last year and, if so,
the details of the offence and the punishment awarded? _____
- (h) Present address of the applicant _____

3 The *expired/expiring pass is attached herewith.

Dated the19.....

Signature of applicant

N.B. The expired/expiring pass must accompany the application.

** Strike out the portion not applicable.*

FORM E*(See Rule 7)*

Application for the grant of a license for trade or business under sub-section 1 of Section 6 of the Andaman & Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956

To

*The Chief Commissioner,
Andaman & Nicobar Islands, Port Blair*

I, _____ (*name of the applicant*), hereby apply for a license under sub-section (1) of section 6 of the Andaman and Nicobar Islands (Protection Of Aboriginal Tribes) Regulation 1956 and the rules made there under authorising me to carry on trade or business in the following reserved area in the Andaman and Nicobar Islands for the period commencing from _____ and ending on _____ namely:

(DETAILS OF THE RESERVED AREA)

2 *The required particulars are as follows:*

- (a) Applicant's father's or husband's name _____
- (b) Applicant's nationality _____
- (c) Applicant's address _____
- (d) Whether the license is desired in applicant's individual name or in the name of any firm, company, etc _____
- (e) If the license be desired in the name of any firm, company, etc the name and style in which the firm, company, etc, carries on business and the details of its constitution including the names, etc, of its partners if it be a partnership firm _____
- (f) Details of resources which are to be employed in connection with the trade or business _____
- (g) Details of water-crafts and transport vehicles, if any proposed to be employed in connection with the trade or business _____
- (h) Name of the station at which a sea-worthy boat shall be kept for the purpose of carriage or transport the Government cargo and officials under the terms and conditions of the license if granted _____
- (i) Does the applicant or the firm, company, etc, in whose name the license is desired, hold any such license in relation to any other such reserved area? _____
- (j) Has the applicant or the firm, company, etc, in whose name the license is desired been refused such a license previously, and, if so, the date of such refusal? _____
- (k) Has the applicant or the firm, company, etc in whose name the license is desired, ever been convicted of an offence under the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 or any other law, and, if so the details of the offence and the punishment awarded? _____
- (l) Any other particulars _____

3 *I, [and also the firm, company, etc, in whose name the license is desired] agree to abide by the provisions of the Andaman & Nicobar Islands (Protection Of Aboriginal Tribes), Regulation 1956 and the rules made thereunder and also by the terms and conditions of the license, if granted.*

Dated at

*Signature of applicant and/or the authorized person
on behalf of the firm, company, etc, together with authorised seal*

the day of 19.....

[] Strike out if not applicable

FORM F*(See Rule 9)***License for trade or business granted under sub-section 1 of Section 6 of the Andaman & Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956***Non transferable*

License No. _____

This LICENSE is hereby granted under sub-section 1 of Section 6 of the Andaman & Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (hereinafter referred to as 'the said Regulation') to Shri/Messrs. _____ Son of _____ resident of _____ (hereinafter referred to as 'the licensee') authorising him/them to carry on trade or business in the reserved area hereinafter fully described for the period commencing from _____ and ending on _____ (hereinafter referred to as 'the term of this LICENSE') subject to the provisions of the said Regulation and the Andaman & Nicobar Islands (Protection of Aboriginal Tribes) Rules, 1957 (hereinafter referred to as 'the said Rules') and also subject to the terms and conditions set forth in the following statement namely:

STATEMENT OF TERMS AND CONDITIONS

- 1** The licensee shall be authorized to carry on trade or business in the following reserved area in the Andaman and Nicobar Islands (hereinafter referred to as 'the said reserved area') namely: _____
- 2** During the term of this LICENSE, the licensee shall:
 - (a)** maintain an efficient system of procurement, supply and distribution of cloth consumers' goods and other articles described in the Annexure hereunder written (such cloth, goods and articles hereinafter collectively referred to as 'the authorized articles') in the said reserved area ;
 - (b)** handle things and properties belonging to Government in such manner and on such terms, conditions and stipulations as may be mutually agreed between the licensee and the Chief Commissioner of the Andaman and Nicobar Islands (hereinafter called 'the Chief Commissioner');
 - (c)** work as the stevedorer for Government cargo in the said reserved area and to provide sufficient labour and other efficient facilities for loading, unloading and stacking of such cargo on payment by Government of such rates or charges as may from time to time be fixed by the Chief Commissioner;
 - (d)** keep maintain and station at own cost and risk a sea-worthy boat at _____ and to make her available at the purpose of:
 - (i) carriage or transport of Government cargo by sea to _____ on payment of such rate or rates of freight as may from time to time be fixed by the Chief Commissioner; and
 - (ii) enabling Government to visit _____ on payment of such rate or rates of passage as may from time to time be fixed by the Chief Commissioner;
 - (e)** perform such other functions and discharge such other obligations as may hereunder devolve on the licensee ; and
 - (f)** perform such other reasonable function or functions as may, with the consent of the licensee, be entrusted to him by the Chief Commissioner;
- 3** For the purpose of maintaining as efficient system of supply and distribution of the authorized articles in the said reserved area, the licensee shall at his own cost and risk, procure and hold sufficient stock of all the authorized articles at such places in the said reserved area as may be conveniently accessible to the local civil population; PROVIDED that the licensee shall be required to procure and hold at its own cost and risk such minimum and maximum stock of all or any of the authorised articles at such place or places in the said reserved area as may, at any time be fixed by the Chief Commissioner or by such Officer as may be authorized by the Chief Commissioner in this behalf.
- 4** The maximum price at which any of the authorized articles may be sold by the licensee in said reserved area shall be fixed from time to time by the Chief Commissioner or by such Officer as may be appointed by the Chief Commissioner in this behalf. PROVIDED that no maximum price so fixed in respect of any authorized articles shall exceed the amount of cost price at which such article was purchased in wholesale at Port Blair or at any such place in India, as the case may be, added by such percentage of the amount of such cost price as has been expressed to be permitted as the margin of profit in the Annexure hereunder written,

- 5 (1) The Chief Commissioner may, from time to time, fix the rates at which the licensee shall be authorized to purchase the various items of local produce from the aboriginal tribes of the said reserved area and, until some other rates are so fixed by the Chief Commissioner, the licensee shall be authorized to purchase any of the commodities specified in column (1) of the following Table from the aboriginal tribes of the said reserved area at a rate not less than the minimum purchase – rate specified there against in column (2) of the said Table, that is to say:

Table of purchase rates

Name of the commodity (1)	Minimum *Purchase-rate (2)
Coconuts	
Hukka nuts	
Copra	
Betel nuts	
Silk–cotton	

- (2) On every item of local produce purchased from the aboriginal tribes of the said reserved area and exported therefrom to any place outside the said reserved area, the licensee shall pay royalty to the Government at such rates as may from time to time be fixed by the Chief Commissioner and until some other rates are so fixed by the Chief Commissioner the royalty payable by the licensee to Government on each of the commodities specified in column (1) of the following Table shall be at the rate specified there against in column (2) of the said Table, that is to say:

Name of the commodity (1)	*Rate of royalty (2)
Coconuts	
Hukka nuts	
Copra	
Betel nuts	
Silk–cotton	

* The current rates which are in force for the time being should be entered in this column.

- 6 During the term of this LICENSE, the licensee shall perform the functions and discharge the obligations on his part most efficiently, faithfully and promptly to the best advantage of the Government and with the same degree of economy, prudence, diligence, skill and judgement as the licensee would exercise if the licensee were entitled to the benefits arising or likely to arise out of the performance of such functions and discharge of such obligations, and generally in accordance with the instructions and to the satisfaction of the Chief Commissioner which might involve the carrying out, without any extra payment, of such subsidiary instructions as the Chief Commissioner may from time to time issue.
- 7 In no event and under no circumstances, the licensee shall assign, transfer, sublet or underlet any of his interests, benefits, titles, rights, covenants, obligations or any other form of interests or liability whatsoever arising from or incidental to this LICENSE or any part thereof and in particular the licensee shall not appoint any person, firm, society, association or company as a sub licensee or sub agent or in any other capacity purporting to act on behalf of, or in name of, Government or of the licensee; and all transactions between the licensee and a third party shall be carried out as between two principals without any recourse in any event to Government or to the Chief Commissioner.
- 8 For the proper and efficient performance and discharge of the functions and obligations on his part of the LICENSE, the licensee shall, at his own risk and expense, provide everything that is necessary including proper establishment and in particular the licensee shall, at his own expense and risk:

- (a) appoint a fully qualified and experienced person to be the General Manager to supervise the shops established by the licensee in the said reserved area and the appointment of such person shall be made with the previous approval of the Chief Commissioner;
- (b) appoint General supervisory and other staff for such shops as well as for storage, godown and transport;
- (c) appoint clerical staff competent to carry out business correspondence and to keep proper record and account of all transactions carried out by the licensee ; and
- (d) employ labour for the purpose of loading, unloading, stacking, distribution and generally for all purpose connected with the functions and obligations on the part of the licensee under this LICENSE:

PROVIDED that the establishment and labour appointed under this clause shall be adequate to carry put the appropriate duties required of them and that in making such appointments the licensee may without prejudice to the terms and conditions of this LICENSE, employ the aboriginal tribes of the said reserved area to such extent as may be feasible.

PROVIDED ALSO that no person who does not hold a valid pass granted under section 7 of the said Regulation, or to whose appointment the Chief Commissioner may take exception, shall be employed by the licensee in his establishment or labour; and if any such exception is taken by the Chief Commissioner in the case of a person already employed under the licensee, such person shall be removed from such employment forthwith.

PROVIDED further that all persons appointed in the establishment or labour of the licensee shall, for all purposes and in all respects, be the servants of the licensee who shall accept full responsibility as their employer and pay fair wages having regard to the rates of wages prevailing in the said reserved area and that the licensee hereby indemnifies Government and the Chief Commissioner against all claims of any kind whatsoever in respect of the persons appointed as aforesaid or otherwise arising out of the working of this LICENSE.

- 9 Such building accommodation, electric fittings including lights, fans, etc., office and shop furniture and equipments, fire and other appliances, boats, launches and other things and materials necessary for the efficient performance and discharge of the functions and obligations on the part of the licensee under this LICENSE, shall be arranged and procured by the licensee himself at his own cost and risk.
- 10 (1) The licensee shall maintain or cause to be maintained the correct and true accounts of all transactions and dealings in relation to his business under the terms and conditions of this LICENSE and the accounts so maintained or caused to be maintained shall among other things, clearly show the details of all moneys received and paid, all authorized articles procured and sold in the said reserved area, the prices at which such articles were so procured and sold, all transactions carried out by the licensee with the inhabitants of the said reserved area and with Government and all other matters which may be necessary to manifest the state of business affairs of the licensee under this LICENSE or which may be specified by the Chief Commissioner.
- (2) All books of accounts maintained or caused to be maintained by the licensee under sub clause(1) shall be kept in the licensee's office at _____ and shall on demand, be made available at all reasonable times, to the Chief Commissioner or to such Officer of Government as may be authorized by the Chief Commissioner in this behalf for the purpose of inspection, examination, copying, fixation of prices, audit or any other reason-able purpose.
- (3) The licensee shall duly account for all Government properties in his possession and shall submit such periodical and other reports as to the state of such properties and other matters connected with this LICENSE as may from time to time be required by the Chief Commissioner.
- 11 (1) The licensee may, at his own expense, insure all or any of the authorized articles and other things, goods or materials procured by him under the terms and conditions of this LICENSE, in order to cover any risk during the transit of such articles, things, goods or materials to the said reserved area or their storage or otherwise and Government undertakes no responsibility or liability for loss or damage to such articles things, goods or materials or to any other property of the licensee in any manner or under any circumstances whatsoever.
- (2) Where any articles, things, goods or materials or any other property belonging to Government is held or handled by the licensee on behalf of Government, the licensee shall be responsible and liable for any loss or damage to such articles, things, goods, materials or property and shall always be deemed to have indemnified Government against such loss or damage.
- 12 (1) Notwithstanding anything hereinbefore contained, this LICENSE shall, at the option of the Chief Commissioner, be liable to cancellation forthwith in each and every of the following events, that is to say:
 - (a) If the licensee commits any breach of any of the provisions of the said Regulation or of the said Rules or any of the terms and conditions of this LICENSE or of any of the provisions herein contained.
 - (b) If the licensee fails to perform any of the functions or discharge any of the obligations on his part under this LICENSE.
 - (c) If the licensee becomes insolvent.
 - (d) If the licensee ceases to exist as a trading concern in its existing formation on account of dissolution or liquidation or otherwise on account of an order passed by any competent Government authority or any competent Court.
- (2) Where this LICENSE is cancelled under sub clause (1), the Chief Commissioner shall, without prejudice to his other rights and powers herein contained be entitled and have full power to take over, at his discretion any of the authorized articles in possession of the licensee and to dispose them at the risk and expense of the licensee and realize Government's claims from the procedure and also from the moneys due to the licensee on account of any transaction with Government under this LICENSE or any other agreement or understanding with Government.

- 13** Without prejudice to the provisions of clause 12, the Chief Commissioner may, at any time without advancing any reasons, cancel this LICENSE by delivering a notice of such cancellation in writing to the licensee at least two months in advance of the date on which such cancellation is intended by the Chief Commissioner to take effect.
PROVIDED that the licensee shall also be entitled and have full power to surrender this LICENSE at any time during its continuance by delivering a notice of such surrender in writing to the Chief Commissioner at least two months in advance of the date on which such surrender is intended by the licensee to take effect.
- 14** Any bribe, commission, gift or advantage given, promised or offered by or on behalf of the licensee to any officer, servant or representative of Government in relation to the grant of this LICENSE shall, in addition to any criminal liability incurred by the licensee render this LICENSE liable to cancellation in the discretion of the Chief Commissioner and any loss or damage resulting to Government on account of such cancellation shall be compensated by the licensee.
- 15** Where this LICENSE is intended to be cancelled by the Chief Commissioner and a notice of intimation of such intention has been given to the licensee by the Chief Commissioner; the licensee shall wind up his business, interests, liabilities and affairs in or in relation to or in respect of the said reserved area and settle all the claims of Government and third parties before the date on which such cancellation is to take effect and in particular the licensee shall, if required by the Chief Commissioner; deliver the stock of the authorized articles and other things, goods and materials procured by him in the said reserved area to Government on payment of fair and reasonable prices therefor by Government. PROVIDED that the provisions of this clause shall, in effect, be in addition to and not in derogation of any of the other provisions herein contained.
PROVIDED ALSO that in the context of any consequences ensuing from the operation of the provisions of this clause, the licensee shall always be deemed to have indemnified Government against any loss or damage to the interests of the licensee or of any other person or party having any dealings with the license.
- 16** In the event of cancellation of this LICENSE before the expiry of the period of its validity ending on the term of this LICENSE shall, notwithstanding anything herein contained expire on the date on which such cancellation is to take effect and all references herein to 'the term of this LICENSE' shall be construed as reference to the term so expiring on such date.
- 17** The licensee shall, within seven days from the date of grant of this LICENSE, deposit with the Government a sum of Rs.6000/- (Rupees six thousand) as security for the due performance of the functions and discharge of obligations on his part under this LICENSE and for strict observance of the terms and conditions of this LICENSE, and the sum so deposited shall, during the continuance of the term of this LICENSE, be retained by Government as security as aforesaid without any liability on its part to pay any interest thereon to the licensee and shall, on expiry of the said term, be refunded to the licensee on presentation by him of a "No Demand" certificate and return in good condition of Government properties issued or entrusted to him ;
PROVIDED that in the event of any default or failure on the part of the licensee in the performance of such functions or discharge of such obligations or in the observance of such terms and conditions, the sum so deposited or any part thereof shall, in the discretion of the Chief Commissioner, be liable to be forfeited by the Government without prejudice to any other rights, titles or remedies enforceable by Government on account of such default or failure.
- 18** No default, failure or omission in the observance of any of the terms or conditions of this LICENSE or in the performance or discharge of any of the functions or obligations arising therefrom, shall give rise to any claim against the licensee or be deemed to be a breach of this LICENSE if such default, failure or omission, as the case may be, has occurred as a result of any force majeure such as political or administrative acts of recognized or de facto foreign States, act of God, act of enemies of the Republic of India, strikes, lock-outs, epidemics, frosts, accidents by fire or inundation or at sea, eruptions, earthquakes, landslips, etc.
- 19** Such matters are not expressly provided in this LICENSE but determination whereby may be necessary in the course of performance of the functions or discharge of the obligations, shall be regulated in accordance with the directions or instructions of the Chief Commissioner and the licensee shall have no title, right or power to question such directions or instructions which shall be binding on Government and also on the licensee.
- 20** Provisions of this LICENSE shall also be subject to such laws as are for the time being in force in the Andaman and Nicobar Islands or as be enacted hereafter by any competent authority.
- 21** If any dispute, differences or question, shall, at any time hereafter; arise between the licensee and the Government or the persons claiming under them respectively on account of the breach or on observance of any of the covenants, terms, conditions, stipulations or agreements herein contained or otherwise attaching or in any way relating to the construction meaning and effect of this LICENSE or any clause or thing herein rights, titles, powers, duties, obligations or liabilities of the licensee and Government respectively except and excluding, however, disputes, differences or questions, the decision whereof is otherwise expressly provided for in this LICENSE, such dispute difference or question, as the case may be, shall be referred to the arbitration of an arbitrator nominated by the Chief Commissioner and the decision of such arbitrator shall be final and binding on the parties hereto:

PROVIDED that the provisions of the Arbitration Act, 1940 and of every statutory modification or re-enactment thereof and also of the rules made thereunder from time to time, shall apply to such arbitration and this deed shall be deemed to be a submission to arbitration.

PROVIDED ALSO that upon such reference to arbitration, the licensee shall, as far as reasonably possible, continue to comply with the terms and conditions of this LICENSE during the arbitration, proceedings, and no payment due or payable by or to the Government shall be withheld on account of such proceedings unless such payment is the subject-matter of arbitration.

Annexure above referred to

Serial No	Name of the article authorized for Procurement, supply, distribution, and sale in the reserved area	Margin of profit over the cost price permitted in fixing the selling price in case the article was purchased by the licensee at Port Blair	Margin of profit over the cost price permitted in fixing the selling price in case the article was purchased by the licensee at any place in India except Port Blair
I	II	III	IV
1	Rice, Wheat and wheat products purchased from open market.	9 ¾ %	25 %
2	Rice, Wheat and wheat products purchased from Government Stores.	As may be fixed by the Chief Commissioner from time to time.	As may be fixed by the Chief Commissioner from time to time.
3	Fresh fruits and vegetables including onions and potatoes.	24 ¾ %.	40 %
4	Foodstuffs other than those specified at Serial Nos. 1, 2 and 3	9 ¾ %	25 %
5	Cloth and ready-made clothes.	9 ¾ %	25 %
6	Tobacco, Cigarettes and Matches.	9 ¾ %	25 %
7	Soap	9 ¾ %	25 %
8	Kerosene oil.	9 %	25 %
9	Oilman's and Grocer's stores excluding every kinds of alcoholic preparations and other articles prohibited by the Chief Commissioner from time to time.	9 %	25 %
10	General merchandise (subject to such exceptions as the Chief Commissioner may, from time to Time, make).	9 %	25 %
11	Stationery.	9 %	25 %
12	Cutlery and Utensils.	9 %	25 %
13	Medicinal drugs and chemicals.	9 %	25 %
14	Bicycles.	9 %	25 %
15	Sewing Machines.	9 %	25 %
16	Watches.	9 %	25 %
17	Such other articles as may from time to time be authorized by the Chief Commissioner.	As may be fixed by the Chief Commissioner from time to time.	As may be fixed by the Chief Commissioner from time to time.

NOTE: In fixing the selling price of an article purchased by the licensees at Port Blair, such amount on account of freight and incidental expenditures as may, from time to time, be fixed by the Chief Commissioner, shall be permitted in addition to this margin of profit specified in column III.

Dated at Port Blair

theday of.....19.....

*Chief Commissioner
Andaman & Nicobar Islands*

FORM G

(See Rule 10)

Register of licenses for trade or business granted under sub-section 6 of the Andaman & Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956

	1	* Number of license.
	2	Licensee's name, father's name, nationality and address. (Other details in the case of a firm, company, etc.)
	3	Details of the reserved area for which the license has been granted.
	4	Registered Nos and description of boats and sea worthy boats used, employed or engaged by the licensee in carrying on trade or business.
	5	Date of grant of license.
	6	Period for which the license has been granted.
	7	Challan No and date of payment of the prescribed fee for the grant of license.
	8	Amount of security deposit, if any
	9	Challan No & date of deposit of security, if any
	10	Date of refund of security, if any.
	11	Date on which license ceased to be valid.
	12	Whether license ceased to be valid on account of normal expiry or non payment of Government dues or cancellation or otherwise.
	13	Remarks

* Each license shall be given a separate number serially.

*T.G.N. AYYAR
Chief Commissioner, A & N Islands
[F, 1-89 (1) / 56-G]
G, P, 53/57*

*Office of the Chief Commissioner
Andaman & Nicobar Islands
Dated at Port Blair, 6th May 57*

NOTIFICATION

No 64-57: Under Rule 14 of the Andaman and Nicobar Islands (Protection Of Aboriginal Tribes), Rules 1957, the Chief Commissioner, Andaman and Nicobar Islands, is pleased to direct that all licenses granted under sub section 1 of section 6 of the Andaman and Nicobar Islands (Protection Of Aboriginal Tribes) Regulation, 1956 before the commencement of the said Rules shall, until any correspondence provision is made under the said Rules, continue to be in force and valid subject to the terms and conditions of the said licenses.

*T.G.N. AYYAR
Chief Commissioner
Andaman and Nicobar Islands
[1-89 (1), 56-G]*

No. 1-89/ 56: GII Port Blair, the 6th May 1957

Copy forwarded to the Foreman, Government Press, Port Blair, with the request that the above notification may please be published in the Andaman and Nicobar Islands Gazette forthwith. Advance copy forwarded for information to the Chief Conservator of Forests, Andaman and Nicobar Islands, and all Heads of local Offices including the Executive Engineer (Development Division).

*By order
Sd/ Assistant Secretary to the Chief Commissioner*

*Office of the Chief Commissioner
Andaman & Nicobar Islands
Dated at Port Blair, 6th May 57*

NOTIFICATION

No AN/PATR/9(1)/1: In exercise to the powers conferred by sub-section (1) of section 9 of the Andaman and Nicobar Islands (Protection Of Aboriginal Tribes), Regulation 1956 (Regulation No.3 of 1956), the Chief Commissioner, Andaman and Nicobar Islands is pleased to authorize any of the following officers to arrest without a warrant, any person who has committed, or is suspected of having committed, any offence punishable under the said Regulation, namely:

- (i)** All police above the rank of a Constable
- (ii)** All members of the Bush Police Force under the administrative control of the Police and Forest Department of the Andaman & Nicobar Islands
- (iii)** All officers of the Forest Department of the Andaman and Nicobar Islands

*T.G.N. AYYAR
Chief Commissioner
Andaman and Nicobar Islands
[1-89 (1), 56-G]*

No. 1-89/ 56: GIII Port Blair, the 6th May 1957

Copy forwarded to the Foreman, Government Press, Port Blair, with the request that the above notification may please be published in the Andaman and Nicobar Islands Gazette forthwith. Advance copy forwarded for information to the Chief Conservator of Forests, Andaman and Nicobar Islands, and all Heads of local Offices including the Executive Engineer (Development Division).

*By order
Sd/ Assistant Secretary to the Chief Commissioner*

Andaman & Nicobar Administration
Chief Commissioner's Secretariat

NOTIFICATION

Port Blair, the 5th December 1960/ 14th Agrahayana 1882

No. 274/60/150-5/60-G: In exercise of the powers conferred by section 10 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes), Regulation 1956 (Regulation No. 3 of 1956), the Chief Commissioner, Andaman and Nicobar Islands, is pleased to direct that the following amendments shall be made in the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Rules, 1957.

AMENDMENTS

For the existing Rule 2 of the said Rules, the following shall be substituted, viz:

- 2** DEFINITIONS: In these Rules, unless the context otherwise requires:
- (a) 'Deputy Commissioner' except in sub rule (2) of rule 13 includes an officer authorized by him under Section 7 to grant passes;
 - (b) 'Form' means a form prescribed in the Schedule appended to these rules;
 - (c) 'General Trade or Business' means the trade or business covered by the licensee in Form F;
 - (d) 'license' means a license granted in Form 'F' or in Form 'H' by the Chief Commissioner under Sub-section 1 of Section 6 to carry on in any reserved area general trade or business, or miscellaneous trade, as the case may be;
 - (e) 'licensee' means a person, or a body of individuals including a member or members of an aboriginal tribe, to whom a license has been granted;
 - (f) 'person' does not include a member of an aboriginal tribe;
 - (g) 'Miscellaneous Trade' means the following:
 - (1) ks related to P.W.D. and I.A.F contracts;
 - (2) Stevedoring;
 - (3) Sale of timber;
 - (4) Import and Export trade, and;
 - (5) Such other trade as may from time to time be specified by the Chief Commissioner.
 - (h) 'prescribed fee' in respect of any document or act means the fee payable thereon or therefore under rule 11;
 - (i) 'Regulation' means the Andaman and Nicobar Islands (Protection of Aboriginal Tribes), Regulation 1956 (Regulation No.3 of 1956);
 - (j) 'Section' and 'Sub-section' respectively mean a section of the Regulation and a sub-section of a section of the Regulation and;
 - (k) 'r' means a financial year.

(2) For the existing Rule 7 of the said Rules, the following shall be substituted namely:

7 APPLICATION FOR LICENSE: Every application for grant of a license shall be in Form 'E' or Form 'G' as the case may be.

(3) In rule 9 of the said Rules for the words 'Shall be in Form "F"' substitute the words 'Shall be in Form "F" or Form "H"'.

(4) In the existing rule 10 of the said Rules for the words 'Form G' substitute the words 'Form I'.

(5) For the existing rule 11 of the said Rules, the following shall be substituted namely:

11 FEES FOR PASSES AND LICENSES: No pass or license shall be granted unless the fee in respect thereof as indicated below has been paid by the Government namely:

Details of pass, etc	Rate of fee
1 A pass to be granted for a period not exceeding one month	Re. 1/-
2 A pass other than a pass specified at item (1) above	Rs. 5/-
3 Renewal of pass	The same fee as for the original grant of a pass
4 A license for general trade or business	Rs. 500/-
5 A license for miscellaneous trade	Rs. 500/-

- (6) In sub rule 1 of rule 12 after the words 'the licensee' insert the words 'holding a license' in Form 'F'.
- (7) In Forms 'E' and 'F' appended to the said Rules for the words 'trade or business' wherever they occur substitute the words 'general trade or business'
- (8) For the existing sub clause (c) of clause 2 of the statement of terms and conditions mentioned in Form 'F' appended to the said Rules substitute the following:
- C** (i) work as a stevedore for cargo in the said reserved area and the ports of Car Nicobar and Camorta and provide sufficient labour and other efficient facilities for loading, unloading and stacking of such cargo on payment of such rates or charges as may from time to time be fixed by the Chief Commissioner.
- (ii) provide necessary embarkation and disembarkation facilities to all passengers between the ships in anchorage and shore and vice versa in the said reserved area and at the ports of Car Nicobar and Camorta on payment on such rates or or charges as may from time to time be fixed by the Chief Commissioner.
- (9) The existing Form 'G' appended to the said Rules shall be deleted.
- (10) The enclosed Forms shall be appended to the said Rules as Forms 'G', 'H' & 'I'.

By Order,
BB Srivastava
Asst Secretary to the Chief Commissioner

Andaman & Nicobar Administration
Andaman & Nicobar Islands
Port Blair, the 1st December 1959

NOTIFICATION

No. AN PATR/3 (1) 1: In exercise of the powers conferred by sub section (1) of Section 3 of the Andaman and Nicobar Islands (Protection Of Aboriginal Tribes), Regulation 56 (Regulation No. 3 of 1956), the Chief Commissioner, Andaman and Nicobar Islands, is pleased to direct that the following amendment shall be carried out to his Notification No. AN PATR/3 (1) 1 dated the 2nd April 1957 published in the *Andaman and Nicobar Extraordinary Gazette* No 3 of 2/4/57, namely:

Para (b) of the said notification shall be substituted by the following:

'The area in Middle Andaman to the west of an imaginary line emerging from South Andaman and proceeding towards Yeratiljig to Bush Police Post No. 4 (Maps reference 772425) and thence due west to the coast below point June (Map reference 625029) along the Bush Police line subject to an adjustment that the line may coincide with the alignment to be aligned by the Andaman and Nicobar Islands Forest Department in Porlob and Boroin Yol areas between the Yeratil/Charalungta Bush Police posts provided that sufficient land is left to the West of such alignment on the eastern side of the Range to provide enough hunting ground to Jarawas while they are on the move and bearing in mind the suitability of such alignment, from the point of view of water and terrain, as a patrol path.'

MV RAJWADE
Chief Commissioner, Andaman & Nicobar Islands
[F. 150/59-G]

No. 150/59-G: *Port Blair, the 1st December 1959*

Copy forwarded to the Foreman, Govt. Press, Port Blair, for publication of the notification in the forthcoming issue of the *Andaman and Nicobar Gazette*, 15 space copies of the printed notification may be supplied to the General Section, Chief Commissioner's office for official use. Advance copy forwarded to:

- 1** The Supdt. Of Police, Port Blair, with reference to his Memo No. 16698/38/19/59 dated the 4 November, '59.
- 2** The Chief Conservator Of Forests, Port Blair for information and necessary action.
- 3** The Deputy Commissioner, Port Blair for information.

Sd/-
Secretary to the Chief Commissioner

FORM G*(See Rule 7)*

**Application for the grant of a license for miscellaneous trade under
sub-section 1 of Section 6 of the Andaman & Nicobar Islands
(Protection of Aboriginal Tribes) Regulation, 1956**

To

*The Chief Commissioner,
Andaman & Nicobar Islands, Port Blair*

I, _____ (*name of the applicant*), hereby apply for a license under sub-section (1) of section 6 of the Andaman and Nicobar Islands (Protection Of Aboriginal Tribes) Regulation 1956 and the rules made there under authorising me to carry on miscellaneous trade in the following reserved area in the Andaman and Nicobar Islands for the period commencing from _____ and ending on _____ namely:

(DETAILS OF THE RESERVED AREA)

2 *The required particulars are as follows:*

- (a) Applicant's father's or husband's name _____
- (b) Applicant's nationality _____
- (c) Applicant's address _____
- (d) Whether the license is desired in applicant's individual name or in the name of any firm, company, etc _____
- (e) If the license be desired in the name of any firm, company, etc the name and style in which the firm, company, etc, carries on business and the details of its constitution including the names, etc, of its partners if it be a partnership firm _____
- (f) Details of resources which are to be employed in connection with the miscellaneous trade _____
- (g) Details of water-crafts and transport vehicles, if any proposed to be employed in connection with the miscellaneous trade _____
- (h) Name of the station at which a sea-worthy boat shall be kept for the purpose of carriage or transport the Government cargo and officials under the terms and conditions of the license if granted _____
- (i) Does the applicant or the firm, company, etc, in whose name the license is desired, hold any such license in relation to any other such reserved area? _____
- (j) Has the applicant or the firm, company, etc, in whose name the license is desired been refused such a license previously, and, if so, the date of such refusal? _____
- (k) Has the applicant or the firm, company, etc in whose name the license is desired, ever been convicted of an offence under the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 or any other law, and, if so the details of the offence and the punishment awarded? _____
- (l) Any other particulars _____

3 *I, [and also the firm, company, etc, in whose name the license is desired] agree to abide by the provisions of the Andaman & Nicobar Islands (Protection Of Aboriginal Tribes), Regulation 1956 and the rules made thereunder and also by the terms and conditions of the license, if granted.*

Dated at

*Signature of applicant and/or the authorized person
on behalf of the firm, company, etc, together with authorised seal*

the day of 19.....

[] *Strike out if not applicable*

FORM H

(See Rule 9)

License for miscellaneous trade granted under sub-section 1 of Section 6 of the Andaman & Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956

Non transferable

License No. _____

This LICENSE is thereby granted under sub-section 1 of Section 6 of the Andaman & Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (hereinafter referred to as 'the said Regulation') to Shri/Messrs. _____ Son of _____ resident of _____ (hereinafter referred to as 'the licensee') authorising him/them to carry on trade or business in the reserved area hereinafter fully described for the period commencing from _____ and ending on _____ (hereinafter referred to as 'the term of this LICENSE') subject to the provisions of the said Regulation and the Andaman & Nicobar Islands (Protection of Aboriginal Tribes) Rules, 1957 (hereinafter referred to as 'the said Rules') and also subject to the terms and conditions set forth in the following statement namely:

STATEMENT OF TERMS AND CONDITIONS

- 1** The licensee shall be authorized to carry on miscellaneous trade in the following reserved area in the Andaman and Nicobar Islands (hereinafter referred to as 'the said reserved area') namely: _____
- 2** During the term of this LICENSE, the licensee shall:
 - (a) handle things and properties belonging to Government in such manner and on such terms, conditions and stipulations as may be mutually agreed between the licensee and the Chief Commissioner of the Andaman and Nicobar Islands (hereinafter called 'the Chief Commissioner');
 - (b) work as a stevedore for cargo in the side reserved area and the ports of Car Nicobar and Camorta and provide sufficient labor and other efficient facilities for loading, unloading and stacking of such cargo on payment of such rates or charges as may from time to time be fixed by the Chief Commissioner;
 - (c) keep maintain and station at own cost and risk a sea-worthy boat at _____ and to make her available at the purpose of:
 - (i) carriage or transport of Government cargo by sea to _____ on payment of such rate or rates of freight as may from time to time be fixed by the Chief Commissioner; and
 - (ii) enabling Government to visit _____ on payment of such rate or rates of passage as may from time to time be fixed by the Chief Commissioner.
 - (d) perform such other functions and discharge such other obligations as may hereunder devolve on the licensee ; and
 - (e) perform such other reasonable function or functions as may, with the consent of the licensee, be entrusted to him by the Chief Commissioner.
- 3** During the term of this LICENSE, the licensee shall perform the functions and discharge the obligations on his part most efficiently, faithfully and promptly to the best advantages of Government and with the same degree of economy, prudence, deligence, skill and judgement as the licensee would exercise if the license were entitled to the benefits arising or likely to arise out of the performance of such functions or discharge of such obligations, and generally in accordance with the instructions and to the satisfaction of the Chief Commissioner which might involve the carrying out, without any extra payment, of such subsidiary instructions as the Chief Commissioner may from time to time issue.
- 4** In no event and under no circumstance, the licensee shall assign, transfer, sublet or underlet any of his interests, benefits, titles, rights, covenants, obligations or any other form or interests or liability whatsoever arising from or incidental to this LICENSE or any part thereof and in particular the licensee shall not appoint any person, firm, society, association or company as a sub-licensee or sub-agent or any other capacity purporting to act on behalf of or in the name of, Government or of the licensee, and all transactions without any recourse in any event to Government or to the Chief Commissioner.
- 5** For the proper and efficient performance and discharge of the functions and obligations on his part under the LICENSE, the licensee shall, at his own risk and expense provide everything that is necessary including proper establishment and in particular the licensee shall, at his own expense and risk:

- (a) appoint general supervisory and other staff to storage, godown and transport;
- (b) appoint clerical staff competent enough to carry out business correspondence and to keep proper record and account of all transactions carried out by the licensee; and
- (c) employ labour for the purpose of loading, unloading, stacking and generally for all purposes connected with the functions and obligations on the part of the licensee under this LICENSE :

PROVIDED that the establishment and labor appointed under the clause shall be adequate to carry out the appropriate duties required of them and that in making such appointments the licensee may, without prejudice to the terms and conditions of this LICENSE, employ the aboriginal tribes of the said reserved area to such extent as may be feasible.

PROVIDED ALSO that no person who does not hold a valid pass granted under Section 7 of the said Regulation, or to whose appointment the Chief Commissioner may take exception shall be employed by the licensee in his establishment or labour; and if any such exception is taken by the Chief Commissioner in the case of a person already employed under the licensee, such person shall be removed from such employment forthwith.

PROVIDED FURTHER that all persons appointed in the establishment of labour of the licensee shall, for all purposes and in all respects, be the servants of the licensee who shall accept full responsibility as their employer and pay fair wages having regard to the rates of wages prevailing in the said reserved area and that the licensee hereby indemnifies Government and the Chief Commissioner against all claims of any kind whatsoever in respect of the persons appointed as aforesaid or otherwise arising out of the working of this LICENSE.

- 6 Such buildings, accommodation, electric fittings including lights, fans, etc office furniture and equipments, fire and other appliances, boats, launches and other things and materials necessary for the efficient performance and discharge of the functions and obligations on the part of the licensee under this LICENSE, shall be arranged and procured by the licensee himself at his own cost and risk.
- 7 (1) The licensee shall maintain or cause to be maintained the correct and true accounts of all transactions and dealings in relation to his business under the terms and conditions of this LICENSE and the accounts so maintained or caused to be maintained shall, among other things, clearly show the details of all moneys received and paid, and all transactions carried out by the licensee with the inhabitants of the said reserved area and with Government and all other matters which may be necessary to manifest the state of business affairs of the licensee under this LICENSE or which may be specified by the Chief Commissioner.
- (2) All books of accounts maintained or caused to be maintained by the licensee under sub-clause (1) shall be kept in the licensee's office of _____ and shall, on demand, be made available at all reasonable times, to the Chief Commissioner or to such officer of Government as may be authorized by the Chief Commissioner in this behalf for the purpose of inspection, examination, copying, audit or any other reasonable purpose.
- (3) The licensee shall duly account for the Government properties in his possession and shall submit such periodical and other reports as to the state of such properties and other matters connected with this LICENSE as may from time to time be required by the Chief Commissioner.
- 8 Where any articles, things, goods, materials, or any other property belonging to Government is held or handed by the licensee on behalf of Government, the licensee shall be responsible and liable for any loss or damage to such articles, things, goods, materials or property and shall always be deemed to have indemnified Government against such loss or damage.
- 9 (1) Notwithstanding anything hereinbefore contained, this LICENSE shall at the option of the Chief Commissioner be liable to cancellation forthwith in each and every of the following events, that is to say:
 - (a) If the licensee commits any breach of any of the provisions of the said Regulation or of the said Rules or of any of the terms or conditions of this LICENSE or of any of the provisions herein contained.
 - (b) If the licensee fails to perform any of the functions or discharge any of the obligations on his part under this LICENSE.
 - (c) If the licensee becomes insolvent.
 - (d) If the licensee ceases to exist as a trading concern in its existing formation on account of dissolution or liquidation or otherwise on account of an order passed by any competent Government authority or any competent Court.
- (2) Where this LICENSE is cancelled under sub-clause (1), the Chief Commissioner shall, without prejudice to his other rights and powers herein contained, be entitled and have full power to take over, at his discretion, any of the property of the licensee and to dispose them of at the risk and expense of the licensee and realize Government claims from the proceeds and also from the moneys due to the licensee on account of any transactions with Government under this LICENSE or any other agreement or understanding with Government.
- 10 Without prejudice to the provisions of clause 9, the Chief Commissioner may, at any time without advancing any reasons, cancel this license by delivering a notice of such cancellation in writing to the licensee at least two months in advance of the date on which such cancellation is intended by the Chief Commissioner to take effect:

PROVIDED that the licensee shall also be entitled and have full power to surrender this LICENSE at any time during its continuance by delivering a notice of such surrender in writing to the Chief Commissioner at least two months in advance of the date on which such surrender is intended by the licensee to take effect.

- 11** Any bribe, commission, gift or advantage given, promised or offered by or on behalf of the licensee to any officer, servant or representative of Government in relation to the grant of this LICENSE shall, in addition to any criminal liability incurred by the licensee render this LICENSE liable to cancellation in the discretion of the Chief Commissioner and any loss or damage resulting to Government on account of such cancellation shall be compensated by the licensee.
- 12** Where the LICENSE is intended to be cancelled by the Chief Commissioner and a notice or intimation of such intention has been given to the licensee by the Chief Commissioner; the licensee shall wind up his business, interest, liabilities and affairs in or in relation to or in respect of the said reserved area and settle all the claims of Government and third parties before the date on which such cancellation is to take effect and in particular the licensee shall, if required by the Chief Commissioner deliver the stock of goods and materials procured by him in the said reserved area to Government on payment of fair and reasonable prices therefore by Government.
 PROVIDED that provisions of this clause shall, in effect be in addition to and not in derogation of any of the other provisions herein contained.
 PROVIDED ALSO that in the context of any consequences ensuing from the operation of the provisions of this clause, the licensee shall always be deemed to have indemnified Government against any loss or damage to the interests of the licensee or of any other person or party having any dealings with the licensee.
- 13** In the event of cancellation of this LICENSE before the expiry of the period of its validity ending on the term of this LICENSE shall, notwithstanding anything herein contained expire on the date on which such cancellation is to take effect and all references herein to 'the term of this LICENSE' shall be construed as references to the term so expiring on such date.
- 14** The licensee shall, within seven days from the date of grant of this LICENSE, deposit with Government a sum of Rs.6000/- (rupees six thousand) as security for the due performance for the functions and discharge of obligations on his part under this LICENSE and for strict observance of such terms and conditions of this LICENSE, and the sum so deposited shall, during the continuance of the term of this LICENSE, be retained by Government as security as aforesaid without any liability on its part to pay any interest thereon to the licensee and shall, on expiry of the said term, be refunded to the licensee on presentation by him of a 'No Demand' certificate and return in good condition of Government properties issued or entrusted to him;
 PROVIDED that in the event of any default or failure on the part of the licensee in the performance of such functions or discharge of such obligations or in the observance of such terms and conditions, the sum so deposited or any part thereof shall, in the discretion of the Chief Commissioner be liable to be forfeited to Government without prejudice to any other rights, titles or remedies enforceable by Government on account of such default or failure.
- 15** No default, failure or omission on the observance of any of the terms or conditions of this LICENSE or in the performance or discharge of any of the functions or obligations arising therefrom, shall give rise to, any claim against the licensee or be deemed to be a breach of this LICENSE if such default, failure or omission, as the case may be, has occurred as a result of any force majeure such as political or administrative acts of recognized or de facto foreign states, act of God, act of enemies of the Republic Of India, strikes, lock-outs, epidemics, frosts, accidents by fire or inundation or at sea, eruptions, earth quakes, landslips, etc.
- 16** Such matters are not as expressly provided in this LICENSE but determination whereof may be necessary in the course of performance of the functions or discharge of the obligations, shall be regulated in accordance with the directions or instructions of the Chief Commissioner and the licensee shall have no title right or power to question such directions or instructions which shall be binding on Government and also on the licensee.
- 17** Provisions of this LICENSE shall also be subject to such laws as are for the time being in force in the Andaman and Nicobar Islands or as may be enacted hereafter by any competent authority.
- 18** If any dispute, difference or question shall, at any time hereafter arise between the licensee and Government or the persons claiming under them respectively on account of the breach of non-observance of any of the covenants, terms, conditions stipulations or agreements herein contained or otherwise attaching or in any way relating to the construction meaning and effect of this LICENSE or any clause or thing herein contained or as to any act done or omitted to be done under this LICENSE, or the rights, titles, powers, duties, obligations or liabilities of the licensee and Government respectively except and excluding, however, disputes, difference or questions, the decision whereof is otherwise expressly provided in this LICENSE, such dispute, difference or question as the case may be, shall be referred to the arbitration of an arbitrator nominated by the Chief Commissioner and the decision of such arbitrator shall be final and binding on the parties hereto:

PROVIDED that the provisions of the Arbitration Act, 1940 and of every statutory modification of re-enactment thereof and also of the rules made thereunder from time to time shall apply to such arbitration and this deed shall be deemed to be a submission to arbitration.

PROVIDED ALSO that upon such reference to arbitration, the licensee shall, as far as reasonably possible, continue to comply with the terms and conditions of this LICENSE during the arbitration proceedings, and no payment due or payable by or to Government shall be with-held on account of such proceedings unless such payment is the subject matter of arbitration.

Dated at Port Blair

theday of 19

*Chief Commissioner
Andaman & Nicobar Islands*

FORM I

(See Rule 10)

Register of licenses for trade or business granted under sub-section 6 of the Andaman & Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956

	1	* Number of license.
	2	Licensee's name, father's name, nationality and address. (Other details in the case of a firm, company, etc.)
	3	Details of the reserved area.
	4	Nature of the trade or business for which license has been granted
	5	Registered Nos and description of boats and sea worthy boats used, employed or engaged by the licensee in carrying on trade or business.
	6	Date of grant of license.
	7	Period for which the license has been granted.
	8	Challan No and date of payment of the prescribed fee for the grant of license.
	9	Amount of security deposit, if any
	10	Challan No & date of deposit of security, if any
	11	Date of refund of security, if any.
	12	Date on which license ceased to be valid.
	13	Whether license ceased to be valid on account of normal expiry or non payment of Government dues or cancellation or otherwise.
	14	Remarks

* Each license shall be given a separate number serially.



The Andaman and Nicobar Gazette

EXTRAORDINARY

PUBLISHED BY AUTHORITY

No. 73, PORT BLAIR, THURSDAY 19 JULY 1979 / ASADA 28, 1901

Andaman & Nicobar Administration
Chief Commissioner's Secreteriat

NOTIFICATION

Port Blair, the 19th July 1979 / Asada 28, 1901

No. 107-7/E.No. 40.243/78-TW: In exercise of the powers conferred by sub-section (1) of Section 3 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes), Regulation 1956 (Regulation No. 3 of 1956) and in partial modification of the Administration's Notification No. ANPATR/3 (r)/1 dated 2-4-1957, published in the *Andaman and Nicobar Gazette* Extraordinary No. 3 of the same date as subsequently amended, the Chief Commissioner, Andaman and Nicobar islands hereby declare the following areas in South and Middle Andamans as reserved areas for the purpose of the said Regulation, namely:

South Andaman

The part of South Andaman Islands situated in the west of the imaginary boundary line including coastal water upto 3km starting from the mouth of Constance Bay proceeds north upto north west corner of village Tirur and thence proceeds towards east-north and joins Andaman Trunk Road at a point 2km south of Miletalak from where the boundary proceeds towards north upto Middle strait point along the western side of Andaman Trunk Road having a 200 metre belt excluding village areas of Miletalak and all allotted land of Jirkatang area. From middle Strait point the boundary proceeds towards north via Needhan reach, enclosing Bluff and Spike Islands, to Yeratil Jig.

Middle Andaman

The part of the Middle Andaman Islands situated in the western side of the imaginary boundary line including coastal water upto 3km starting from Yeratil Jig and proceeds towards north-east excluding village areas of Kadamtala and touches Andaman Trunk Road at a point 12km north of Uttara Jetty and passes alongside the road leaving 200 metre belt upto 24km point of the Andaman Trunk Road from Uttara Jetty and thence due north through jungle upto a distance of 6km and then towards north-east from a distance of 7km and further proceeds due north for 11km and then joins Wolaga Boilu Creek. Thereafter the boundary line proceeds north-west through the boundary Wolaga Boilu Creek upto the point 1/3km from the northern tip of the village Hanspuri and skirt around South West and southern side keeping the same half a km distance from village Hanspuri extending and culminating ultimately at Bush Police Camp No. 32 facing the luice Inlet including entire Wolaga Boilu, Melagar Boilu and Mar Boilu Creeks.

By order
(Siri Kishen),
Assistant Secretary (General)

The Andaman and Nicobar Gazette

EXTRAORDINARY

PUBLISHED BY AUTHORITY

NO. 6, PORT BLAIR, MONDAY 22 APRIL 1957

*Office of the Chief Commissioner
Andaman & Nicobar Islands*

NOTIFICATION

Port Blair, the 21st April 1957

No. AN/PATR/7/1: In exercise of the powers conferred by section 7 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation 1956 (Regulation No. 3 of 1956), the Chief Commissioner, Andaman and Nicobar Islands is pleased to prohibit every person other than a member of an aboriginal tribe from entering a reserve area in the Andaman and Nicobar islands except on the authority, and subject to the observance of the conditions and restrictions, of a pass granted by the Deputy Commissioner of the said islands or by such other officer as the said Deputy Commissioner may authorise in writing in this behalf.

*T.G.N.AYYAR
Chief Commissioner, A & N Islands
(F.No. 1-89 (1)/56-G)
(G.P. 52/57)*

No. 5/5(a)/11-59

*Office of the Deputy Commissioner
Andaman & Nicobar Islands
Port Blair, the 29th December, 1971*

ORDER

In exercise of the powers conferred on him under section 7 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956, the Deputy Commissioner, Andaman and Nicobar Islands is pleased to authorise the Assistant Commissioner, Campbell Bay and the Assistant Commissioner, Nicobars to grant tribal passes under rule 5 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Rules, 1957.

*Sd/
(R. KAUUJA)
Deputy Commissioner
Andaman and Nicobar Islands*

Copy to:

- 1 The Chief Secretary, A & N Administration.
- 2 The Addl. Deputy Commissioner, Car Nicobar
- 3 The Assistant Commissioner, Campbell Bay.
- 4 The Assistant Commissioner, Nancowry.
- 5 The Supdt. of Police, Port Blair.
- 6 The Harbour Master, Port Blair.

*Sd/
Deputy Commissioner*

The Andaman and Nicobar Gazette

PUBLISHED BY AUTHORITY

NO. 1, PORT BLAIR, FRIDAY 5 FEB. 1960 / MAGHA 16, 1881

*Office of the Chief Commissioner
Andaman & Nicobar Islands*

NOTIFICATION

Port Blair, the 18th January 1960 / 28th Pausa 1881

No. 10/60: In partial modification of his Notification No. AN/PATR/7/1 dated the 21st April 1957 and in exercise of the powers conferred by section 7 of Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (Regulation No. 3 of 1956), the Chief Commissioner, Andaman and Nicobar Islands is pleased to order that all Government servants while proceeding on duty to a reserved area and the families of such government servants shall be exempted from taking out a pass or passes for entering a reserved area in the Andaman and Nicobar Islands.

'Family' means Govt. servant's wife, children, step children, parents and sisters and minor brothers if residing with and wholly dependable on him.

The Andaman and Nicobar Gazette

EXTRAORDINARY

PUBLISHED BY AUTHORITY

NO. 107, PORT BLAIR, FRIDAY 27 MAY 1977 / JYAISTHA 6, 1899

*Andaman & Nicobar Administration
Chief Commissioner's Secreteriat*

NOTIFICATION

Port Blair, the 27th May, 1977 / Jyaistha 6, 1899

No. 108/77/E No. 15-222/76-J. I: In exercise of the powers conferred by sub-section (1) of section 3 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (Regulation 3 of 1956), the Chief Commissioner, Andaman and Nicobar Islands, hereby makes the following amendments to the Notification No. ANPATR/3(1)/1 dated the 2nd April, 1957 and published in A & N Gazette Extraordinary No. 3 dated the 2nd April, 1957 as amended by the Notification No. 62/72/E No. 81-9/71-71-J. (I) dated the 20th April, 1972 published in the Andaman and Nicobar Gazette, Extraordinary No. 51 dated the 20th April, 1972, namely:

AMENDMENT

In the said notification, under Amendment No. I, the following entries shall be substituted for the existing entries against 'latitude': 'Between latitude 10° 34 minutes North and 10° 45 minutes 30 seconds North.'

*By order
K. K. Warriar
Assistant Secretary (Gen.)*

The Andaman and Nicobar Gazette

EXTRAORDINARY

PUBLISHED BY AUTHORITY

No. 50, PORT BLAIR, SATURDAY 31 MAY 1969 / JYAISTHA 10, 1891

Andaman & Nicobar Administration

Chief Commissioner's Secreteriat

NOTIFICATION

Port Blair, the 31st May, 1969 / Jyaistha 10, 1891

No. 61/69/F. No. 50-8/68-J (I): In exercise of the powers conferred by section 10 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (Regulation No. 3 of 1956), I, H.S. Butalia, Chief Commissioner, Andaman and Nicobar Islands, hereby makes the following amendment to the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Rules, 1957.

AMENDMENT

In the said rules, for the existing Rule 11, the following shall be substituted.

II Fees for passes and licences

No pas or licence shall be granted unless the fee in respect thereof as indicated below has been paid to Government, namely:

Details of pass, etc		Rate of fee
(i)	A Pass to be granted to a settler selected for settlement in Andaman and Nicobar Islands under the Accelerated Development Programme of the Ministry of Labour, Employment and Rehabilitation (Dept. of Rehabilitation)	Nil
(ii)	Subject to item (i) above, a pass to be granted for a period not exceeding one month.	Re. 1/-
(iii)	A pass other than a pass specified at item (i) or (ii) above.	Rs. 5/-
(iv)	Renewal of a pass	The same fee as for the original grant of pass.
(v)	A licence for general trade or business	Rs. 500/-
(vi)	A licence for miscellaneous trade	Rs. 500/-

HS Butalia
Chief Commissioner, Andaman and Nicobar islands

By order and in the name of Chief Commissioner
BC Achari
Assistant Secretary to the Chief Commissioner

Andaman & Nicobar Administration
Chief Commissioner's Secreteriat

NOTIFICATIONS

PORT BLAIR, THE 16TH JANUARY, 1969 / PAUSA 26, 1890

No. 6/69/50-8/68-J. I: In partial modification of Notification No. AN/PATR/7/1 dated 21st April, 1957 and in exercise of the powers conferred by section 7 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (Regulation No. 3 of 1956), I, H.S. Butalia, Chief Commissioner, Andaman and Nicobar Islands, hereby order that the employees of the Indian Rubber Board while proceeding on duty to a reserved area shall be exempted from taking out a pass or passes for entering a reserved area in the Andaman and Nicobar Islands subject to the condition that each such employee is provided with an Identity Card by the Rubber Board or its duly authorised officer.

HS Butalia
Chief Commissioner,
Andaman & Nicobar islands

By order and in the name of Chief Commissioner
BC Achari
Assistant Secretary to the Chief Commissioner
(F. No. 50-8/68-J. I)

The Andaman and Nicobar Gazette, February 5, 1969

PORT BLAIR, THE 24TH JANUARY 1969 / MAGHA 4, 1890

No. 8/69/No. 139/SW/68-Jud. II: Under Rules 4 and 6 of the Rules of the State Social Welfare Advisory Board, Andaman and Nicobar Islands and in consultation with the Central Welfare Board, the Chief Commissioner, Andaman and Nicobar Islands has been please to appoint Smt. Harinder Butalia, as Chairman of the Andaman and Nicobar Social Welfare Advisory Board with immediate effect.

By order
BC Achari
Assistant Secretary to the Chief Commissioner

PORT BLAIR, THE 27TH JANUARY 1969 / MAGHA 7, 1890

No. 9/69/F. 83-56/66-Adm. (EPH): Under Section 10(2) of the Indian Nursing Council Act 1947 read with Government of India, Ministry of Home Affairs Notification No. F. 2/6/68- UTL dated the 27th March, 1968, the Chief Commissioner, Andaman and Nicobar Islands, has been pleased to recognize the Certificates issued by the Board of Examiners in Auxiliary Nursing Midwifery Course constituted in the Administration's Notification No. 38/67/F. No. 83-56/66-Adm. dated the 21st April, 1967 with effect from 16-12-1963 i.e. the date of commencement of the first batch of training.

By order
BBL Bharadwaj
Secretary (F) to the Chief Commissioner



The Andaman and Nicobar Gazette

EXTRAORDINARY

PUBLISHED BY AUTHORITY

No. 77, PORT BLAIR, WEDNESDAY 28 JUNE 1972 / ASADHA 7, 1894

Andaman & Nicobar Administration
Chief Commissioner's Secreteriat

NOTIFICATION

Port Blair, the June 28, 1972 / Asadha 7, 1894

No. 95/72/81-15/72-J (I): In exercise of the powers conferred by sub-section (1) of section 3 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (Regulation 3 of 1956), the Chief Commissioner, Andaman and Nicobar Islands, hereby makes the following amendment to Notification No. ANPATR/3(1) I dated the 2nd April, 1957 and published in Andaman and Nicobar Gazette, Extraordinary No. 3 dated the 2nd April, 1957, as subsequently amended namely.

AMENDMENT

In the said notification as subsequently amended, in clause (c), the following shall be added as item No. (viii), namely:
'(viii) Strait Island.'

Har Mander Singh
Chief Commissioner
Andaman and Nicobar Islands
By order and in the name of the Chief Commissioner
PG Balaraman Nair
Assistant Secretary (CC)

Andaman & Nicobar Administration
Chief Commissioner's Secreteriat

ORDER No. 2648

Port Blair, the 10th September, 1971 / Bhadra 19, 1893

In pursuance of the provision contained in sub-rule (2) of rule 12 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Rules, 1957, I, H.S. Butalia, Chief Commissioner, Andaman and Nicobar Islands hereby fix that the minimum rate at which Dhup Resin may be purchased by a licensee from the Aboriginal Tribes of any reserved area shall be Rs. 125/- (Rupees one hundred twenty-five only) per quintal and that the total quantity of Dhup Resin so purchased by a licensee shall not exceed 100 tonnes per annum.

HS Butalia
Chief Commissioner
Andaman and Nicobar Islands
By order and in the name of the Chief Commissioner
PG Balaraman Nair
Asst. Secretary (Confidential Cell)
No. 81-7/71-J. I.

The Andaman and Nicobar Gazette

EXTRAORDINARY

PUBLISHED BY AUTHORITY

No. 62, PORT BLAIR, THURSDAY 24 MAY 1973 / JYAISTHA, 3, 1895

Andaman & Nicobar Administration

Chief Commissioner's Secreteriat

NOTIFICATION

Port Blair, the 24th May, 1973 / Jaistha 3, 1895

No.65/73/E. No.81-14/72-J.I.: In Exercise of the powers conferred by subsection (l) of section 3 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (Regulation 3 of 1956), the Chief Commissioner, Andaman and Nicobar Islands, hereby makes the following amendment to the Administration's notification No.AN/PATR/3(I) 1 dated the 2nd April, 1957, published in Andaman and Nicobar Gazette, Extraordinary No.3 of the same date as subsequently amended namely:

AMENDMENTS

In the said notification as subsequently amended, in clause (c), item (i) 'Rutland' shall be omitted.

Har Mander Singh
Chief Commissioner
Andaman and Nicobar Islands

By order and in the name of the Chief Commissioner
KK Warriar,
Assistant Secretary (Genl.)

The Andaman and Nicobar Gazette

EXTRAORDINARY

PUBLISHED BY AUTHORITY

No. 51, PORT BLAIR, THURSDAY 20 APRIL 1972 / CHAITRA 31, 1894

Andaman & Nicobar Administration

Chief Commissioner's Secreteriat

NOTIFICATION

Port Blair, the 20th April, 1972 / Chaitra 31, 1894

No.62/72/E. No.81-9/71-J.I.: In exercise of the powers conferred by subsection (1) of section 3 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (Regulation 3 of 1956), I, Har Mander Singh, Chief Commissioner, Andaman and Nicobar Islands, hereby make the following amendments to the Notification No. ANPATR/3 (1) / 1. dated the 2nd April, 1957 and published in Andaman and Nicobar Gazette, Extraordinary No.3 dated the 2nd April, 1957, as subsequently amended, namely.

AMENDMENTS

In the said notification as subsequently amended:

Amendment No.1

In clause (c), item (vii), for the words 'up to and including Little Andaman' the following shall be substituted, namely: 'Up to and including Little Andaman except the area on the eastern coast of Little Andaman Island located within the following co-ordinates:

Longitude – between the longitude 92° 28 minutes East and 92° 35 minutes East;

Latitude – between latitude 10° 34 minutes North and 10° 44 minutes North.'

Amendment No.2

In clause (d), in the opening paragraph, the following shall be added at the end namely:

'and the area located between the co-ordinates mentioned below in the eastern coast of Great Nicobar Island.

LONGITUDE – the area between longitude 93° 50 minutes East and 93° 57 minutes East.

LATITUDE – the area between latitude 6° 53 minutes and North 7° 2 minutes North.'

*Har Mander Singh
Chief Commissioner
Andaman and Nicobar Islands*

*By order and in the name of the Chief Commissioner
PG Balaraman Nair
Asst. Secretary (Confidential Cell)*

Andaman & Nicobar Administration
Secretariat
Port Blair, dated the 13th Oct / 2nd Nov 1989

NOTIFICATION

No. /No.1-467/86-TW: In exercise of the powers conferred by Sub Section (1) of Section 3 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (No.3 of 1956) the Lieutenant Governor (Administrator) Andaman and Nicobar Islands hereby makes the following amendment to the Administration's Notification No.ANPATR/3 (1) /1 dated 2nd April, 1957 as published in Andaman and Nicobar Gazette, Extraordinary No.3 dated 2nd April, 1957 and as subsequently amended, namely:

AMENDMENT

In the said Notification at the end of clause (a) the following shall be inserted: 'and New Survey No.2265/5 area measuring 1000 sq. meters situated at Aberdeen Village, Port Blair, Andaman District.'

By Order
Sd/-
(AC Kher)
Secretary (Tribal Welfare)

Copy to:

- 1** The Manager, Govt. Press, Port Blair; with request that the Notification may be published in the Extra Ordinary Gazette of A & N Islands & 20 copies may be supplied to the Directorate of Tribal Welfare in the Secretariat.
- 2** The Deputy Commissioner, Andamans District, Port Blair.
- 3** The Deputy Commissioner, Nicobars District, Car Nicobar.
- 4** The Inspector General of Police, A & N Islands, Port Blair.
- 5** The Asst. Secretary (Law) A & N Administration, Port Blair.
- 6** The Publicity Officer, A & N Administration, Port Blair with the request that a suitable news items may be published in the *Daily Telegram*.
- 7** The Hindi Cell, Secretariat, with the request that the notification may be translated into Hindi and the same be sent to the Directorate of Tribal Welfare.
- 8** The Legal Section, Secretariat, Port Blair.

Andaman & Nicobar Administration
Secretariat
Port Blair, dated the 9th November, 1990

NOTIFICATION

No.181/90/F.No.1-467/86-TW: In exercise of the powers conferred by Section 7 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (No.3 of 1956) and in partial modification of this Administration Notification No. AN/PATR/7/1 dated 21st April, 1957, the Lieutenant Governor (Administrator) Andaman and Nicobar Islands has been pleased to order that all the Defence personnel while proceeding to a reserved area in the discharge of their specific duty in organised body shall be exempted from taking out a pass for entering in such area in the Andaman and Nicobar Islands. The Administration will be intimated about such movement so as to inform elements of Bush Police and forest employees working in the area.

This supersedes the Administration Notification No. 62/69/F.NO. 50-8/68-J(1) dated 3rd June, 1969 as published in the Andaman and Nicobar Gazette Extra-ordinary No. 51 dated 3rd June, 1969.

(Lt. Gen. Ranjit Singh Dyal)
Lieutenant Governor
Andaman and Nicobar Islands
By order and in the name of the Lieutenant Governor
Sd/-
Secretary (Tribal Welfare)

No. 1-467/86-TW:
Dated the 1st November, 1990

Copy forwarded to the Manager, Govt. Press, Port Blair, with request that the above Notification may please be published in the Extra Ordinary Gazette forth-with and 40 copies of the notification supplied to the Directorate of Tribal Welfare in the Secretariat. Copy forwarded to the Hindi Officer, A & N Islands with the request that Hindi version of the notification may be provided to the Manager, Govt. Press, Port Blair for publication of the notification in the official Gazette.

Copy also forwarded to the following for information:

- 1 The Chief of Staff, Fortress Commander, A & N islands.
- 2 The Deputy Commissioner, Andamans District, Port Blair.
- 3 The Deputy Commissioner, Nicobars District, Car Nicobar.
- 4 The Inspector General of Police, A & N Islands, Port Blair.

Sd/
Secretary (Tribal Welfare)

The Andaman and Nicobar Gazette

EXTRAORDINARY
PUBLISHED BY AUTHORITY

No. 108, PORT BLAIR, SEPT. 10 1991

Andaman & Nicobar Administration
Secreteriat
Port Blair, dated 10th Sept, 1991

No. 104/E.No 1-582/91-TW: In exercise of the powers conferred by Sub-section (1) of section 3 of the Andaman and Nicobar Islands (Protection of Aboriginal Tribes), Regulation, 1956 (No 3 of 1956), the Lieutenant Governor (Administrator), Andaman and Nicobar Islands hereby makes the following amendments to this Administration Notification No ANP-TR/3 (1) dated the 2nd April 1957, published in the Andaman and Nicobar Gazette, Extraordinary No. 3 dated the 2nd April 1957 as subsequently amended from time to time with immediate effect, namely:

AMENDMENTS

In the said Notification after Item No (VIII) in clause (c) the following entries shall be Inserted as Item No (IX):

- (ix)(a)** For Onges of Dugong Creek, Little Andaman Island:
The coastal sea extending upto 5kms from the high water mark within the Imaginary line commencing on the Eastern Coast of Little Andaman Island at the North Latitude of 10° 45 minutes 30 seconds extending towards North and further North West up to 92° 25 minutes East longitude.
- (b)** For Onges of South Bay and Nicobarese of Harminder Bay Little Andaman Island:
The coastal sea extending upto 5kms from the high water mark within the Imaginary line which commences on the Eastern Coast of Little Andaman Island at the North Latitude of 10° 34 minutes extending towards South and further to South-West up to 0° 35 minutes North Latitude on the Western Coast of West Bay of Little Andaman Island
- (c)** For Andamanese of Strait Island:
The coastal sea extending upto 5kms from the high water mark around the Strait Island.
- (d)** For Sentinelese of North Sentinel Island:
The coastal sea extending upto 5kms from the high water mark around the North Sentinel Island.

(Lt. Gen. Ranjit Singh Dyal)
Lieutenant Governor
Andaman & Nicobar Islands

By Order and in the name of the Lieutenant Governor
Sd/-
Secretary (Tribal Welfare)
(F. No. 1- 582/ 91 – TW)

Andaman & Nicobar Administration
Secreteriat
Port Blair, dated the 15th September 2004

NOTIFICATION

No.159/2004/E.No./1-752/2002-TW (PF): On the recommendation of Andaman Adim Janjati Vikas Samiti to increase the resource base of Jarawas and in exercise of the powers conferred by the sub section (1) of Section 3 of the Andaman & Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (Regulation No. 3 of 1956) and in supersession of the Administration's notification No. 1077/E. No. 40-243/78-TW dated 19th July, 1979 and notification No. 1-324/82-TW dated 09/04/1984, the Lt. Governor, Andaman & Nicobar Islands hereby declares the following areas in South and Middle Andaman as reserved areas for the purpose of the said Regulation, namely: -

South Andaman

The part of South Andaman Island situated in the west of the imaginary boundary line starting from the mouth of Constance Bay (East Longitude 92degree 34' 03" and North Latitude 11degree 39' 52") proceeds towards north up to mouth of Banjlungtajig (East Longitude 92degree 35' 20" and North Latitude 11degree 42' 18") and proceeds towards east through the mangrove swamp and meets a point (East Longitude 92degree 36' 26" and North Latitude 11degree 42' 31"). Then the boundary proceeds North and follows the ridge (East Longitude 92degree 36' 26" and North Latitude 11degree 43' 51") and meets a point (East Longitude 92degree 36' 59" and North Latitude 11degree 44' 25") and then boundary turns South East and proceeds through a point (East Longitude 92degree 37' 20" and North Latitude 11degree 44' 15") and further proceeds towards North through a point (East Longitude 92degree 37' 46" and North Latitude 11degree 46' 14") and thence proceeds towards North-East and joins a point 30 M West of center line of Andaman Trunk Road at milestone of 52 Kms point on Chidiyatapu to Middle Strait Andaman Trunk Road, from where the boundary proceeds along side the Andaman Trunk Road excluding area of Mile Tilak village and all allotted land of Jirkatang area up to the milestone of 61 Kms. The boundary then turns towards east and follows the ridge of 100 M height point (East Longitude 92degree 40' 10" and North Latitude 11degree 51' 35") and proceeds further South-East and passes through the 123 M height ridge (East Longitude 92degree 41' 02" and North Latitude 11degree 51' 12") and further proceeds South-East and meets a point (East Longitude 92degree 42' 26" and North Latitude 11degree 50' 11") and finally joins Mangrove Creek at point (East Longitude 92degree 42' 15" and North Latitude 11degree 49' 57") and afterwards follows through the mangrove creek and then western bank of Shoal Bay Creek and thereafter proceeds North along the eastern coast of South Andaman Island (excluding James, Kyd, other Islands and islets) and follows Amita Boicha Passage and then follows Southern bank of Middle Strait excluding Middle Strait Jetty / harbour, Belle Island, Boning Islands, Oralkatcha, Baby Islands, Stoa Island and Talakaicha Island. Then the boundary follows Middle Strait towards northwards via Needham reach passage, enclosing Bluff and Spike Islands and then follows Homfray's Strait up to Yeratiljig Creek mouth.

Middle Andaman

From the above point namely the mouth of Yeratiljig creek (East Longitude 92degree 44' and North Latitude 12degree 18' 23") boundary in Middle Andaman follows Yeratiljig creek along western bank excluding village area of Kadamtala and boundary finally meeting milestone of 142 Kms on ATR (i.e. 12 Kms milestone from Uttara Jetty). Then it follows the ATR leaving 30 M from the center line of road up to 24 Km point of the Andaman Trunk Road from Uttara Jetty and thence the boundary follows the ridge of 100 M height point (East Longitude 92degree 47' 20" and North Latitude 12degree 30'), ridge of 104 M height point (East Longitude 92degree 47' 55" and North Latitude 12degree 31' 10"), ridge of 122 M height point (East Longitude 92degree 48' 21" and North Latitude 12degree 32' 24"), ridge of 168 M height (East Longitude 92degree 48' 28" and North Latitude 12degree 32' 45"), ridge of 122 M height point (East Longitude 92degree 49' 02" and North Latitude 12degree 33' 39"), ridge of 125 M height point (East Longitude 92degree 50' 34" and North Latitude 12degree 35' 50"), ridge of 132 M height point (East Longitude 92degree 50' 21" and North Latitude 12degree 36' 45") and meets the origin of Pichar Nullah (East Longitude 92 degree 50' 28" and North Latitude 12degree 37' 33", i.e. the old Kalsi 4 No. JPP). Then the boundary follows towards Northwards following the ridge of 68 M height point (East Longitude 92degree 50' 23" and North Latitude 12degree 38' 37"), ridge of 73 M height point (East Longitude 92degree 50' 17" and North Latitude 12degree 39' 48") then turns North-East and follows the ridge of 194 M height point (East Longitude 92degree 51' 10" and North Latitude 12degree 41' 55") and then the boundary turns to

North-West and passes through the ridge of 201 M height point (East Longitude 92degree 49' 30" and North Latitude 12degree 42' 48") and ridge of 100 M height point (East Longitude 92degree 48' 40" and 12degree 43' 05") and meets the Chainpur Nullah in mangrove swamp at a point (East Longitude 92degree 48' 06" and North Latitude 12degree 43' 14") then proceeds towards west through Chainpur Nullah and meets a point having East Longitude 92degree 47' 02" and North Latitude 12degree 43' 27" and then boundary follows southwards through the mangrove swamp following western bank of Chainpur Nullah and finally meets sea through Lewis Inlet.

The existing belt of 200 metres from the central line of Andaman Trunk Road, on either side is restricted to 30 metres on either side of the ATR except at Nilambur-Middle Strait and Uttara-Gandhighat where the existing jetty and port facilities will continue to be outside the reserved area. The above reserve is also extended to coastal waters up to a distance of 5 Km from the high tide line on the western side of the South and Middle Andaman Islands from Constance Bay to Lewis Inlet Bay.

By Order
Sd/
Assistant Secretary (Tribal Welfare)
(2004/T2-Jarawa notification)

Hospital Areas Reserved for the Jarawas

The A&N Administration has declared various places as reserved area under the Protection of Aboriginal Tribes Regulation. Accordingly, the places designated as reserved area are the ward reserved for the Jarawas at Primary Health Centre, Tushnabad, comprising an area of 100 sq. mtrs in survey No. 103/1 at village Muslim basti located in western side to the existing PHC Building. The ward reserved for the Jarawas in the first floor of the Special Ward of the G.B. Pant hospital connected by a staircase from the ground floor of the Special Ward and the ward reserved for the Jarawas at Primary Health Centre, Kadamtala comprising an area of 250 Sq. mtrs in Survey No. 1/6 at village Shantanu located on western side to the existing PHC building and connected by a concrete path have also been reserved for this purpose, an official communication issued by the Secretary (TW) said here today.

Source: The Daily Telegrams, June 9, 2004

ANNEXURE 06

Tracking A HUNDRED-MILLION-YEAR-OLD giant

by Adhith Swaminathan

Even on a dark moonless night, it is impossible to miss this giant living relic emerging on the white sandy shores of Little Andaman Island. Leatherback sea turtles *Dermochelys coriacea* sometimes grow over six feet in length, which is larger than an average human body. They are the largest of all sea turtle species, weighing up to a tonne, maintaining this massive physique solely on a diet of jellyfish. They are named from their leathery, flexible back, which is unlike the hard shell of other turtles. Perhaps



ADHITH SWAMINATHAN

In India, the nesting of leatherback turtles is currently restricted to the Andaman & Nicobar Islands where 1,000 nests are found annually

unsurprisingly, Leatherbacks are found in every ocean except the Arctic and Antarctic, ranging longer than any other reptile. Sri Lanka and India are currently the only sites in South Asia that are known to host large nesting populations.

Leatherbacks were known to nest sporadically on the Indian mainland up to the late 1960s. However, current nesting populations are restricted to the Andaman & Nicobar Islands. Leatherback nesting was first reported from this archipelago of 500-odd islands in 1979, and research over the last three decades has confirmed the importance of the Islands as Leatherback rookeries. Known for their untouched and picturesque beaches, the Andaman



ADHITH SWAMINATHAN

& Nicobar Islands underwent drastic changes in 2004 when an earthquake and the resulting tsunami swept across the ocean; these islands, lying close to the epicenter, bore the brunt of the tidal onslaught. Most of the coastal plates of the Nicobar group got submerged, while some of those in the Andaman group were uplifted.

In the wake of such large scale alteration of the shore topography of the archipelago, a collaborative monitoring programme was initiated in 2008 on Little Andaman Island by Dakshin Foundation, Madras Crocodile Bank Trust, Andaman Nicobar Environment Team (ANET), Centre for Ecological Science, Indian Institute of Science, Bangalore, and the Department of Environment and Forests, Andaman & Nicobar Islands. Since the initiation of the programme, two nesting sites, South Bay and West Bay of Little Andaman Island, have been monitored annually and serve as representative sites for Leatherback nesting in the region.

One of the turtles tagged with a satellite tracker in 2014 covered over 13,000 km from West Bay, Little Andaman, to the coast of Mozambique in 266 days. The turtle traversed close to about 50 km a day



Post nesting migratory route of Leatherback Turtles fitted with satellite trackers in West Bay, Little Andaman



ADHITH SWAMINATHAN

The eggs take about two months to hatch. The hatchlings are only 5–8 cm long

Every nesting season, between December and March, a team of six field staff sets up temporary camps at the two nesting sites. During these months, the team is cut off from the outside world, without access to mobile network or electricity. Coming across people is a rare event at these sites which are inaccessible to most people as they fall within the Onge Tribal Reserve.

Our monitoring efforts have focused on West Bay beach and the main task during the nesting season is to patrol the 7 km beach daily, looking for tracks and evidence of nesting. In the last decade, more than 100 nesting females have been tagged with Passive Integrated Transponders (PIT) and external metal flipper tags to help identify individual turtles. When turtles are encountered, biometric measurements and



ADHITH SWAMINATHAN

Leatherback Turtles can nest 4 to 7 times in a nesting season; at West Bay, an average of 30–35 females nest annually

information on time of nesting, egg-laying duration, tidal activity, and clutch size are collected. The recapture of tagged individuals over the years indicates a minimum nesting interval of one year. These turtles are known to migrate over 10,000 km between their foraging and nesting grounds. They seem to make it back, remarkably, to the same stretch of the beach. All the recaptured turtles in the last decade were initially tagged at the same beach.



ADHITH SWAMINATHAN



ADHITH SWAMINATHAN



ADHITH SWAMINATHAN

The primary threat faced by leatherback turtles in the region is fishery-associated mortality. Though they are not usually hunted for their meat, other threats include predation of nests and hatchlings by dogs, water monitor lizard, and feral pigs

To understand long distance migration of leatherbacks, 10 females were tagged with satellite transmitters at West Bay between 2010 and 2014. The turtles travelled in two directions across the Indian Ocean, southeast towards the western coast of Australia and southwest towards the eastern coast of Africa. While we have identified two main migratory routes, more satellite telemetry studies need to be carried out to assess if there are other migratory routes taken by the turtles and to identify areas where they are most susceptible to fishing-related mortality in the high seas.

Globally, in recent years, many leatherback populations have been stable or are increasing, leading to downlisting of the species from Critically Endangered to Vulnerable by the International Union for Conservation of Nature (IUCN). The data from South and West Bay reveals a steady increase of leatherback nesting in comparison to the period following the December 2004 tsunami. Although the number of nests recorded dips in certain years, these fluctuations can be attributed to variations in reproductive cycles, food supply, and environmental conditions. Our recent survey of the Nicobar Islands in 2016 also confirmed the recovery of previously known nesting beaches and nesting numbers, which are comparable to the surveys conducted before the 2004 tsunami. With more than 1,000 nests located per season across the region, the Andaman & Nicobar Islands are a stronghold for leatherback populations of the South Asian region. Though we have successfully monitored the nesting population in Little Andaman for more than a decade, we still need to fully understand an animal whose lifespan exceeds ours.



ADHITH SWAMINATHAN

A researcher at Dakshin Foundation since 2008, Adhith has worked on marine turtles since the age of 10. He has been working on the Leatherback Sea Turtle monitoring project based in Little Andaman for the last eight years.

ANNEXURE 07



National Marine Turtle Action Plan

Government of India
Ministry of Environment, Forest & Climate Change

(2021-2026)



National Marine Turtle Action Plan

**Government of India
Ministry of Environment, Forest & Climate Change**

(2021-2026)

मंत्री
पर्यावरण, वन एवं जलवायु परिवर्तन,
सूचना एवं प्रसारण और
भारी उद्योग एवं लोक उद्यम
भारत सरकार



MINISTER
ENVIRONMENT, FOREST & CLIMATE CHANGE,
INFORMATION & BROADCASTING AND
HEAVY INDUSTRIES & PUBLIC ENTERPRISES
GOVERNMENT OF INDIA

प्रकाश जावडेकर
Prakash Javadekar



MESSAGE

India is blessed with its rich and varied biodiversity. We have always taken pride in conserving this natural heritage. Our marine biodiversity is no exception to this. Marine Turtles have always captured our imagination and has been conserved since the ages. Marine Turtles are considered to be flagship species in various marine habitats such as coral reefs, sea grass meadows, sandy beaches, etc.

Besides being home to one of the largest congregations of nesting of the Olive Ridley Turtles, five species of marine turtles are found in India. These species found in Indian waters have been listed in the Schedule-I of the Wild Life (Protection) Act, 1972 and therefore, accorded very high protection status. Considering the importance of conservation of marine turtles, the Ministry had included marine turtles as one of the 22 species for taking up focussed conservation programme under the Centrally Sponsored Scheme- Development of Wildlife Habitats.

I am happy to note that the Ministry has now prepared a 'National Marine Turtle Action Plan' through an extensive consultative process with relevant stakeholders. This Action Plan focuses on reducing threats, conserving critical habitat, exchanging scientific data, increasing public awareness and most importantly emphasizes on a participatory approach in conservation of marine turtles and its habitats. The Action Plan will enable the stakeholders to perform their roles in a coordinated manner and take effective measures for the conservation of marine turtles.

I am confident that this 'National Marine Turtle Action Plan' will provide a fresh impetus to work towards conserving these magnificent species and their habitats and provide them with safe havens for their future and for a healthy planet.

With best wishes.

(Prakash Javadekar)

Date: 19.01.2021

॥ प्लास्टिक नहीं, कपड़ा सही ॥

Babul Supriyo

Union Minister of State

Ministry of Environment, Forest & Climate Change
Government of India



बाबुल सुप्रियो

केन्द्रीय राज्य मंत्री

पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
भारत सरकार



MESSAGE

Marine turtles play a variety of ecological roles like controlling prey populations, supporting coastal vegetation through their hatchlings etc. in maintaining healthy marine habitats. They are key indicators of healthy marine habitats.

Numerous direct and indirect pressures arising from various factors adversely impact marine turtle populations and their habitat. This includes man made factors such as pollution, habitat destruction, bycatch, etc. and also includes natural disasters such as tsunamis, cyclones, hurricanes and storms. With a view to conserve marine turtles, associated species and their habitats, the Ministry of Environment, Forest and Climate Change, Government of India has prepared this "National Marine Turtle Action Plan, 2021-2026" with a vision to create a viable and healthy marine ecosystem for marine turtles and associated species through a coordinated and participatory mechanism to ensure long term survival of marine turtles.

The National Marine Turtle Action Plan, 2021-2026 would be implemented at the National and State Government level with the following objectives:

- Reduce direct and indirect causes of marine turtle mortality;
- Protect, conserve and rehabilitate marine turtle habitats;
- Improve understanding of marine turtle ecology and populations through research, monitoring and information exchange;
- Increase public awareness of the threats to marine turtles and their habitats, and enhance public participation in conservation activities;
- Enhance national, regional and international cooperation.

I wish all the best for the successful implementation of the "National Marine Turtle Action Plan, 2021-2026".


(Babul Supriyo)

Background

India has a vast coastline of more than 7,500 km, of which, about 5,400 km belong to Peninsular India and about 2,000 km to the Andaman, Nicobar, and Lakshadweep Islands, and with an EEZ (Exclusive Economic Zone) of 2.02 million sq. km. Five species of sea turtles are found in Indian waters. The marine biodiversity including marine turtles in India is one among the richest in the Indian Ocean.

Marine turtles have a major influence on the structure and function of marine biodiversity and play an important role in shaping the behavior and life history traits of prey species and predators that is critical for the sustainability of fisheries in the region. Factors like climate change, unsustainable resource use, marine litter and pollution affect marine turtles and their habitats.

Constitution of India recognizes the need to protect wildlife that include marine life and their environment. The provision under Article 48 A mandates the state to protect, safeguard and improve the environment with the corresponding duty under Article 51 A (g) to the citizen to protect and improve the natural environment. This clearly supports the need to carry out all necessary steps to not only protect but also improve the marine environment.

Marine turtles play a variety of ecological roles for maintaining healthy marine habitats like controlling prey populations, supporting coastal vegetation through their hatchlings etc. Their presence is an indicator of healthy marine ecosystems and provide a source of revenue for local communities through tourism. Marine turtles thus present themselves as a key indicator of healthy marine habitats and an opportunity for conservation of associated species.



Goal

1. **Conserve** Species, their habitat and reduce negative impacts on survival of marine turtles;
2. **Improve** the understanding of marine turtles and their habitats, through a coordinated mechanism;
3. **Promote** Awareness and Education on conservation of marine turtles and their habitats;
4. **Enhance** livelihoods of coastal communities through promoting sustainable ecotourism;
5. **Increase** national, regional and international cooperation on marine turtle conservation.

Vision

Create a viable and healthy marine ecosystem for marine turtles and associated species through a coordinated and participatory mechanism to ensure long term survival of marine turtles.

Mission

The Action Plan aims to conserve marine turtles and their habitats for maintaining a healthy marine ecosystem.





Clockwise: Hawksbill turtle, Olive ridley turtle, Green turtle, Loggerhead Sea Turtle (Wikimedia commons), Leatherback turtle (Dakshin foundation)

Marine Turtle Action Plan

The Indian coastal waters supports five species of sea turtles found worldwide. These are the Olive ridley (*Lepidochelys olivacea*), Green (*Chelonia mydas*), Hawksbill (*Eretmochelys imbricata*), Leatherback (*Dermochelys coriacea*) and Loggerhead (*Caretta caretta*). These five species of sea turtles that occur in Indian coastal waters are protected under Schedule I of the Wildlife (Protection) Act, 1972.

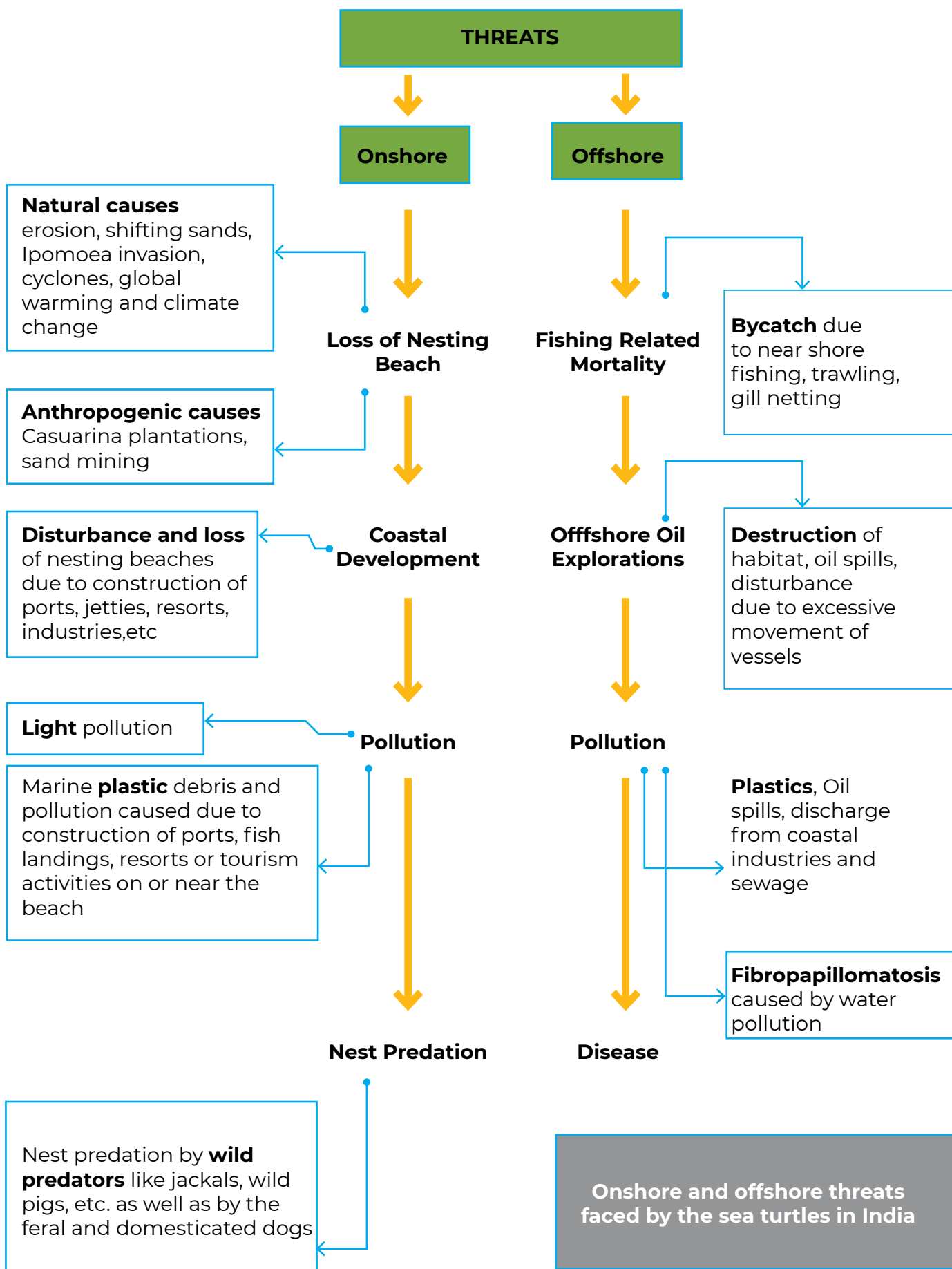
India is home to the largest known nesting population of olive ridley turtles. Except Loggerhead turtles, the remaining four species (Leatherback, Hawksbill, Green and Olive ridley turtles) nest along the Indian coastline and islands of India. About 40,000 to 11,00,000 turtles nest every year on the beaches of India. Number of turtles nesting varies between years and the success of sporadic nests have been observed to decline due to predations and habitat degradation.

Numerous direct and indirect pressures arising from various factors adversely impact marine turtle populations and their habitat. This also includes natural disasters such as tsunamis, cyclones, hurricanes and storms.

With a view to conserve marine turtles in India, various measures have been adopted by the Ministry of Environment, Forest and Climate Change, Government of India, the coastal State/ UT Governments, civil society organizations, experts and local communities. India has identified all its important sea turtle nesting habitats as 'Important Coastal and Marine Biodiversity Areas' of India and included in the Coastal Regulation Zone (CRZ) -1.

With a view to conserve marine turtles, associated species and their habitats, the following action plan is proposed to be adopted at the National and State Government level.

a. To reduce direct and indirect causes of marine turtle mortality, the possible threats to marine turtle populations and their habitats are to be identified, documented and best practice approaches to mitigate those threats to be implemented. It is proposed to undertake management of oceanic marine plastic debris and coastal clean-up for enabling the survival of marine turtles.



b. Protection, conservation and rehabilitation of marine turtle habitats is key for long term survival of marine turtles. Towards meeting this objective, areas of critical habitat such as migratory corridors, nesting beaches, inter-nesting and feeding areas to be identified and managed, while degraded marine turtle habitats are to be rehabilitated.

c. In order to improve the understanding of marine turtle ecology and populations, studies on marine turtles and their habitats targeted towards conservation and management through research, monitoring and information exchange to be taken up through involvement of scientific institutes and universities. It is proposed that proper exchange of scientific and technical information and expertise among scientific institutions, civil society and other agencies is ensured, in order to develop and implement best practice approaches to conservation of marine turtles and their habitats.

d. People's participation is imperative for successful conservation interventions. It is therefore envisaged to increase awareness of marine turtles and their habitats, conservation needs and threats, amongst the wider public to enhance public participation in conservation activities. Setting up of turtle conservation clubs at taluk or district or state levels, declaration of marine turtle day, conduct special events related to marine turtle conservation are few activities proposed in this direction. In addition, developing alternate livelihood opportunities and better fishing practices for local communities to be encouraged for active participation in conservation efforts that also generate livelihoods like eco-tourism (e.g. turtle tourism). All relevant stakeholders, including local communities should be involved in planning and implementation of conservation and management measures.

e. National, regional and international cooperation is an integral part of marine turtle conservation. The existing mechanisms for cooperation at the sub-regional level to be strengthened to enhance coordination in management of turtle habitats. A web-based information resource for marine turtle conservation to be developed, besides creating networks for cooperative management of shared populations, within or across sub-regions, and, where appropriate. Adequate and regular training on marine turtle conservation and management techniques to relevant agencies, individuals and local communities to be provided through identified scientific institutes.

f. To strengthen law enforcement activities, a coordinated effort to be taken up amongst relevant stakeholders

Important Marine Turtle Habitats in India

State	Important Turtle Habitats (Catchment District)	Remarks / Clarification	Major Threats
Odisha	Rushikulya river (Kandhamal and Ganjam)	Mass nesting ground of Olive Ridley	Erosion, Nest predation, plastic pollution, light pollution and bycatch
Odisha	Gahirmatha river (Kandhamal and Ganjam)	Mass nesting ground of Olive Ridley	Erosion and Nest predation, bycatch
Odisha	Devi River (Jagatsinghpur, Puri)	Sporadic mass nesting ground of Olive ridley	Nest predation, plastic pollution, light pollution, plantation and bycatch
Andaman & Nicobar Islands	Galathea bay, Indira point, Hingloi, Alexandria, Dagmar, and Renhongbeaches (Great Nicobar Island)	Largest Leatherback turtle nesting ground in India	Nest predation
Andaman & Nicobar Islands	Bahua, Muhincohn and Kiyang beaches (Little Nicobar Island)	Leatherback, Green, Hawksbill and Olive ridley	Nest predation and bycatch
Andaman & Nicobar Islands	West Bay, Jackson Creek beaches (Little Andaman Island)	Leatherback nesting ground, currently largest in the Andaman group	Nest predation and bycatch
Andaman & Nicobar Islands	Cuthbert Bay, (Middle Andamans)	Leatherback, Green, hawksbill, and Olive ridley	Nest predation
Andaman & Nicobar Islands	South Reef Island, (Middle Andamans)	Best hawksbill turtle nesting ground in India	Nest predation
Lakshdweep Islands	Lagoons of Lakshdweep Islands (Agatti, Kadmat, Kavaratti and other islands)	Foraging ground of Green turtle	Erosion, over grazing, conflict with fishermen, nest predation and bycatch
Lakshdweep Islands	Suheli Island, (Lakshadweep)	Olive ridley / Hawksbill / Green turtle nesting ground (sympatric habitat for three species)	Erosion and bycatch
Andhra Pradesh	Godavari River Mouth (Sacramentoshoal, East Godavari)	Very high sporadic nesting of Olive ridleys (approx. 500 to 1000/year),	Nest predation, plastic pollution, light pollution, habitat degradation and bycatch
Andhra Pradesh	Kapasukuddi (Bahuda river mouth), Nagavali, Bamsadhara (Srikakulam)	High sporadic nesting of Olive ridleys	Nest predation, plastic pollution, light pollution, habitat degradation and bycatch
Andhra Pradesh	Beaches along Krishna River and Penneru river mouth (Nellore)	Moderate sporadic nesting of Olive Ridley	Nest predation, plastic pollution, light pollution, habitat degradation and bycatch

Important Marine Turtle Habitats in India

Puducherry	Nallavadu, Pannithittu, Narambi and Moorthikuppam villages (Puducherry) and beaches around Arasalar River (Karaikal)	High sporadic nesting of Olive Ridley	Nest predation, by-catch, erosion, habitat degradation, plantation, plastic and light pollution
Tamil Nadu	Gulf of Mannar Biosphere Reserve (Thoothukkudi and Ramanathapuram)	Foraging ground of green and Olive ridley, good seagrass beds	Nest predation, plastic pollution, habitat degradation, poaching, bycatch
Tamil Nadu	Chennai coast, (northern Tamil Nadu)	Sporadic nesting ground of Olive ridley turtles with conservation programmes from 1973	Nest predation, by-catch, plastic pollution, light pollution, egg poaching, habitat degradation
Gujarat	Western Saurashtra coast, Gujarat (Junagadh, Jamnagar and Porbandar)	Green and -Olive ridley turtle nesting grounds	Nest predation, by-catch, plastic pollution, habitat degradation
Maharashtra	Sindhudurg Coasts (Raigad and Ratnagiri)	Sporadic nesting of Olive ridley and Green	Nest predation, bycatch, plastic pollution, habitat degradation
Goa	Galgibaga beach (South Goa)	Sporadic nesting of Olive Ridley	Nest predation, by-catch, plastic pollution, lighting, tourism, habitat degradation



Asit Kumar/AFP

Marine Turtle Action Plan

Objective 1. Reduce direct and indirect causes of marine turtle mortality

Programme	Activity	Implementation Agencies	Sites/ States	Timeline
1.1 Identify and document the threats to marine turtle populations and their habitats	<p>a) Collate and organise existing data on threats to marine turtle populations</p> <p>b) Establish baseline data collection and monitoring programmes to gather information on the nature and magnitude of threats</p> <p>c) Determine those populations affected by incidental capture in fisheries, and other sources of mortality</p>	<p>MoEF&CC, State/UT Forest and Fisheries Departments,</p> <p>WII, ZSI, CMFRI, NCSCM, IISc, FSI, NIOT, ICMAM, ANCOST, Universities, State level research institutions, NGOs etc.</p>	All coastal States and UTs	To be initiated in 2021; to be repeated every 5 year thereafter
1.2 Determine and apply best practice approaches to minimising those threats to marine turtle populations and their habitats	1.2 Determine and apply best practice approaches to minimising those threats to marine turtle populations and their habitats	<p>Erosion and Nest predation, bycatch State/ UT Forest and Fisheries Departments</p> <p>MoEF&CC and MoES, WII</p>	All coastal States and UTs	To be initiated in 2021 and to be continued thereafter



Objective 2. Protect, conserve and rehabilitate marine turtle habitats

Programme	Activity	Implementation Agencies	Sites/ States	Timeline
2.1 Establish necessary measures to protect and conserve marine turtle habitats	<p>a) Identify areas of critical habitat such as migratory corridors, nesting beaches, inter-nesting and feeding areas.</p> <p>b) Designate and manage protected/conservation areas, sanctuaries or temporary exclusion zones in areas of critical habitat, or take other measures (e.g. modification of fishing gear, restrictions on vessel traffic) to remove threats to such areas</p> <p>c) Develop incentives for adequate protection of areas of critical habitat outside protected areas</p> <p>d) Undertake assessments of the environmental impact of marine and coastal development and other human activities that may affect marine turtle populations and their habitats</p> <p>e) Manage and regulate within each jurisdiction the use of beaches and coastal dunes, for example location and design of buildings, use of artificial lighting, and transit of vehicles in nesting areas</p> <p>f) Monitor and promote the protection of water quality from land-based and maritime pollution, including marine debris, that may adversely affect marine turtles</p> <p>g) Strengthen the application of existing bans on the use of poisonous chemicals and explosives in the exploitation of marine resources.</p> <p>h) Mainstream the turtles and their habitats conservation into the production sectors with active participations of industrial sectors including financial supports from their CSR Fund.</p>	State/UT Forest and Fisheries Departments and MoEF& CC	All coastal States and UT especially those important sites mentioned in this action plan.	To be initiated in 2021 and to be continued thereafter

Programme	Activity	Implementation Agencies	Sites/ States	Timeline
2.2 Rehabilitate degraded marine turtle habitats	<p>a) Re-vegetate, where appropriate, frontal dunes at nesting beaches, with indigenous flora as far as possible, in order to provide visual barriers to coastal development and to restore appropriate beach temperature regimes</p> <p>b) Remove casuarinas from the important nesting beaches</p> <p>c) No plantation on Sand Dune</p> <p>d) Remove debris that impedes turtle nesting and hatchling production</p> <p>e) Enhance recovery of degraded coral reefs</p> <p>f) Enhance recovery of degraded mangrove and seagrass habitats</p>	MoEF&CC, State/UT Forest Departments, NGOs etc	All coastal States and UT especially those important sites mentioned in this action plan.	To be initiated in FY 21-22 and to be continued thereafter



Objective 3.Improve understanding of marine turtle ecology and populations through research, monitoring and information exchange

Programme	Activity	Implementation Agencies	Sites/ States	Timeline
3.1 Conduct studies on marine turtles and their habitats targeted to their conservation and management	<p>a) Conduct baseline studies or gather secondary information on marine turtle populations and their habitats</p> <p>b) Initiate and/or continue long-term monitoring of priority marine turtle populations in order to assess conservation status</p> <p>c) Characterise genetic identity of marine turtle populations</p> <p>d) Identify migratory routes through the use of tagging, genetic studies and/or satellite tracking</p> <p>e) Carry out studies on marine turtle population dynamics and survival rates</p> <p>f) Conduct research on the frequency and pathology of diseases of marine turtles</p> <p>g) Promote the use of traditional ecological knowledge in research studies</p> <p>h) Review periodically and evaluate research and monitoring activities</p>	MoEF&CC, State/UT Forest and Fisheries Departments, ICMAM, WII, IISc, NIOT,/ANCOST, ZSI, CMFRI, CMLRE, NIO, SAC, Universities, NGOs	All coastal States and UT especially those important sites mentioned in this action plan.	To be initiated in 2021 and end by 2022
3.2 Conduct collaborative research and monitoring	<p>a) Identify and include priority research and monitoring needs in National and sub-regional action plans</p> <p>b) Conduct collaborative studies and monitoring on genetic identity, conservation status, migrations, and other biological and ecological aspects of marine turtles</p>	MoEF&CC, State/UT Forest and Fisheries Departments, ICMAM, WII, IISc, IISER, NIOT,/ANCOST, ZSI, CMFRI, CMLRE, NIO, SAC, NGOs	All coastal States and UT especially those important sites mentioned in this action plan.	To be initiated in 2021 and to be continued thereafter

Programme	Activity	Implementation Agencies	Sites/ States	Timeline
3.3 Analyse data to support mitigation of threats and to assess and improve conservation practices	<p>a) Prioritise populations for conservation actions</p> <p>b) identify population trends</p> <p>c) Use research results to improve management, mitigate threats and assess the efficacy of conservation activities (e.g. hatchery management practices, habitat loss, etc.)</p>	MoEF&CC, State/UT Forest and Fisheries Departments, ICMAM, WII, IISc, IISER, NIOT, / ANCOST, ZSI, CMFRI, CMLRE, NIO, SAC, NGOs	All coastal States and UT especially those important sites mentioned in this action plan.	To be initiated in 2021 and to be continued thereafter
3.4 Exchange information	<p>a) Standardise methods and levels of data collection and adopt or develop an agreed set of protocols for inter alia monitoring of nesting beaches, feeding ground studies, genetic sampling, and collection of mortality data</p> <p>b) Determine the most appropriate methods for information dissemination</p> <p>c) Exchange at regular intervals scientific and technical information and expertise among nations, scientific institutions, non-governmental and international organisations, in order to develop and implement best practice approaches to conservation of marine turtles and their habitats</p> <p>d) Disseminate traditional knowledge on marine turtles and their habitats for conservation and management</p> <p>e) Compile on a regular basis data on marine turtle populations of regional interest</p>	MoEF& CC, State/UT Forest and Fisheries Departments, IOSEA, BOBP, ICMAM, CSIR, WII, IISc, IISER, NIOT, / ANCOST, ZSI, CMFRI, CMLRE, NIO, SAC, NGOs	All coastal States and UT especially those important sites mentioned in this action plan.	To be initiated in 2021 and to be continued thereafter

Objective 4. Increase public awareness of the threats to marine turtles and their habitats, and enhance public participation in conservation activities

Programme	Activity	Implementation Agencies	Sites/ States	Timeline
4.1 Establish public education, awareness and information programmes	<ul style="list-style-type: none"> a) Setting up of turtle clubs at taluk or district or state levels b) Declaration of National Marine Turtle Day may be coinciding with mass nesting season c) Collect, develop and disseminate education materials d) Establish community learning / information centres e) Develop and implement accurate mass media information programmes f) Develop and implement guidelines for hatchery programmes for conservation and environmental education g) Develop and conduct focused education and awareness programmes for target groups (e.g. policy makers, teachers, schools, fishing communities, media) h) Encourage the incorporation of marine turtle biology and conservation issues into school curricula i) Organise special events related to marine turtle conservation and biology (e.g. Turtle Day, Year of the Turtle, symposia, Track-a-turtle) 	MoEF&CC, State/UT Forest and Fisheries Departments and NGOs	All coastal States and UT especially those important sites mentioned in this action plan.	To be initiated in 2021 and to be continued thereafter

Programme	Activity	Implementation Agencies	Sites/ States	Timeline
4.2 Develop alternative livelihood opportunities for local communities to encourage their active participation in conservation efforts	<p>a) Identify and facilitate alternative livelihoods (including income generating activities) that are not detrimental to marine turtles and their habitats, in consultation with local communities and other stakeholders. Undertaking turtle based tourism programme like Turtle Festival</p> <p>b) Bring in ecotourism (turtle tourism) and interpretation centres in an organized fashion.</p>	MoEF& CC, State/UT Forest and Fisheries Departments, ICSF, NGOs	All coastal States and UT especially those important sites mentioned in this action plan.	To be initiated in 2021 and to be continued thereafter
4.3 Promote public participation	<p>Involve stakeholders, and local communities in particular, in planning and implementation of conservation and management measures</p> <p>Encourage the participation of Government institutions, non-governmental organisations, the private sector and the general community (e.g. students, volunteers, fishing communities, local communities) in research and conservation efforts</p> <p>Implement, where appropriate, incentive schemes to encourage public participation (e.g. T-shirts for tag returns, public acknowledgement, certificates)</p> <p>National Marine Turtle Seminar needs to be conducted annually to review the entire issues related to conservation of marine turtles in India.</p>	MoEF&CC, State/UT Forest and Fisheries Departments, NGOs	All coastal States and UT especially those important sites mentioned in this action plan.	To be initiated in 2021 and to be continued thereafter

Objective 5. Enhance national, regional and international cooperation

Programme	Activity	Implementation Agencies	Sites/ States	Timeline
5.1 Enhance mechanisms for cooperation and promote information exchange	<p>a) Develop regional database of relevant information in relation to marine turtles conservation and management</p> <p>b) Identify and strengthen existing mechanisms for cooperation at the sub-regional level</p> <p>c) Develop/strengthen a website and/or newsletter to facilitate networking and exchange of information</p> <p>d) Develop/strengthen a web-based information resource for marine turtle conservation (including data on populations, nesting, migration, on-going projects)</p> <p>e) Create a directory of experts and organisations concerned with marine turtle conservation</p> <p>f) Develop networks for cooperative management of shared populations, within or across sub-regions, and, where appropriate, formalise cooperative management arrangements</p> <p>g) Cooperate where possible in the establishment of transboundary marine protected areas using ecological rather than political boundaries</p> <p>h) Develop a streamlined format for reporting and exchanging information (through the IOSEA MoU) on the state of marine turtle conservation at the national level</p> <p>i) Creation of network of NGO's in supporting forest departments marine turtles conservation. For example, coordination with Turtle Action Group (TAG) etc.</p>	MoEF&CC, State/UT Forest and Fisheries Departments and NGOs	All coastal States and UT especially those important sites mentioned in this action plan.	To be initiated in 2021 and to be continued thereafter

Programme	Activity	Implementation Agencies	Sites/ States	Timeline
	<p>j) Encourage IOSEA MoU signatory States that have not already done so to become Parties to the Convention on Migratory Species (CMS)</p> <p>k) Establish relationships with regional fisheries bodies with a view to obtaining data on incidental capture and encourage them to adopt marine turtle conservation measures within EEZs and on the high seas</p>	MoEF&CC, State/UT Forest and Fisheries Departments and NGOs	All coastal States and UT especially those important sites mentioned in this action plan.	To be initiated in 2021 and to be continued thereafter
5.2 Strengthen and improve enforcement of conservation legislation	<p>a) Review domestic policies and laws to address gaps or impediments to marine turtle conservation</p> <p>b) Cooperate in law enforcement to ensure compatible application of laws across and between jurisdictions (including through bilateral/multilateral agreements and intelligence sharing)</p> <p>c) Include turtle breeding/foraging habitats as important marine habitat.</p> <p>d) Constitution and Periodic review on the National Marine Turtle Action Committee</p> <p>e) State Level Marine Turtle Action Committee under the chairmanship of the Chief Secretary.</p> <p>f) Development of compensation schemes for loss of fishing gear due to incidental capture of marine turtles.</p> <p>g) Promotion of TED and by-catch reduction policy and smart gear use.</p> <p>h) Establishment Marine Biodiversity Cell to implement various conservation action plans related to marine biodiversity including marine turtles</p> <p>i) Mapping and monitoring of important turtle nesting sites in context with CRZ</p>	MoEF&CC, State/UT Forest and Fisheries Departments	All coastal States and UT especially those important sites mentioned in this action plan.	To be initiated in 2021 and to be continued thereafter

Government of India
Ministry of Environment, Forest & Climate Change

ANNEXURE 08



F.No.6-161/2020 WL
Government of India
Ministry of Environment, Forest and Climate Change
(Wildlife Division)

2nd Floor, Jal Wing,
Indira Paryavaran Bhawan,
Jor Bagh Road, Aliganj,
New Delhi – 110003.

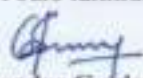
Dated: 22nd January, 2021

To
All Members
Standing Committee of NBWL.

Sub: Minutes of 60th Meeting of the Standing Committee of National Board for Wild Life- reg.
Sir / Madam,

Kindly find enclosed copy of the Minutes of 60th Meeting of the Standing Committee of National Board for Wild Life held on 5th January, 2021 under the chairmanship of Hon'ble Minister of Environment, Forest and Climate Change, Government of India.

Yours faithfully,


(Surender Gugloth)
Scientist 'D'

Email: ddwlmef@gmail.com

Encl: As above

Distribution:

1. Secretary, MoEF&CC
2. DGF&SS, MoEF&CC
3. ADGF(WL), MoEF&CC
4. ADGF(FC), MoEF&CC
5. ADGF (PT) and Member Secretary, NTCA
6. Director/IGF, PE Division, MoEF&CC
7. Director, WII, Dehradun
8. Director, GEER Foundation, Gandhinagar, Gujarat
9. Prof. R. Sukumar, Member, NBWL
10. Dr. H.S. Singh, Member, NBWL
11. Secretary, Environment, Forest, Science and Technology Department, Govt. of Andhra Pradesh.

Copy to:

1. PS to Hon'ble MoEF&CC
2. PS to Hon'ble MoSEF&CC
3. PPS to DGF&SS, MoEF&CC
4. PSO to Addl.DGF(WL), Sr.PPS to IGF(WL)
5. Additional Chief Secretary / Principal Secretary / Secretary, Forest Department, Andaman & Nicobar Islands, Andhra Pradesh, Assam, Bihar, Karnataka, Kerala, Maharashtra, Rajasthan, Telangana, Uttarakhand, Uttar Pradesh;
6. PCCF & HoFF, Andaman & Nicobar Islands, Andhra Pradesh, Assam, Bihar, Karnataka, Kerala, Maharashtra, Rajasthan, Telangana, Uttarakhand, Uttar Pradesh;
7. Chief Wild Life Warden, Andaman & Nicobar Islands, Andhra Pradesh, Assam, Bihar, Karnataka, Kerala, Maharashtra, Rajasthan, Telangana, Uttarakhand, Uttar Pradesh.

60.3.2 WP (C) No. 13056/2020 (F) - Manikandan T. Vs. MoEF & CC & Ors. And W.P. (C) No. 4280/2020 (H) – Betty Biju Vs. MoEF & CC & Ors.- High Court of Kerala at Ernakulam [File No. 6-160/2020WL]

60.3.3 WP (C) No. 7211/2020 (B) - Denson K.S. Vs. UOI & Ors- High Court of Kerala at Ernakulam [File No. 6-159/2020WL]

The Member Secretary informed the Standing Committee that the Principal Secretary, Environment Department, Government of Kerala has requested to place the matters before the Standing Committee of the National Board within a period of one week as directed by the Kerala High Court for consideration vide letters dated 21.10.2020. As per the normal procedure for consideration by the Standing Committee, the proposals should be received through proper channel with the recommendations of the State Chief Wild Life Warden, State Board for Wild Life and State Government.

Decision Taken: Based on the discussions held and documents submitted, the Standing Committee decided to return the proposals and requested the State Government of Kerala to submit the proposals as per the established guidelines and procedures.

60.3.4 De-notification of Megapode Sanctuary, Andaman and Nicobar Islands [File No. 6-132/2020WL]

The Member Secretary briefed the Standing Committee and stated that the proposal for de-notification of Megapode Sanctuary has been submitted by Office of Principal Chief Conservator of Forests (Wild Life), Andaman and Nicobar Islands. During the mega earthquake and Tsunami which occurred in December, 2004, the Megapode Island has been submerged in the sea and there is no existence of the island post Tsunami. He further stated that Nicobar Megapode is a terrestrial bird which nests on ground.

The Member Secretary informed the Standing Committee that views of Wildlife Institute of India were taken and they have suggested that the submergence of island now does not serve any purpose for the conservation of Nicobar Megapode.

Decision Taken: After discussions, the Committee decided to recommend the proposal and suggested that conservation measures shall be taken for the Nicobar Megapode in other islands with the help of Wildlife Institute of India.

60.3.5 Denotification of Galathea Sanctuary (Only intention to declare as sanctuary notified), Andaman and Nicobar Islands [File No. 6-

135/2020WL]

The Member Secretary briefed the Standing Committee and stated that Andaman and Nicobar Islands administration had notified intention to declare Galathea Bay as sanctuary for an area of 11.44 sq. km. vide notification dated 15.09.1997 under section 18 (1) of the Wild Life (Protection) Act, 1972. Proclamation notification for initiating acquisition proceedings was issued by the Collector on 14.10.1997. The acquisition proceedings have not been completed and final notification for the sanctuary has not yet been issued. Now, the Andaman and Nicobar Islands has submitted de-notification proposal for the Galathea Bay Sanctuary for which intention to declare as sanctuary alone was notified.

The proposal has been recommended by Chief Wild Life Warden and Andaman and Nicobar Islands Administration. The State Board for Wild Life, Andaman and Nicobar Islands have also recommended the proposal.

Secretary, MoEFCC stated that Andaman and Nicobar Islands Administration had sought clarification from the Ld. ASG who opined that de-notification of Galathea Sanctuary is not needed as the notification regarding intention to declare Galathea Bay as sanctuary isand void because rights were not settled within 2 years. Ministry had also sought clarification from the Ld. Solicitor General regarding the validity of the notification for intention to declare Galathea Bay as Sanctuary. However, the Ministry is of the opinion that the notification for intention to declare Galathea Bay as Sanctuary does not lapse even though the rights have not been settled. Therefore, the Ministry has decided to place the proposal before the Standing Committee to take a decision on this de-notification proposal of Andaman and Nicobar Administration.

Comments from the Wildlife Institute of India (WII) were sought and the Director, WII has opined that the concerned authorities develop and implement a mitigation plan to facilitate leather back and other turtles to continuously nest for which the connectivity between the Galathea River and the Bay should be ensured. The mitigation plan needs to be developed through a detailed study so that marine turtles continue to nest on the beaches near the Galathea Bay during both construction as well as operational phases of the International Shipment Project.

The provisions of CRZ should be enforced in the area. The concerned authorities should secure and conserve all other important turtles nesting areas of Andaman and Nicobar Islands with enhanced protection/conservation measures through appropriate legal/administrative means and through a Management Plan.

Dr. Sukumar, Member opined that there should be a management plan for conservation and nesting of Leatherback Turtles.

Decision Taken: After discussions, the Standing Committee decided to recommend the proposal with the recommendations of WII, CWLW and directed that a comprehensive management plan may be prepared and followed by the Andaman and Nicobar Administration for conservation and protection of Leatherback Turtles in Great Nicobar Islands along with the Wildlife Institute of India and the project proponents. The Andaman and Nicobar Islands Administration shall bring more areas under conservation of leatherback turtle.

AGENDA No. 4

60.4.1 Amendments in minutes of meeting of Standing Committee [File No. 6-182/2017 WL(pt)]

The Member Secretary briefed the Standing Committee and stated that the proposal for diversion of 13.27 ha forestland from Valmiki Tiger Reserve for construction of NH-28B was recommended by the Standing Committee in its 46th meeting held on 8th December, 2017 subject to the conditions and mitigation measures imposed by the State Chief Wild Life Warden and the NTCA. One of the conditions imposed by Chief Wild Life Warden while recommending the proposal was that the traffic- worthy maintenance of the earlier used access road segment (approximately 5 km) inside the sanctuary shall be limited to the extent of 2 years from the grant of permission. However, work could not be carried out in the given period as informed by the Chief Wild Life Warden and requested amendment in this condition for permission to use the existing road for 2 more years.

The State Board for Wild Life recommended the proposal in its meeting held on 13.08.2020 to extend the period for two years.

Decision taken: After discussion, the standing committee decided to recommend the proposal to extend the period for two years with a condition that no further request for extension shall be entertained.

AGENDA No.5

(Fresh Proposals Falling Inside / Outside the Protected Area)

60.5.1 Proposal for diversion of 6.82 ha. of forestland in Kadapa Range in Kadapa Division for laying of 16” dia VDPL pipeline route from Vijayawada in Andhra Pradesh and Dharmapuri in Tamil Nadu passing

ANNEXURE 09

**ANDAMAN AND NICOBAR ADMINISTRATION
(DEPARTMENT OF ENVIRONMENT & FORESTS)**

NOTIFICATION

Port Blair, dated the 25th January, 2021

No. 15/2021/F.No.CWLW/WL/163.-Whereas, the Lieutenant Governor, A & N Islands vide Notification published in Andaman and Nicobar Gazette (Extraordinary) No.CWLW/WL/3/798 dated 15.09.1997, had declared his intention to constitute an area of 11.44 sq.km in Great Nicobar Island, A & N Islands to be declared as Galathea Bay Wildlife Sanctuary for protection and propagation of Leatherback Sea Turtles in terms of Sub-section (1) of Section 18 of the Wildlife (Protection) Act, 1972.

And, whereas, the State Board of Wildlife considering the need for holistic development including creation of infrastructure in Great Nicobar Island, had recommended to de-notify 11.44 sq.km of Galathea Bay Wildlife Sanctuary for onward submission to the Standing Committee of National Board for Wildlife in the Govt. of India, Ministry of Environment, Forest & Climate Change for consideration.

And, whereas, the Standing Committee of the National Board for Wildlife in its 60th meeting held on 05.01.2021, after careful consideration of the Administration's proposal, had recommended to de-notify of 11.44 sq.km of Galathea Bay Wildlife Sanctuary with a direction to prepare a comprehensive Management Plan and followed by the A & N Administration for conservation and protection of Leatherback Sea Turtles in Great Nicobar Islands with the help of Wildlife Institute of India, Dehradun and the project proponents. The Committee also directed that the A & N Administration shall bring more areas under conservation of Leatherback Sea Turtles.

Now, therefore, in exercise of the powers conferred under Sub-section (29) of Section 2 read with Section 26A(3) of the Wildlife (Protection) Act, 1972, the Lieutenant Governor, A & N Islands is pleased to withdraw the intention Notification constituting 11.44 sq.km of Galathea Bay Wildlife Sanctuary and thereby its de-notification with effect from the date of publication of this Notification in the Andaman and Nicobar Gazette (Extraordinary), with a direction that a comprehensive Management Plan may be prepared and followed by the Administration for conservation and protection of Leatherback Sea Turtles in Great Nicobar Islands with the help of Wildlife Institute of India, Dehradun and the project proponents as also may bring more areas for its conservation.

**By order and in the name of the Lieutenant Governor,
A & N Islands.**

Sd./-

(Dr.V. Candavelou)

**Commissioner-cum-Secretary (E&F)
Andaman and Nicobar Administration**

ANNEXURE 10



पत्तन प्रबंध बोर्ड / PORT MANAGEMENT BOARD
अण्डमान तथा निकोबार द्वीपसमूह / ANDAMAN & NICOBAR ISLANDS

Document No: 5000/PMB/PL/2015

Expression of Interest Document
for

“Establishment of Transshipment Port & Free Trade Warehousing Zone in Andaman & Nicobar Islands”

1. Project:

The Port Management Board, Andaman & Nicobar Islands, intend to develop a Container Transshipment Terminal (CTT) with Free Trade Warehousing Zone (FTWZ) in Andaman & Nicobar Islands on Public Private Partnership (PPP) mode and as part of considerations to start a process to grant a concession agreement through competitive bidding for the same, PMB is looking to obtain expressions of interest from all possible operators.

The EOI is expected to inter alia evaluate commercial viability and identify private developer with abilities to meet specific project requirements, check the willingness of the developers to invest in the proposed CTT project.

2. Background:

World over containers are being handled by a system of transshipment i.e. large container carriers are unloading the containers in a particular port (Transshipment Port) from where the containers are further shipped to the final destination ports by feeder vessels. Large container carriers (mother ships) with deep draft are unable to call on smaller ports and therefore, take equatorial shipping lines (East to West or vice versa) and call on such transshipment ports and leave the containers to be picked up by feeder vessels to the smaller ports.

Indian container terminals at JNP, Chennai, Kolkata and Cochin do not handle transshipment containers and handle containers with local O-D. Accordingly, they handle the country's requirements. The containers to Indian Sub Continent ports are therefore presently transhipped from Dubai, Colombo and Singapore. At present 65% of the 17,20,000 containers received at Singapore port are further transhipped to the ports in the Asian Region including Indian Ports.

The advantage of Colombo and Singapore for container traffic is their geographic locations adjacent to the equatorial shipping line stretching from Gulf/Red Sea to the South - East China Sea.

A look at the shipping routes for Asia-pacific & Atlantic Rim underlines the unique locational advantage that the Great Nicobar Islands possess. It is at nearest location embracing international sea route (East West Corridor) i.e.



Malacca straits and onwards which links Japan, South Korea, Hong-Kong, Malaysia Singapore on one side giving access to Australia, New Zealand on one side and outer routes towards Middle East.

This sea route passing through South Bay Great Nicobar Island is one of the busiest routes with about 50000 ships per annum passing through Indian Ocean & Pacific Ocean via Malacca Strait. For developing countries like India, Indonesia and China, the Malacca strait is thus the gate way for Maritime Trade. The strait carries around one fifth to one quarter of the world sea trade.

Most of the major ships carrying cargo between US-East Asia-Africa-Europe pass through Indian territorial waters. Most of these ships terminate at Colombo, Singapore, Hong Kong. As such South Bay location has the potential to positively intervene as midway transshipment terminal. If India institutes a transshipment terminal at this location world shipping companies would take advantage by cutting short their travel distance to south bay and other countries will pick-up/dispatch their containers to South Bay.

A Techno economic feasibility study for development of Free Port in A&N Island was conducted by Trade Development authority during 1970. They submitted the report in two volumes during February 1975, and concluded that South bay in Great Nicobar Island as the most promising location for development of free port in A&N Islands. Keeping in view of the opportunity available Techno economic feasibility for creating CTT at South Bay, Great Nicobar island, was studied by M/s WAPCOS, New Delhi. The entire studies / investigations were carried out during 2009 & 2010 and final report was submitted on 9th November' 2010.

3. Scope:

Although hinterland is limited to the land boundary of Andaman & Nicobar Islands, the proposed CTT is intended to be a common user container transshipment terminal with FTWZ, which will distribute cargo to the region, including the East Coast of India and other neighboring countries, as well as providing services for the repositioning of empty containers and handling local cargo; and to operate as logistics hub. The Container Transshipment Terminal will serve competitively, non-exclusively and efficiently, all interested carriers and all routes, particularly vessels carrying cargo from littoral countries of India Ocean, West Coast, Europe, US etc and shall be capable to handle New Panmax vessels carrying 14000 TEUs.

The development of CTT is planned to be granted through an award of a 30-year concession agreement to develop, design, finance, construct, operate and maintain the container terminal, with an option to extend it for an additional 30 year period, at the discretion of the Port Management Board, A & N Islands.

In order to get benefit of the geographical location of the A&N Islands a CTT with FTWZ is proposed to be developed at Great Nicobar Islands (Annexure B)



CTT with FTWZ at South Bay in Great Nicobar Islands

The South Bay proposed for creation of transshipment port facilities is located in the Great Nicobar Island of Andaman & Nicobar Islands (A & N Islands) of India at latitude 6047' N and longitude 93051' E. The project site is strategically located equidistant from Colombo, Port Klang and Singapore and is also very close to the East – West international shipping corridor. The proposed site has potential for more than 20m depth for handling 18 m draft ships with 16000-18500 TEU Carrying capacity.

The proposed site is endowed with natural depth of 20 m as close as one Nautical Mile from the sea coast. As may be appreciated, due to natural depth availability, the site needs minimal capital dredging requirements and thus low costs (as compared to the any other port in India within a reasonable distance from the East-West Shipping axis). The proposed site has minimal Littoral drift and as such would hardly require any maintenance dredging during the years of operation. This will result in low O&M Costs. The proposed site is away from mainland / urban / city limits, and thus can be master planned and shaped by the professional and experienced developers as per their own efficient designs and needs.

This site can be developed in two (2) phases, where the first phase will include a breakwater and berth able to accommodate up to Two (2) New Panmax container ships simultaneously, a container yard to match the capacity, buildings and operational facilities, and any other operational infrastructure, container handling cranes, services, utilities, lighting, signalling, appurtenances, shops, together with such equipment and systems as are required for the efficient and safe operation of the berth and container yard.

The second phase to include an additional berth to accommodate up to two (2) additional New Panmax and two Post Panmax ships simultaneously, a container yard, gates, buildings and operational facilities, and any other operational infrastructure, services, utilities, lighting, signalling, appurtenances, shops, together with such equipment and systems required for the efficient and safe operation of the berth and container yard.

Upon completion of the second phase, the CTT with FTWZ shall be able to handle Four (4) additional ULCC container ships simultaneously.

Ample backup land for CTT with FTWZ is available in form of forest land without any rehabilitation & relief issues. The diversion of required forest land for the project shall be processed by the A&N Administration and all clearances shall be obtained before proceeding to signing of concession agreement.

The Galathia river, a natural fresh water source, flowing to the South Bay can be tapped to meet fresh water requirement of the project. The nearest airstrip is about 10 nautical mile from the project site.



The techno-economic output of the study conducted by M/s WAPCOS is summarized below:

Economic Viability

The study recommends establishing CTT, considering various factors of economic development, growing container traffic in E-W corridor, growing size of container vessels, present and projected container handling possibilities, port developmental possibilities and competitions prevailing in the region. The project Internal Rate of Return (IRR) was worked out to be 12.39% with projected annual earning of Rs. 614 cr. during 1st year, Rs. 1205 cr. in 5th year, Rs. 2936 cr. during 10th year of operation.

Technical Viability

Different layouts were worked out to accommodate maximum number of vessels keeping minimum capital cost, operational ease, low maintenance dredging, better harbor tranquility etc. The layout with following technical details was selected for further project analysis and costing.

- a. Basin area – 3.5 sq. km.
- b. Length of eastern breakwater- 3500 m
- c. Length of western breakwater- 400 m
- d. Approach channel width – 300m
- e. Turning circle diameter – 800m
- f. Dredged depth - -20m
- g. Berth Length – 6800m
- h. Storage Area – 280 ha
- i. Maximum Ship Size (for Jetty design) - 18000 TEU
- j. Design Ship Size (Operation) - 9000 TEU

4. Brief Scope of Works of Private Developer:

These works may be taken up on BOT/DBOT/BOOT or any other concession or viability gap funding patterns and the bidder is expected to do all project utility and arrange investment for the entire project excluding cost of land, water etc. which will be arranged by Govt. as an equity or otherwise to the project or business. The private investor shall be arranging capital for all components excluding the items listed at point no. 5, which will be provided by Govt.

5. Government Support, if any

Commercial joint venture can be made by Government / Government sector SPV for this project to equity shares (% to be decided). However, cost of Breakwater, Basic infrastructure for township (such as road, sewerage, public utilities, extension of Air Strip etc. can be borne by Govt or can be considered to be part of project and equity share by the Govt.

6. Important general notes.

- 6.1 This invitation is issued only to elicit an Expression of Interest from Parties interested in the Project and does not constitute any binding commitment from Port Management Board, ANI to proceed with the Project or to invite any or all the Parties in the subsequent bidding process.



- 6.2 Port Management Board, ANI makes no guarantees about and takes no responsibility for the accuracy and completeness of this request for EOI and disclaims any liability for any interested party's use of the information.
- 6.3 This request for EOI is not intended to serve as the basis for an investment decision. Each recipient is expected to make an independent investigation and to obtain the necessary independent advice for submitting an EOI.
- 6.4 Port Management Board, ANI may change or replace any information contained in this request for EOI at any time, without giving any prior notice or providing any reason.
- 6.5 The details furnished in the Expression of Interest will not have any bearing on the tender evaluation and its finalization.
- 6.6 All statutory clearances such as Environment clearance, Security clearance, Customs clearance from the concerned authorities and the clearances under the SEZ Act, 2005 and SEZ Rules, 2006 from Ministry of Commerce & Industry (Department of Commerce) for development of CTT & FTWZ shall be obtained by the Government/Port Management Board.

7. The purpose and limits of the EOI process

- 7.1 Port Management Board, ANI is currently investigating the feasibility of a PPP opportunity for Establishment of Transshipment Port & Free Trade Warehousing Zone in Andaman & Nicobar Islands with all associated infrastructure.
- 7.2 As part of establishing the feasibility of this PPP opportunity, particularly what scale and type of market interest there is in it, Port Management Board, ANI invites prospective investors to submit EOI following the format in paragraph 9 below.
- 7.3 Port Management Board, ANI will assess the EOI and will use the information to complete its feasibility study. If the PPP opportunity is feasible, Port Management Board, ANI will use the EOI information it received to compile bid documentation, and a competitive bid will follow.
- 7.4 Port Management Board, ANI reserves the right to ask any investor that submits an EOI questions for clarity.
- 7.5 Submitting an EOI does not constitute a bid. No investor will be bound by anything contained in their EOI submission. The information in the EOI will be used solely for Port Management Board, ANI to complete its feasibility study and to prepare bid documentation if it decides to proceed with a PPP.
- 7.6 Port Management Board, ANI will acknowledge receipt of all EOI received, but reserves the right not to proceed any further with the proposed PPP.
- 7.7 If a PPP bid process follows for the opportunity at Port Blair Port, all interested parties that submitted EOI will be invited to bid.
- 7.8 The private party will be granted rights to finance, design, build, maintain and operate a Transshipment Port & Free Trade Warehousing Zone in Andaman & Nicobar Islands with all associated infrastructure for a period likely to provide a fair return on investment. In return, the private party will meet agreed environmental, development, operating and other obligations required for the project, and pay a PPP fee to Port Management board, ANI. At the end of the agreement term, the facility reverts to the institution.



8. Public Tender process:

The concession for the CTT Project is planned to be granted through a two-stage bidding process. The first stage will include the prequalification of interested parties. The requisites for this prequalification will be issued through a Request for Qualification document. Requisites will cover technical, financial and environmental criteria. The second stage involves issuance of the Request for Proposals for prequalified bidders only, in order to grant the concession according to the terms and conditions of the RFP and the Port Regulations.

9. Participation

- 9.1 Investors interested in this PPP opportunity should submit information under the headings below. They are welcome to provide additional information.
- 9.2 Interested parties in participating in an international public tender process for the CTT Project should deliver their expressions of interest, by submitting a formal written letter to Chief Port Administrator, Port Management Board, A & N Islands, according to the letter format enclosed as Annexure A, by not later than 3:00 p.m. (local time) on 21/07/2019.
- 9.3 The expression of interest shall contain following details:
 - a. Their financial capability
 - b. Business presence in the field of Port or similar operations
 - c. Technical expertise in undertaking projects in Port Sector.
 - d. List of similar Port project completed during previous years
 - e. Pre feasibility report of such completed projects for the Transshipment Terminal.
 - f. What level of capital investment would you be prepared to consider?
 - g. What period of PPP agreement would you deem viable?
 - h. What will be the land requirement?
 - i. Details of Sea Area required?
 - j. What specific conditions would encourage you to bid?
 - k. What specific conditions would discourage you from bidding?

Proposal including above details may be sent via email, Post or courier to:
Chief Port Administrator,
Port Management Board, Andaman & Nicobar Islands
Port Blair-744101, INDIA
Phone: 91-3192-233679, 232773
Fax : 91-3192-233675
e-mail: cpapmb2015@gmail.com

Once the PMB, A & N Islands decide to start the Public Tender Process to grant the concession, the PMB, A & N Islands will publish the corresponding tender documents to the public in general. In addition, the PMB, A & N Islands will contact directly those interested parties that have submitted their expressions of interests as described herein.

**Sd /-
Chief Port Administrator**



Annexure - A

[COMPANY LOGO]

[Date signed]

To,
Chief Port Administrator,
Port Management Board,
Andaman & Nicobar Islands
Port Blair-744101, INDIA

Sub: Submission of EOI for CTT in A & N Islands-reg.

Dear,

The undersigned submits this expression of interest in response and according to the request issued by the Port Management Board, A & N Islands to participate in the international public tender process for the concession of developing a Container Transshipment Terminal (CTT) with Free Trade Warehousing Zone (FTWZ) in Andaman & Nicobar Islands on Public Private Partnership (PPP) mode

We authorize the PMB, A&N Islands to disclose freely this expression of interest.

Name of the Company

_____ [Signature of authorized representative]

[Name of interested Party's Authorized Representative]

[Title of Authorized Representative]

[Address]



Annexure - B

Location map:



ANNEXURE 11

②

अण्डमान तथा निकोबार प्रशासन
ANDAMAN AND NICOBAR ADMINISTRATION
जनजाति कल्याण निदेशालय
DIRECTORATE OF TRIBAL WELFARE

4th
Port Blair dated the September, 2020


Order No. 198

In exercise of powers vested upon him under Section 3(1) of the A&N (Protection of Aboriginal Tribes) Regulation, 1956 to declare any area which is predominately inhabited by aboriginal tribes to be a reserved area and specify the limits of such area; and may, from time to time, in like manner alter such limits, the Hon'ble Lt. Governor, A&N Islands is pleased to constitute an Empowered Committee to examine the proposals of NITI Aayog regarding development of various projects in Little Andaman and Great Nicobar Islands applied by Andaman and Nicobar Islands Integrated Development Corporation Limited (ANIIDCO) which has been designated as Project Proponent vide Order No. 639 dated 28.7.2020 and 653 dated 3.8.2020.

The Empowered Committee shall comprise of the following:-

(i) Chief Secretary, A&N Administration	-Chairman
(ii) Representative of Ministry of Tribal Affairs	-Member
(iii) Director General of Police, ANP	-Member
(iv) Principal Secretary /Secretary (Revenue)	-Member
(v) Commissioner-cum-Secretary (E&F)/PCCF	-Member
(vi) Secretary (Tribal Welfare)	-Member
(vii) Secretary (Shipping)	-Member
(viii) Managing Director, ANIIDCO Ltd	-Member
(ix) Dy Commissioner (SA) for Little Andaman /Dy Commissioner (N) for Great Nicobar	-Member
(x) Director (ANTRJ)	-Member
(xi) Superintendent Anthropologist, Anthological Survey of India, Port Blair	-Member
(xii) Executive Secretary, AAJVS	-Member
(xiii) Director (TW)	-Member Secy

The Committee may co-opt any subject expert/ department/ organization for the purpose, as it may deemed fit,


(Vinay Kumar Jindal)
Director (Tribal Welfare)
F. No. 1-999/TW-2020/LAI/


Office Order Book

Copy to:-

- 1) The Secretary to the Govt of India, Ministry of Tribal Affairs, Govt of India. As per the Clause 6.3 of the notified Shompen Policy, 2015, consultation with Ministry of Tribal Affairs, Govt of India is necessary for large scale development proposals in Great Nicobar Island. In this regard, it is requested to kindly nominate any appropriate level officer to represent the Ministry of Tribal Affairs, Govt of India in the Empowered Committee. A copy of the Shompen Policy, 2015 is enclosed.
- 2) All officers concerned for kind information and necessary action

Copy for kind information to:-

- 1) Sr PS to Hon'ble Lt. Governor, A&N Islands
- 2) Sr PS to Chief Secretary, A&N Administration
- 3) PA to Secretary (TW), A&N Administration


Director (Tribal Welfare)

04/09/2020

ANNEXURE 12

(2)

अण्डमान तथा निकोबार प्रशासन
ANDAMAN AND NICOBAR ADMINISTRATION
जनजाति कल्याण निदेशालय
DIRECTORATE OF TRIBAL WELFARE

4th
Port Blair dated the September, 2020


Order No. 198

In exercise of powers vested upon him under Section 3(1) of the A&N (Protection of Aboriginal Tribes) Regulation, 1956 to declare any area which is predominately inhabited by aboriginal tribes to be a reserved area and specify the limits of such area; and may, from time to time, in like manner alter such limits, the Hon'ble Lt. Governor, A&N Islands is pleased to constitute an Empowered Committee to examine the proposals of NITI Aayog regarding development of various projects in Little Andaman and Great Nicobar Islands applied by Andaman and Nicobar Islands Integrated Development Corporation Limited (ANIIDCO) which has been designated as Project Proponent vide Order No. 639 dated 28.7.2020 and 653 dated 3.8.2020.

The Empowered Committee shall comprise of the following:-

(i) Chief Secretary, A&N Administration	-Chairman
(ii) Representative of Ministry of Tribal Affairs	-Member
(iii) Director General of Police, ANP	-Member
(iv) Principal Secretary /Secretary (Revenue)	-Member
(v) Commissioner-cum-Secretary (E&F)/PCCF	-Member
(vi) Secretary (Tribal Welfare)	-Member
(vii) Secretary (Shipping)	-Member
(viii) Managing Director, ANIIDCO Ltd	-Member
(ix) Dy Commissioner (SA) for Little Andaman /Dy Commissioner (N) for Great Nicobar	-Member
(x) Director (ANTRJ)	-Member
(xi) Superintendent Anthropologist, Anthological Survey of India, Port Blair	-Member
(xii) Executive Secretary, AAJVS	-Member
(xiii) Director (TW)	-Member Secy

The Committee may co-opt any subject expert/ department/ organization for the purpose, as it may deemed fit,


(Vinay Kumar Jindal)
Director (Tribal Welfare)
F. No. 1-999/TW-2020/LAI/


Office Order Book

Copy to:-

- 1) The Secretary to the Govt of India, Ministry of Tribal Affairs, Govt of India. As per the Clause 6.3 of the notified Shompen Policy, 2015, consultation with Ministry of Tribal Affairs, Govt of India is necessary for large scale development proposals in Great Nicobar Island. In this regard, it is requested to kindly nominate any appropriate level officer to represent the Ministry of Tribal Affairs, Govt of India in the Empowered Committee. A copy of the Shompen Policy, 2015 is enclosed.
- 2) All officers concerned for kind information and necessary action

Copy for kind information to:-

- 1) Sr PS to Hon'ble Lt. Governor, A&N Islands
- 2) Sr PS to Chief Secretary, A&N Administration
- 3) PA to Secretary (TW), A&N Administration


Director (Tribal Welfare)

04/09/2020

ANNEXURE 13



असाधारण

EXTRAORDINARY

प्राधिकार से प्रकाशित

Published by Authority

सं. 89, पोर्ट ब्लेयर, शुक्रवार, 22 मई, 2015

No. 89, Port Blair, Friday, May 22, 2015

अण्डमान तथा निकोबार प्रशासन
जनजाति कल्याण निदेशालय

अधिसूचना

पोर्ट ब्लेयर, दिनांक 22 मई, 2015

ग्रेट निकोबार द्वीप के लिए शोम्पेन जनजाति नीति, 2015

सं. 89/2015/फ. सं. 1-892/2009-TW/557.— शोम्पेन जनजाति के लिए नीति में इनके विभिन्न समूहों की भिन्न-भिन्न आवश्यकताओं और इस समुदाय के बारे में हमारी जानकारी के लिए इनकी कई भिन्नताओं पर ध्यान देने की आवश्यकता पर बल देते हुए समुदाय के भीतर सामाजिक-भौगोलिक भिन्नताओं को महत्व दिया गया है। यह नीति संपूर्ण समुदाय की सामाजिक, आर्थिक एवं सांस्कृतिक अखंडता को सुनिश्चित करती है। इस नीति में शोम्पेन जनजाति द्वारा अपने समुदाय से अलग अन्य लोगों और आपस में परस्पर संवाद में गतिशीलता देने के लिए क्रियान्वित की जा रही नीति के लिए व्यवस्था तंत्र में सुधार की आवश्यकता पर भी जोर दिया गया है। इस नीति के मार्गदर्शी सिद्धांत का उद्देश्य उनके समाज की एकता को जीवन के मूल अधिकारों से उन्हें वंचित किए बिना सुनिश्चित करना है।

तदनुसार, भारत सरकार, जनजाति कल्याण मंत्रालय के अनुमोदन से जिसे दिनांक 10.04.2015 के पत्र सं. 17014/05/2008-सी. एण्ड एल.एम.—II (भाग) के अनुसार सूचित किया गया था, उप राज्यपाल, अण्डमान तथा निकोबार द्वीपसमूह एतद्वारा निम्नलिखित स्कीम बनाते हैं, अर्थात् :-

1. संक्षिप्त नाम तथा प्रारंभ :

- (i) इन नियमों को अण्डमान तथा निकोबार द्वीपसमूह शोम्पेन नीति, 2015 कहा जा सकेगा।
- (ii) सरकारी राजपत्र में प्रकाशित होने की तिथि से प्रभावी मानी जाएगी।

2. उद्देश्य :

- 2.1 शोम्पेनों के बीच के सामाजिक, पारिस्थितिकी और आर्थिक विविधता को मान्यता देना।
- 2.2 किसी प्रकार के शोषण और अधारणीय निर्भरता को चरणबद्ध तरीके से समाप्त करना।
- 2.3 स्वास्थ्य और शिक्षासम्बन्धी आवश्यकताओं के लिए अवसर प्रदान करना।
- 2.4 उनकी इच्छा के अनुसार ही संपर्क, परामर्श और भागीदारी के माध्यम से उनकी इच्छाओं और कल्याण को सुनिश्चित करना।
- 2.5 भाषा सहित उनके सांस्कृतिक अंशों को संरक्षित और संरक्षित रखना।

3. शोम्पनों के बीच वर्गीकरण और आवश्यकताओं में भिन्नता :

- 3.1 शोम्पेन समुदाय की नीति में इस समुदाय को चार विशिष्ट वर्गों के रूप में मान्यताप्राप्त है जो भौगोलिक रूप से ग्रेट निकोबार द्वीप में फैले हुए हैं और इनका लोगों से सम्पर्क बहुत कम है। ये स्थान (क) न्यू चिनगेन्ड (ख) लाफुल क्षेत्र (ग) ईस्ट वेस्ट रोड क्षेत्र (घ) कोकिओन/गलाथिया क्षेत्र है (संलग्नक में नक्शा दिया गया है)। शोम्पेनों के संबंध में नीति का दस्तावेज विभिन्न सम्पर्कों की प्रतिक्रिया तथा बाहरी वर्गों से आवश्यकता में भिन्नता को ध्यान में रखेगा।
- 3.2 वन क्षेत्रों से आने वाले शोम्पेन लाफुल क्षेत्र से हैं। उनके बार-बार आने से चावल और अन्य आवश्यक वस्तुओं पर उनकी निर्भरता भी बढ़ी है। जबकि ये वस्तुएँ मुफ्त दी जाती हैं, इसलिए यह लोगों के सम्मान का भी प्रश्न है। अन्य दो समूह (ईस्ट-वेस्ट रोड और कोकिओन/गलाथिया) इतने निर्भर नहीं हैं और कैम्पबेल बे बस्ती में कभी-कभी ही आते हैं।
- 3.3 पहचानी गई प्रत्यक्ष समस्या में पर्याप्त सूचना की कमी है और कुछ समुदायों के सदस्यों द्वारा वस्तुएँ जैसे चावल के लिए कई सम्पर्क स्थापित किये गये। पारम्परिक खाद्य सामग्रियों के उपभोग को सम्भवतः छोड़ देने के कारण पीष्टिकता की दृष्टि से चावल की आवश्यकता का आकलन भी किया जाना चाहिए।
- 3.4 शोम्पनों की एकता और सामाजिक सांस्कृतिक कल्याण को उनके निर्भरता में हुई कमी के आधार पर समय-समय पर निर्धारित किया जाना चाहिए और समय-समय पर अपेक्षित किसी भी हस्तक्षेप को बनाए रखा जाए।

4. सामूहिक कल्याण के लिए सुविधा (जीविका, स्वास्थ्य एवं शिक्षा) :

- 4.1 न्यू चिनगेन्ड में शोम्पेन निकोबारियों के साथ मिल कर रहते हैं, उनके अपने खाद्य स्रोतों के न होने पर वे चावल पर निर्भर रहते हैं तथा इसलिए वे एक अपवाद हैं। न्यू चिनगेन्ड और लाफुल समुदायों को चावल और दाल वितरित किया जाता रहा है। जीविका को निरन्तर बनाए रखने की आवश्यकता के लिए उनके मोजन शैली में एक विकल्प के रूप में भूमि का आबंटन करके उनके सक्रिय भागीदारी के माध्यम से कन्दमूल और अन्य पारम्परिक फसलों की खेती की जाए। चूंकि इन वर्गों को वृक्ष संवर्धन/बागवानी के अभ्यास के लिए जाना जाता है, इन्हें मुफ्त बाहरी खाद्य सामग्री का वितरण बंद नहीं करना चाहिए।
- 4.2 अन्य वर्गों (ईस्ट वेस्ट रोड और कोकिओन गलाथिया क्षेत्र) के लिए चावल की आवश्यकता अथवा चावल पर निर्भरता के संबंध में कुछ स्पष्ट नहीं है।
- 4.3 जब महिला रोगी अस्पताल में आती है अथवा भर्ती होती है तो रोगी और डॉक्टर/चिकित्सा कर्मचारी के बीच उनके उपचार के दौरान सही और विवेकपूर्ण वार्तालाप होना चाहिए। अण्डमान आदिम जनजाति विकास समिति के महिला कार्यकर्ता जो मुख्यतः शोम्पेन समुदाय से हैं, उन्हें आधारभूत मेडिकेयर प्रशिक्षण दिया जाना चाहिए और ऐसे अवसरों पर उन्हें उपलब्ध होना चाहिए। जबकि आजकल इस जनजाति में से ऐसे व्यक्ति की उपलब्धता कम हो रही है उनके स्थान पर अन्य को लिया जाना चाहिए।
- 4.4 आपात स्थिति में रोगियों को ले जाने हेतु हेलिकॉप्टर सेवा, जहाँ तक व्यवहार्य हो तथा जब और जैसे आवश्यकता हो, जारी रखी जाएगी।
- 4.5 अधिकतर शोम्पेन, सामान्य रोगों के उपचार के लिए पारम्परिक तरीके का उपयोग करते हैं। अण्डमान आदिम जनजाति विकास समिति ने सुनिश्चित किया है कि रोग निदान, उपचार प्रतिरक्षण प्रक्रिया के लिए अनुभवी स्वास्थ्य विशेषज्ञों का एक प्रोटोकॉल तैयार किया जाएगा। अण्डमान आदिम जनजाति के कार्यकर्ताओं को दृष्टि जाँच, रोग का क्लिनिकल लक्षण को पहचानने में प्रशिक्षित किया जाना चाहिए जिसमें चिकित्सकीय दृष्टि से ध्यान देने की आवश्यकता है।
- 4.6 दूर दृष्टि के तौर पर प्रभावपूर्ण वार्तालाप, क्षेत्र कर्मचारी के लिए भाषाई कुशलता का विकास और स्थानीय रूप से उपयुक्त शैक्षिक उपकरणों का विकास तथा शोम्पनी बच्चों और वयस्कों में जागरूकता उत्पन्न करने के कार्य अण्डमान तथा निकोबार जनजाति अनुसंधान संस्थान (ए एन टी आर आई) द्वारा हाथ में लिया जाएगा जिसमें इसी कार्य के लिए जा रहा जनजाति के साथ के अनुभव का उपयोग किया जाए। तथापि इससे पहले जनजाति कल्याण कर्मचारी के भाषाई कुशलता को बढ़ाया जाए।
- 4.7 अण्डमान तथा निकोबार जनजाति अनुसंधान संस्थान (ए एन टी आर आई) और स्वास्थ्य विशेषज्ञों द्वारा सुजित और विश्लेषित सूचना के आधार पर और जनजाति कल्याण विभाग द्वारा ए एन टी आर आई के सहयोग से चयनित उन्मुख और अनुभवी चिकित्सा तथा कल्याण कर्मचारी के सहयोग से स्वास्थ्य शिविरों का आयोजन किया जाए।

4.8 गैर-शोम्पेनियों के साथ जागरूकता बढ़ाने और समान संबंध स्थापित करने हेतु लाफुल और न्यू चिनगेन्ह के शोम्पेनों के लिए द्विसांस्कृतिक और द्विभाषिक शिक्षा कार्यक्रम प्रदर्शित किया जाना चाहिए, इसे जब आवश्यकता हो, के आधार पर अन्य वर्गों के लिए भी प्रदान किया जा सकता है। नीति में मान्यता है कि सीखने तथा संवाद विकास के आधार पर असमान आदान-प्रदान की कमी एक अनुकूल प्रक्रिया होगी।

5. अनुसंधान और शोम्पेन के डेटाबेस का रख-रखाव :

- 5.1 जनजाति कल्याण के लिए अण्डमान तथा निकोबार जनजाति अनुसंधान संस्थान के सनन्धय से खाद्य पदार्थों की उपलब्धता की पद्धति, आवश्यकता और मांग पर आधारित अनुसंधान अभियान कार्यक्रम का आयोजन किया जाएगा। यह कार्यक्रम मांग और आपूर्ति में फेर-बदल को समझने का प्रयत्न करेगी ताकि इन समुदायों के कल्याण के प्रबंधन में लचीले प्रयास की अनुमति दी जा सके, बिना किसी उपायों के जो अस्थिर निर्भरता तथा उनके पौषणिक स्तर, पहचान की भावना और आत्म-निर्भरता को नकारात्मक रूप से प्रभावित करता हो।
- 5.2 इस अस्थाई प्रबंधन के माध्यम से अण्डमान आदिम जनजाति विकास समिति मौसमी स्थानीय खाद्य सामग्री की उपलब्धता और अनुपलब्धता को सुनिश्चित करने में सक्षम है और इसके अब उपलब्ध होने पर चावल/दाल के वितरण में संशोधन किया जाना चाहिए। अन्य सब्जियाँ जिसकी कृषि की जा सकती है, उसकी भी जाँच की जाए।
- 5.3 सामाजिक और आर्थिक व्यवहार जैसे खाद्यान्नों की कृषि, संग्रह और वितरण, आहार संबंधी चक्र, महिलाओं की स्थिति और पुरुषों की भूमिका, बच्चों और युवाओं के बीच सामाजिक अध्ययन और विकास को समझने के लिए अण्डमान आदिम जनजाति विकास समिति द्वारा आधारभूत अनुसंधान हेतु फील्ड सर्वेक्षण किया जाना चाहिए। यह भी संवाद के विकास में सहायता देगी जो इस समय कल्याण कर्मचारी और समुदाय के बीच प्राथमिक है।
- 5.4 पारम्परिक औषधियों और व्यवहार, पोषाहार का मूल्य, औषधि और पौषणिक खाद्य सामग्रियों के चिकित्सकीय गुण-दोषों को प्रलेखित किया जाएगा और अण्डमान तथा निकोबार जनजाति अनुसंधान संस्थान द्वारा डेटाबेस में अनुसंधान प्रेरित कल्याण नीति के रूप में अनुरक्षित करके रखा जाएगा। अण्डमान आदिम जनजाति विकास समिति के कार्यकर्ता अपने परस्पर संवाद के दौरान इसे प्रलेखित करेंगे। विशेषकर औषधि और व्यवहार जो मलेरिया से लोगों को बचाता है उसे प्रलेखित किया जाना जरूरी है।
- 5.5 मुख्यतः लाफुल शोम्पेन द्वारा बाजार की वस्तुओं पर बढ़ती निर्भरता संबंधी पहलू पर व्यवहार्य कार्यक्रम के कार्य को अनुसंधान अभियान नीति के एक भाग के रूप में हाथ में लिए जाने की आवश्यकता है।
- 5.6 अंतरी शोम्पेन बोली/बोलियों का प्रलेख तैयार करेगा। इसका प्रयोग प्रभावपूर्ण संपर्क स्थापित करने के साथ-साथ समुदाय की परम्परा/मौखिक ज्ञान के संरक्षण में किया जाएगा।
- 5.7 सूचना के आभाव को दूर करने हेतु यह अति आवश्यक है कि अण्डमान आदिम जनजाति विकास समिति द्वारा, ग्रेट निकोबार द्वीप में चिकित्सा सुविधा प्राप्त कर रहे सभी शोम्पेनों का एक "हेल्थ डाटाबेस" का विकास किया जाए। जो शोम्पेन स्वास्थ्य केन्द्रों पर जाते हैं, उनका सभी चिकित्सा रिकॉर्ड कैम्पबेल बे के चिकित्सा केन्द्र द्वारा रखा जाना होगा और अण्डमान आदिम जनजाति विकास समिति शोम्पेन सराए द्वारा इसकी निगरानी की जाएगी। ऐसे हेल्थ डाटा को गुप्त रखना जरूरी है।
- 5.8 कैम्पबेल बे के अण्डमान आदिम जनजाति विकास समिति शोम्पेन सराए ने सामयिक निरीक्षण, चिकित्सा मध्यस्थता, राशन और अन्य सामग्रियों के वितरण पर सूचना उपलब्ध कराने के लिए एक डिजिटल डाटा बेस की शुरुआत की है। अण्डमान आदिम जनजाति विकास समिति द्वारा इस डाटा बेस के पैरामीटर्स को नियमित और सही बनाए रखना होगा।
- 5.9 लिंग के संबंध में, उनके भाग लेने की सहमति और वास्तविक प्रयोग हेतु सूचना को सुरक्षित रखने के लिए डाटा सुग्राहिता से तथा नीतिपरक कर एकत्र की जाएगी। अण्डमान आदिम जनजाति विकास समिति द्वारा डाटा तथा मूल क्षेत्र अनुसंधान अभ्यास के विकास की गोपनीयता को सुनिश्चित करने की प्रक्रिया में अन्य विभागीय कर्मचारियों की आवश्यकता होगी।
- 5.10 इस डाटा बेस का मासिक रिपोर्ट अंतरी तथा अण्डमान आदिम जनजाति विकास समिति, पोर्ट ब्लेयर को अभिलेख तथा पारस्परिक क्रिया में भिन्नता निर्धारण हेतु भेजने की आवश्यकता होगी, जब शोम्पेन समूहों के मध्य लचीलेपन से उचित जरूरतों की व्यवस्था की जाती है।
- 5.11 डाटा, इंटरनेट द्वारा न भेजा जाए।

6. प्राकृतिक निवास स्थान की सुरक्षा :

- 6.1 सुनामी तथा पुर्नवास के बाद, संभावित अतिक्रमण के कारण, जनजाति आरक्षण क्षेत्र की बस्तियों का स्पष्ट सीमांकन आवश्यक है । सभी अतिक्रमणों को हटाया जाएगा । राजस्व बंदोबस्त क्षेत्र के रूप में अधिसूचित क्षेत्र का नक्शा बनाकर भूमि पर स्पष्ट सीमांकन करना होगा । अण्डमान प्रशासन (अण्डमान आदिम जनजाति विकास समिति/जनजाति कल्याण विभाग, मण्डलीय वन अधिकारी कार्यालय, कैम्पबेल बे, सहायक आयुक्त कार्यालय, कैम्पबेल बे) को यह नक्शा उपलब्ध कराना होगा ।
- 6.2 जिन क्षेत्रों में शोम्पेनों से कई लोगों की पहचान रहती है ऐसे स्थानों पर किसी भी प्रकार के पर्यावरण हितैषी पर्यटन की अनुमति नहीं होगी । जनजाति आरक्षण क्षेत्र की बस्तियों के साथ पूर्वी सीमा की बाउन्डरी और पर्यावरण तथा वन विभाग, अण्डमान तथा निकोबार प्रशासन द्वारा चलाए जा रहे नेचर ट्रेल तक आगंतुकों के लिए ई. डब्ल्यू. सड़क को स्पष्टतया चिन्हित और प्रबंधित किया जाएगा ।
- 6.3 ग्रेट निकोबार द्वीप के लिए भविष्य में बड़े पैमाने पर विकास प्रस्तावों के संबंध में (जैसा कि शिपमेंट/कनटेनर, टर्मिनल आदि) शोम्पेन समुदाय के कल्याण और एकता को प्राथमिकता दी जाएगी तथा जनजाति कल्याण विभाग, अण्डमान आदिम जनजाति विकास समिति और जनजाति कार्य मंत्रालय के साथ संपर्क कर समीक्षा की जाएगी ।
- 6.4 ग्रेट निकोबार द्वीप में उचित स्थानों पर विविध संरक्षण के संबंध में संकेतों के अतिरिक्त अण्डमान निकोबार आदिम जनजाति संरक्षण विनियम, 1966 तथा "क्या करें क्या न करें" की सूचनाएँ भी प्रदर्शित की जाएगी ।
- 6.5 अन्य विभागों या व्यक्तियों द्वारा मानवतावादी कार्यों के रूप में फसलों या पशुओं पर शुरूआती कार्य, संसाधन संवर्धन अभ्यास के रूप में प्राथमिकता, मूल रूप से बने डाटा की उपलब्धता के बिना नहीं किया जाएगा ।

7. संस्थागत व्यवस्था :

- 7.1 अण्डमान आदिम जनजाति विकास समिति और ए.एन.टी.आर.आई. के माध्यम से नीति कार्यान्वयन की आवधिक समीक्षा पर आधारित, शोम्पेन नीति कार्यान्वयन से लिए जनजाति कल्याण विभाग, अण्डमान तथा निकोबार प्रशासन जिम्मेदार होगा । इस नीति के समग्र उद्देश्यों की प्राप्ति हेतु उपयुक्त समय में संशोधन किया जाएगा ।
- 7.2 दो स्थान जहाँ से दो समूह (पूर्व पश्चिम और कोकेन/गलाथिया क्षेत्र) वन से बस्ती तक दृष्टिगोचर होते हैं, लक्ष्मी नगर में 16 किलोमीटर पूर्व पश्चिम सड़क और 24 किलोमीटर उत्तर दक्षिण सड़क है । (अनुसंधान 2) अनुसंधान के साथ-साथ गैर-जनजातियों द्वारा शोषण की निगरानी के लिए फील्ड स्टेशनों का निर्माण किया जाएगा । ये फील्ड स्टेशन, फील्ड स्टाफ के लिए कम से कम आवास तथा भंडार सुविधाओं के साथ कार्य करेगी । नीति के उद्देश्यों के कार्यान्वयन को सरल करने के प्रयास से अन्य केन्द्रों लक्ष्मणतट तथा गलाथिया नदी के निकट उत्तर-दक्षिण सड़क पर विचार किया जाएगा ।
- 7.3 अनुसंधान प्रेरित कल्याण नीति के माध्यम से असमान वस्तु विनियम, शोषण तथा निर्वाह भत्ता निर्भरता को समाप्त करने के लिए प्रोत्साहन योग्य समान विनियम तथा संपर्क तंत्र बनाया जाएगा । यदि आवश्यकता पड़ने पर, अण्डमान आदिम जनजाति विकास समिति द्वारा कुछ हद तक बाजार मध्यस्थता उपलब्ध कराई जाएगी ।
- 7.4 ए.एन.टी.आर.आई./अण्डमान आदिम जनजाति विकास समिति के फील्ड स्टाफ तथा विशेषज्ञ सलाहकार समूह द्वारा जनित सूचना की समीक्षा के आधार पर एक क्रमबद्ध नीति कार्यान्वयन की प्रक्रिया का विकास किया जाएगा । यह परिकल्पना की जाती है कि इससे जो ग्रेट निकोबार के शोम्पेन का गठन एक बेहतर पकड़ हेतु उनके सामाजिक, सांस्कृतिक एकता तथा स्थानिक सुरक्षा को सुनिश्चित करने के लिए करते हैं, पूर्ण जानकारी उपलब्ध होगी ।
- 7.5 जनजाति कार्य मंत्रालय, इन संस्थानों को बढ़ाने हेतु वित्तीय सहायता तथा अन्य सहयोग मुहैया कराएगा ।

8. विशेषज्ञ समिति तथा नीति की समीक्षा :

सचिव, जनजाति कार्य मंत्रालय "अण्डमान तथा निकोबार द्वीपसमूह के विभिन्न आदिम जनजाति समूह के लिए नीतियाँ तैयार करने हेतु बनी विशेषज्ञ समिति" की नीति की समीक्षा/ संशोधन के लिए जिम्मेदार होगा। उपलब्ध सूचना के आधार पर जैसे और जब भी आवश्यकता पड़ने के आधार पर नीति की समीक्षा की जाएगी।

उप राज्यपाल, अण्डमान तथा निकोबार द्वीपसमूह के आदेश से

ह./-

(दीपक मोहन शुक्ल)

सचिव (जनजाति कल्याण)

अण्डमान तथा निकोबार प्रशासन

**ANDAMAN AND NICOBAR ADMINISTRATION
DIRECTORATE OF TRIBAL WELFARE**

NOTIFICATION

Port Blair, dated the 22nd May, 2015.

POLICY ON SHOMPEN TRIBE OF GREAT NICOBAR ISLAND

No. 89/2015/F. No. 1-892/2009-TW/557.— The policy towards the Shompens Tribe recognizes socio-geographic variation within the community, varying requirements of different groups of Shompens, and the need to address various gaps in our understanding of this somewhat less known community. The policy seeks to ensure the social, economic and cultural integrity of the entire community. It also recognizes the need to improve the mechanisms by which the policy is implemented in response to dynamism in interaction by the Shompens with others outside their community and also within. The guiding principle for this document is to ensure the integrity of their society but without denying them basic rights to life.

Accordingly, with the approval of Government of India, Ministry of Tribal Welfare as communicated vide letter No.17014/05/2008-C&LM-II(Part) dated 10.04.2015, the Lt. Governor, Andaman and Nicobar Islands hereby makes the following scheme, namely :-

1. SHORT TITLE AND COMMENCEMENT :

- (i) These policy may be called Andaman and Nicobar Islands Shompen Policy, 2015.
- (ii) They shall come in to force from the date of publication of Official Gazette.

2. OBJECTIVES :

- 2.1 Recognize the social, ecological and economic diversity among Shompens.
- 2.2 Eliminate through phased reduction, any exploitation and unsustainable dependency.
- 2.3 Provide appropriate opportunity for health and medical requirements.
- 2.4 Ensure their integrity and well being through developing channels of communication, consultation and participation only based on their willingness.
- 2.5 Preserve and protect their cultural heritage including language.

3. THE DISTRIBUTION AND VARIATION IN REQUIREMENTS AMONG SHOMPENS :

- 3.1 The policy towards the Shompens community recognizes four distinct groups of Shompens, geographically spread on the island of Great Nicobar with varying degrees of contact. They are at (a) New Chingenhy, (b) Laful Region, (c) East-West Road Region and (d) the Kokeon/Galatheia Region (map in Annexure). The policy towards the Shompens will document and respond to the variable contact and varying requirements from outside of the groups.
- 3.2 The most frequent Shompens visitors from the forested regions are those from Laful. Their frequent visitation has also raised a growing dependence on rice and other market commodities. Since these commodities are given free, there is a question of dignity to the people. The other two groups (East-West road and Kokeon/Galatheia) are not as dependent, and infrequently visit the Campbell Bay settlement.
- 3.3 The most evident problem identified is the lack of sufficient information and rationale with regard to the periodic and variable contact made by some community members for articles such as rice. Also the need for rice has to be assessed in terms of nutritional loss since traditional foods are possibly abandoned.
- 3.4 Integrity of the Shompens socio-cultural well-being should be determined periodically on the basis of reducing dependence, and sustainability of any interventions that may be required from time to time.

4. FACILITATION FOR COMMUNITY WELL BEING (LIVELIHOOD, HEALTH AND EDUCATION) :

- 4.1 The Shompens families at New Chingenh are integrated with Nicobarese and are dependent on rice in the absence of their own food resources, and, therefore, are an exception. Rice and dal may continue to be distributed to New Chingenh and Laful communities. Requirements in sustainable livelihood options will include enhancing their dietary profile through land allotment for cultivation of tubers and other traditional crops through their active participation. Since these groups are known to practice arboriculture/horticulture, these should not be discontinued through free distribution of external foods.
- 4.2 For the other groups (East-West road and Kokeon/Galathea region), the degree of requirement of or dependence on rice, is not clearly established.
- 4.3 When women patients visit or are admitted in the hospital, accurate and sensitive communication between patient and doctor/medical staff will be required during their treatment. Women Andaman Adim Janjati Vikas Samiti (AAJVS) workers preferably from the Shompens community should be trained in basic medicare, and be available for such occasions. Since at present the availability of such persons from the tribe will be less, others may have to be taken.
- 4.4 The use of helicopter services for evacuations in times of emergencies will be continued as far as it is practical and when required.
- 4.5 Though most Shompens use traditional practices of healing for most common ailments, the AAJVS will ensure that a protocol for diagnosis, treatment and immunization procedures is developed by well experienced health experts. AAJVS workers should be trained to identify on visual examination of the clinical symptoms of diseases which may require medical intervention.
- 4.6 As a long terms vision toward effective communication, linguistic skill development for field staff, and the development of locally appropriate educational tools and creating awareness among Shompens children and adults will be undertaken by Andaman and Nicobar Tribal Research Institute (ANTRI) utilizing the experience in similar ventures with the Ang/Jarawa tribal community. However, before this can happen, the language skills of Tribal Welfare Staff has to be upgraded.
- 4.7 Based on the information generated and analyzed by ANTRI and health experts, health camps may be conducted only in collaboration with ANTRI and Department of Tribal Welfare by the selection of well oriented and experienced medical and welfare staff.
- 4.8 To increase awareness and equitable relations with non-Shompens, a bicultural and bilingual education programme should be tailored for Laful and New Chingenh Shompens. This may be extended, if and when required for other groups. The policy recognizes that the reduction of inequitable exchange will be an adaptive process based on learning and development of communication.

5. RESEARCH AND MAINTENANCE OF A SHOMPENS DATABASE :

- 5.1 The research driven programme for tribal welfare will be coordinated by the A&N Tribal Research Institute (ANTRI) to establish patterns of food availability, requirement and demand. The programme should seek to understand alterations in demand and supply to allow a flexible approach in catering to the welfare of these communities, without introducing any measures that bring on unsustainable dependence and/or negatively impacts their nutrition level, sense of identity and self-sufficiency.
- 5.2 Though this temporary arrangement by which the AAJVS is able to clearly establish seasonal local food availability and its non-availability (if at all), the distribution or modification in rice/dal distribution may be revisited. Other vegetables which can be cultivated may also be examined.
- 5.3 Field surveys by AAJVS should be conducted on basic research to understand social and economic practices, such as food cultivation, collection and distribution, dietary cycles, the position of women and role of men, social learning and growth among children and youth. This will also aid the development of communication, which is rudimentary at present between welfare staff and the community.

- 5.4 Traditional medicines and practices, diet value and therapeutic properties of medicinal and dietary foods will be documented and maintained as a database by ANTRI as part of the research led welfare policy. AAJVS workers should document this during their interactions. In particular, the medicines and practices which protect the people from malaria need to be documented.
- 5.5 A viable programme of action on the aspect of growing dependence on market goods primarily by Laful Shompens needs to be taken up as part of the research driven policy.
- 5.6 ANTRI will document Shompens dialect(s). These will be used for effective communication as well as conserving the traditional/oral knowledge of the community.
- 5.7 A major requirement to bridge an information-gap is the development of a 'health database' by the AAJVS for all Shompens who use the medical facilities on the island of Great Nicobar. All medical records for those Shompens who visit the Health Centre are to be maintained by the Health Centre at Campbell Bay and monitored by AAJVS Shompens Sarai. It is important to maintain the privacy of such health data.
- 5.8 A digital database has been initiated at the AAJVS Shompens Sarai at Campbell Bay to generate and maintain information on periodic visitation, medical intervention, distribution of rations or other articles. The parameters of the database have to be regularly and accurately maintained by AAJVS.
- 5.9 All data should be sensitively and ethically collected, with regard to gender, their participatory consent and in safeguarding information for bonafide use. Steps in ensuring the confidentiality of data and development of basic field research practices by AAJVS and other departmental staff are requirements in this process.
- 5.10 Monthly reports of this database need to be sent to ANTRI and AAJVS at Port Blair to archive and assess variations in interaction, while flexibly administering appropriate requirements between Shompens groups.
- 5.11 Data should not be sent by internet.

6. PROTECTION OF NATURAL HABITAT :

- 6.1 After the tsunami and rehabilitation, there is a requirement of clearly demarcating the settlement region from the Tribal Reserve. Given the possibility of encroachments, all encroachments will be removed. The area notified as a Revenue settlement area has to be mapped and clearly demarcated on the ground. This map should be made available to the Andaman Administration (AAJVS/Department of Tribal Welfare, Office of Divisional Forest Officer, Campbell Bay, Assistant Commissioner Office, Campbell Bay).
- 6.2 No eco-tourism ventures should be allowed in the regions where Shompens are known to frequent. The boundary of the eastern limit of the Tribal Reserve along the settlement region and the EW road should be clearly marked and managed for visitors to the Nature Trail maintained by the Department of Environment and Forests, A&N Administration.
- 6.3 With regard to large-scale development proposals in the future for Great Nicobar Island (such as trans-shipment/container terminal etc), the welfare and integrity of the Shompens community should be given priority and be reviewed in consultation with the Department of Tribal Welfare and Andaman Adim Janjati Vikas Samiti (AAJVS), and the Ministry of Tribal Affairs.
- 6.4 Signages regarding legal protection vis-à-vis Andaman Nicobar Protection of Aboriginal Tribes Regulation, 1956, and informative 'Do's and Don'ts' will be maintained at appropriate locations on Great Nicobar Island.
- 6.5 Introduction of crops or animals as a humanitarian gesture should not be undertaken by other departments or individuals as a resource augmentation exercise without availability of basic data generated first. Such efforts should be examined by the Expert Committee.

7. INSTITUTIONAL ARRANGEMENTS :

- 7.1 Based on the periodic review of policy implementation, the Department of Tribal Welfare, A&N Administration will be responsible for the implementation of the Shompens policy through AAJVS and ANTRI. Appropriate course correction should be carried out to achieve the overall objectives of this policy.

- 7.2 Two locations from where two groups (East-West road and Komeon/Galatea regions) emerge from the forest to the settlement are at the 16 Km East-West road and at 24 Km North-South road at Laxmi Nagar (Annexure-2). Field stations must be constructed to facilitate research as well as to monitor exploitation by non-tribals. They should be made operational with minimal accommodation for field staff and storage facilities. Other stations may be considered at Laxman beach and near the Galatea River, North-South road in effort to facilitate implementation of the policy objectives.
- 7.3 Through the research led welfare policy, the development of a sustainable mechanism of equitable exchange and communication may be undertaken to eliminate inequitable barter, exploitation and dole dependence. Some extent of market intervention through AAJVS may be taken up, if necessary.
- 7.4 A systematic process of policy implementation will be developed by field staff and the expert advisory group of the ANTRI/AAJVS based on the review of the information generated. It is envisaged that these will provide insights and understanding on who constitute the Shompens of Great Nicobar for a better grip on ensuring their socio-cultural integrity and spatial security.
- 7.5 The Ministry of Tribal Affairs will provide financial and other support for strengthening these institutions.

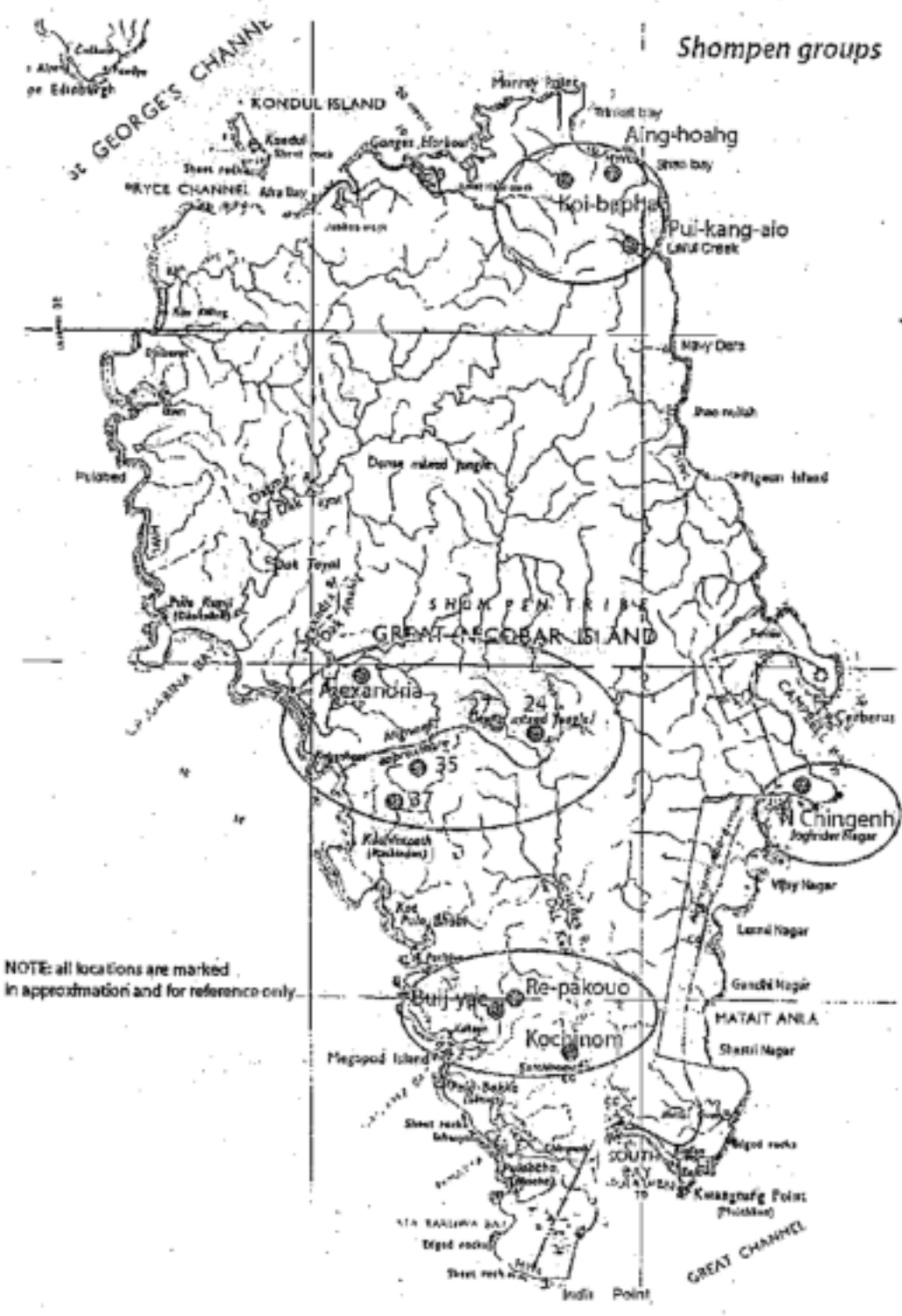
8. EXPERT COMMITTEE AND REVIEW OF POLICY :

"The Expert Committee for preparation of policies for various PVTGs of A&N Islands" under the Chairpersonship of Secretary, Ministry of Tribal Affairs will be responsible for modification/review of the policy. The policy may be reviewed as and when required, based upon available information.

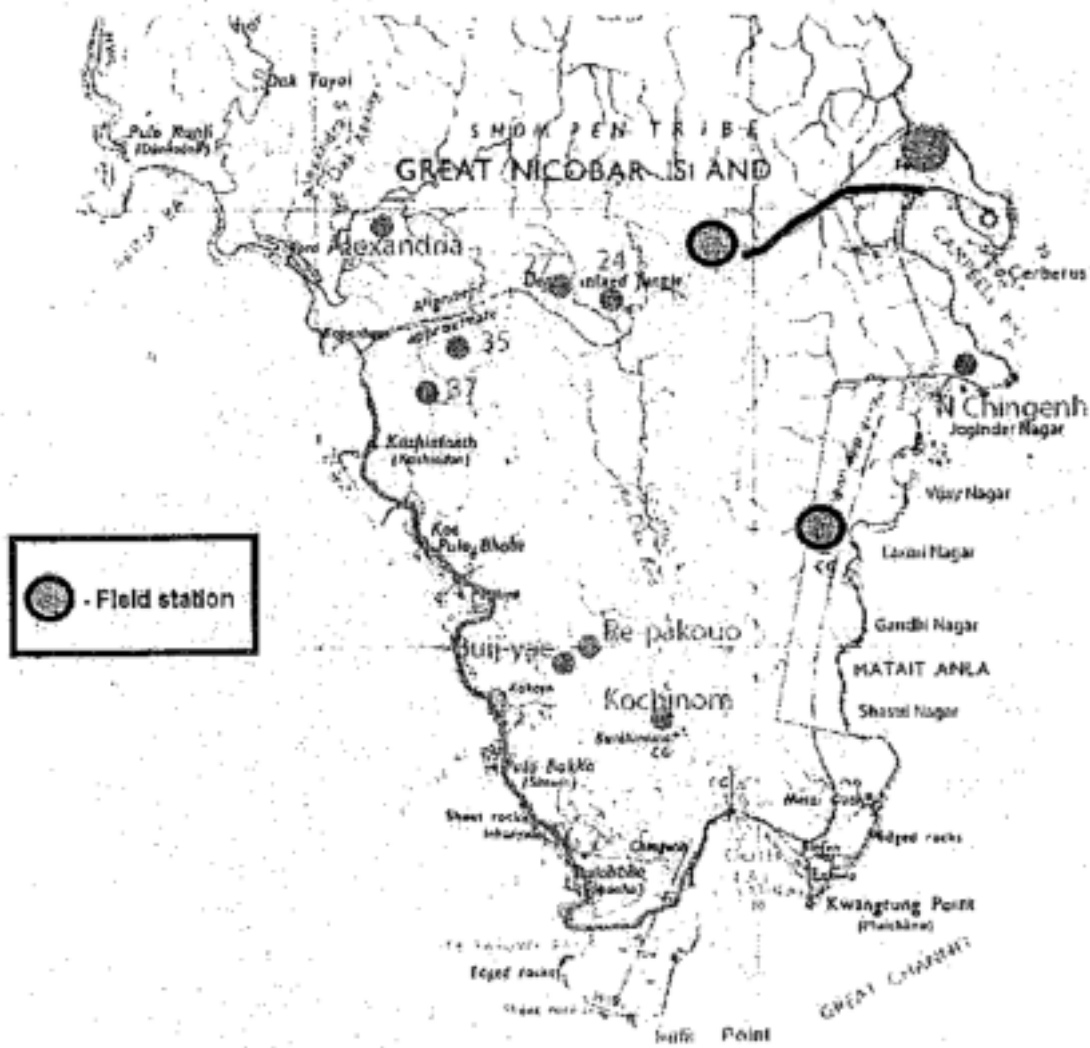
By order and in the name of the Lt. Governor,
Andaman & Nicobar Islands.

Sd./-
(D. M. Shukla)
Secretary (Tribal Welfare)
A&N Administration

Geographical spread and categorisation of groups



Proposed AAJVS field stations



ANNEXURE 14

MINUTES OF 44th MEETING OF THE EXPERT COMMITTEE FOR THE DECLARATION OF ECO-SENSITIVE ZONE (ESZ) AROUND PROTECTED AREAS (WILDLIFE SANCTUARIES/NATIONAL PARKS/TIGER RESERVES) THROUGH VIDEO CONFERENCING (VC) HELD ON 18th JANUARY, 2021.

The 44th Meeting of the Expert Committee on Eco-Sensitive Zone was held under the Chairmanship of Shri Ravi Agrawal, Additional Secretary, Ministry of Environment, Forest & Climate Change (MoEFCC) on 18th January, 2021 through Video Conferencing. The list of participants is enclosed as **Annexure**.

2. At the outset, the Chairman welcome the members, participants from the State Governments/UT administration of Andaman and Nicobar. After a brief introduction, the Chairman invited State Governments/UT administration representatives to present their proposals as per the Agenda items. The following twenty proposals listed in the agenda were taken up *ad-seriatim*:

Item No.	State/UT	Protected Area	Remarks
	Andaman & Nicobar	Campbell Bay National Park	Fresh proposal
		Galathea Bay National Park	Fresh proposal
	Himachal Pradesh	Renukaji Wildlife Sanctuary	Re-notified draft proposal
		Chail Wildlife Sanctuary	Re-notified draft proposal
		Gangul Siyabehi Wildlife Sanctuary	Re-notified draft proposal
		Nargu Wildlife Sanctuary	Re-notified draft proposal
	Kerala	Thattekkad Wildlife Sanctuary	Revised proposal received from State Govt.
		Silent valley National Park	Re-notified draft proposal
		Aralam Wildlife Sanctuary	Revised proposal received from State Govt.
		Idduki Wildlife Sanctuary	Revised proposal received from State Govt.
		Kottiyoor Wildlife Sanctuary	Revised proposal received from State Govt.
		Malabar Wildlife Sanctuary	Revised proposal received from State Govt.
	Jammu and	Ramnagar Wildlife	Re-notified draft proposal

	Kashmir	Sanctuary	
	Rajasthan	Bassi Wildlife Sanctuary	Revised proposal received from State Govt.
	Odisha	Simlipal Tiger Reserve and Hadagarh Sanctuary	Revised proposal awaited from State Govt.
	Haryana	Sukhna Wildlife Sanctuary	Proposal awaited from State Govt.
	Assam	Dehing Patkai Wildlife Sanctuary	For consideration of ECC's recommendation.
3.18	Madhya Pradesh	Bandhavgarh Tiger Reserve	For Amendment
3.19	Pradesh	Gandhi Sagar Wildlife Sanctuary	For Amendment
3.20	Tamil Nadu	Pulicat Bird Sanctuary	Proposal under pre-draft stage

The deliberations held and the decisions taken are as under:

Item No. 3.1: Campbell Bay National Park, Andaman and Nicobar Island

The draft notification for declaration of ESZ around Campbell Bay National Park was published on 28th October, 2020 for seeking public comments. The salient features of the draft Eco-Sensitive Zone (ESZ) notification are as follows:

Area of PA : 426.23 sq. km

Proposed ESZ area : 65.81 sq. km

Proposed Extent : 0 to 1 kilometre (*Zero extent of ESZ as the boundary of the National Park coincides with the boundary of Bay of Bengal*)

A presentation was made by the PCCF and Chief Wildlife Warden, UT administration of Andaman and Nicobar before the Expert Committee. The Secretary (Environment), Government of UT was also present in the meeting. It was informed that the Campbell Bay National Park and its adjoining areas is a biodiversity rich area and houses endemic species like Nicobar Megapode, Crab eating Macaque, Giant Robber Crab, Nicobar Pigeon etc.

The Committee was informed that no comments/ objections have been

received in respect of the draft notification for declaration of ESZ around the Campbell Bay National Park within the stipulated 60 days and till date. The Committee was also informed that zero ESZ extent on the Western side and the Northern side of the boundary of the Park is due to the fact the National Park directly ends and merges with the Bay of Bengal, and whereas, on the Eastern side, it is already a tribal area protected under the Forest Act. The representatives of the UT Administration further informed that the area beyond zero extent on the coastal sides are already protected under CRZ regulations. The Expert Committee agreed to the above justification for zero extent of ESZ on these sides.

The Committee informed the UT administration representatives that the Ministry is in the process of integrating the ESZ boundaries in the Digital Support System and therefore requested that digitized map of the ESZ and protected area shall be submitted to the Ministry at the earliest.

Based on the presentation made deliberations held the Committee recommended finalisation of the ESZ notification of Campbell Bay National Park.

Item No. 3.2: Galathea National Park, Andaman and Nicobar Island

The draft notification for declaration of ESZ around Galathea National Park was published on 28th October, 2020 for seeking public comments. The salient features of the draft Eco-Sensitive Zone (ESZ) are as follows:

Area of PA : 110 sq km

Proposed ESZ area : 14.93 sq km

Proposed Extent : 0 to 1 kilometre (*Zero extent of ESZ as the major geographical area of the Great Nicobar Island is covered under Protected Area Network and Tribal Reserve with almost no area left for development.*)

A presentation was made by the PCCF and Chief Wildlife Warden, Govt. of Andaman and Nicobar before the Expert Committee. The Secretary (Environment), Government of UT was also present in the meeting. It was

informed that the Galathea National Park and its adjoining areas are rich in biodiversity which includes endemic faunal species like Nicobar Megapode, Crab eating Macaque, Giant Robber Crab, Salt water crocodile, Nicobar Pigeon and floral species like tree fern etc.

The Committee discussed on the zero extent of the ESZ in major stretches along the boundary of the National Park. On this issue, the UT administration representatives stated that zero extent is proposed since major geographical area of the Great Nicobar Island where the Park is located, is covered under Protected Areas Network and Tribal Reserves; therefore, there is hardly any area left for holistic development. Further, to protect the development and inhabitants from unforeseen natural disaster like Tsunami, rising water level, a 750 m buffer is proposed from the coast and near the National Park boundary. It was also stated that Island has tremendous strategic significance for the country and the Government of India is in the process of development of strategic projects on this side; therefore, there is no scope for ESZ left.

The Committee also considered detailed justification provided in the letter of even date that gave following justification.

1. The Great Nicobar Island with an area of 910.74 sqkm (as per Survey of India) is strategically located in the South, very close to the major international shipping route of Malacca Strait.
2. Out of total geographic area of 910.74 sqkm, the area under revenue is 44.20 sqkm which constitutes only 4.8% of the total geographic area, whereas the remaining 95.2% is either National Parks, Protected Forests and Tribal Reserve leaving little area for development.
3. As per the Vision Document prepared by NITI Aayog, a contiguous stretch of land is required in the south-eastern and south-western part of the island, which has a narrow strip ranging from 1.83 km to 3.8 km in the eastern side and 1.3 km to 5.4 km in the western side from the Galathea National Park which also happens to be Protected Forest and Tribal Reserve.
4. In the eastern side, the NITI Aayog has proposed to construct an Airport, requiring 21.64 sqkm of land at the south eastern part and construction of Rapid Mass Transit System originating from Campbell Bay and terminating somewhere in the western part and running parallel to the coast line.
5. In the southern part, besides the development of a major Transshipment Port, the area is also earmarked for future strategic Defence use in view of the developing geo-political scenario in the area.
6. The south-western and western part of Great Nicobar Island outside the Galathea National Park are narrow and proposed to be used as Free Trade Zone as ancillary to the transshipment port leaving little area for declaration of ESZ.

ANNEXURE 15



भारत का राजपत्र The Gazette of India

सी.जी.-डी.एल.-अ.-30102020-222839
CG-DL-E-30102020-222839

असाधारण
EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)
PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. 3420]
No. 3420]

नई दिल्ली, बुधवार, अक्टूबर 28, 2020/ कार्तिक 6, 1942
NEW DELHI, WEDNESDAY, OCTOBER 28, 2020/ KARTIKA 6, 1942

पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 28 अक्टूबर, 2020

का.आ. 3874(अ).—अधिसूचना का निम्नलिखित प्रारूप, जिसे केन्द्रीय सरकार, पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 3 की उपधारा (2) के खंड (v) और खंड (xiv) तथा उपधारा (3) के साथ पठित उपधारा (1) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, जारी करने का प्रस्ताव करती है को, पर्यावरण (संरक्षण) नियमावली 1986 के नियम 5 के उपनियम (3) की अपेक्षानुसार, जनसाधारण की जानकारी के लिए प्रकाशित किया जाता है जिनके उससे प्रभावित होने की संभावना है, और यह सूचित किया जाता है कि उक्त प्रारूप अधिसूचना पर, उस तारीख से, जिसको इस अधिसूचना को अंतर्विष्ट करने वाले भारत के राजपत्र की प्रतियां जनसाधारण को उपलब्ध करा दी जाती हैं, साठ दिन की अवधि की समाप्ति पर या उसके पश्चात् विचार किया जाएगा;

ऐसा कोई व्यक्ति, जो प्रारूप अधिसूचना में अंतर्विष्ट प्रस्तावों के संबंध में कोई आपत्ति या सुझाव देने का इच्छुक है, वह विनिर्दिष्ट अवधि के भीतर, केन्द्रीय सरकार द्वारा विचार किए जाने के लिए अपनी आपत्ति या सुझाव सचिव, पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय, इंदिरा पर्यावरण भवन, जोर बाग रोड, अलीगंज, नई दिल्ली-110003 को लिखित रूप में या ई-मेल esz-mef@nic.in पर भेज सकता है।

प्रारूप अधिसूचना

और, गालाथिया राष्ट्रीय उद्यान का क्षेत्रफल 110 वर्ग किलोमीटर है और अंडमान एवं निकोबार द्वीप समूहों के निकोबार जिला में दक्षिण मध्य ग्रेट निकोबार द्वीप में स्थित है;

और, गालाथिया राष्ट्रीय उद्यान अधिसूचना सं. जे-22010/14/89-सी एस सी, द्वारा 13 जनवरी, 1989 से बफर जोन के रूप में, संरक्षित वन से घिरा हुआ, ग्रेट निकोबार जीवमंडल रिज़र्व का कोर क्षेत्र है और 2013 में यूनेस्को द्वारा विश्व धरोहर स्थल भी घोषित किया गया था;

और, गालाथिया राष्ट्रीय उद्यान विविध स्थानिक वनस्पति और जीवजंतु का ऐसा वास स्थल है जिसमें तटीय और मैंग्रोव पारिस्थितिकी प्रणाली भी शामिल है। इस क्षेत्र में पारिस्थितिकी, जीवजंतु, वनस्पति, भू-आकृति और मनोरंजनात्मक और अनुसंधान/ शिक्षण संदर्भ का काफी महत्वपूर्ण मूल्य भी है;

और, संरक्षित क्षेत्र की वनस्पति भूमध्यरेखा के निकटतम होने के कारण इसकी उष्णकटिबंधीय आर्द्र जलवायु, क्षेत्र की द्वीपीय प्रकृति, द्वीपों के भौतिक अलगाव और दक्षिण- पश्चिम और उत्तर-पूर्व दोनों मौसून के प्रभाव के कारण अद्भुत है जो कि घनत्व वृद्धि और विविध वनस्पति का कवर प्रदान करता है;

और, गालाथिया राष्ट्रीय उद्यान में वनस्पति विश्व में सबसे अच्छे संरक्षित उष्णकटिबंधीय वर्षा वनों में एक है और अपनी भौगोलिक स्थिति और भौतिक अलगाव के कारण उच्च स्तर की स्थानिकता को दर्शाता है। राष्ट्रीय उद्यान के इंडो-चीन और इंडो-मालायन क्षेत्रों से भी घटक हैं। 422 जेनेरा और 142 परिवारों से संबंधित क्षेत्र से वनस्पति की लगभग 648 प्रजातियां रिपोर्ट की गई हैं, जिसमें से स्थानिक वनस्पति की 48 प्रजातियां और गैर-स्थानिक वनस्पति की 85 प्रजातियां दुर्लभ और लुप्तप्राय है। जिमनोस्पर्मस् 3 जेनेरा और 3 परिवारों से संबंधित 4 प्रजातियों का प्रतिनिधित्व करता है। पेट्रोडोफाइटिक समूह 77 प्रजातियों से युक्त पौधों की विविधता और समृद्धता के अच्छे विस्तार में सहायक है जिसमें आंतरिक वनों के पहाड़ी ढलानों के साथ वनस्पति का मुख्य भाग फर्न वृक्ष से संघटित है;

और, गालाथिया राष्ट्रीय उद्यान ज्वारीय दलदल वन (मैंग्रोव वन), तट वन (समुद्र तट वन), निचला स्तर सदाहरित वन (कोरल रीफ वन), उष्णकटिबंधीय सदाहरित वन (टुरु उष्णकटिबंधीय वन), दक्षिणी पहाड़ी-शिखर सदाहरित वन और फर्न ब्रेक से युक्त है। राष्ट्रीय उद्यान में इयूफोरबियाकिया, रूबियाकिया, अरेकाकिया, आर्किडाकिया और स्यपेराकिया और पोआकिया और अन्नोनाकिया परिवारों के सदस्य उच्च प्रतिनिधित्व दर्शाते हैं। क्षेत्र की वनस्पतियाँ की विशिष्टता इस प्रकार देखी जा सकती है कि मेलास्टोमाटाकिया की जेनेरा ओटेंथेरा और एस्ट्रोनिया, स्क्रोफुलारियाकिया के सराईटड्रोमिया, जेस्त्रेरियाकिया के साइरटेंड्र, इकाकीनाकिया के स्टेमोनुरुस, आर्किडाकिया के अरेकाकिया और स्पाथोगलोटीस से रहोपलोब्लास्टे और कई और प्रजातियां इन क्षेत्रों की स्थानिक प्रजातियां हैं;

और, क्षेत्र में स्थानिक वनस्पति प्रजातियां विद्यमान है जिसमें वृक्ष फर्नों जैसे *सफाईरोप्टेरिस एल्बो-सेताकेया* (*कयथेया एल्बो-सेताकेया*) और *सफाईरोप्टेरिस निकोबारिका* (*कयथेया निकोबारिका*) शामिल हैं। क्षेत्र में अन्य स्थानिक वनस्पति प्रजातियों में *प्रोनेपहरियम नाकाइकेयडम*, *अर्टाबोटाँयस निकोबारिअनुस*, *उवरिया निकोबारिका*, *चिसोचेटोन निकोबारिअनुस*, *निकोबारिओ डेंड्रोसलेयमेरी*, *कोन्नारूस निकोबारिकस*, *ओटांथेरा निकोबारेंसिस*, *ओफिआरहिंजा इंडुडिबुलारिस*, *ओफिओरहिंजा निकोबारिका*, *जास्मिनुम सयरिंगिफोलियम*, *चिलोकार्पुस डेनुडाटुस वार*, *निकोबारिकस*, *गेनिअंथुस होरेड*, *कयरटांड्रोइमिया निकोबारिका*, *कीरतंद्रा बुरट्टी*, *कीयरतांड्रा ओक्कीडेंटालिस*, *नोथोफोइबे निकोबारिकस*, *कलेइस्टांथुस बालाकरिसनानि*, *टरोगोनोस्टेमोन विल्लोसुस वार*, *निकोबारिकस*, *एरिडेस इमेरिकी*, *अनोइकटोचिलुस निकोबारिकस*, *डेंड्रोबियम शोम्पेनि*, *हॉर्नस्टेडिया फेंजली*, *फरयनियम पानिकुलातम*, *कलामुस निकोबारिकस*, *रहोपालोबालास्टे औगुस्टाटा*, *अग्लाओनेमा निकोबारिकम*, *होमालोमेना ग्रिफिथी वार*, *ओवाटेपाई जाती* हैं;

और, क्षेत्र के मंग्रोव वनों में उच्च उर्वर पारिस्थितिकी प्रणालियां हैं और कई पारिस्थितिकीय क्रियाएं हैं। क्षेत्र से मंग्रोव की 14 प्रजातियां अर्थात् *रहीजोफोरा अपिकुलाटा*, *बरूगुइरा गयन्नोरहिजा*, *सोन्नैराटिया कासेओलारिस*, आदि अभिलिखित की गई हैं। क्षेत्र के अन्य महत्वपूर्ण वनस्पति में बेल और कठलता जैसे *डेरिस ट्राइफोलियाटा*, *सारकोलोबुस ग्लोबोसुस*, *फिनलायसोनिया ओबोवाटा*, इफाइटीक फर्न और ऑकिड अर्थात् *एस्पलेनियम निडुस*, *डेंड्रोबियम कुमेनाटम* और *टरिचोगलोट्टिस चिरहिफेरा* शामिल हैं। संरक्षित क्षेत्र में संभावित और आर्थिक रूप से महत्वपूर्ण प्रजातियां जिसमें *नयपा फरुटिकनस* और *वानिल्ला अंडमानिका* शामिल हैं प्रचुर मात्रा में उगती हैं;

और, संरक्षित क्षेत्र में सिर्फ एक बारहमासी नदी अर्थात् गालाथिया है, जो कि कैम्पबेल खाड़ी राष्ट्रीय उद्यान से आरंभ होती है और गालाथिया राष्ट्रीय उद्यान से होते हुए दक्षिण की ओर बहती है। यह ज्याइंट लैडर बैक समुद्री कछुआ (*डेर्मोचेल्यस कोरिअकेया*), ओलिव रिडले कछुआ (*लेपिडोचेल्यस ओलिवाकेया*), ग्रीन समुद्री कछुआ (*चेलोनिया मायदास*) के लिए महत्वपूर्ण बसेरा स्थल खाड़ियों को बनाता है;

और, गालाथिया राष्ट्रीय उद्यान से जीवजंतु की कुल 330 प्रजातियां अभिलिखित की गई हैं जिसमें स्तनधारियों (3 मरीन स्तनधारी सहित) की 28 प्रजातियां, पक्षियों की 97 प्रजातियां, सरीसृपों की 23 प्रजातियां, उभयचरों की 10 प्रजातियां, तितलियों की 52 प्रजातियां, ऑडोनोट्स की 24 प्रजातियां, मकड़ियों की 20 प्रजातियां और जलीय हेमीप्टेनस की 76 प्रजातियां शामिल हैं;

और, गालाथिया राष्ट्रीय उद्यान वन्यजीव की विशेष विविधता के लिए जाना जाता है, राष्ट्रीय उद्यान से मुख्य संकटापन्न और स्थानिक जीवजंतु निकोबार क्रैब ईटिंग मैकाक्यू (*मकाका फस्किकुलारिस उम्बरोसा*), निकोबार वन्यजीव सूअर (*सस स्क्रोफा निकोबारिका*), डुगोंग (*डुगोंग डुगोन*), निकोबार ट्री श्रेव (*तुपाइया निकोबारिका निकोबारिका*), निकोबार फ्लांग लोमड़ी (*पटेरोपुस फौनुलुस*), स्पाइनी श्रेव (*करोकिडुरा निकोबारिका*) और निकोबार नोज्ड (*हिप्पोसिडेरोस अटेर निकोबारूलेया*), रेट (*रत्तुस बुरेस्केन्स*), (*रत्तुस बुरूस*), (*रत्तुस पुल्लिवेटर*), (*रत्तुस पाल्मारूम*), निकोबार पिपिस्ट्रेल्ले (*पिपिस्ट्रेल्लुस कामोटेंया*), अंडमान वाटर मॉनिटर (*वारानुस सल्वाटोर अंडमानेंसिस*), तिवारी गार्डन लिर्जाड (*कलोटेस डानिइलि*), इस्चूराइन मगरमच्छ (*क्रोकोडिलुस पोरसस*), अभिलिखित किए गए हैं;

और, क्षेत्र में महत्वपूर्ण स्थानिक पक्षी प्रजातियों में निकोबार बाघ बितर्न (गोरसाचिउस मेलानोफुस माइनर), निकोबार कोयल डव (*माक्रोरोपयगिया रूफिपेंनिस रूफिपेन्निस*), निकोबार इमेराल्ड डव (*चाल्कोफाप्स इंडिका औगुस्टा*), ग्रेट निकोबार क्रेस्टेड सरपेंट ईगल (*स्पिलोरनिस क्लोस्सिस*), निकोबार पेराडाइस फ्लाईकैचर (*टेरिसिपोन पेराडाइस निकोबारिका*), अंडमान श्री टोइड किंगफिशर (*केयक्स इरिथाकस माक्रोकूरुस*), निकोबार स्टोकबिल्लेड किंगफिशर (*पेलारगोप्सिस कापेंसिस*), निकोबार वाइट-कोल्लारेड किंगफिशर (हलकयोन च्लोरिस ओक्लिपिटालिस), अंडमान कोयल (*इयडयनामयस स्कोलोपाकेया डोलोसा*), निकोबार मेगापोडे (मेगापोडियस निकोबारिइंसिस), निकोबार हिल मैना (*ग्राकुला रेलिगिओसा हालिबरेकटा*), निकोबार बैक-नापेड ओरिओले (ओरिओलुस चिनेंसिस माक्रोउरुस), निकोबार स्कोपस ओवल (*ओटुस स्कोपस निकोबारिकस*), बल्यथस निकोबार पैराकिट (पसिट्टाकुला कानिकेपस), निकोबार रेडचीकड पैराकीट (पसिट्टाकुला लॉगिकउडा निकोबार), निकोबार कबूतर (*कैलोनियस निकोबारिका निकोबारिका*), निकोबार ग्रीन शाही कबूतर (*डुकुला एनेया निकोबारिका*), कटचेल शिकरा (*एकिपिटर बैजियस ऑब्सोलेटस*), निकोबार वाइट आई (*ज़ोस्टरोप्स पाल्पेबरोस अनिकोबारिका*), अंडमान ग्लॉसी स्टेयर (*एप्लॉनिस पैनयेन्सिस टाइलरी*), निकोबार ऑलिव बैकड सनबर्ड (*नेकरिनिया जुगुलारिस क्लोस्सिस*), निकोबार यल्लो बैकड सनबर्ड (*एथोपेगा सिपाराजा निकोबारिका*), अंडमान ग्रे रूमपेड स्विफ्टलेट (*कोल्लोकालिया फुकिफागा इनेक्पेकटाटा*), वाइट बेल्लीड स्विफ्टलेट (*कोल्लोकालिया इस्कलेंटा अपिफनिस*), निकोबार ग्राउंड थ्रश (*ज़ोथेरा सिट्रीन एल्बोगुलरिस*), आदि विद्यमान हैं;

और, गालाथिया राष्ट्रीय उद्यान संवेदनशील जनजाति समूहों, में से एक जनजाति शोम्पेन का वास स्थल है, जो कि शिकार करने और संचयन करने के चरण में है और वन संसाधन पर पूरी तरह से निर्भर है गालाथिया राष्ट्रीय उद्यान

सहित पारिस्थितिकी संवेदी जोन को अंडमान एवं निकोबार (आदिकालीन जनजातियों का संरक्षण) विनियमन, 1956 की धारा 3 के अधीन आदिवासी रिज़र्व के रूप में अधिसूचित किया गया, जिसमें वह अंडमान एवं निकोबार (आदिकालीन जनजातियों का संरक्षण) विनियमन, 1956 और वन्यजीव (संरक्षण) अधिनियम, 1972 की धारा 65 के अधीन वन संसाधनों पर उन्मुक्त अधिकारों का प्रयोग करते हैं;

और, कृषि उद्देश्यों के लिए भूमि के आबंटन और रिज़र्व क्षेत्र के अंतर्गत किसी भी भूमि में किसी भी ब्याज का अधिग्रहण या ऐसी भूमि पर उत्पादित फसलों को अंडमान और निकोबार (आदिकालीन जनजातियों का संरक्षण) विनियमन, 1956 की धारा 4 और धारा 6 के अधीन विनियमित किया जाता है;

और, रिज़र्व क्षेत्र में आदिकालीन जनजाति के किसी व्यक्ति के अलावा या आदिकालीन जनजाति के सदस्यों के अलावा व्यक्तियों की किसी श्रेणी के प्रवेश का विनियमन पूर्वोक्त विनियम की धारा 7 के अधीन किया जाएगा। इसके अतिरिक्त, बिक्री, विनियम, बंधक, पट्टे या अन्यथा द्वारा का आदिकालीन जनजाति के सदस्य के अलावा किसी अन्य व्यक्ति को हस्तांतरण अंडमान एवं निकोबार (आदिकालीन जनजातियों का संरक्षण) विनियमन, 1956 की धारा 5 के अधीन विनियमित किया जाएगा और ग्रेट निकोबार द्वीप की शोम्पेन जाति संबंधी नीति-2015 द्वारा सामाजिक, सांस्कृतिक और आर्थिक अखंडता, समुदाय की सुरक्षा, सामुदायिक कल्याण को प्रकट करने के साथ साथ प्राकृतिक वास की सुरक्षा निर्देशित होती है;

और, गालाथिया राष्ट्रीय उद्यान के चारों ओर के क्षेत्र को, जिसका विस्तार और सीमाएं इस अधिसूचना के पैराग्राफ 1 में विनिर्दिष्ट हैं, पारिस्थितिकी, पर्यावरणीय और जैव-विविधता की दृष्टि से पारिस्थितिकी संवेदी जोन के रूप में सुरक्षित और संरक्षित करना तथा उक्त पारिस्थितिकी संवेदी जोन में उद्योगों या उद्योगों की श्रेणियों के प्रचालन तथा प्रसंस्करण को प्रतिषिद्ध करना आवश्यक है;

अतः अब, केन्द्रीय सरकार, पर्यावरण (संरक्षण) नियमावली, 1986 के नियम 5 के उपनियम (3) के साथ पठित पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) (जिसे इसमें इसके पश्चात् पर्यावरण अधिनियम कहा गया है) की उपधारा (1) तथा धारा 3 की उपधारा (2) खंड (v) और खंड (xiv) एवं उपधारा (3) के द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, केंद्र शासित प्रदेश अंडमान और निकोबार द्वीप समूह के गालाथिया राष्ट्रीय उद्यान की सीमा के चारों ओर (0) शून्य से एक किलोमीटर तक विस्तारित क्षेत्र को पारिस्थितिकी संवेदी जोन (जिसे इसमें इसके पश्चात् पारिस्थितिकी संवेदी जोन कहा गया है) के रूप में अधिसूचित करती है, जिसका विवरण निम्नानुसार है, अर्थात्:-

1. **पारिस्थितिकी संवेदी जोन का विस्तार और सीमा.**-(1) पारिस्थितिकी संवेदी जोन का विस्तार गालाथिया राष्ट्रीय उद्यान की सीमा के चारों ओर 0 (शून्य) से 1 किलोमीटर तक विस्तृत है और पारिस्थितिकी संवेदी जोन का क्षेत्रफल **14.93 वर्ग किलोमीटर** है। न्यूनतम विस्तार 'शून्य' है क्योंकि ग्रेट निकोबार द्वीप का मुख्य भौगोलिक क्षेत्र संरक्षित क्षेत्र नेटवर्क और जनजातीय रिज़र्व के अंतर्गत इस तरह से कवर किया है कि क्षेत्र के आसपास समग्र विकास के लिए बहुत कम क्षेत्र बचा हुआ है। इसके अतिरिक्त, सूनामी, जल स्तर में वृद्धि जैसी आकस्मिक प्राकृतिक आपदा/प्रतिकूल प्रभाव से विकास और वास को सुरक्षित रखने के लिए विकास के लिए समुद्र-तट रेखा के साथ-साथ दिशा-निर्देशों सहित 750 मीटर का बफर क्षेत्र प्रस्तावित किया गया है। विकास योग्य क्षेत्र के लिए आवश्यक है कि वह समुद्रतट से दूर और राष्ट्रीय उद्यान की सीमा के निकट स्थित हो। इसके अतिरिक्त, विकास और मानवीय हस्तक्षेप के सभी क्रियाकलाप पहले से ही भारतीय वन अधिनियम, 1927 या वन संरक्षण अधिनियम, 1980 अथवा अंडमान एवं निकोबार (आदिकालीन जनजातियों का संरक्षण) विनियमन, 1956 द्वारा विनियमित है।

(2) पारिस्थितिकी संवेदी जोन की सीमा का विवरण और विस्तार **अनुलग्नक -I** के रूप में संलग्न है।

(3) भू-निर्देशांकों, सैटेलाइट चित्र और अवस्थान मानचित्र के साथ गालाथिया राष्ट्रीय उद्यान के पारिस्थितिकी संवेदी जोन का मानचित्र **अनुलग्नक -II क-ग** के रूप में संलग्न हैं।

(4) गालाथिया राष्ट्रीय उद्यान की सीमा और पारिस्थितिकी संवेदी जोन के भू-निर्देशांकों की सूची **अनुलग्नक -III की सारणी क और ख** के रूप में संलग्न हैं।

(5) पारिस्थितिकी संवेदी जोन के अंतर्गत कोई राजस्व ग्राम स्थित नहीं है।

2. पारिस्थितिकी संवेदी जोन के लिए आंचलिक महायोजना.—(1) संघ राज्य सरकार, द्वारा पारिस्थितिकी संवेदी जोन के प्रयोजन के लिए, राजपत्र में अंतिम अधिसूचना के प्रकाशन की तारीख से दो वर्ष की अवधि के भीतर, स्थानीय व्यक्तियों के परामर्श से और इस अधिसूचना में दिए गए अनुबंधों का पालन करते हुए, केंद्र शासित राज्य के सक्षम प्राधिकारी के अनुमोदनार्थ एक आंचलिक महायोजना बनाई जायेगी।

(2) केंद्र शासित प्रदेश द्वारा पारिस्थितिकी संवेदी जोन के लिए आंचलिक महायोजना इस अधिसूचना में विनिर्दिष्ट रीति से तथा प्रासंगिक केंद्रीय और राज्य विधियों के अनुरूप तथा केंद्र सरकार द्वारा जारी दिशा निर्देशों, यदि कोई हों, के अनुसार बनायी जाएगी।

(3) आंचलिक महायोजना में पारिस्थितिकी और पर्यावरण संबंधी सरोकारों को शामिल करने के लिए इसे केंद्र शासित सरकार के निम्नलिखित विभागों के परामर्श से बनाया जाएगा, अर्थात्:-

- (i) पर्यावरण;
- (ii) वन और वन्यजीव;
- (iii) कृषि;
- (iv) पशुपालन;
- (v) अंडमान लोक निर्माण विभाग;
- (vi) राजस्व;
- (vii) मत्स्य; और
- (viii) अंडमान एवं लक्षद्वीप बंदरगाह निर्माण (एएलएचडब्ल्यू) और अन्य अनुसंधान संगठन।

(4) जब तक इस अधिसूचना में विनिर्दिष्ट न हो, आंचलिक महायोजना में वर्तमान में अनुमोदित भू-उपयोग, अवसंरचना और क्रियाकलापों पर कोई प्रतिबंध नहीं लगाया जाएगा तथा आंचलिक महायोजना में सभी अवसंरचनाओं और क्रियाकलापों में सुधार करके उन्हें अधिक दक्ष और पारिस्थितिकी-अनुकूल बनाने की व्यवस्था की जाएगी।

(5) आंचलिक महायोजना में वनरहित और अवक्रमित क्षेत्रों के सुधार, विद्यमान जल निकायों के संरक्षण, जलग्रहण क्षेत्रों के प्रबंधन, जल-संभरों के प्रबंधन, भू-जल के प्रबंधन, मृदा और नमी के संरक्षण, स्थानीय जनता की आवश्यकताओं तथा पारिस्थितिकी एवं पर्यावरण के ऐसे अन्य पहलुओं की व्यवस्था की जाएगी जिन पर ध्यान दिया जाना आवश्यक है।

(6) आंचलिक महायोजना ग्रेट निकोबार द्वीप-2015 के शोम्पेन जनजाति संबंधी नीति और अंडमान एवं निकोबार (आदिकालीन जनजातियों का संरक्षण) विनियमन, 1956 में किए गए प्रावधानों को ध्यान में रखते हुए तैयार की जाएगी।

(7) आंचलिक महायोजना द्वारा पारिस्थितिकी संवेदी जोन में होने वाले विकास का विनियमन किया जाएगा और ग्रेट निकोबार द्वीप-2015 के शोम्पेन जनजाति संबंधी नीति में प्रतिष्ठापित और अंडमान एवं निकोबार (आदिकालीन जनजातियों का संरक्षण) विनियमन, 1956 में किए गए प्रावधानों को विशेष रूप से संवेदनशील जनजाति समूह

(पीवीटीजी) के बचाव, सुरक्षा और कल्याण को ध्यान में रखते हुए पैराग्राफ 4 में सारणी में सूचीबद्ध प्रतिषिद्ध, विनियमित कार्यकलापों का पालन किया जाएगा।

(8) आंचलिक महायोजना में सभी विद्यमान पूजा स्थलों, ग्रामों एवं शहरी बस्तियों, वनों की श्रेणियों एवं किस्मों, कृषि क्षेत्रों, उपजाऊ भूमि, उद्यानों एवं उद्यानों की तरह के हरित क्षेत्रों, बागवानी क्षेत्रों, बगीचों, झीलों और अन्य जल निकायों की सीमा का सहायक मानचित्र के साथ निर्धारण किया जाएगा और मौजूदा और प्रस्तावित भू-उपयोग की विशेषताओं का ब्यौरा भी दिया जाएगा।

(9) आंचलिक महायोजना में पारिस्थितिकी संवेदी जोन में होने वाले विकास का विनियमन किया जाएगा और पैराग्राफ 4 में सारणी में यथासूचीबद्ध प्रतिषिद्ध एवं विनियमित क्रियाकलापों का पालन किया जाएगा। इसमें स्थानीय जनता की आजीविका की सुरक्षा के लिए पारिस्थितिकी-अनुकूल विकास का भी सुनिश्चय एवं संवर्धन किया जाएगा।

(10) आंचलिक महायोजना, क्षेत्रीय विकास योजना की सह-कालिक होगी।

(11) अनुमोदित आंचलिक महायोजना, निगरानी समिति के लिए एक संदर्भ दस्तावेज होगी ताकि वह इस अधिसूचना के उपबंधों के अनुसार निगरानी के अपने कर्तव्यों का निर्वहन कर सके।

3. केंद्र शासित प्रदेश द्वारा किए जाने वाले उपाय.- केंद्र शासित प्रदेश अधिसूचना के उपबंधों को प्रभावी बनाने के लिए निम्नलिखित उपाय करेगी, अर्थात्:-

(1) **भू-उपयोग.-** (क) पारिस्थितिकी संवेदी जोन में वनों, बागवानी क्षेत्रों, कृषि क्षेत्रों, मनोरंजन के लिए चिन्हित उद्यानों और खुले स्थानों का वृहद वाणिज्यिक या आवासीय परिसरों या औद्योगिक क्रियाकलापों के लिए प्रयोग या संपरिवर्तन अनुमति नहीं किया जाएगा:

परंतु पारिस्थितिकी संवेदी जोन के भीतर भाग (क), में विनिर्दिष्ट प्रयोजन से भिन्न प्रयोजन के लिए कृषि और अन्य भूमि का संपरिवर्तन, निगरानी समिति की सिफारिश पर और सक्षम प्राधिकारी के पूर्व अनुमोदन से क्षेत्रीय नगर योजना अधिनियम तथा यथा लागू केन्द्रीय सरकार एवं केंद्र शासित सरकार के अन्य नियमों एवं विनियमों के अधीन तथा इस अधिसूचना के उपबंधों के अनुसार स्थानीय निवासियों की निम्नलिखित आवासीय जरूरतों को पूरा करने के लिए अनुमत किया जाएगा जैसे:-

- (i) विद्यमान सड़कों को चौड़ा करना, उन्हें सुदृढ़ करना और नई सड़कों का निर्माण करना;
- (ii) बुनियादी ढांचों और नागरिक सुविधाओं का संनिर्माण और नवीकरण;
- (iii) प्रदूषण उत्पन्न न करने वाले लघु उद्योग;
- (iv) कुटीर उद्योग एवं ग्राम उद्योग; पारिस्थितिकी पर्यटन में सहायक सुविधा भण्डार, और स्थानीय सुविधाएं तथा गृह वास; और
- (v) पैराग्राफ-4 में उल्लिखित बढ़ावा दिए गए क्रियाकलाप:

परंतु यह भी कि क्षेत्रीय शहरी नियोजन अधिनियम के अधीन सक्षम प्राधिकारी के पूर्व अनुमोदन के बिना तथा राज्य सरकार के अन्य नियमों एवं विनियमों एवं संविधान के अनुच्छेद 244 के उपबंधों तथा तत्समय प्रवृत्त विधि, जिसके अंतर्गत अनुसूचित जनजाति और अन्य परंपरागत वन निवासी (वन अधिकारों की मान्यता) अधिनियम, 2006 (2007 का 2) भी आता है, का अनुपालन किए बिना वाणिज्यिक या औद्योगिक विकास क्रियाकलापों के लिए जनजातीय भूमि का प्रयोग अनुमत नहीं होगा:

अंडमान एवं निकोबार (आदिकालीन जनजातियों का संरक्षण) विनियमन, 1956 की धारा 4,5 और 6 में किए गए प्रावधानों के अनुसार भूमि उपयोग को विनियमित किया जाएगा:

परंतु यह भी कि पारिस्थितिकी संवेदी जोन के अंतर्गत आने वाली भूमि के अभिलेखों में हुई किसी त्रुटि को, निगरानी समिति के विचार प्राप्त करने के पश्चात्, संघ राज्य सरकार द्वारा प्रत्येक मामले में एक बार सुधारा जाएगा और उक्त त्रुटि को सुधारने की सूचना केंद्रीय सरकार के पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय को दी जाएगी:

परंतु यह भी कि उपर्युक्त त्रुटि को सुधारने में, इस उप-पैरा में यथा उपबंधित के सिवाय, किसी भी दशा में भू-उपयोग का परिवर्तन शामिल नहीं होगा।

(ख) अनुप्रयुक्त या अनुत्पादक कृषि क्षेत्रों में पुनः वनीकरण तथा पर्यावासों की बहाली के प्रयास किए जाएंगे।

(2) **प्राकृतिक जल स्रोत.**- सभी प्राकृतिक जलमार्गों के जलग्रहण क्षेत्रों की पहचान की जाएगी और आंचलिक महायोजना में उनके संरक्षण और बहाली की योजना सम्मिलित की जाएगी और केंद्र शासित सरकार द्वारा दिशा-निर्देश इस रीति से तैयार किए जाएंगे कि उसमें ऐसे क्षेत्रों में या उसके पास विकास क्रियाकलापों को प्रतिषिद्ध और निर्बंधित किया गया हो।

(3) **पर्यटन एवं पारिस्थितिकी पर्यटन.**- (क) पारिस्थितिकी संवेदी जोन में सभी नए पारिस्थितिकी पर्यटन क्रियाकलाप या विद्यमान पर्यटन क्रियाकलापों का विस्तार पारिस्थितिकी संवेदी जोन संबंधी पर्यटन महायोजना के अनुसार अनुमत होगा।

(ख) पारिस्थितिकी पर्यटन महायोजना केंद्र शासित सरकार के पर्यावरण और वन विभाग के परामर्श से पर्यटन विभाग द्वारा बनायी जाएगी।

(ग) पर्यटन महायोजना आंचलिक महायोजना का घटक होगी।

(घ) पर्यटन महायोजना पारिस्थितिकी संवेदी जोन की वहन क्षमता के आधार पर तैयार की जायेगी।

(ङ) पारिस्थितिकी पर्यटन संबंधी क्रियाकलाप निम्नानुसार विनियमित किए जाएंगे, अर्थात्:-

(i) संरक्षित क्षेत्र की सीमा से एक किलोमीटर के भीतर या पारिस्थितिकी संवेदी जोन की सीमा तक, इनमें से जो भी अधिक निकट हो, किसी होटल या रिजॉर्ट का नया सन्निर्माण अनुमत नहीं किया जाएगा:

परंतु यह, पारिस्थितिकी पर्यटन सुविधाओं के लिए संरक्षित क्षेत्र की सीमा से एक किलोमीटर की दूरी से परे पारिस्थितिकी संवेदी जोन की सीमा तक पूर्व परिभाषित और अभीहित क्षेत्रों में पर्यटन महायोजना के अनुसार, नए होटलों और रिजॉर्ट की स्थापना अनुमत होगी;

(ii) पारिस्थितिकी संवेदी जोन के अन्दर सभी नए पर्यटन क्रिया-कलापों या विद्यमान पर्यटन क्रियाकलापों का विस्तार, केंद्रीय सरकार के पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय द्वारा जारी दिशानिर्देशों तथा पारिस्थितिकी पर्यटन, पारिस्थितिकीविकास-शिक्षा और पारिस्थितिकी-पर बल देने वाले राष्ट्रीय व्याघ्र संरक्षण प्राधिकरण द्वारा जारी पारिस्थितिकी पर्यटन संबंधी दिशानिर्देशों (समय-समय पर यथा संशोधित) के अनुसार होगा;

(iii) आंचलिक महायोजना का अनुमोदन होने तक, पर्यटन के विकास और विद्यमान पर्यटन क्रियाकलापों के विस्तार को वास्तविक स्थल-विशिष्ट संवीक्षा तथा निगरानी समिति की सिफारिश के आधार पर संबंधित विनियामक प्राधिकरणों द्वारा अनुमत किया जाएगा और पारिस्थितिकी संवेदी जोन में किसी नए होटल/ रिजॉर्ट या वाणिज्यिक प्रतिष्ठान का सन्निर्माण अनुमत नहीं होगा।

(4) **प्राकृतिक विरासत.**- पारिस्थितिकी संवेदी जोन के अंतर्गत आने वाले बहुमूल्य प्राकृतिक विरासत के सभी स्थलों जैसे कि जीन पूल रिजर्व क्षेत्र, शैल संरचना, जल प्रपात, झरने, दर्रे, उपवन, गुफाएं, स्थल, वनपथ, रोहण मार्ग, उत्प्रपात आदि की पहचान की जाएगी और उनकी सुरक्षा एवं संरक्षण के लिए आंचलिक महायोजना के भाग के रूप में एक विरासत संरक्षण योजना बनायी जाएगी।

(5) **मानव निर्मित विरासत स्थल.**- पारिस्थितिकी संवेदी जोन में भवनों, संरचनाओं, कलाकृति-क्षेत्रों तथा ऐतिहासिक, स्थापत्य संबन्धी, सौंदर्यात्मक और सांस्कृतिक महत्व के क्षेत्रों की पहचान की जाएगी और उनके संरक्षण के लिए आंचलिक महायोजना के भाग के रूप में एक विरासत संरक्षण योजना बनायी जाएगी।

(6) **ध्वनि प्रदूषण.**- पर्यावरण अधिनियम के अधीन ध्वनि प्रदूषण (विनियमन और नियंत्रण) नियम, 2000 में नियत उपबंधों के अनुसार पारिस्थितिकी संवेदी जोन में ध्वनि प्रदूषण की रोकथाम और नियंत्रण किया जाएगा।

(7) **वायु प्रदूषण.**- पारिस्थितिकी संवेदी जोन में, वायु प्रदूषण का निवारण और नियंत्रण, वायु (प्रदूषण निवारण और नियंत्रण) अधिनियम, 1981 (1981 का 14) और उसके अधीन बनाए गए नियमों के उपबंधों के अनुसार किया जाएगा।

(8) **बहिस्त्राव का निस्सरण.**- पारिस्थितिकी संवेदी जोन में उपचारित बहिस्त्राव का निस्सरण, पर्यावरण अधिनियम और उसके अधीन बनाए गए नियमों के अधीन आने वाले पर्यावरणीय प्रदूषकों के निस्सरण के लिए साधारण मानकों या केंद्र शासित द्वारा नियत मानकों, जो भी अधिक कठोर हो, के उपबंधों के अनुसार होगा।

(9) **ठोस अपशिष्ट.**- ठोस अपशिष्ट का निपटान एवं प्रबन्धन निम्नानुसार किया जाएगा:-

(i) पारिस्थितिकी संवेदी जोन में ठोस अपशिष्ट का निपटान और प्रबंधन भारत सरकार के पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय की समय-समय पर यथा संशोधित अधिसूचना सं. का.आ. 1357(अ), दिनांक 8 अप्रैल, 2016 के तहत प्रकाशित ठोस अपशिष्ट प्रबंधन नियम, 2016 के उपबंधों के अनुसार किया जाएगा; अकार्बनिक पदार्थों का निपटान पारिस्थितिकी संवेदी जोन से बाहर चिन्हित किए गए स्थानों पर पर्यावरण-अनुकूल रीति से किया जाएगा;

(ii) पारिस्थितिकी संवेदी जोन में मान्य प्रौद्योगिकियों का प्रयोग करते हुए विद्यमान नियमों और विनियमों के अनुरूप ठोस अपशिष्ट का सुरक्षित और पर्यावरण अनुकूल प्रबंधन अनुमत किया जायेगा।

(10) **जैव चिकित्सा अपशिष्ट.**- जैव चिकित्सा अपशिष्ट का प्रबंधन निम्नानुसार किया जाएगा:-

(i) पारिस्थितिकी संवेदी जोन में जैव चिकित्सा अपशिष्ट का निपटान भारत सरकार के पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय की समय-समय पर यथा संशोधित अधिसूचना सं.सा.का.नि 343 (अ), तारीख 28 मार्च, 2016 के तहत प्रकाशित जैव चिकित्सा अपशिष्ट प्रबंधन नियम, 2016 के उपबंधों के अनुसार किया जाएगा।

(ii) पारिस्थितिकी संवेदी जोन में मान्य प्रौद्योगिकियों का प्रयोग करते हुए विद्यमान नियमों और विनियमों के अनुरूप ठोस अपशिष्ट का सुरक्षित और पर्यावरण अनुकूल प्रबंधन अनुमत किया जायेगा।

(11) **प्लास्टिक अपशिष्ट का प्रबंधन.**- पारिस्थितिकी संवेदी जोन में प्लास्टिक अपशिष्ट का प्रबंधन, भारत सरकार के पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय की समय-समय पर यथा संशोधित अधिसूचना सं.सा.का.नि 340(अ), तारीख 18 मार्च, 2016 के तहत प्रकाशित प्लास्टिक अपशिष्ट प्रबंधन नियम, 2016 के उपबंधों के अनुसार किया जाएगा।

(12) **निर्माण और विध्वंस अपशिष्ट का प्रबंधन.**- पारिस्थितिकी संवेदी जोन में निर्माण और विध्वंस अपशिष्ट का प्रबंधन, भारत सरकार के पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय की समय-समय पर यथा संशोधित अधिसूचना सं.सा.का.नि 317(अ), तारीख 29 मार्च, 2016 के तहत प्रकाशित निर्माण और विध्वंस अपशिष्ट प्रबंधन नियम, 2016 के उपबंधों के अनुसार किया जाएगा।

(13) **ई-अपशिष्ट.**- पारिस्थितिकी संवेदी जोन में ई-अपशिष्ट का प्रबंधन, भारत सरकार के पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय द्वारा प्रकाशित तथा समय-समय पर यथा संशोधित ई-अपशिष्ट प्रबंधन नियम, 2016 के उपबंधों के अनुसार किया जाएगा।

(14) **सड़क-यातायात.**- सड़क-यातायात को पर्यावास-अनुकूल तरीके से विनियमित किया जाएगा और इस संबंध में आंचलिक महायोजना में विशेष उपबंध शामिल किए जाएंगे। आंचलिक महायोजना के तैयार होने और केंद्र शासित सरकार

के सक्षम प्राधिकारी से अनुमोदित होने तक, निगरानी समिति प्रासंगिक अधिनियमों और उनके तहत बनाए गए नियमों एवं विनियमों के अनुसार सड़क-यातायात के अनुपालन की निगरानी करेगी।

(15) **वाहन जनित प्रदूषण.**- वाहन जनित प्रदूषण की रोकथाम और नियंत्रण लागू विधियों के अनुसार किया जाएगा। स्वच्छतर ईंधन के उपयोग के लिए प्रयास किए जाएंगे।

(16) **औद्योगिक इकाइयां.**- (क) सरकारी राजपत्र में इस अधिसूचना के प्रकाशन की तारीख को या उसके बाद पारिस्थितिकी संवेदी जोन में किसी नए प्रदूषणकारी उद्योग की स्थापना की अनुमति नहीं होगी।

(ख) जब तक इस अधिसूचना में विनिर्दिष्ट न हो, पारिस्थितिकी संवेदी जोन में केंद्रीय प्रदूषण नियंत्रण बोर्ड द्वारा फरवरी, 2016 में जारी दिशानिर्देशों में किए गए उद्योगों के वर्गीकरण के अनुसार केवल गैर-प्रदूषणकारी उद्योगों की स्थापना अनुमत होगी। इसके अतिरिक्त, गैर-प्रदूषणकारी कुटीर उद्योगों को बढ़ावा दिया जाएगा।

(17) **पहाड़ी ढलानों का संरक्षण.**- पहाड़ी ढलानों का संरक्षण निम्नानुसार किया जाएगा:-

(क) आंचलिक महायोजना में पहाड़ी ढलानों के उन क्षेत्रों को दर्शाया जाएगा जिनमें किसी भी संनिर्माण की अनुज्ञा नहीं होगी;

(ख) जिन ढलानों या विद्यमान खड़ी पहाड़ी ढलानों में अत्यधिक भू-क्षरण होता है उनमें किसी भी संनिर्माण की अनुज्ञा नहीं होगी।

4. **पारिस्थितिकी संवेदी जोन में प्रतिषिद्ध या विनियमित किए जाने वाले क्रियाकलापों की सूची-** पारिस्थितिकी संवेदी जोन में सभी क्रियाकलाप, पर्यावरण अधिनियम उसके अधीन बने नियमों के उपबंधों जिसमें तटीय विनियमन जोन, 2011 एवं पर्यावरणीय प्रभाव आकलन अधिसूचना, 2006 शामिल है सहित वन (संरक्षण) अधिनियम, 1980 (1980 का 69), भारतीय वन अधिनियम, 1927 (1927 का 16), वन्यजीव (संरक्षण) अधिनियम, 1972 (1972 का 53) अन्य लागू नियमों तथा उनमें किए गए संशोधनों के अनुसार शासित होंगे और नीचे दी गई सारणी में विनिर्दिष्ट रीति से विनियमित होंगे, अर्थात्:-

सारणी

क्रम सं. (1)	क्रियाकलाप (2)	टिप्पणी (3)
क. प्रतिषिद्ध क्रियाकलाप		
1.	वाणिज्यिक खनन, पत्थर उत्खनन और अपघर्षण इकाइयां।	(क) पारिस्थितिकी संवेदी जोन के अंतर्गत वास्तविक स्थानीय निवासियों की घरेलू आवश्यकताओं जिसमें मकानों के संनिर्माण या मरम्मत के लिए धरती को खोदना सम्मिलित है, के सिवाय सभी प्रकार के नए और विद्यमान खनन (लघु और वृहत खनिज), पत्थर उत्खनन और अपघर्षण इकाइयां तत्काल प्रभाव से प्रतिषिद्ध होंगी; (ख) खनन प्रचालन, 1995 की रिट याचिका (सिविल) सं. 202 में टी.एन. गौडाबर्मन थिरूमूलपाद बनाम भारत संघ के मामले में माननीय उच्चतम न्यायालय के आदेश 4 अगस्त, 2006 और 2012 की रिट याचिका (सिविल) सं. 435 में गोवा फाउंडेशन बनाम भारत संघ के मामले में तारीख 21 अप्रैल, 2014 के आदेश के अनुसरण में होगा।

2.	प्रदूषण (जल, वायु, मृदा, ध्वनि, आदि) उत्पन्न करने वाले उद्योगों की स्थापना।	पारिस्थितिकी संवेदी जोन में कोई नया उद्योग लगाने और वर्तमान प्रदूषणकारी उद्योगों का विस्तार करने की अनुमति नहीं होगी: जब तक कि इस अधिसूचना में विनिर्दिष्ट न हो, पारिस्थितिकी संवेदी जोन में फरवरी, 2016, में केंद्रीय प्रदूषण नियंत्रण बोर्ड द्वारा जारी दिशानिर्देशों में किए गए उद्योगों के वर्गीकरण के अनुसार केवल गैर- प्रदूषणकारी उद्योगों की स्थापना होगी। इसके अतिरिक्त, गैर-प्रदूषणकारी कुटीर उद्योगों को प्रोत्साहन दिया जाएगा।
3.	बड़ी जल विद्युत परियोजनाओं की स्थापना।	प्रतिषिद्ध।
4.	किसी परिसंकटमय पदार्थ का प्रयोग या उत्पादन या प्रसंस्करण।	प्रतिषिद्ध।
5.	प्राकृतिक जल निकायों या भूमि क्षेत्र में अनुपचारित बहिष्कावों का निस्सरण।	प्रतिषिद्ध।
6.	नई आरा मिलों की स्थापना।	पारिस्थितिकी संवेदी जोन के भीतर नई और विद्यमान आरा मिलों का विस्तार अनुमत नहीं होगा।
7.	ईट भट्टों की स्थापना करना।	प्रतिषिद्ध।
8.	पोलिथीन बैगों का प्रयोग।	प्रतिषिद्ध।
9.	जलावन लकड़ियों का वाणिज्यिक प्रयोग।	प्रतिषिद्ध।
10.	होटलों और रिसोर्टों की वाणिज्यिक स्थापना।	प्रतिषिद्ध।
11.	संनिर्माण क्रियाकलाप।	प्रतिषिद्ध।
12.	गैर प्रदूषणकारी लघु उद्योग।	प्रतिषिद्ध।
13.	वृक्षों की कटाई।	प्रतिषिद्ध।
14.	सतही और भूजल का वाणिज्यिक प्रयोग एवं निष्कर्षण।	प्रतिषिद्ध।
15.	विदेशी प्रजातियों को लाना।	प्रतिषिद्ध।
16.	बड़े पैमाने पर वाणिज्यिक तरीके से यंत्रिकृत नाव की मदद से नदी जल कृषि और मत्स्य ग्रहण।	प्रतिषिद्ध।
ख. विनियमित क्रियाकलाप		
17.	विद्युत और संचार टॉवर लगाने, तार-बिछाने तथा अन्य बुनियादी ढांचे की व्यवस्था।	लागू विधियों के अधीन विनियमित होगा (भूमिगत केवल बिछाने को बढ़ावा दिया जाएगा)।
18.	नागरिक सुविधाओं सहित बुनियादी ढांचा।	लागू विधियों, नियमों और विनियमनों और उपलब्ध दिशानिर्देशों के अनुसार न्यूनीकरण उपाय किए जाएंगे।

19.	विद्यमान सड़कों को चौड़ा करना, उन्हें सुदृढ़ बनाना और नई सड़कों का निर्माण।	लागू विधियों, नियमों और विनियमनों और उपलब्ध दिशानिर्देशों के अनुसार न्यूनीकरण उपाय किए जाएंगे।
20.	पर्यटन से संबंधित अन्य क्रियाकलाप जैसे कि पारिस्थितिकी संवेदी जोन क्षेत्र के ऊपर से गर्म वायु के गुब्बारे, हेलीकाप्टर, ड्रोन, माइक्रोलाइट्स उड़ाना आदि।	लागू विधियों के अधीन विनियमित होगा।
21.	रात्रि में वाहन यातायात का संचलन।	लागू विधियों के अधीन वाणिज्यिक प्रयोजन के लिए विनियमित होगा।
22.	स्थानीय जनता द्वारा अपनायी जा रही वर्तमान कृषि और बागवानी पद्धतियों के साथ डेयरियां, दुग्ध उत्पादन, जल कृषि और मत्स्य पालन।	स्थानीय जनता के प्रयोग के लिए लागू विधियों के अधीन अनुमत होंगे।
23.	प्राकृतिक जल निकायों या भू क्षेत्र में उपचारित अपशिष्ट जल/बहिर्स्राव का निस्सरण।	जल निकायों में उपचारित अपशिष्ट जल/बहिर्स्राव के निस्सरण से बचा जाएगा। उपचारित अपशिष्ट जल के पुनर्चक्रण और पुनःउपयोग के प्रयास किए जाएंगे अन्यथा उपचारित अपशिष्ट जल/बहिर्स्राव का निस्सरण लागू विधियों के अनुसार विनियमित किया जाएगा।
24.	फर्मों, कारपोरेट, कंपनियों द्वारा बड़े पैमाने पर वाणिज्यिक पशुधन संपदा और कुक्कुट फार्मों की स्थापना।	स्थानीय आवश्यकताओं को पूरा करने के सिवाय लागू विधियों के अधीन विनियमित (अन्यथा उपबंधित के अलावा) होंगे।
25.	कृषि और अन्य उपयोग के लिए खुले कुंआ, बोर कुंआ, आदि।	विनियमित और उपयुक्त प्राधिकारी द्वारा क्रियाकलापों की सख्ती से निगरानी की जायेगी।
26.	टोस अपशिष्ट का प्रबंधन।	लागू विधियों के अधीन विनियमित होगा।
27.	पारिस्थितिकी पर्यटन।	लागू विधियों के अधीन विनियमित होगा।
28.	वाणिज्यिक संकेत बोर्ड और होर्डिंग का प्रयोग।	लागू विधियों के अधीन विनियमित होगा।
29.	पारम्परिक मत्स्य पालन।	लागू विधियों के अधीन विनियमित होगा।
ग.संबंधित क्रियाकलाप		
30.	वन उत्पादों और गैर काष्ठ वन उत्पादों का संग्रहण।	अंडमान एवं निकोबार (आदिकालीन जनजातियों का संरक्षण) विनियमन, 1956 में उपबंधित पीवीटीजी (शोम्पेन) एवं निकोबारियों की प्रामाणिक आवश्यकता को पूरा करने के लिए अनुमति दी गई।
31.	पहाड़ी ढालों और नदी तटों का संरक्षण।	पीवीटीजी (शोम्पेन) की आजीविका को प्रभावित किए बिना यथासंभव बढ़ावा देना है।
32.	पीवीटीजी एवं निकोबारियों द्वारा	जीविका आवश्यकता के लिए बढ़ावा दिया जाएगा।

	कृषि और बागवानी पद्धतियां।	
33.	वर्षा जल संचय ।	सक्रिय रूप से बढ़ावा दिया जाएगा ।
34.	जैविक खेती।	सक्रिय रूप से बढ़ावा दिया जाएगा ।
35.	सभी गतिविधियों के लिए हरित प्रौद्योगिकी का अंगीकरण ।	सक्रिय रूप से बढ़ावा दिया जाएगा ।
36.	ग्रामीण कारीगरी सहित कुटीर उद्योग।	सक्रिय रूप से बढ़ावा दिया जाएगा ।
37.	नवीकरणीय ऊर्जा और ईंधन का प्रयोग ।	बायोगैस, सौर प्रकाश इत्यादि को सक्रिय बढ़ावा दिया जाएगा।
38.	कृषि वानिकी ।	सक्रिय रूप से बढ़ावा दिया जाएगा ।
39.	बागान लगाना और जड़ी बूटियों का रोपण ।	सक्रिय रूप से बढ़ावा दिया जाएगा ।
40.	पारिस्थितिकी अनुकूल यातायात का प्रयोग ।	सक्रिय रूप से बढ़ावा दिया जाएगा ।
41.	कौशल विकास ।	सक्रिय रूप से बढ़ावा दिया जाएगा ।
42.	अवक्रमित भूमि/वनों/ पर्यावासों की बहाली ।	सक्रिय रूप से बढ़ावा दिया जाएगा ।
43.	पर्यावरण के प्रति जागरूकता।	सक्रिय रूप से बढ़ावा दिया जाएगा ।

5. निगरानी समिति.- पर्यावरण (संरक्षण) अधिनियम, 1986 की धारा 3 की उपधारा (3) के तहत इस अधिसूचना के उपबंधों की प्रभावी निगरानी के लिए केन्द्रीय सरकार एतद्वारा एक निगरानी समिति का गठन करेगी जो निम्नलिखित से मिलकर बनेगी, नामतः

क्र.स.	निगरानी समिति का गठन	पद
1.	उपायुक्त, निकोबार जिला	अध्यक्ष;
2.	सदस्य, जिला परिषद, कैम्पबेल खाड़ी	सदस्य;
3.	कार्यकारी अभियंता, अंडमान लोक निर्माण विभाग, कैम्पबेल खाड़ी	सदस्य;
4.	निदेशक, कृषि विभाग या प्रतिनिधि,	सदस्य;
5.	निदेशक, मत्स्य या प्रतिनिधि	सदस्य;
6.	वरिष्ठ पशु चिकित्सा अधिकारी, कैम्पबेल खाड़ी	सदस्य;
7.	केंद्र शासित सरकार द्वारा तीन साल के लिए पर्यावरण (विरासत संरक्षण सहित) के क्षेत्र में काम करने वाले गैर-सरकारी संगठन का एक प्रतिनिधि	सदस्य;
8.	केंद्र शासित सरकार द्वारा नामित एक प्रतिष्ठित संस्थान से पर्यावरण या पारिस्थितिकी या वन्यजीव में एक विशेषज्ञ	सदस्य;
9.	अंडमान और निकोबार द्वीप समूह जैव विविधता परिषद के प्रतिनिधि	सदस्य;
10.	प्रभागीय वन अधिकारी, निकोबार प्रभाग	सदस्य- सचिव

6.विचारार्थ विषय:- (1) निगरानी समिति इस अधिसूचना के उपबंधों के अनुपालन की निगरानी करेगी।

(2) निगरानी समिति का कार्यकाल तीन वर्ष तक या केंद्र शासित सरकार द्वारा नई समिति का पुनर्गठन किए जाने तक होगा और इसके बाद निगरानी समिति केंद्र शासित सरकार द्वारा गठित की जाएगी।

(3) पारिस्थितिकी संवेदी जोन में भारत सरकार के तत्कालीन पर्यावरण और वन मंत्रालय की अधिसूचना सं. का.आ. 1533(अ), तारीख 14 सितंबर, 2006 की अनुसूची में सम्मिलित और पारिस्थितिकीय संवेदी जोन में आने वाले क्रियाकलापों और इस अधिसूचना के पैराग्राफ 4 के अधीन सारणी में यथा विनिर्दिष्ट प्रतिषिद्ध गतिविधियों के सिवाय आने वाले ऐसे क्रियाकलापों की वास्तविक विनिर्दिष्ट स्थलीय दशाओं के आधार पर निगरानी समिति द्वारा संवीक्षा की जाएगी और उक्त अधिसूचना के उपबंधों के अधीन पूर्व पर्यावरण अनापत्ति लेने के लिए केन्द्रीय सरकार के पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय को निर्दिष्ट की जाएगी।

(4) इस अधिसूचना के पैरा 4 के अधीन सारणी में यथा विनिर्दिष्ट प्रतिषिद्ध क्रियाकलापों के सिवाय, भारत सरकार के तत्कालीन पर्यावरण और वन मंत्रालय की अधिसूचना संख्या का.आ. 1533(अ), तारीख 14 सितंबर, 2006 की अधिसूचना के अनुसूची के अधीन ऐसे क्रियाकलापों, जिन्हें सम्मिलित नहीं किया गया है, परंतु जो पारिस्थितिकी संवेदी जोन में आते हैं, ऐसे क्रियाकलापों की वास्तविक विनिर्दिष्ट स्थलीय दशाओं के आधार पर निगरानी समिति द्वारा संवीक्षा की जाएगी और उसे संबद्ध विनियामक प्राधिकरणों को निर्दिष्ट किया जाएगा।

(5) निगरानी समिति का सदस्य-सचिव या संबंधित उपायुक्त ऐसे व्यक्ति के विरुद्ध, जो इस अधिसूचना के किसी उपबंध का उल्लंघन करता है, पर्यावरण अधिनियम की धारा 19 के अधीन परिवाद दायर करने के लिए सक्षम होगा।

(6) निगरानी समिति संबंधित विभागों के प्रतिनिधियों या विशेषज्ञों, औद्योगिक संघों के प्रतिनिधियों या संबंधित पक्षों को, प्रत्येक मामले में आवश्यकता के अनुसार, अपने विचार-विमर्श में सहायता के लिए आमंत्रित कर सकेगी।

(7) निगरानी समिति प्रत्येक वर्ष 31 मार्च की स्थिति के अनुसार अपनी वार्षिक कार्रवाई रिपोर्ट संघ राज्य के मुख्य वन्यजीव वार्डन को, अनुलग्नक IV में दिए गए प्रपत्र के अनुसार, उस वर्ष की 30 जून तक प्रस्तुत करेगी।

(8) केन्द्रीय सरकार का पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय निगरानी समिति को उसके कृत्यों के प्रभावी निर्वहन के लिए ऐसे निदेश दे सकेगा जो वह उचित समझे।

7. इस अधिसूचना के उपबंधों को प्रभावी बनाने के लिए केन्द्रीय सरकार और केंद्र शासित सरकार, अतिरिक्त उपाय, यदि कोई हों, विनिर्दिष्ट कर सकेंगी।

8. इस अधिसूचना के उपबंध भारत के माननीय उच्चतम न्यायालय या उच्च न्यायालय या राष्ट्रीय हरित अधिकरण द्वारा पारित किए गए या पारित किए जाने वाले आदेश, यदि कोई हो, के अधीन होंगे।

[फा. सं. 25/16/2020-ईएसजेड]

डॉ. सतीश चन्द्र गढ़कोटी, वैज्ञानिक 'जी'

अनुलग्नक - I

क. गालाथिया राष्ट्रीय उद्यान और पारिस्थितिकी संवेदी जोन की सीमा का विवरण

पूर्व- पारिस्थितिकी संवेदी जोन गालाथिया राष्ट्रीय उद्यान की सीमा बिंदु 1 ($6^{\circ} 59' 33.429''$ उ एवं $93^{\circ} 52' 8.570''$ पू) से आरंभ होती है, राष्ट्रीय उद्यान की सीमा से 0.5 किलोमीटर मगर नाला के निकट बिंदु ए2 ($6^{\circ} 59' 40.690''$ उ एवं $93^{\circ} 52' 23.157''$ पू) के पूर्व दिशा की ओर मुड़ती है। इसके बाद राष्ट्रीय उद्यान की पूर्वी सीमा से 0.5 किलोमीटर की दूरी बनाकर बिंदु ए 3 ($6^{\circ} 58' 52.401''$ उ एवं $93^{\circ} 52' 36.066''$ पू) एवं ए4 ($6^{\circ} 57' 24.953''$ उ एवं $93^{\circ} 51' 43.686''$ पू) से होते हुए ढिल्लन नाला के निकट बिंदु ए5 ($6^{\circ} 55' 53.257''$ उ एवं $93^{\circ} 52' 13.565''$ पू) तक दक्षिण दिशा की ओर जाती है। इसके बाद सीमा दक्षिण- पश्चिम दिशा की ओर मुड़ती है और बिंदु 3 ($6^{\circ} 55' 36.340''$ उ एवं $93^{\circ} 52' 4.623''$ पू) में गालाथिया राष्ट्रीय उद्यान की सीमा से मिलती है और बिंदु 5 ($6^{\circ} 50' 16.834''$ उ एवं $93^{\circ} 52' 22.608''$ पू) तक गालाथिया राष्ट्रीय उद्यान की सीमा जाती है।

दक्षिण- बिंदु 5 ($6^{\circ} 50' 16.834''$ उ एवं $93^{\circ} 52' 22.608''$ पू), से, सीमा गालाथिया राष्ट्रीय उद्यान की सीमा से होते हुए बिंदु 6 ($6^{\circ} 50' 52.594''$ उ एवं $93^{\circ} 49' 18.952''$ पू) तक दक्षिण-पश्चिम दिशा की ओर मुड़ती है।

पश्चिम:- बिंदु 6 ($6^{\circ} 50' 52.594''$ उ एवं $93^{\circ} 49' 18.952''$ पू) से, सीमा गालाथिया राष्ट्रीय उद्यान की सीमा से होते हुए बिंदु 7 ($6^{\circ} 53' 42.182''$ उ एवं $93^{\circ} 48' 37.418''$ पू), बिंदु 8 ($6^{\circ} 54' 4.291''$ उ एवं $93^{\circ} 49' 11.580''$ पू), बिंदु 9 ($6^{\circ} 55' 2.576''$ उ एवं $93^{\circ} 48' 14.121''$ पू) एवं बिंदु 10 ($6^{\circ} 56' 45.865''$ उ एवं $93^{\circ} 47' 52.416''$ पू) से होते हुए बिंदु 11 ($6^{\circ} 58' 15.837''$ उ एवं $93^{\circ} 47' 30.378''$ पू) तक उत्तर दिशा की ओर मुड़ती है।

उत्तर: बिंदु 11 ($6^{\circ} 58' 15.837''$ उ एवं $93^{\circ} 47' 30.378''$ पू)से, सीमा इसके बाद गालाथिया राष्ट्रीय उद्यान की सीमा से 1.00 किलोमीटर की दूरी में बिंदु ए 6 ($6^{\circ} 58' 27.217''$ उ एवं $93^{\circ} 46' 58.873''$ पू) तक उत्तर-पश्चिम दिशा की ओर मुड़ती है इसके बाद राष्ट्रीय उद्यान की सीमा से एक किलोमीटर की एकरूप दूरी बनाकर बिंदु ए7 ($6^{\circ} 59' 2.745''$ उ एवं $93^{\circ} 49' 40.976''$ पू) और बिंदु ए8 ($7^{\circ} 0' 19.532''$ उ एवं $93^{\circ} 51' 42.870''$ पू) से होते हुए बिंदु ए1 ($6^{\circ} 59' 47.949''$ उ एवं $93^{\circ} 52' 37.740''$ पू) तक पूर्व दिशा की ओर मुड़ती है। सीमा इसके बाद पश्चिम दिशा की ओर मुड़ती है और बिंदु ए 2 ($6^{\circ} 59' 40.690''$ उ एवं $93^{\circ} 52' 23.157''$ पू) में मिलती है।

अनुलग्नक - IIक

भू-निर्देशांकों के साथ गालाथिया राष्ट्रीय उद्यान के पारिस्थितिकी संवेदी जोन का मानचित्र



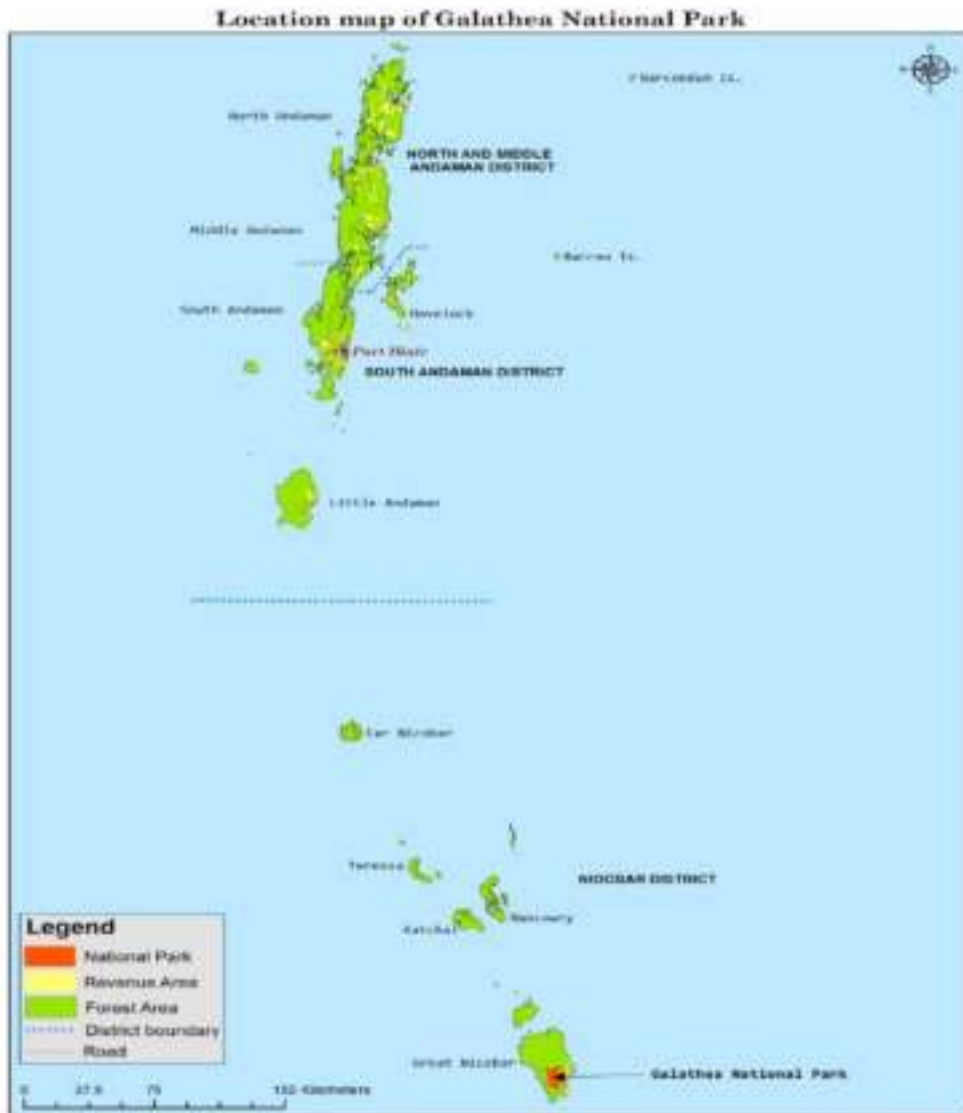
अनुलग्नक – IIख

गालाथिया राष्ट्रीय उद्यान और इसके पारिस्थितिकी संवेदी जोन का सैटेलाइट चित्र



अनुलग्नक - IIग

गालाथिया राष्ट्रीय उद्यान और इसके पारिस्थितिकी संवेदी जोन का अवस्थान मानचित्र



अनुलग्नक -III

सारणी क: मानचित्र पर दर्शाये गये गालाथिया राष्ट्रीय उद्यान की सीमा के साथ मुख्य अवस्थानों के भू-निर्देशांक

क्र.सं	स्टेशन	अक्षांश	देशांतर
1.	1	6° 59' 33.429" उ	93° 52' 8.570" पू
2.	2	6° 58' 54.027" उ	93° 52' 19.857" पू
3.	3	6° 55' 36.340" उ	93° 52' 4.623" पू
4.	4	6° 54' 31.706" उ	93° 52' 21.859" पू
5.	5	6° 50' 16.834" उ	93° 52' 22.608" पू
6.	6	6° 50' 52.594" उ	93° 49' 18.952" पू
7.	7	6° 53' 42.182" उ	93° 48' 37.418" पू
8.	8	6° 54' 4.291" उ	93° 49' 11.580" पू
9.	9	6° 55' 2.576" उ	93° 48' 14.121" पू
10.	10	6° 56' 45.865" उ	93° 47' 52.416" पू
11.	11	6° 58' 15.837" उ	93° 47' 30.378" पू
12.	12	6° 58' 30.158" उ	93° 49' 51.839" पू

सारणी ख: मानचित्र पर दर्शाए गए गालाथिया राष्ट्रीय उद्यान के पारिस्थितिकी संवेदी जोन की सीमा के साथ मुख्य अवस्थानों के भू-निर्देशांक

क्र.सं	स्टेशन	अक्षांश	देशांतर
1.	ए1	6° 59' 47.949" उ	93° 52' 37.740" पू
2.	ए2	6° 59' 40.690" उ	93° 52' 23.157" पू
3.	ए3	6° 58' 52.401" उ	93° 52' 36.066" पू
4.	ए4	6° 57' 24.953" उ	93° 51' 43.686" पू
5.	ए5	6° 55' 53.257" उ	93° 52' 13.565" पू
6.	ए6	6° 58' 27.217" उ	93° 46' 59.873" पू
7.	ए7	6° 59' 2.745" उ	93° 49' 40.976" पू
8.	ए8	7° 0' 19.532" उ	93° 51' 42.870" पू

अनुलग्नक -IV

की गई कार्रवाई - सम्बन्धी रिपोर्ट का प्रपत्र पारिस्थितिकी संवेदी जोन की निगरानी समिति

1. बैठकों की संख्या और तारीख ।
2. बैठकों का कार्यवृत्त : (कृपया मुख्य उल्लेखनीय बिंदुओं का वर्णन करें । बैठक के कार्यवृत्त को एक पृथक अनुलग्नक में प्रस्तुत करें) ।
3. पर्यटन महायोजना सहित आंचलिक महायोजना की तैयारी की स्थिति ।
4. भू-अभिलेखों की स्पष्ट त्रुटियों के सुधार के लिए निबटाए गए मामलों का सार (पारिस्थितिकी-संवेदी जोन वार) । विवरण अनुलग्नक के रूप में संलग्न करें।
5. पर्यावरण प्रभाव आकलन अधिसूचना, 2006 के अधीन आने वाली गतिविधियों से संबंधित संवीक्षा किए गए मामलों का सार। (विवरण एक पृथक अनुलग्नक के रूप में संलग्न करें)।
6. पर्यावरण प्रभाव आकलन अधिसूचना, 2006 के अधीन न आने वाली गतिविधियों से संबंधित संवीक्षा किए गए मामलों का सार । (विवरण एक पृथक अनुलग्नक के रूप में संलग्न करें)।
7. पर्यावरण (संरक्षण) अधिनियम, 1986 की धारा 19 के अधीन दर्ज की गई शिकायतों का सार ।
8. कोई अन्य महत्वपूर्ण मामला ।

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 28th October, 2020

S.O. 3874(E).—the following draft of the notification, which the Central Government proposes to issue in exercise of the powers conferred by sub-section (1), read with clause (v) and clause (xiv) of sub-section (2) and sub-section (3) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986) is hereby published, as required under sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986, for the information of the public likely to be affected thereby; and notice is hereby given that the said draft notification shall be taken into consideration on or after the expiry of a period of sixty days from the date on which copies of the Gazette containing this notification are made available to the public;

Any person interested in making any objections or suggestions on the proposals contained in the draft notification may forward the same in writing, for consideration of the Central Government within the period so specified to the Secretary, Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor bagh Road, Aliganj, New Delhi-110 003, or send it to the e-mail address of the Ministry at esz-mef@nic.in

DRAFT NOTIFICATION

AND WHEREAS, the Galathea National Park is spread over an area of 110 square kilometers and is located in the South Central Great Nicobar Island in Nicobar District of Andaman & Nicobar Islands;

AND WHEREAS, the Galathea National Park is the core area of Great Nicobar Biosphere Reserve with surrounding protected forest as the buffer zone with effect from 13 January 1989, vide notification No.J-22010/14/89-CSC and was also declared as World Heritage Site by UNESCO in 2013;

AND WHEREAS, the Galathea National park is home to a variety of endemic flora and fauna including the coastal and mangrove ecosystem. The area also has several important values from ecological, faunal, floral, geomorphologic and recreational and research/educational perspective;

AND WHEREAS, the vegetation of the protected area is unique due to its tropical humid climate being closer to the equator, insular nature of the territory, physical isolation of the islands and the impact of both South-West and North-East monsoons which has given rise to dense and diverse vegetation cover;

AND WHEREAS, the vegetation at Galathea National park is one of the best preserved tropical rain forests in the world and shows high degree of endemism owing to its geographic location and physical isolation. The National Park also has elements from the Indo-Chinese and Indo-Malayan regions. About 648 species of flora have been reported from the area belonging to 422 genera and 142 families, out of which 48 species of endemic flora and 85 species of non-endemic flora are rare and endangered. The Gymnosperms are represented by 4 species belonging to 3 genera and 3 families. The Pteridophytic group contributes to a great extent to the plant diversity and richness of the flora comprising of 77 species of which the population of tree fern constitute a major portion of the vegetation along the hilly slopes of the interior forests;

AND WHEREAS, the Galathea National park is consisted of Tidal Swamp Forest (Mangrove Forest), Littoral Forest (Beach Forests), Low level Evergreen Forests (Coral Reef Forests), Tropical Evergreen Forests (True Tropical Forests), Southern hill-top evergreen forests and fern breaks. The members of the families Euphorbiaceae, Rubiaceae, Arecaceae, Orchidaceae and Cyperaceae and Poaceae and Annonaceae show high representation in terms of endemism. The distinct flora of the area can be visualized by the fact that the genera *Otentera* and *Astronia* of Melastomataceae, *Cyrtandromea* of Scrophulariaceae, *Cyrtandra* of Gesneriaceae, *Stemonurus* of Icacinaeae, *Rhopaloblaste* from Arecaceae and *Spathoglottis* of Orchidaceae and many more species are endemic to these areas;

AND WHEREAS, the endemic floral species present in the area includes tree ferns like *Sphaeropteris albo-setacea* (*Cyathea albo-setacea*) and *Sphaeropteris nicobarica* (*Cyathea nicobarica*). Other endemic floral species found in the area are *Pronophrium nakaikeum*, *Artabotrys nicobarianus*, *Friesodielsia forniculata*, *Uvaria nicobarica*, *Chisocheton nicobarianus*, *Nicobario dendronsleumeri*, *Connarus nicobaricus*, *Otentera nicobarensis*, *Ophiorrhiza infundibularis*, *Ophiorrhiza nicobarica*, *Jasminum syringifolium*, *Chilocarpus denudatus* var. *nicobaricus*, *Genianthus horei*, *Cyrtandroemia nicobarica*, *Cyrtandra burtii*, *Cyrtandra occidentalis*, *Nothophoebe nicobaricus*, *Cleistanthus balakrishnani*, *Trogonostemon villosus* var. *nicobaricus*, *Aerides emerici*, *Anoectochilus nicobaricus*, *Dendrobium shompenii*, *Hornstedtia fenzlii*, *Phrynium paniculatum*, *Calamus nicobaricus*, *Rhopaloblaste augustata*, *Aglaonema nicobaricum*, *Homalomena griffithii* var. *ovate*;

AND WHEREAS, mangrove forests of the Galathea National park are highly productive ecosystems and have many ecological functions. 14 species of mangroves are recorded from the area namely *Rhizophora apiculata*, *Bruguiera gymnorhiza*, *Sonneratia caseolaris*. Other important vegetation of the area includes climbers and lianas such as *Derris trifoliata*, *Sarcolobus globosus*, *Finlaysonia obovata*, epiphytic fern and orchids namely *Asplenium nidus*, *Dendrobium crumenatum* and *Trichoglottis cirrhifera*. A number of potential and economically important species including *Nypa fruticans* and *Vanilla anadamanica* grows wild in the protected area;

AND WHEREAS, the protected area has only one perennial river namely Galathea, which originates in Campbell Bay National Park flowing all the way towards south through Galathea National Park and its estuaries form important nesting grounds for Giant Leatherback Sea Turtle (*Dermochelys coriacea*), Olive Ridley Turtle (*Lepidochelys olivacea*), Green Sea Turtles (*Chelonia mydas*);

AND WHEREAS, a total of 330 species of fauna are recorded from the Galathea National Park including 28 species of mammals (including 3 marine mammals), 97 species of birds, 23 species of reptiles, 10 species of amphibians, 52 species of butterflies, 24 species of odonates, 20 species of spiders and 76 species of aquatic Hemipterans;

AND WHEREAS, the Galathea National park is known to harbor an exceptional variety of wildlife, the major threatened and endemic fauna recorded from the national park are Nicobar Crab eating Macaque (*Macaca fascicularis umbrosa*), Nicobar Wild Pig (*Sus scrofa nicobarica*), Dugong (*Dugong dugon*), Nicobar Tree Shrew (*Tupaia nicobarica nicobarica*), Nicobar Flying Fox (*Pteropus faunulus*), Spiny Shrew (*Crocidura nicobarica*) and Nicobar Leaf nosed Bat (*Hipposideros ater nicobarulae*), Rat (*Rattus burrescens*), (*Rattus burrus*), (*Rattus pulliventer*), (*Rattus palmarum*), Nicobar Pipistrelle (*Pipistrellus camortae*), Andaman Water Monitor (*Varanus salvator andamanensis*), Tiwari's Garden Lizard (*Calotes danieli*), Estuarine Crocodile (*Crocodylus porosus*);

AND WHEREAS, the important endemic avi-faunal species present in the area are Nicobar tiger bittern (*Gorsachius melanolophus minor*), Nicobar cuckoo dove (*Macropygia rufipennis rufipennis*), Nicobar emerald dove (*Chalcophaps indica augusta*), Great Nicobar crested serpent eagle (*Spilornis klossi*), Nicobar paradise flycatcher (*Terpsiphone paradise nicobarica*), Andaman three toed kingfisher (*Ceyx erithacus macrocarus*), *Nicobar strokilled kingfisher (Pelargopsis capensis)*, Nicobar white-collared kingfisher (*Halcyon chloris occipitalis*), *Andaman koel (Eudynamys scolopacea dolosa)*, Nicobar megapode (*Megapodius nicobariensis*), *Nicobar hill myna (Gracula religiosa halibrecta)*, Nicobar back-naped oriole (*Oriolus chinensis macrourus*), *Nicobar scops owl (Otus scops nicobaricus)*, Blyth's nicobar parakeet (*Psittacula caniceps*), Nicobar redcheeked parakeet (*Psittacula longicauda nicobarica*), *Nicobar pigeon (Caloenas nicobarica nicobarica)*, Nicobar green imperial pigeon (*Ducula aenea nicobarica*), katchal shikra (*Accipiter badius obsoletus*), Nicobar white eye (*Zosterops palpebros anicobarica*), Andaman Glossy Stare (*Aplonis panayensis tytleri*), Nicobar Olive backed sunbird (*Nectarinia jugularis klossi*), Nicobar yellow backed sunbird (*Aethopyga siparaja nicobarica*), Andaman grey rumped swiftlet (*Collocalia fuciphaga inexpectata*), white bellied swiftlet (*Collocalia esculenta affinis*), Nicobar ground thrush (*Zoothera citrine albogularis*);

AND WHEREAS, the forests of Galathea National Park are abode to one of the Particularly Vulnerable Tribal Groups, the Shompens, which is still in the hunting and gathering stage and is solely dependent on the forest resources as the Galathea National Park including the Eco- Sensitive Zone has been notified as Tribal Reserve under section 3 of the Andaman & Nicobar (Protection of Aboriginal Tribes) Regulation, 1956, wherein, they enjoy unfettered rights over the forest resources under the Andaman & Nicobar (Protection of Aboriginal Tribes) Regulation, 1956 and section 65 of the Wildlife (Protection) Act, 1972;

AND WHEREAS, the allotment of land for agricultural purposes and acquisition of any interest in any land within the reserved area or any produce of or crops raised on such land are regulated under section 4 and section 6 of the Andaman & Nicobar (Protection of Aboriginal Tribes) Regulation, 1956;

AND WHEREAS, entry of any person other than aboriginal tribe or any class of persons other than members of an aboriginal tribe into the reserve area is regulated under section 7 of Regulation aforesaid. Further, transfer of reserved land by way of sale, exchange, mortgage, lease or otherwise to any person other than the member of aboriginal tribe shall be regulated under section 5 the Andaman & Nicobar (Protection of Aboriginal Tribes) Regulation, 1956 and insurance of social, cultural and economic integrity, community, facilitation of community wellbeing as also the protection of natural habitat is guided by the Policy on Shompen Tribe of Great Nicobar Island – 2015;

AND WHEREAS, it is necessary to conserve and protect the area, the extent and boundaries of Galathea National Park which are specified in paragraph 1 as Eco-sensitive Zone from ecological, environmental and biodiversity point of view and to prohibit industries or class of industries and their operations and processes in the said Eco-sensitive Zone;

NOW, THEREFORE, in exercise of the powers conferred by sub-section (1) and clauses (v) and (xiv) of sub-section (2) and sub-section (3) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986) (hereafter in this notification referred to as the Environment Act) read with sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government hereby notifies an area to an extent of (0)zero to one kilometer around the boundary of Galathea National Park in the Union Territory of Andaman and Nicobar Islands as Eco-sensitive Zone (hereafter in this notification referred to as the Eco-sensitive Zone) details of which are as under, namely:-

- (1) **Extent and boundaries of Eco-Sensitive Zone.** –(1) The Eco-sensitive Zone shall be to an extent of zero to one kilometre around the boundary of Galathea National Park and the area of the Eco-sensitive zone shall be **14.93 square kilometres**. The minimum extent is 'zero' because the major geographical area of Great Nicobar Island is covered under Protected Area Network and Tribal Reserve in such a way that there is little area left for holistic development around the area. Further, to protect the development and inhabitation from the unforeseen natural disaster/ adverse effect like Tsunami, rising water level, a 750 metres buffer is proposed with guidelines all along the coastline for development. This requires the developable area to be located away from the coast and near to National Park boundary. Furthermore, all activities of development and human intervention are already regulated by either Indian Forest Act, 1927 or Forest Conservation Act, 1980 or the Andaman & Nicobar (Protection of Aboriginal Tribes) Regulation, 1956.
- (2) The extent and boundary description of the Eco-Sensitive Zone is appended as **Annexure –I**.
- (3) Map of Eco-Sensitive Zone of Galathea National Park along with geo-coordinates, satellite image and location maps are appended as **Annexure-IIA-C**.

(4) List of geo-coordinates of the boundary of Galathea National Park and eco-sensitive zone is appended as Table A and B of **Annexure-III**.

(5) No revenue villages are located within the Eco-Sensitive Zone.

2. Zonal Master Plan for Eco-Sensitive Zone. - (1) The Union Territory Government shall, for the purposes of the Eco-sensitive Zone prepare a Zonal Master Plan within a period of two years from the date of publication of this notification in the Official Gazette, in consultation with local people and adhering to the stipulations given in this notification for approval of the Competent authority of Union Territory.

(2) The Zonal Master Plan for the Eco-sensitive Zone shall be prepared by the Union Territory Government in such manner as is specified in this notification and also in consonance with the relevant Central and Union Territory laws and the guidelines issued by the Central Government, if any

(3) The Zonal Master Plan shall be prepared in consultation with the following Departments of the Union Territory Government, for integrating the ecological and environmental considerations into the said plan:-

- (i) Environment;
- (ii) Forest and Wildlife;
- (iii) Agriculture;
- (iv) Animal Husbandry;
- (v) Andaman Public Works Department;
- (vi) Revenue;
- (vii) Fisheries; and
- (viii) Andaman and Lakshadweep Harbour Works (ALHW) and other research organisations.

(4) The Zonal Master Plan shall not impose any restriction on the approved existing land use, infrastructure and activities, unless so specified in this notification and the Zonal Master Plan shall factor in improvement of all infrastructure and activities to be more efficient and eco-friendly.

(5) The Zonal Master Plan shall provide for restoration of denuded areas, conservation of existing water bodies, management of catchment areas, watershed management, groundwater management, soil and moisture conservation, needs of local community and such other aspects of the ecology and environment that need attention.

(6) The Zonal Master Plan shall be prepared taking into consideration the Policy on Shompen Tribe of Great Nicobar Island-2015 and the provisions made in the Andaman & Nicobar (Protection of Aboriginal Tribes) Regulation, 1956.

(7) The Zonal Master Plan shall regulate development in Eco-Sensitive Zone and adhere to prohibited, regulated activities listed in the Table in paragraph 4, keeping the safety, security and wellbeing of Particularly Vulnerable Tribal Group (PVTG) to the fore as enshrined in Policy on Shompen Tribe of Great Nicobar Island-2015 and the provisions made in the Andaman & Nicobar (Protection of Aboriginal Tribes) Regulation, 1956.

(8) The Zonal Master Plan shall demarcate all the existing worshipping places, villages and urban settlements, types and kinds of forests, agricultural areas, fertile lands, green area, such as, parks and like places, horticultural areas, orchards, lakes and other water bodies and also with supporting maps giving details of existing and proposed land use features.

(9) The Zonal Master Plan shall regulate development in Eco-sensitive Zone and adhere to prohibited, regulated activities listed in the Table in paragraph 4 and also ensure and promote eco-friendly development for Security of local communities livelihood.

(10) The Zonal Master Plan shall be co-terminus with the Regional Development Plan.

(11) The Zonal Master Plan so approved shall be the reference document for the Monitoring Committee for carrying out its functions of monitoring in accordance with the provisions of this notification.

3. Measures to be taken by the Union Territory Government. -The Union Territory Government shall take the following measures for giving effect to the provisions of this notification, namely: -

- (1) **Land use.** - (a) Forests, horticulture areas, agricultural areas, parks and open spaces earmarked for recreational purposes in the Eco-sensitive Zone shall not be used or converted into areas for major commercial or residential or industrial activities:

Provided that the conversion of agricultural and other lands, for the purpose other than that specified at part (a), within the Eco-sensitive Zone may be permitted on the recommendation of the Monitoring Committee, and with the prior approval of the competent authority under Regional Town Planning Act and

other rules and regulations of Central Government or Union Territory Government as applicable and vide provisions of this Notification, to meet the residential needs of the local residents and for activities such as:-

- (i) widening and strengthening of existing roads and construction of new roads;
- (ii) construction and renovation of infrastructure and civic amenities;
- (iii) small scale industries not causing pollution;
- (iv) cottage industries including village industries; convenience stores and local amenities supporting eco-tourism including home stay; and
- (v) promoted activities given under paragraph 4:

Provided further that no use of tribal land shall be permitted for commercial and industrial development activities without the prior approval of the competent authority under Regional Town Planning Act and other rules and regulations of the Union Territory Government and without compliance of the provisions of article 244 of the Constitution or the law for the time being in force, including the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (2 of 2007):

The land use shall be regulated as per the provisions made at section 4, 5 and 6 of the Andaman & Nicobar (Protection of Aboriginal Tribes) Regulation, 1956:

Provided also that any error appearing in the land records within the Eco-sensitive Zone shall be corrected by the Union Territory Government, after obtaining the views of Monitoring Committee, once in each case and the correction of said error shall be intimated to the Central Government in the Ministry of Environment, Forest and Climate Change:

Provided also that the correction of error shall not include change of land use in any case except as provided under this sub-paragraph.

(b) Efforts shall be made to reforest the unused or unproductive agricultural areas with afforestation and habitat restoration activities.

(2) **Natural water bodies.**-The catchment areas of all natural springs shall be identified and plans for their conservation and rejuvenation shall be incorporated in the Zonal Master Plan and the guidelines shall be drawn up by the Union Territory Government in such a manner as to prohibit development activities at or near these areas which are detrimental to such areas.

(3) **Tourism or Eco-tourism.**-(a) All new eco-tourism activities or expansion of existing tourism activities within the Eco-sensitive Zone shall be as per the Tourism Master Plan for the Eco-sensitive Zone.

(b) The Eco-Tourism Master Plan shall be prepared by the Department of Tourism in consultation with Union Territory Departments of Environment and Forest.

(c) The Tourism Master Plan shall form a component of the Zonal Master Plan.

(d) The Tourism Master Plan shall be drawn based on the study of carrying capacity of the Eco-sensitive Zone.

(e) The activities of eco-tourism shall be regulated as under, namely:-

- (i) New construction of hotels and resorts shall not be allowed within 1 kilometre from the boundary of the Wildlife Sanctuary or upto the extent of the Eco-sensitive Zone whichever is nearer:

Provided that, beyond the distance of one kilometre from the boundary of the Wildlife Sanctuary till the extent of the Eco-sensitive Zone, the establishment of new hotels and resorts shall be allowed only in pre-defined and designated areas for eco-tourism facilities as per Tourism Master Plan;

- (ii) all new tourism activities or expansion of existing tourism activities within the Eco-sensitive Zone shall be in accordance with the guidelines issued by the Central Government in the Ministry of Environment, Forest and Climate Change and the eco-tourism guidelines issued by National Tiger Conservation Authority (as amended from time to time) with emphasis on eco-tourism, eco-education and eco development;

- (iii) until the Zonal Master Plan is approved, development for tourism and expansion of existing tourism activities shall be permitted by the concerned regulatory authorities based on the actual site specific

scrutiny and recommendation of the Monitoring Committee and no new hotel, resort or commercial establishment construction shall be permitted within Eco-sensitive Zone area.

- (4) **Natural heritage.**- All sites of valuable natural heritage in the Eco-sensitive Zone, such as the gene pool reserve areas, rock formations, waterfalls, springs, gorges, groves, caves, points, walks, rides, cliffs, etc. shall be identified and a heritage conservation plan shall be drawn up for their preservation and conservation as a part of the Zonal Master Plan.
- (5) **Man-made heritage sites.**-Buildings, structures, artefacts, areas and precincts of historical, architectural, aesthetic, and cultural significance shall be identified in the Eco-sensitive Zone and heritage conservation plan for their conservation shall be prepared as part of the Zonal Master Plan.
- (6) **Noise pollution.** -Prevention and control of noise pollution in the Eco-sensitive Zone shall be carried out in accordance with the provisions of the Noise Pollution (Regulation and Control) Rules, 2000 under the Environment Act.
- (7) **Air pollution.**-Prevention and control of air pollution in the Eco-sensitive Zone shall be carried out in accordance with the provisions of the Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981) and the rules made thereunder.
- (8) **Discharge of effluents.**-Discharge of treated effluent in Eco-sensitive Zone shall be in accordance with the provisions of the General Standards for Discharge of Environmental Pollutants covered under the Environment Act and the rules made thereunder or standards stipulated by the Union Territory Government, whichever is more stringent.
- (9) **Solid wastes.**-Disposal and Management of solid wastes shall be as under:-
 - (i) the solid waste disposal and management in the Eco-sensitive Zone shall be carried out in accordance with the Solid Waste Management Rules, 2016, published by the Government of India in the Ministry of Environment, Forest and Climate Change *vide* notification number S.O. 1357 (E), dated the 8th April, 2016; the inorganic material may be disposed in an environmental acceptable manner at site identified outside the Eco-sensitive Zone;
 - (ii) safe and Environmentally Sound Management of Solid wastes in conformity with the existing rules and regulations using identified technologies may be allowed within Eco-sensitive Zone.
- (10) **Bio-Medical Waste.**-Bio-Medical Waste Management shall be as under:-
 - (i) the Bio-Medical Waste disposal in the Eco-sensitive Zone shall be carried out in accordance with the Bio-Medical Waste Management Rules, 2016, published by the Government of India in the Ministry of Environment, Forest and Climate Change *vide* notification number G.S.R. 343 (E), dated the 28th March, 2016.
 - (ii) safe and Environmentally Sound Management of Bio-Medical Wastes in conformity with the existing rules and regulations using identified technologies may be allowed within the Eco-sensitive Zone.
- (11) **Plastic waste management.**- The plastic waste management in the Eco-sensitive Zone shall be carried out as per the provisions of the Plastic Waste Management Rules, 2016, published by the Government of India in the Ministry of Environment, Forest and Climate Change *vide* notification number G.S.R. 340(E), dated the 18th March, 2016, as amended from time to time.
- (12) **Construction and demolition waste management.**-The construction and demolition waste management in the Eco-sensitive Zone shall be carried out as per the provisions of the Construction and Demolition Waste Management Rules, 2016 published by the Government of India in the Ministry of Environment, Forest and Climate Change *vide* notification number G.S.R. 317(E), dated the 29th March, 2016, as amended from time to time.
- (13) **E-waste.**-The e - waste management in the Eco-sensitive Zone shall be carried out as per the provisions of the E-Waste Management Rules, 2016, published by the Government of India in the Ministry of Environment, Forest and Climate Change, as amended from time to time.
- (14) **Vehicular traffic.**- The vehicular movement of traffic shall be regulated in a habitat friendly manner and specific provisions in this regard shall be incorporated in the Zonal Master Plan and till such time as the Zonal Master plan is prepared and approved by the competent authority in the Union Territory Government,

the Monitoring Committee shall monitor compliance of vehicular movement under the relevant Acts and the rules and regulations made thereunder.

(15) Vehicular pollution.—Prevention and control of vehicular pollution shall be in compliance with applicable laws and efforts shall be made for use of cleaner fuels.

(16) Industrial units.— (a) On or after the publication of this notification in the Official Gazette, no new polluting industries shall be permitted to be set up within the Eco-sensitive Zone.

(b) Only non-polluting industries shall be allowed within Eco-sensitive Zone as per the classification of Industries in the guidelines issued by the Central Pollution Control Board in February, 2016, unless so specified in this notification, and in addition, the non-polluting cottage industries shall be promoted.

(17) Protection of hill slopes.— The protection of hill slopes shall be as under:-

(a) the Zonal Master Plan shall indicate areas on hill slopes where no construction shall be permitted;

(b) construction on existing steep hill slopes or slopes with a high degree of erosion shall not be permitted.

4. List of activities prohibited or to be regulated within Eco-sensitive Zone.— All activities in the Eco-sensitive Zone shall be governed by the provisions of the Environment (Protection) Act, 1986 and the rules made there under including the Coastal Regulation Zone, 2011 and the Environmental Impact Assessment Notification, 2006 and other applicable laws including the Forest (Conservation) Act, 1980 (69 of 1980), the Indian Forest Act, 1927 (16 of 1927), the Wildlife (Protection) Act 1972 (53 of 1972) and amendments made thereto and be regulated in the manner specified in the Table below, namely:-

TABLE

S. No.	Activity	Description
A. Prohibited Activities		
1.	Commercial mining, stone quarrying and crushing units.	(a) All new and existing mining (minor and major minerals), stone quarrying and crushing units shall be prohibited with immediate effect except for meeting the domestic needs of bona fide local residents including digging of earth for construction or repair of houses within Eco-Sensitive Zone; (b) The mining operations shall be carried out in accordance with the order of the Hon'ble Supreme Court dated the 4 th August, 2006 in the matter of T.N. Godavarman Thirumulpad Vs. UOI in W.P.(C) No.202 of 1995 and dated the 21 st April, 2014 in the matter of Goa Foundation Vs. UOI in W.P.(C) No.435 of 2012.
2.	Setting of industries causing pollution (Water, Air, Soil, Noise, etc.).	New industries and expansion of existing polluting industries in the Eco-sensitive Zone shall not be permitted: Provided that, non-polluting industries shall be allowed within Eco-Sensitive Zone as per classification of Industries in the guidelines issued by the Central Pollution Control Board in February, 2016, unless so specified in this notification and in addition, the non-polluting cottage industries shall be promoted.
3.	Establishment of major hydroelectric project.	Prohibited.
4.	Use or production or processing of any hazardous substance.	Prohibited.
5.	Discharge of untreated effluents in natural water bodies or land area.	Prohibited.

6.	Setting up of new saw mills.	New or expansion of existing saw mills shall not be permitted within the Eco-sensitive Zone.
7.	Setting up of brick kilns.	Prohibited.
8.	Use of polythene bags.	Prohibited.
9.	Commercial use of firewood	Prohibited.
10.	Commercial establishment of hotels and resorts.	Prohibited.
11.	Construction activities.	Prohibited.
12.	Small scale no-polluting industries.	Prohibited.
13.	Felling of trees.	Prohibited.
14.	Commercial extraction of surface and ground water.	Prohibited.
15.	Introduction of Exotic species.	Prohibited.
16.	Practice river aquaculture and fishing by the help of mechanized boats in large scale commercial manner.	Prohibited.
B. Regulated Activities		
17.	Erection of electrical and communication towers and laying of cables and other infrastructures.	Regulated under applicable laws of underground cabling may be promoted.
18.	Infrastructure including civic amenities.	Taking measures of mitigation, as per applicable laws, rules and regulation and available guidelines.
19.	Widening and strengthening of existing roads and construction of new roads.	Taking measures of mitigation, as per applicable laws, rules and regulation and available guidelines.
20.	Undertaking other activities related to tourism like over flying over the Eco-sensitive Zone area by hot air balloon, helicopter, drones, Microlites, etc.	Regulated as per the applicable laws.
21.	Movement of vehicular traffic at night.	Regulated for commercial purpose under applicable laws.
22.	Ongoing agriculture and horticulture practices by local communities along with dairies, dairy farming, aquaculture and fisheries.	Permitted as per the applicable laws for use of locals.
23.	Discharge of treated waste water/effluents in natural water bodies or land area.	The discharge of treated waste water or effluents shall be avoided to enter into the water bodies and efforts shall be made for recycle and reuse of treated waste water. Otherwise the discharge of treated waste water/effluent shall be regulated as per the applicable laws.
24.	Establishment of large-scale commercial livestock and poultry farms by firms, corporate and companies.	Regulated (except as otherwise provided) as per applicable laws except for meeting local needs.

25.	Open Well, Bore Well, etc. for agriculture or other usage.	Regulated and the activity should be strictly monitored by the appropriate authority.
26.	Solid Waste Management.	Regulated as per the applicable laws.
27.	Eco-tourism.	Regulated as per the applicable laws.
28.	Commercial Sign boards and hoardings.	Regulated as per the applicable laws.
29.	Traditional fishing practices	Regulated as per the applicable laws.
C. Promoted Activities		
30.	Collection of Forest Produce or Non-Timber Forest Produce.	Permitted for meeting the bonafide requirement of the PVTG (Shompen) & Nicobarese as provided in the Andaman and Nicobar (Protection of Aboriginal Tribes) Regulation, 1956.
31.	Protection of Hill Slopes and river banks.	Should be encouraged to the extent possible without affecting the livelihood of PVTG (Shompens).
32.	Agriculture and Horticulture practices by PVTG and Nicobarese.	Promoted for meeting their subsistence requirement.
33.	Rain water harvesting.	Shall be actively promoted.
34.	Organic farming.	Shall be actively promoted.
35.	Adoption of green technology for all activities.	Shall be actively promoted.
36.	Cottage industries including village artisans, etc.	Shall be actively promoted.
37.	Use of renewable energy and fuels.	Bio-gas, solar light etc. shall be actively promoted.
38.	Agro-Forestry.	Shall be actively promoted.
39.	Plantation of Horticulture and Herbals.	Shall be actively promoted.
40.	Use of eco-friendly transport.	Shall be actively promoted.
41.	Skill Development.	Shall be actively promoted.
42.	Restoration of Degraded Land/ Forests/ Habitat.	Shall be actively promoted.
43.	Environmental Awareness.	Shall be actively promoted.

5. Monitoring Committee.- For effective monitoring of the provisions of this notification under sub-section (3) of section 3 of the Environment (Protection) Act, 1986, the Central Government hereby constitutes a Monitoring Committee, comprising of the following, namely: -

S. No.	Constituent of the Monitoring Committee	Designation
1.	Deputy Commissioner, Nicobar District	Chairman;
2.	Member, Zilla Parishad, Campbell Bay	Member;
3.	Executive Engineer, Andaman Public Works Department, Campbell Bay	Member;
4.	Director, Department of Agriculture or representative,	Member;
5.	Director, Fisheries or representative	Member;
6.	Senior Veterinary Officer, Campbell Bay	Member;

7.	One representative of Non-governmental Organization working in the field of Environment (including heritage conservation) to be nominated by the Union Territory Government for three years	Member;
8.	One expert in environment/ecology/wildlife from a reputed Institution to be nominated by Union Territory Government	Member;
9.	Representative of A&N Islands Biodiversity Council	Member;
10.	Divisional Forest Officer, Nicobar Division	Member – Secretary

6. Terms of Reference. – (1) The Monitoring Committee shall monitor the compliance of the provisions of this notification.

(2) The tenure of the Monitoring committee shall be for three years or till the re-constitution of the new Committee by the Union Territory Government and subsequently the Monitoring Committee shall be constituted by the Union Territory Government.

(3) The activities that are covered in the Schedule to the notification of the Government of India in the erstwhile Ministry of Environment and Forests number S.O. 1533 (E), dated the 14th September, 2006, and are falling in the Eco-sensitive Zone, except for the prohibited activities as specified in the Table under paragraph 4 thereof, shall be scrutinized by the Monitoring Committee based on the actual site-specific conditions and referred to the Central Government in the Ministry of Environment, Forest and Climate Change for prior environmental clearances under the provisions of the said notification.

(4) The activities that are not covered in the Schedule to the notification of the Government of India in the erstwhile Ministry of Environment and Forests number S.O. 1533 (E), dated the 14th September, 2006 and are falling in the Eco-sensitive Zone, except for the prohibited activities as specified in the Table under paragraph 4 thereof, shall be scrutinised by the Monitoring Committee based on the actual site-specific conditions and referred to the concerned regulatory authorities.

(5) The Member-Secretary of the Monitoring Committee or the concerned Deputy Commissioner(s) shall be competent to file complaints under section 19 of the Environment Act against any person who contravenes the provisions of this notification.

(6) The Monitoring Committee may invite representatives or experts from concerned Departments, representatives from industry associations or concerned stakeholders to assist in its deliberations depending on the requirements on issue to issue basis.

(7) The Monitoring Committee shall submit the annual action taken report of its activities as on the 31st March of every year by the 30th June of that year to the Chief Wildlife Warden in the Union Territory as per proforma given in Annexure IV.

(8) The Central Government in the Ministry of Environment, Forest and Climate Change may give such directions, as it deems fit, to the Monitoring Committee for effective discharge of its functions.

7. The Central Government and Union Territory Government may specify additional measures, if any, for giving effect to provisions of this notification.

8. The provisions of this notification are subject to the orders, if any passed or to be passed by the Hon'ble Supreme Court of India or the High Court or the National Green Tribunal.

[F.No. 25/16/2020-ESZ]

Dr. SATISH C. GARKOTI, Scientist 'G'

ANNEXURE I

A. BOUNDARY DESCRIPTION OF GALATHEA NATIONAL PARK AND ECO-SENSITIVE ZONE

EAST- The Eco Sensitive Zone boundary of Galathea National Park starts from a **point 1** (6° 59' 33.429" N & 93° 52' 8.570" E) moves towards East direction upto the **point A2** (6° 59' 40.690" N & 93° 52' 23.157" E) near Magar nallah 0.5 km away from the boundary of the National Park. Then proceeds towards south direction upto **point A5** (6° 55' 53.257" N & 93° 52' 13.565" E) near Dhillon nallah through the **point A3** (6° 58' 52.401" N & 93° 52' 36.066" E) & **A4** (6° 57' 24.953" N & 93° 51' 43.686" E) maintaining a distance of 0.5 kilometre from the Eastern boundary of the National Park. Then the boundary moves towards South-West direction and meets the boundary of Galathea National Park at **point 3** (6° 55' 36.340" N & 93° 52' 4.623" E) and follows the boundary of Galathea National Park upto **point 5** (6° 50' 16.834" N & 93° 52' 22.608" E).

SOUTH- From **point 5** (6° 50' 16.834" N & 93° 52' 22.608" E), the boundary moves towards South-West direction upto a **point 6** (6° 50' 52.594" N & 93° 49' 18.952" E) following the boundary of Galathea National Park.

WEST:-From the **point 6** (6° 50' 52.594" N & 93° 49' 18.952" E)), the boundary moves towards North direction upto the **point 11** (6° 58' 15.837" N & 93° 47' 30.378" E) through the **point 7** (6° 53' 42.182" N & 93° 48' 37.418" E), **point 8** (6° 54' 4.291" N & 93° 49' 11.580" E), **point 9** (6° 55' 2.576" N & 93° 48' 14.121" E) & **point 10** (6° 56' 45.865" N & 93° 47' 52.416" E) following the boundary of Galathea National Park.

NORTH: From the **point 11** (6° 58' 15.837" N & 93° 47' 30.378" E) the boundary then moves towards North-West direction upto the **point A6** (6° 58' 27.217" N & 93° 46' 58.873" E) at a distance of 1.00 km from the boundary of Galathea National Park then moves towards East direction upto the **point A1** (6° 59' 47.949" N & 93° 52' 37.740" E) passing through the **point A7** (6° 59' 2.745" N & 93° 49' 40.976" E) and **point A8** (7° 0' 19.532" N & 93° 51' 42.870" E) maintaining an uniform distance of one kilometre from the boundary of the National Park. The boundary then moves towards West direction and meets at **point A2** (6° 59' 40.690" N & 93° 52' 23.157" E).

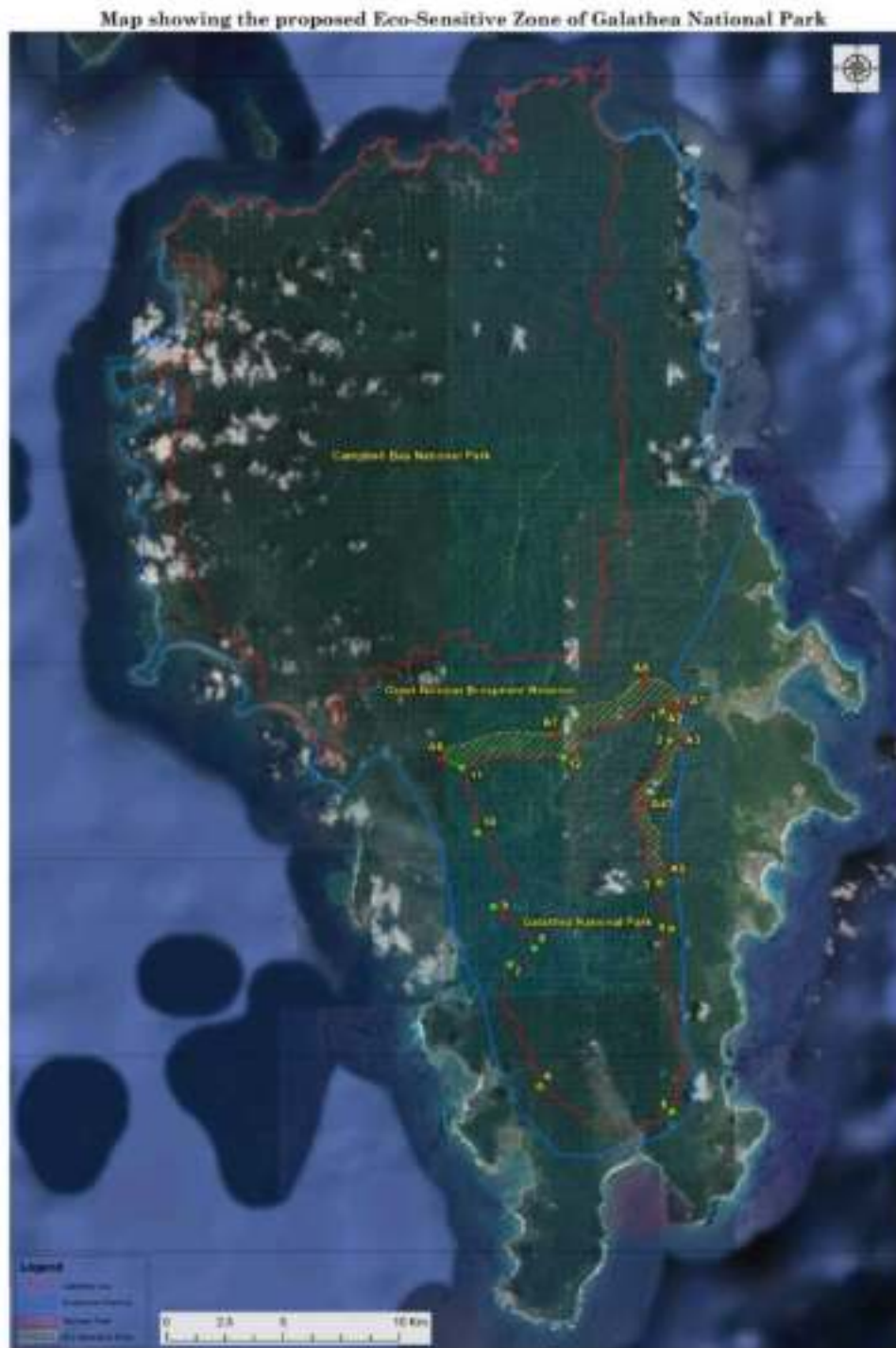
ANNEXURE II A

MAP OF ECO-SENSITIVE ZONE OF GALATHEA NATIONAL PARK ALONG WITH GEO-COORDINATES



ANNEXURE II B

SATELLITE IMAGE OF GALATHEA NATIONAL PARK AND ITS ECO-SENSITIVE ZONE



ANNEXURE II C

LOCATION MAP OF GALAETHEA NATIONAL PARK AND ITS ECO-SENSITIVE ZONE



ANNEXURE - III

TABLE A: Geo-coordinates of prominent locations along the boundary of Galathea National Park shown on map

S. No	Station	Latitude	Longitude
1.	1	6° 59' 33.429" N	93° 52' 8.570" E
2.	2	6° 58' 54.027" N	93° 52' 19.857" E
3.	3	6° 55' 36.340" N	93° 52' 4.623" E
4.	4	6° 54' 31.706" N	93° 52' 21.859" E
5.	5	6° 50' 16.834" N	93° 52' 22.608" E
6.	6	6° 50' 52.594" N	93° 49' 18.952" E
7.	7	6° 53' 42.182" N	93° 48' 37.418" E
8.	8	6° 54' 4.291" N	93° 49' 11.580" E
9.	9	6° 55' 2.576" N	93° 48' 14.121" E
10.	10	6° 56' 45.865" N	93° 47' 52.416" E
11.	11	6° 58' 15.837" N	93° 47' 30.378" E
12.	12	6° 58' 30.158" N	93° 49' 51.839" E

Table B: Geo-coordinates of prominent locations along the boundary of Eco-sensitive Zone of Galathea National Park shown on map

S.No	Station	Latitude	Longitude
1.	A1	6° 59' 47.949" N	93° 52' 37.740" E
2.	A2	6° 59' 40.690" N	93° 52' 23.157" E
3.	A3	6° 58' 52.401" N	93° 52' 36.066" E
4.	A4	6° 57' 24.953" N	93° 51' 43.686" E
5.	A5	6° 55' 53.257" N	93° 52' 13.565" E
6.	A6	6° 58' 27.217" N	93° 46' 59.873" E
7.	A7	6° 59' 2.745" N	93° 49' 40.976" E
8.	A8	7° 0' 19.532" N	93° 51' 42.870" E

ANNEXURE - IV**Proforma of Action Taken Report: - Eco-sensitive Zone Monitoring Committee. -**

1. Number and date of meetings.
2. Minutes of the meetings: (mention noteworthy points. Attach minutes of the meeting as separate annexure).
3. Status of preparation of Zonal Master Plan including Tourism Master Plan.
4. Summary of cases dealt with rectification of error apparent on face of land record (Eco-sensitive Zone wise). Details may be attached as Annexure.
5. Summary of cases scrutinized for activities covered under the Environment Impact Assessment notification, 2006. (Details may be attached as separate Annexure)
6. Summary of cases scrutinized for activities not covered under the Environment Impact Assessment notification, 2006. (Details may be attached as separate Annexure)
7. Summary of complaints lodged under section 19 of the Environment (Protection) Act, 1986:
8. Any other matter of importance:

ANNEXURE 16



Compendium on Indian Biosphere Reserves

Progression During two Decades of Conservation



G.B.Pant Institute of Himalayan
Environment & Development



जहाँ है हरियाली |
वहीं है खुशाली ||

Ministry of Environment and Forests,
Government of India



Compendium on Indian Biosphere Reserves is an outcome of a collaborative effort of the Ministry of Environment & Forests (MoEF), Govt. of India, and the G.B. Pant Institute of Himalayan Environment & Development (GBPIHED). The designated Lead Coordinating Centres and the Biosphere Reserve Managers contributed chapters jointly or independently on respective Biosphere Reserves (BRs) in the country. The document intends to provide glimpses of representativeness, uniqueness and values of Indian BRs to inculcate excitement about these reserves amongst diverse stakeholders in India and as well as abroad. The document is presented in a popular reading style; therefore, scientific citations have been largely excluded.

The facts contained in individual chapters and opinions expressed therein are not necessarily those of editors, and do not commit their respective organizations (i.e, MoEF & GBPIHED).

This first reprint of compendium has been produced for wide distribution amongst participants of CoP 11 (2012)

An aerial photograph of a lush green landscape. In the foreground, there are terraced fields with distinct brown and green patterns, interspersed with dense green forests. The middle ground shows rolling hills covered in thick green vegetation. The background features a vast, hazy expanse of land under a clear blue sky. The overall scene is a harmonious blend of natural beauty and human agricultural activity.

Compendium on Indian Biosphere Reserves

Progression During two Decades of Conservation



Compendium on Indian Biosphere Reserves Progression During two Decades of Conservation

Year 2012

Editors

Lok Man Singh Palni
Ranbeer S Rawal

G.B. Pant Institute of Himalayan Environment & Development

Rama K Rai
S Venkata Reddy

Ministry of Environment & Forests Government of India

[**PHOTO CREDITS** – **Cover:** Lepcha tribes in Khangchendzonga - HK Badola; Mangrove in Gulf of Mannar - AG Pandurangan; Wild- Ass in Kachchh- S Panchal; Timber-line in Nanda Devi- Balwant Rawat; Agriculture in Cold Desert - SS Samant; Strobilanthus (Kuranji) in Nilgiri - AG Pandurangan. **Cover inside:** River Palpada in Simlipal- HS Upadhyay; **Back Cover:** Mukesh Bhandari **Title Inside:** Biosphere Components -S Nainwal; **Contents:** Maldhari in Kachchh- S Panchal; **Foreword:** Valley of Flowers: S Nainwal; **Preface:** Evergreen Forest in Simlipal- HS Upadhyay; **Acknowledgements & following page:** Bet and mudflats in Kachchh- S Panchal; **Chapters:** Authors or otherwise indicated].



Contents

Foreword

Preface

Message

Acknowledgements

Indian Biosphere Reserves

1. Introduction & Progression 12

Reserves in WNBR

2. Nilgiri 22
3. Gulf of Mannar 32
4. Nanda Devi 44
5. Sunderban 58
6. Simlipal 68
7. Pachmarhi 80
8. Nokrek 92

Other Indian BRs

9. Great Nicobar 102
10. Manas 109
11. Dibru Saikhowa 117
12. Dehang-Dibang 123
13. Khangchendzonga 133
14. Agasthyamala 143
15. Achanakmar-Amarkantak 152
16. Kachchh 161
17. Cold Desert 169
18. Seshachalam 178
19. Panna 184

Fact File 193

9

Great Nicobar Biosphere Reserve – Nicobar Islands, India

9.1. Introduction

The Great Nicobar Biosphere Reserve (GNBR) comprises of a large portion of terrestrial and coastal ecosystem which encourages for developing sustainable practices for the core area and zone of cooperation at varying degrees. The reserve also helps in preserving the integrity of cultural resources and heritage in the region. The Great Nicobar Biosphere Reserve represents tropical forest biome and is located in the tropical Indo-Malayan biotic zone. Biogeographically, Great Nicobar Island is amongst the most important regions of the world and represents one of the noted areas for speciation in the tropics.

It is represented by unique and threatened tropical evergreen forests including a host of forest systems, ranging from seasonal rain forests in the low hills, the tropical mountain forests and moist deciduous to scrub through dry-deciduous ones. The region is noted for its rich biodiversity. It houses 650 species of angiosperms, ferns and gymnosperms. The fauna consists of over 1800 species of animals. In addition, 200 species of meiofauna have also been recorded from its coastal habitats.

9.2. Area Description

9.2.1. Zonation details

The entire northern part of the island and the area between Alexandra River and Chengappa Bay forms Zone-I with 520 km² of Core zone and 90 km² of Buffer Zone. The buffer zone consists of 180 km² spread with over 90 km² in each of the two zones (Figure 9.1).

The southern part between the Sahini and Mani hill ranges including the Galathea River is Zone-II with 185 km² of Core Zone. This zone represents the least disturbed region existing more or less in its natural state. An outer area of 159 km² is designated as transition zone for management requirements of the area such as providing sustainable livelihood to the indigenous people. This includes provisioning of safe drinking water to local people, compensation for damages to life and crop, setting up of biogas plants to ensure the involvement of local people in conservation efforts. Eco-

Designation Date	: 6 January 1989
Total Area	: 885 km ²
Core Area	: 705 km ²
Buffer Area	: 180 km ²
Transition Area	: 159 km ²
Extent	: 7° and 7° 20' N, 93°37' and 93°46' E (Zone –I); 6°46' and 7° N, 93°37' and 93°56' E (Zone –II)

tourism activities are also in practice in other fringe areas and eco-development works like compatible agriculture, recreation and other relevant sectors are in progress with the participation of local people.



Figure 9.1: Great Nicobar Biosphere Reserve (GNDBR)-zonation map

9.2.2. Biogeographic characteristics

The Biosphere Reserve falls within the Island (10 B) Biogeographical zone of India. As such the Biosphere Reserve is located in the Great Nicobar Island (Province-10B) of the Union Territory of Andaman and Nicobar Islands.

9.3. Background Information

9.3.1. Landscape features and land use history

The Great Nicobar Island is the southernmost Island of Andaman and Nicobar Islands located about 482 km south of Port Blair, the capital of the Union Territory. The total geographical area of the island is 1044 km² with a length of 55 km from Murray Point in the North to Indira Point in the South. The greatest width of about 30 km is in the north which narrows down to about 3 km in the southern tip.

9.3.2. Reserve inhabitants, demographic trends and dependence

Immigration of mainlanders began in 1969, when 337 families were settled on the southeastern coast of Great Nicobar Island. The total population of Great Nicobar Island was 6831 in 1991 of which 3745 resided in Campbell Bay. The economy of the settlers is based on agricultural production and fishing. Paddy, coconut, arecanut and spices constitute the major agricultural produce. Rice is grown on a subsistence basis. Income generating horticulture crops include coconut and arecanut plantations. Fishing is done mainly by the fisher-folk who migrated from Andhra Pradesh and have now settled in Campbell Bay and Shastrinagar. Fishing in the creeks and bays is carried out using gill nets and hook and line.

Historically, the Great Nicobar Island is the land of Shompen and Nicobarese Tribes. The Shompen inhabit the interior forest. They are shy in nature and avoid contact with outsiders

They live around and along the perennial freshwater rivers and construct huts using palm and pandanus leaves. The Shompens are hunters and food gatherers leading a semi-nomadic life. They cultivate yams, pandanus, coconuts, arecanuts and bananas. They maintain small herds of pigs and also hunt wild pigs with spears and fish with harpoons.

The Mongoloid Shompen Tribe, about 200-250 in number, live within the Biosphere Reserve. They also rely on the marine resources for sustenance. Another Mongoloid Tribe - Nicobarese, about 310 in number, live in the villages along the west coast of the Transition Zone.

The Nicobarese are horticulturists. Coconut, pandanus, banana, papaya, yam and other starch y roots and tubers are their principal items of crop. They also depend for food on hunting and fishing. Pig rearing is an important traditional job of Nicobarese. They live in villages located along the coast. The huts are made of wooden logs, stems of areca palm, coconut palm, etc., while the roof is thatched with grass, canes, bamboo and coconut leaves. At present their traditional beliefs and customs are changing and modern education and Government jobs are readily accepted, provided these are made available in their own place. Over 6000 settlers and mainlanders live along the southwest coast of the island practicing agriculture, horticulture and fishing. The Shompens live wandering in the Core and Buffer Zones. The settlers and the Nicobarese live in settlements spread along the coast in the Transition zone.

9.3.3. State of knowledge

The Great Nicobar Biosphere Reserve has received relatively little attention from the researcher largely owing to its remoteness. Analyses of literature reveals that 224 research papers have been published pertaining to flora and fauna of GNBR. Of the published information, it is revealing that most of the studies have been conducted on floristic aspects of this Reserve (Figure 9.2).



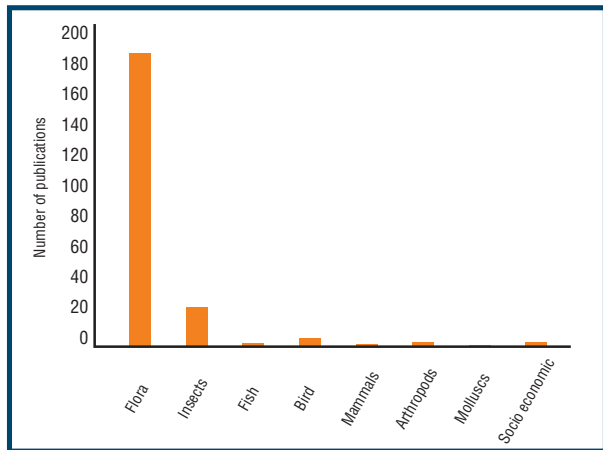


Figure 9.2: Among researches, the floral studies have been most common in the reserve

However, most of the published information regarding GNBR deals with taxonomy and distribution of flora and fauna, and effectively very little quantitative information exists.

Among gap areas following can be indicated for immediate attention: (i) detailed quantitative studies on fauna and flora;



(ii) assessment and quantification of crop damage by wild animals; (iii) in-depth socio economic studies.

9.4. Global and National Significance

The Great Nicobar Island has remained in global focus and in the priority of leading conservation agencies due to its rich and unique biodiversity. The richness of flora and fauna of this region reflects the diversity of wide range of habitats associated with. The Great Nicobar Island has been identified as an Endemic Bird Area by the Royal Society for Protection of Birds. This reserve is home for several endemic species

namely Nicobar Megapode (*Megapodius nicobariensis*), Edible-nest Swiftlet (*Aerodramus fuciphagus*), Nicobar Tree Shrew (*Tupaia nicobarica*), Long-tailed Macaque (*Macaca fascicularis*), Saltwater Crocodile (*Crocodylus porosus*), Giant Leatherback Sea Turtle (*Dermochelys coriacea*), Reticulated Python (*Python reticulatus*), Coconut Crab (*Birgus latro*), etc.

Great Nicobar Island has been identified as an Endemic Bird Area.

9.5. Biodiversity Values

Great Nicobar Biosphere Reserve represents the tropical forest biome, and is located in the tropical Indo-Malayan biotic zone of the world. Biogeographically, Great Nicobar Island is one amongst the most important region and one of the noted areas for speciation in the tropics. The Biosphere Reserve is represented by unique and threatened tropical evergreen forest ecosystems including a host of forest systems. Barring the North Andaman there is no area in these islands where such large contiguous forests still exists.

9.5.1. Flora

Based on the reports available, the reserve houses 650 species of angiosperms, ferns and gymnosperms. The tree fern, *Cyathea albosetacea* is dominant in many parts of the Reserve. Other important plant species include *Scaevola sercea*, *Heritiera littoralis*, *Pandanus* sp., *Terminalia bialata*, *Barringtonia andamanicos*, *Rhizophora* spp., *Gnetum gnemon*, *Sterculia macrophylla*, *Elaeocarpus aristatus*. The



knowledge of the lower plants is, however, limited.

9.5.2. Fauna

The known vertebrate fauna of the reserve includes: 14 species of mammals, 71 species of birds, 26 species of reptiles, 10 species of amphibians and 113 species of fishes. Invertebrates are represented by 7 species of annelids, 417 species of insects including 73 species of butterflies and 132 species of moths. A large number of other invertebrates such as mollusks, and many more species that await discovery. The important faunal elements of the Biosphere Reserve include the Nicobar Tree Shrew, Wild Boar, Crab eating Macaque, Nicobar Civet, Nicobar Pigeon, Nicobar Megapode, Serpent Eagle, Marine Turtle, Reticulated Python. Among the birds Nicobar Megapode, Nicobar Sparrow hawk, Nicobar Serpent Eagle, Blyth's Parakeet and Nicobar Bulbul are endemic to Nicobar. Whereas Andaman Woodpigeon, Andaman Cuckoo Dove, White-bellied Mynah and Andaman Hawk Owl are endemic to Andaman and Nicobar Islands.

The reserve is also a home for many rare and endangered species of flora and fauna and helps them rear in nature.

The Biosphere Reserve holds a remarkable genetic diversity of plants, animals and other lower life forms, with an estimated 24 per cent endemism over the number of species of some faunal groups. The economically important species, including the traditionally used ones, could be categorized as timber, edibles, fodder, plants and animals with medicinal value, apart from the wild progenitors of cultivated crops and domesticated animals. There are several important timber yielding plants, fruit trees, food plants and number of medicinal plants have also been reported from the reserve.

9.6. Issues and Concerns

Many of the scientists working on species within the Great Nicobar Islands ecosystem have established study sites within and outside of the reserve boundaries. The creation of GNBR has provided further opportunity for applied research which monitors changes within the designated zones: core, buffer, cooperation. An extended geography implies the need for more measurement of human activities and also generalization up to the landscape scale.

One of the most pressing needs would be to have a consensus on the ecosystem units, their size and distribution across Great Nicobar Island. This would also provide us with a framework for species level research in the region.

9.6.1. Sustainable development issues

- ❖ Protect and enhance the quality of life enjoyed by citizens of the Great Nicobar Biosphere Reserve.

- ❖ Promote increased recognition and understanding of the cultural heritage of the Great Nicobar Biosphere Reserve.
- ❖ Promote demonstration sites to illustrate traditional sustainable practices of the regional economy.
- ❖ Encourage development of innovative resource use and conservation techniques to explore new approaches to local resource issues.
- ❖ Encourage development of appropriate nature-based recreation that is ecologically sustainable (eco-tourism).

9.8. Major Achievements

Among others the following achievements have been made by the lead Institution w.r.t. the Great Nicobar Biosphere Reserve.

- ❖ Literature pertaining to ecology and diversity of faunal and floral communities of Great Nicobar Biosphere Reserve has been collected.
- ❖ Nomination Form for UNESCO-MAB Network for the consideration of Great Nicobar Biosphere Reserve (GNBR), Andaman and Nicobar Islands under the World Network of UNESCO has been prepared and submitted for necessary action.

7. Perspective 5 year plan – major components

S.N.	Relevant Action Areas/Targets of Madrid Action Plan (MAP)
1	<p>Collection, synthesis and dissemination of research based information in respect of Great Nicobar Biosphere Reserve.</p> <ul style="list-style-type: none"> ❖ Carryout detailed inventories to collect datasets of the fauna and floras, socio economic data, meteorological and hydrological data for assessing the need for site specific management of the Reserve.
2	<p>Create and implement a system of recognizing performance of the Seville Strategy</p> <p>Ten key directions of the Seville Strategy would be implemented and monitored in the Great Nicobar Biosphere Reserve.</p> <ul style="list-style-type: none"> ❖ The contribution of biodiversity in respect of Convention on Biological Diversity and other agreements on climate change, desertification and forests would be strengthened in the GNBR. ❖ The biosphere to be developed by considering wide variety of environmental, biological, economic and cultural situations. ❖ The emerging regional, inter-regional and thematic networks of GNBR to be strengthened ❖ Strengthen scientific research, monitoring, training and education in GNBR. ❖ Assess through research and monitoring the contribution of each zone. ❖ Explore and demonstrate at local and regional level through meeting/seminar the sustainable development mechanism of GNBR. ❖ The linkages between culture and biological diversity of GNBR need to be understood through field studies, questionnaire surveys and available literature. ❖ Increasing frequency of awareness camps, meetings, seminars for local communities for strengthening conservation of Biosphere Reserve. ❖ Development of a network of the interested groups and sectors for adequate information sharing. ❖ Improving public awareness through media, publications, environmental education on both long term and short term basis.
3	<p>Produce regional, sub regional (country) and ecosystem specific publications on GNBR</p> <ul style="list-style-type: none"> ❖ Bringing-out ecosystem specific publications based on the field surveys and review of available published information. Ensure proper distribution of the same amongst the public and policy makers.

4	<p>Implementation of communication strategy on environmental, economic, social, spiritual, cultural and political important and benefits of Biosphere Reserve to National Governments, policy makers, journalists, local communities and other targets groups</p> <ul style="list-style-type: none"> ❖ Organize training workshop for BR Managers, National/State Government officials, Policy makers, Journalists, Local communities and other targets groups.
5	<p>Carry out a survey on the present zoning system of the GNBR (including the proportions of the different zones) and investigate how well they fulfill the three functions in each zone</p> <ul style="list-style-type: none"> ❖ Conduct detailed surveys in different zones to collect the information on biodiversity.
6	<p>Use BRs to manage large biome as a BR system and for extensive terrestrial and marine areas as a series of units linking up relatively small protected core areas with significantly larger buffer zones and transition areas</p> <ul style="list-style-type: none"> ❖ Conduct separate surveys in terrestrial and marine areas.
7	<p>Cooperative conservation and development strategies for biosphere reserve</p> <ul style="list-style-type: none"> ❖ Conduct periodic reviews in respect of Great Nicobar Biosphere Reserve and assist the BR managers to ensure proper functioning of reserve and also develop detailed strategy documents.
8	<p>Provide training to BR managers on science-policy practice interaction and participatory management for science and other relevant areas</p> <p>The following aspects should be included in the training programme of BR managers</p> <ul style="list-style-type: none"> ❖ Introduction (BR concept, its progression and current thinking; Indian scenario); Structure and functions of Biosphere Reserve (BR). ❖ Research needs in BRs (Research priorities, use of research outcomes). ❖ Eco-development activities in BRs (needs assessment, livelihood options, new scopes). ❖ Quantitative methods for Biosphere Managers to collect the data under field conditions using well structured experimental designs. ❖ Data generation, management and interpretation. ❖ Conservation of critical species and habitat, participatory management. ❖ Practical wildlife management and GIS for Biosphere Reserve Managers. ❖ Wildlife management and environmental impact assessment. ❖ Sustainable agriculture and land management for wildlife conservation. ❖ Conventions or agreements on biodiversity and legislation on biodiversity.
9	<p>Promote capacity enhancement programmes for BR administrators and managers, such as on adaptive management, including conflict resolution and negotiation skills</p> <ul style="list-style-type: none"> ❖ Identifying the root causes of the conflict. ❖ The analysis of stakeholder representations based on order of magnitude. ❖ Concentrating on the reality of the conflict. ❖ Review the issues of conflict and alternative control measures.
10	<p>Use of research results to assist countries in developing and implementing policies for Sustainable development</p> <ul style="list-style-type: none"> ❖ Frequent publications of the research results in the form of reports and also in peer reviewed journals. The findings need to be incorporated by researchers, wildlife managers and other forest administrators especially by the forest department for preparing the management action plan. Suitable conservation measures to emerge from these studies for conservation of ecosystem.

11	<p>Carry out training courses for different ecosystem types related to climate change, in particular using the ERAIFT regional flagship project for tropical forests and certified forestry as a climate change mitigation Approach</p> <p>The following training courses need to be organized</p> <ul style="list-style-type: none"> ❖ Biodiversity conservation and participatory management. ❖ Social mobilization, leadership and community development. ❖ Forest management and social mobilization. ❖ Tools and techniques for participatory rural appraisal. ❖ Communication techniques, tools and principals.
----	--



- ❖ Interaction with regional research organizations viz. Pondicherry University, University of Calcutta, Annamalai University, Central Salt and marine Chemical Research Institute, Central Agricultural Research Institute, National Institute of Ocean Technology, Wildlife Institute of India, and Salim Ali Centre for Ornithology and Natural History to undertake holistic research on GNBR. In this respect, 11 proposals have been submitted to the Ministry.
- ❖ Frequent interactions with BR managers to assess research needs and crucial issues requiring research efforts, to assist in preparation of management plans, and to document the faunal wealth of GNBR.
- ❖ Preparation of detailed research projects for consideration of the Ministry to implement the Madrid Action Plan.

C Raghunathan
 Officer-in-Charge
 Zoological Survey of India
 Andaman and Nicobar Regional Centre
 Port Blair-744 102, Andaman and Nicobar Islands
 Phone: +91-3192-230115/237582/23148
 Fax: +91-3192 - 230115
 eMail: anrszi@gmail.com

K Venkataraman
 Director
 Zoological Survey of India
 M-Block, New Alipore
 Kolkata - 700 053

ANNEXURE 17



The Nicobar megapode

Status, ecology and conservation: Aftermath tsunami



K Sivakumar

Research Report No. RR 07/002



भारतीय वन्यजीव संस्थान
Wildlife Institute of India

Dehradun

February 2007

Acknowledgements

This survey was jointly carried out by the Wildlife Institute of India and the Andaman & Nicobar State Forest Department especially the Campbell Forest Division. I thank all the TRAC members of WII for encouraging to take up this task. I am grateful to Sh P.R. Sinha, Director, Wildlife Institute of India for his guidance and encouragement. Thanks to Prof.. V.B.Mathur , Dean, WII and Prof. B.C. Choudhury, WII for their help and encouragement. I am also thankful to all my faculty colleagues, Researchers and staff of WII for their help and encouragement.

I am grateful to Sh S.S. Choudhury, PCCF(WL), A&N FD, Sh Madhava Trivedy, CF(WL) and Sh C.R. Mallick, DFO, Campbell Bay, Sh J.C. Jayaraj, CF, Sh Ravichandran, DCF(WL), Sh Dharma Rao, Sh S. Durai, Sh Jona Phillips, Sh. Vishnudevan of Forest Department for their support and help. Thanks to Sh Nagendra Kumar, Sh Mahindra, Sh John, Sh Sivanandan, Sh Ravisundaram, Sh Virendra Sharma and all Nicobarese for their help in the field.

Special thanks to Dr. Ravi Sankaran, Dr. R. Jayapal, Dr. R.W.R.J. Dekker, Dr. Darryl Jones and Dr. Guntram for their valuable comments and suggestions on the final report. I wish to acknowledge the contributions made by Sh S. K. Mukerjee, Sh V.B. Swarkar, Dr. A.J.T. Johnsingh, Dr. Asad Rahmani, Dr. K. Sankar, Dr. Qamar Qureshi, Dr. Karthikeyan Vasudevan, Dr. B.S. Adhikari, Dr. K. Ramesh, has greatly helped my research on megapode.

I thank the Andaman & Nicobar administration especially the District Commissioners of Andaman and Nicobar districts, Assistant Commissioners of Campbell Bay and Nancowry for their support.

Last but not the least, I am grateful to my survey team members Mr. Samuel Andrew, Mr. Jugulu Mehato, Mr. Chandrasekar Rao, Mr. S. Sivakumar, Mr. Koruma Rao, Mr. Damodhar Rao, Mr. Alkana, Mr. Rajan, Mr. Maianeus, Mr. Simos, Mr. James, Mr. Samuel and Mr. Rahul for having worked with me in a harsh climate. Their excellent cooperation and hard works made this survey successful. I am also grateful to my wife and son who have been a source of encouragement and suffered missing me for such a long period.

Executive Summary

1. The Wildlife Institute of India conducted a status survey of the Nicobar megapode along with other coastal endangered species in the Nicobar group of islands in an effort to document the adverse impacts on their populations due to tsunami that occurred on 26th December 2004. The endemic Nicobar megapode population showed a dramatic decline (nearly 70%) in the number when compared to previous survey carried out in 1993-94. In 2006, there are approximately 800 breeding pairs in the coastal zones of these island group.
2. There was no evidence of Nicobar megapode in Megapode Island WLS and Trax Island during this survey where megapodes was reported earlier.
3. Crucial megapode habitats such as littoral forests of the island group were adversely affected. The populations of indicator species of the littoral forests *Barringtonia asiatica* and *Terminalia bialata* were severely impacted. However, regeneration of these species was found on the coastal region.
4. The island ecosystem are known for their resilience due to their ability for re-populating habitats and promoting regeneration. However, the restoration of the original biodiversity is possible only if the natural process such as recolonization is facilitated. The aftermath of the tsunami has left the trail of homeless families who need rehabilitation. Finding proper homes and alternate livelihood for them should not undermine ecosystem resilience. Raising plantation crops to generate revenue in the littoral forests should take into account the long term effects of habitat alteration.
5. Significant levels of wildlife habitats have been occupied by the tribals under the leadership of the tribal chiefs (known as Village Captain). Any conservation awareness programme with the help of these Village Captains would be useful for implementing recovery plans of declining species.
6. The Nicobar Division of the State Forest Department needs to be strengthened to facilitate wildlife protection and to take up appropriate wildlife management actions.
7. A total of 37 permanent monitoring plots have been identified and marked (Table 2) for long term monitoring of megapodes and its habitat. With some basic training, forest staff can collect data from these plots and within a weeks time all islands can be surveyed and collected data analyzed for developing appropriate conservation and management measures.

Content

Acknowledgement	2
Executive Summary	3
Chapter 1: The Nicobar megapode	5
Chapter 2: The Andaman and Nicobar islands	12
Chapter 3: Objectives	16
Chapter 4: Methods	17
Chapter 5: Results and Discussion	20
Chapter 6: Threats	20
Chapter 7: Conservation perspectives	33
Chapter 8: Protocol for monitoring megapodes and their habitats	38
References	44
Annexure I: Details about permanent monitoring plots and all sampled plots	i
Annexure II: Summary data of the Nicobar megapode survey 2006	iv

Chapter 1

The Nicobar megapode

1.1. Introduction

The megapodes are a unique group of birds as they utilise external sources of heat to incubate their eggs (Jones *et al.* 1995). The Megapodiidae, literally meaning big feet after the disproportionately large feet of the birds, were first described to science during Magellan's 1519-1522 expedition to the Far East (Frith 1956 & 1959). The family Megapodiidae consists of 22 species in seven genera, most of which are island forms occurring in Australia, New Guinea and surrounding islands, eastern Indonesia, the Philippines, Niuafo'ou Island, the Palau and Mariana Islands and the Nicobar Islands (Dekker 1989, 1990 & 1992). Thirteen of these 22 species are currently threatened by habitat destruction, introduction of predators and over-exploitation of eggs (Jones *et al.* 1995).

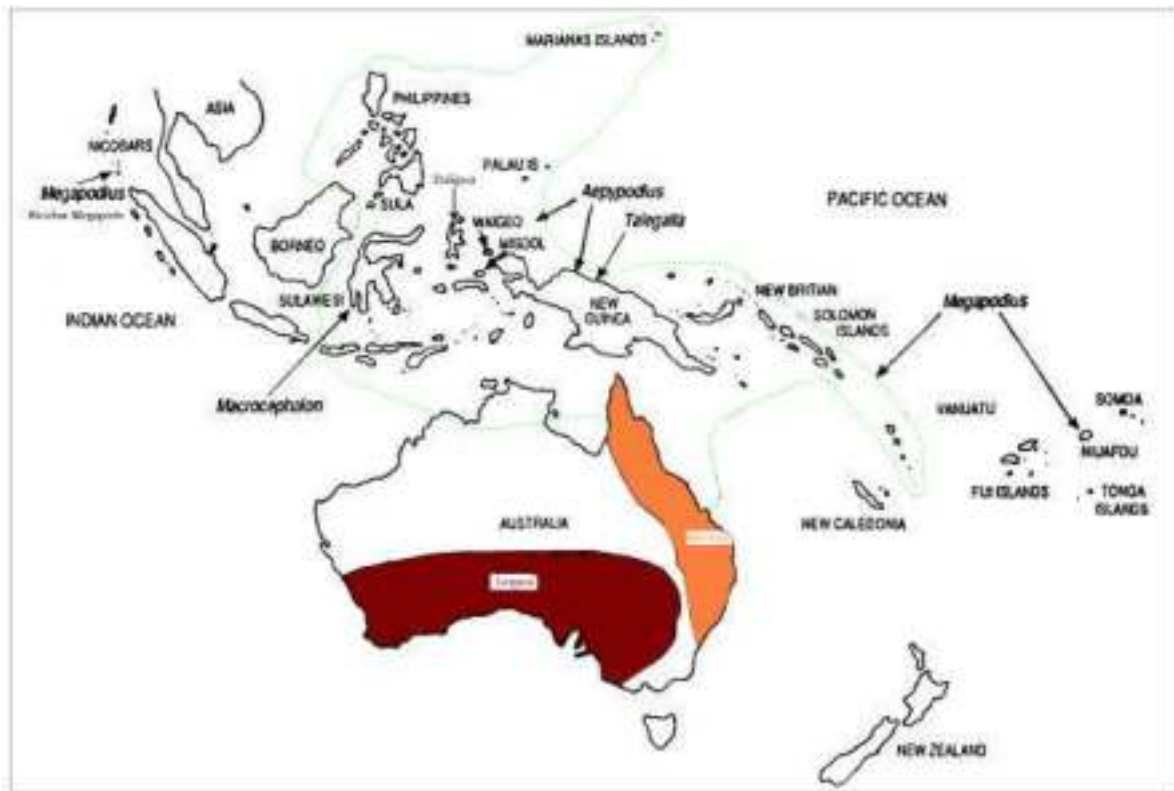
Megapodes are heavy-bodied birds of the forest floor and resemble Galliformes in body shape and plumage. Most megapodes are brown, blackish, or grey in colour. Many have virtually bare areas on their face or neck and this exposed skin may be coloured yellow, blue, or dull red. Megapodes are opportunistic ground foragers, eating a wide variety of food such as insects, seeds, and fallen fruits. Although all are able to fly, and some make considerable flights on a daily basis, most species move primarily by walking (Jones *et al.* 1995).

The taxonomic position of the family Megapodidae is still subject to debate (Jones *et al.* 1995). In the past, megapodes were believed to have more affinities with Charadriiformes, Columbiformes, Passeriformes and even Falconiformes. Later megapodes were included in the order Galliformes along with Guans and Curassows which are sometimes classified under a separate order Craciformes (e.g. Sibley and Monroe, 1990). In 1899, Sharpe divided the Galliformes into several suborders, the "megapodii" was first among them. After studying the osteological, karyological and biochemical properties of egg white proteins of megapodes and other galliformes, Megapodiidae was considered as the sister group of all remaining Galliformes (Jones *et al.* 1995).

The family Megapodiidae contains seven genera : *Megapodius*, *Macrocephalon*, *Talegalla*, *Aepyodius*, *Alectura*, *Leipoa* and *Eulipoa*. The genera *Megapodius* and *Eulipoa* have the smallest megapodes and their geographical variation is considerable but most are domestic-chicken-sized birds with short tails and a short pointed nuchal crest (Beehler *et al.* 1986). The monotypic genus *Macrocephalon* is closely related to the genus *Megapodius*. The *Talegalla* species do not have wattles and are large sized black coloured megapodes. *Alectura* is considered to be closely related to *Talegalla* and *Aepyodius*, a group known as the Brush-turkeys, each having a bare neck and face that may be brightly coloured (Jones *et al.* 1995). *Alectura* and the two *Aepyodius* species also possess inflatable necksacs or wattles and combs, and have brilliantly coloured heads and necks (Jones *et al.* 1995). The Brush-turkeys are the only group in which sexual dimorphism is evident, with the males

being slightly larger and more colourfully ornamented than the females. The *Leipoa* species is characterised by their contrasting body colour, dense feathering on head and neck, short and thin bill and short legs.

Figure 1.1. Distribution of the megapodes (source Jones 1989b)



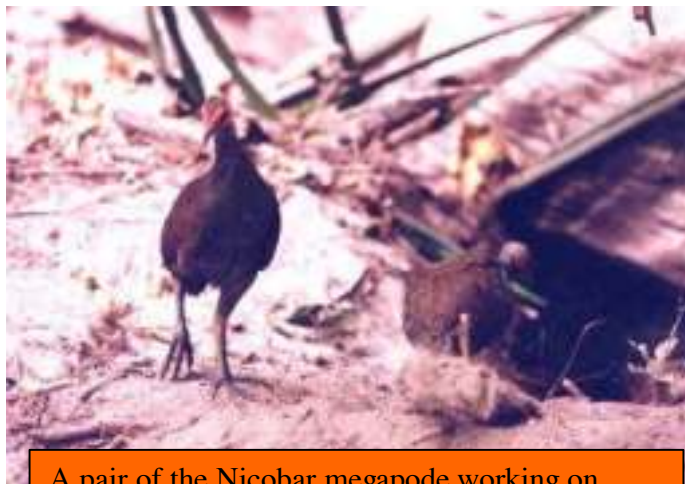
The Megapodiidae are mainly found in the Indo-Australian region east of Wallace's line (Jones *et al.* 1995) (Fig. 1.1). There are three exceptions to this: *Megapodius nicobariensis* from the Nicobar Islands, *Megapodius pritchardii* from Niuafo'ou Island and *Megapodius laperouse* from the Pulau and Marianna Islands. Based on these exceptions, Lister (1911) said that these species were introduced into the respective islands by domestication and then transported from one island to another. This theory was later rejected and two new theories were presented to explain the distribution of the megapodes. Olson (1980) considered Phasianids and Megapodes as ecological counterparts that could not co-exist, and suggested that the megapodes were restricted largely to islands, due to the presence of galliformes on neighbouring mainlands. However, the co-occurrence of the Green Jungle Fowl *Gallus varius* and Orange-footed Megapode *Megapodius reinwardt* in the Lesser Sunda Islands, and similar cases of sympatric distribution of both Phasianids and megapodes in Palawan and Borneo, led to an alternative theory proposed by Dekker (1989). Based on mammalian predation, especially by cats and civets, Dekker (1989) proposed that mammalian carnivores prevented the expansion of the megapodes westward. The high predation pressure associated with the wide variety of large predators on the Greater Sunda Islands and on the

mainland of Southeast Asia rendered these regions unsuitable for mound-building megapodes. The fact that the Nicobar Islands have never had a land connection (Dekker 1989) and are thus devoid of carnivores could explain the occurrence of the Nicobar Megapode. The predation theory, however, is also debatable because of the coexistence of carnivores (Little Civet *Vivericula indica* and Leopard Cat *Prionailurus bengalensis*) and the Orange-footed Megapode on the Lesser Sunda Islands (Jones *et al.* 1995).

Megapode eggs are large and heavy compared with the eggs of birds of equivalent size, and 48 to 69 per cent of weight of the egg contents is yolk (Dekker and Brom 1990). These large-sized eggs are incubated by the megapodes in mounds or burrows. Based on this, megapodes are divided into two groups: species that lay eggs in burrows in geothermally heated soils are called burrow nesters (eg. *Macrocephalon maleo*) and the mound builders, which construct mounds of decomposing vegetative matter (eg *Megapodius nicobariensis*).

1.2. The Nicobar Megapode

The Nicobar Megapode *Megapodius nicobariensis*, a mound nesting megapode, is endemic to the Nicobar group of Islands in the Bay of Bengal, separated from its nearest congener by a distance of over 1500 km (Olson 1980). The polytypic Nicobar Megapode has two subspecies. *M. n. nicobariensis* Blyth, is present in the Nancowry group of Islands north of the Sombrero channel, and *M. n. abbotti* Oberholser, is found on the Great Nicobar group of Islands lying south of the Sombrero channel (Hume and Marshall 1878, Abdulali 1964, Ali and Ripley 1983, Fig 1.2).



A pair of the Nicobar megapode working on their mound nest

Figure 1.2. *Megapodius nicobariensis* occurs as two subspecies. *M. n. nicobariensis* found in the Nancowry group of Islands north of Sombrero channel and *M. n. abbotti* found in the Great Nicobar group of Islands.



The Nicobar Megapode is a terrestrial brown or reddish-brown bird with a pinkish-red bare patch around the eye and a greyish crown; the dorsal side of the leg is blackish-brown and the ventral side is yellowish. They are usually seen in pairs in forests close to the beach, the sexes are alike (Hume 1874, Sivakumar and Sankaran, 2003 and 2005). The total body length is 37-40 cm (Hume 1874, Ali and Ripley 1983, Jones *et al.* 1995, Table 1.1). Newly-hatched chicks have the crown, upperparts, and upper wing rufous brown, and the under parts a dull cinnamon-brown, sometimes with slight grey tinge, with the lower back inconspicuously rufous and black (Ali and Ripley 1983).

Table 1.1. Morphometric characters of *M. n. abbotti* (Sivakumar, 2000).

Bird	Structure	mm/gram* (Mean±SE)	n
Adult female	Tarsus	72.45 ±SE 0.56	6
	Wing	231.2 ± 3.99	6
	Culmen	27.8 ± 0.25	6
	Weight	783.5 ± 28.48	6
Adult male	Tarsus	73.69 ± 0.85	11
	Wing	243.45 ± 3.15	11
	Culmen	27.44 ± 0.34	11
	Weight	758.09 ± 25.42	11
Chick	Tarsus	25.6 ± 1.14	17
	Wing	87.96 ± 1.7	17
	Maxillary	18.3 ± 0.3	17
	Weight	63.9 ± 3.9	17
Egg	Length	83.6 ± 0.73	36
	Width	49.0 ± 0.3	36
	Weight	109.4 ± 5.8	36

* Weights are in gram and lengths are in mm

1.3. Historical distribution of the Nicobar megapode

Historically the Nicobar Megapode occurred on most Nicobar Islands (Hume 1874; Kloss 1903; Dekker 1992; Sankaran 1995a&b) barring Car Nicobar (Butler 1899), Chaura (Abdulali 1967) and Bati Malv (Sankaran 1995a). There were a few records from the Andaman group of Islands (Hume 1874; Butler 1899; Sewell 1922) and from the Coco Islands further north (Kbss 1903; Abdulali 1964). None of the records from the Andaman group are of recent origin and the species is now believed to be absent there (Sankaran 1995a & b). It may have existed on Car Nicobar a century ago (Kloss 1903) but no traces of mounds were found there (Sankaran 1995a&b). The Island of Chaura is only 11.5 km from Teresa and, considering the megapode's occurrence on the more remote Tillanchong, there is no reason why it should not have existed in Chaura (Sankaran 1995b). The presence of what was most probably an ancient mound indicates that the megapode did occur on Chaura

historically (Sivakumar 2000). However, both Car Nicobar and Chaura are much too densely populated for the species to exist there now.

1.3.1. *Megapodius nicobariensis abbotti* Oberholser, 1919.

M. n. abbotti is common in all coastal forests, particularly uninhabited or sparsely inhabited areas, on Great and Little Nicobar. *M. n. abbotti* is believed to have disappeared from all areas colonised by mainlanders (Dekker 1992), but they continue to survive in small remnant pockets (Sankaran 1995b). Seven of the nine islets in the Great Nicobar group have habitat suitable for megapodes and two (Cabra and Pigeon) are too small. Small populations of megapodes are present on six of these seven islets. The seventh islet, Pilo Milo is inhabited, and the islet is mostly under coconut palms. Megapodes are apparently extinct on this islet. Over 50% of the forests of uninhabited Meroe, Treis, Trax, Menchal and Megapode Island have been converted to coconut plantation, and populations of megapodes on these islands are threatened (Sankaran 1995b).

1.3.2. *Megapodius nicobariensis nicobariensis* Blyth, 1846.

M. n. nicobariensis occurs on seven islands of the Nancowry group (Sankaran 1995b). On Camorta, Katchall and Trinkat, *M. n. nicobariensis* is patchily distributed, with very few locations having active mounds. Good populations of megapodes exist on Teresa and Bompoka and the density of active mounds is similar to that of Great and Little Nicobar. Tillanchong is mainly hilly with very little level coastal forest, thus megapodes are naturally scarce except in the low lying coastal forests.

1.4. Population status

The Nicobar Megapode is considered to be seriously endangered (Jones 1989; Jones and Birks 1992), and has featured in several lists of endangered species (e.g. Collar and Andrews 1988). In 1988, the extinction of the megapode from Kondul was reported, a population of less than 400 birds was estimated on Great Nicobar and the extinction of this species was predicted in the next 10 years (Sankaran, 1995b). However, Dekker (1992) estimated the population of *M. n. abbotti* at about 780 breeding pairs (if not more) in the coastal area of Great Nicobar and concluded that it was not threatened there. The population of *M. n. abbotti* was estimated to be between 3400 and 6000 birds and the number of active mounds at 849 (Sankaran 1995a). The population of adult breeding birds of *M. n. nicobariensis* was estimated to be between 1200 and 2100 birds and the number of active mounds to be a little over 300 (Sankaran 1995a). Currently, *Megapodius nicobariensis* is considered as vulnerable (Sankaran 1995a&b).

The Nicobar Megapode is protected under Schedule I of the Indian Wildlife Protection Act (1972) whereby hunting and trade is prohibited. However, as per the Section 65 of the Indian Wildlife (Protection) Act, 1972, nothing in this Act shall affect the human rights conferred on the Scheduled Tribes of the Nicobar Islands in the Union territory of Andaman and Nicobar Islands by notification of the Andaman and Nicobar Administration, No.40/67/F, No.G635, Vol. III, dated the 28th April, 1967. As per this Act, the ethnic tribes

of the Nicobar Islands (Nicobarese and Shompen) are allowed to continue hunting on wild animals including the megapodes.

Chapter 2

The Andaman and Nicobar Islands

The Andaman and Nicobar Islands (latitudes 6° 45' and 13° 41' and longitudes 92° 12' and 93° 57') in the Bay of Bengal arch from Arakan Yoma in Myanmar in the north to Sumatra in Indonesia in the south (Saldanha 1989; Dagar *et al.* 1991). The islands cover an area of 8,249 km², with a total coastline of 1962 km; the Andaman group has more than 325 islands (21 inhabited) covering 6,408 sq km, and the Nicobar group has over 23 islands (12 inhabited) with an area of 1,841 sq. km (Singh 1981; Saldanha 1989).

2.1. The Nicobar Islands

The Nicobar Islands can be subdivided into three distinct subgroups based on ornithological affinities (Sankaran 1997). To the south lies the Great Nicobar group consisting of two islands over 100 km² in area, nine islets less than five km² in area, and a few rocks. Among them, Great Nicobar, Little Nicobar, Kondul and Pilo Milo are inhabited, while Meroe, Treis, Trax, Menchal, Megapod, Cabra and Pigeon are uninhabited. Fifty-eight km north of the Great Nicobar group is the Nancowry group (middle Nicobar Islands), which consists of three islands larger than 100 km², two of 36 and 67 km², three less than 17 km², 2 small islets and a few rocks. Except islets, all other islands of Nancowry group are inhabited. The northernmost subgroup comprises of Batti Malv and Car Nicobar, which is 88 km north of the Nancowry group. Batti Malv is uninhabited and Car Nicobar has a population of over 19000 people (Sankaran 1995b).

The shore line of Nicobar Islands are endowed with varied landscapes such as rocky shore, sandy beaches, backwaters, bays, lagoons, mangrove forests and coral reefs. To the interior most of the islands have undulating terrain with the main ridges running north-south, falling steeply and irregularly on both sides to the floor of the Bay of Bengal and the Andaman sea. The Great Nicobar groups is significantly more hilly than the Nancowry group, with the high peak, Mt. Thullier at 670 MSL.

The soil shows considerable variability from heavy clay, loams, gravelly loams, sandy loam and sand. The depth of soil depends on the slope, with deep alluvial deposits often found along the lower reaches of the creeks. The soil lacks humus due to continuous leaching by heavy rainfall.



Four Islands in the Nicobar group have areas protected as wildlife preserves, and all islands are tribal reserves. Tillanchong, Batti Malv and Megapode Island, all uninhabited, are Wildlife Sanctuaries. Great Nicobar has two National Parks (536 km²) and is also a Biosphere Reserve (885 km²), whose core areas are the National Parks (Sankaran 1995a).

2.2. Flora

The vegetation and the floristic composition of the Car Nicobar group, Nancowry and Great Nicobar groups of islands differ from one another (Thothathri 1962). In general the vegetation of the Nicobar Islands can be classified into six groups: Marine vegetation, beach vegetation, tidal mangrove forest, inland evergreen forests, patches of deciduous forest and grass land and open vegetation (Thothathri 1962).



Survey team approaching sampling area

The beach forests or the dune forests are restricted to the beaches of fine calcareous sand which stretch along the shores. Creepers that mark the beginning of beach vegetation are *Ipomoea per-caprae*, *Vigna retusa*, *Ischaemum muticum*, *Phyla nodiflora* and herbs like *Acalypha indica* etc. *Scaevola frutescens* is the immediate successor to these plants. *Tournefortia argentina* is a large shrub with silvery pubescent leaves and is very common in Katchall, Camorta and Great Nicobar Islands (Thothathri 1962). *Pandanus leram*, *Pandanus tectorius* and *Pandanus furcatus* grow luxuriently in this forest. The shrub layer is accompanied by trees like *Barringtonia asiatica*, *Terminalia catappa*, *Calophyllum inophyllum*, *Hernandia peltata*, *Pongamia pinnata*, *Heritiera littoralis*, *Ficus rumphii*, *Odina wodier* and *Syzygium samarangense*. *Cycas rumphii*, *Cerebra manghas* and *Cerbera odollam* grow well under the shade of these trees. *Casuarina equisetifolia* is present on Great Nicobar. The ground cover consists of grasses like *Centotheca lappacea*, *Oplismenus compositus*, *Chrysopogon aciculatus*.

Mangrove forests are found in patches of varying sizes in most islands. The dominant species present in this mangrove forests are *Rhizophora mucronata*, *Bruguiera gymnorrhiza*, *Excoecaria agallocha*, *Carallia brachiata*, *Sonneratia acida*, *Timonius jambosella* and *Nipa fruticans*.

True tropical evergreen forests are present in the Nicobar Islands (Thothathri 1962). In Great Nicobar the forests are extensive and completely cover the hill ranges and even lowland areas. The most common and dominant tree species in tropical evergreen forests of Great Nicobar are *Calophyllum soulattri*, *Sideromylon longipetiolatum*, *Endospermum malaccense*, *Garcinia xanthochymus*, *Adenantha pavonia*, *Albizia lebbek*, *Pisonia excelsa* and *Mangifera sylvatica* (Sahni 1953). Patches of deciduous forest with *Terminalia procera* and *Terminalia bialata* have been reported at low elevations in Great Nicobar (Sahni 1953). The forest floor is covered with herbaceous plants such as *Blumea myriocephala*, *Lasianthus laevicaulis*, *Homalonema aromatica*, *Adenostemma viscosum* and *Maranta dichotoma*. In areas where rainwater accumulates *Helminthostachys zeylanica* is common, growing together with *Polygonum flaccidum* (Thothathri 1962).

Grasslands are peculiar to Camorta, Nancowry, Trinkat, Terressa and Bompoha Islands (Thothathri 1962; Sankaran 1995b) and in some patches of Chaura and Car Nicobar. *Imperata cylindrica* and *Saccharum spontaneum* are the most dominant grass species present in these islands (Thothathri 1962).

2.3. Fauna

The Nicobar Islands are the summits of a submarine mountain range contiguous with the Arakan Yoma of Burma (through the Andaman Islands) in the north and the island festoons of Sumatra in the south. The Nicobar Islands contain an impoverished Sumatran fauna (Smith 1930), but Stoliczka (1870) remarked that several species of lizard and snake are common to both Andaman and Nicobar Islands, and the whole fauna generally resembles the Malayan, gradually passing into Burmese fauna. Affinities of mammalian and avian species of these islands seem to be closer to India than Burmese and Malay (Abdulali 1964). The islands are characterised by the absence of large mammals and the presence of a significant number of endemics among the island's vertebrates (Sivakumar 2000).

Within the Nicobar group of Islands there are notable differences in the faunal profile (Sankaran 1997). For example, the Nicobar Parakeet *Psittacula caniceps* occurs on Great Nicobar, Little Nicobar, Kondul and Menchal but is absent in the Nancowry group. The Nicobar Bulbul *Hypsipetes nicobariensis* is present in the Nancowry group but is absent in the Great Nicobar group. The Nicobar Racket-tailed Drongo *Dicrurus paradiseus nicobariensis* occur on Great Nicobar, Little Nicobar, Katchall, and Car Nicobar but is absent on other islands of the Nancowry group (Sankaran 1995b). The differences are also evident in the herpetofauna; Pit vipers are common on the Nancowry group but are absent in the Great Nicobar group. The Nicobar Crab Eating Macaque *Macaca fascicularis umbrosa* is present only on Great Nicobar, Little Nicobar and Katchall. The Nicobar Tree Shrew *Tupaia nicobarica* is present on Great Nicobar and Little Nicobar Islands but is absent on other Nicobar Islands (Tikadar and Das 1985).

2.4. Climate and weather

The island is exposed to both south-west and north-east monsoons, with an average rainfall of 200 cm (Sivakumar, 2000). The bulk of the rainfall comes during the southwest monsoon, and the wettest months are August to November, while the driest months are February and March when less than 5 cm of rainfall is received. The climate is humid, tropical-coastal due to its proximity to the equator. The average temperature varies from 25.5°C and 34.4°C. The average relative humidity is 80.8% and seldom goes below 70%. The islands get northeast wind from November to January and southwest from May to October. Cyclones sometimes bring huge devastation, endangering life. These islands are prone to earthquakes, which were experienced several times during the study period.

2.5. People

The survival, amelioration or degradation of ecosystem depends largely on man. Within the confines of an island ecosystem, the arrival of humans, especially in large numbers, can bring about great changes. Great Nicobar shows the impact of such an intervention. The

human population on Great Nicobar (6831 people) has both tribal (8%) and mainland Indians including settlers. The tribals are thinly distributed along the southern, western and northern coasts and interior forest. Nearly 55% of the mainlanders are in the township of Campbell Bay midway up the east coast, and the remainder pursue agrarian livelihoods along the south-eastern coast.

Two groups of tribals inhabit Great Nicobar. The Shompen, who now number less than 150, are a semi-nomadic tribe who inhabit the forests of the central uplands. It is probable that they were pushed into inaccessible areas by the Nicobarese who have several settlements along the coast. The Nicobarese constitute the largest tribal group in the islands. Belonging to the Mongoloid race probably the Indomalayans, these horticulturist-herders now number around 400 on Great Nicobar.

Communities in Nicobars have a long tradition of natural resource use. They depend on natural habitats as a source of food, fuel, and building materials. Traditional forms of natural resource exploitation can be sustainable when practiced by human populations living at low densities to meet their subsistence needs. But recent decades have been characterized by unprecedented economic, social, and demographic changes. With a high population growth rate, general lifestyle is marked by high degree of consumption. These changes led to overexploitation of natural resources and inadequate development planning, which exert significant impacts on biodiversity.

2.6. Tsunami

The earthquake of magnitude 9.15 with its epicentre at 3.29°N and 95.94°E off the coast of Sumatra with a focal depth of 30 km occurred on 26th December 2004 at 06: 28: 50 hrs. The earthquake occurred at the interface between the India and Burma plates and the epicentre was very close to the Nicobar group of islands. The tsunami that followed was within a few minutes of the earthquake. The tsunami waves reached the coast first, causing a phenomenon called draw down, where the sea level dropped considerably. The draw down was followed by the crest of the wave, which resulted in sea inundating land, also known as the run-up. There appears to have been three waves in succession, with the second being the largest. The waters took several days to recede completely, leaving in its wake a devastation of unimaginable magnitude on the people and wildlife of Nicobar islands (Sankaran, 2005). In Nicobar group of Islands where endemism is very high in some faunal groups such as mammals, birds and reptiles, it was expected that the highly diversified coastal biodiversity with high endemism may have been adversely affected by the tsunami. With this assumption, the Wildlife Institute of India conducted a status survey of certain focal endangered species such as the Nicobar megapode and their habitats in the Nicobar group of islands.

Chapter 3

Objectives

Though the ecology of the Nicobar megapode is fairly well known (Sivakumar 2000), the information on the population trends is essential for the long-term conservation status of this species (Dekker *et al.* 2000). It was also expected that the coastal living Nicobar megapodes might have adversely been affected by the tsunami. Hence, this study was proposed with the following objectives.

1. To assess the present conservation status and distribution of the Nicobar Megapode *Megapodius nicobariensis*
2. To assess the habitat availability, threats and conservation of this species.
3. To identify the permanent sampling sites for continuous long-term monitoring of population and habitat of these birds.



Littoral forest of southern tip of the Great Nicobar Island before (A) and after (B) tsunami

Chapter 4

Methods

The Nicobar islands have been surveyed between 10 March 2006 and 7 May 2006. Firstly, the southern group of Nicobar islands were surveyed using seven observers between 10 March 2006 and 5 April 2006, and between 26 April 2006 and 30 April 2006. Nancowry group of islands were surveyed using same man power between 7 April and 25 April 2006. A total of 15 islands have been surveyed. A boat was used to reach each sampling points. This survey has covered the entire range of the Nicobar megapode, except the Megapode Island, which could not be sampled as entire island was under water.

As mounds are stationary, inanimate and represent breeding signs, the best way to estimate and monitor the megapode populations is by assessing the number of active mounds those in use (Sankaran 1995b, Sivakumar & Sankaran 2003). The



Megapode habitat: coastal littoral forests are better habitat of the Nicobar megapode.

coastline of 15 islands where the species was reported earlier have been surveyed for mounds by following standardized survey protocols (Sankaran 1995b). To estimate the total number of active mounds, the coastline of each island was divided into two segments such as 'Potential coastal habitat for megapode (PCHM)' and 'Non-conductive coastal habitat for megapode (NCHM)'. Potential coastal habitat of megapode was identified based on habitat preference of this species (Sivakumar, 2000). Various habitat parameters have been considered to identify these two habitats which are listed in the Table 4.1. Total available PCHM and NCHM areas of each island were measured by ground-truthing all around the island using a pedometer, GPS, a small boat and the latest satellite habitat imageries.

Table 4.1. Various habitats considered for *Potential coastal habitat for megapode (PCHM)* and *Non-conductive coastal habitat for megapode (NCHM)*

Sl. No.	Potential coastal habitat for megapode	Non-conductive coastal habitat for megapode
1	Low-lying coastal habitat between beach and up to near by hills	Coastal habitat with cliffs, hilly and rocky

2	Coastal habitat with sand and sandy-loam substratum	Substratum with muddy or clay
3	Coastal habitat with dry deciduous forests	Mangrove, grasslands, coconut plantation
4	Coastal habitat without inundation during monsoon or high tide	Inundation during monsoon or high tide
5	Coastal habitat without human disturbance or with least disturbance	Habitation or with more anthropogenic pressure

Variable width belt transects were used to count all the mounds present within sampled area. Length of transect, and distance between the two transects was set according to the size of the islands but it was uniform for any given islands. Average length of belt transect was 2 km, however, in some cases the length of the transects were small due to smaller sizes of islands. Width of the each transect varied depending upon the extent of low lying forest from the shore to near by hills. The census was carried out with seven observers walking at 20 m interval abreast parallel to the seashore. Interior forests of Great Nicobar, Little Nicobar, Kamorta, Katchal and Teressa islands were also sampled with fixed width transect i.e. 140 m width and 1 km long. Total number of active mounds, abandoned mounds, inactive mounds, mound types, mound size, canopy cover over mound, substratum of mound, number of pits present, possible number of megapode use the mound, and the distance between high tide mark and mounds were recorded. Mound substratum type was assessed based on Wentworth particle scale. Apart from this, anthropogenic disturbances such as plantation, fire, logging, wood cutting, evidence for hunting, and socio-economic condition of near by habitation were also collected in every sampled area. Presence of predators such as water monitor lizard, python, dog and cat were also recorded in each sampled transects.

Active mounds those are in use were identified by signs of recent digging by megapodes or by checking the mound whether the soil was compact and hard with vegetation growth on it (abandoned mound) or loose and easily penetrable with a stick (active mound) (Sankaran 1995b). In some mounds, there was no sign of recent digging but the soil was loose without vegetation on it and though these mounds had a chance of reuse by megapodes those mounds were considered as inactive.

Since the distribution of mounds was not uniform (Sankaran 1995b), PCHM and NCHM coastal areas were sampled separately as a part of stratified sampling. Mound density was also estimated separately for each segment. A total of 328 km long coastal habitat was identified as PCHM in the Nicobar islands; of these, 157.5 km coastal forests were sampled in 80 transects. Of the 80 transects, 68 transects were 2 km long, 10 transects were less than 2 km and two transects were more than 2 km. Of the 358.8 km long NCHM, 77.9 km long coastal stretches have been sampled in 39 transects. In a majority of islands, the standard deviation for 'mean mound density' for a transect was high or in some cases higher than mean; it revealed that the mound distribution within a segment

(PCHM) was also not uniform, hence, the mound density of a island was estimated using the following formula:

$$\text{Mound Density (D)} = \left(\frac{N}{S_a} \right) H_a$$

Where N = total number of mounds found in 'S_a', a = type of segments (PCHM or NCHM), S = total area sampled in segment 'a' and H = total area available for segment 'a'.

Megapodes also occur in the interior forests of islands and it is believed that about 20% total population live in these interior forests. Due to difficulty in sampling in the interior forests, less number of transects were laid to count the mounds. A total of 11 transects were laid in the Great Nicobar, four in Little Nicobar, four in Kamorta, three in Katchal, and two each in Teressa and Nancowry islands. Of these 26 transects, mounds were found only in three transects, one from the southern tip of Great Nicobar Islands, and two mounds from two different locations of the Kamorta Islands. Hence, the detection or availability of mounds in the interior forests was small and the interior populations have not been considered in the current population estimates.

The basal circumference, height and diameter of the mounds were measured to estimate their sizes. Mounds were uneven in shape with a cone like appearance. The mound size, expressed as volume, was derived from the equation for the volume of a cone: $1/3\pi r^2 h$ where 'r' is the radius and 'h' the height, giving an approximate volume of the mound (Sivakumar and Sankaran, 2003).

Chapter 5

Results and Discussion

5.1. Distribution of the Nicobar megapode and its mounds

After tsunami 2004, the Nicobar megapode continued to be found on all but two islands viz Trax and Megapode in the Nicobars from where it had been reported earlier. Car Nicobar, Chaura and Batti Malv islands of Nicobars were not surveyed as there was no record of megapode in these islands in the recent past (Sankaran 1995b) and extinction of population at Pilo Milo was re-confirmed. Polytypic *Megapodius nicobariensis* occur in Nicobars in two sup-species. *Megapodius nicobariensis abbotti* occurred on Great Nicobar, Little Nicobar, Kondul, Menchal, Treis, Meroe. *M. n. nicobariensis* was present on Camorta, Trinkat, Nancowry, Katchall, Teressa, Bompoka and Tillanchong islands.

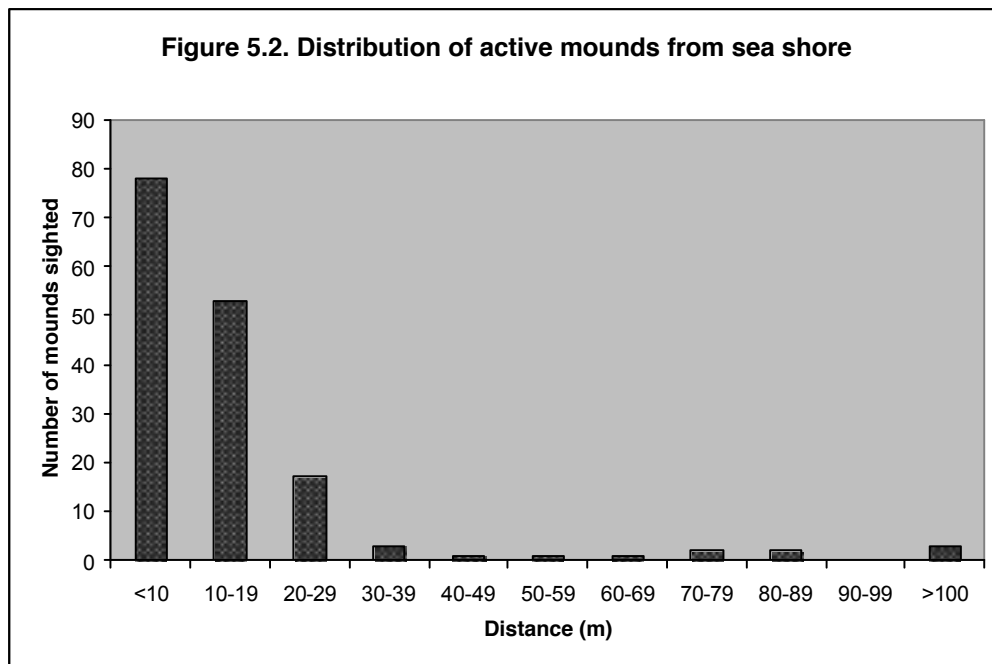
The Megapode Island was fully submerged due to rise in sea water level after tsunami. Megapodes from this island were either killed by tsunami waves or the birds flew to the nearby Great Nicobar Island which was less than 150 meter in distance. The Nicobar megapode was not found on Trax Island (Fig 5.1) and it was believed that the bird



Figure5.1 Trax Island after tsunami. Megapodes from this island are believed to be extinct

probably became extinct here due to tsunami waves.

Incubation mounds of the Nicobar megapode have been found on all islands where megapodes were seen. More than 90% of mounds were built within 30 m distance from the shore (Fig 5.2) and this preference for nesting near the beach is due to availability of certain substratum (Sivakumar 2000). Compared to previous survey (Sankaran 1995b) the concentration of mounds towards fringe of sea shore was high and it might be due to tsunami which has significantly reduced the potential coastal habitat. Around 16% of active mounds were found within 5 m distance from shore which may probably be influenced by high high-tide water during full or new moon days. Maintaining mound temperature at a constant rate is important for the successful egg hatching (Sivakumar and Sankaran, 2003), however, influence of sea water on the incubation temperature of these mounds is expected to adversely affect the hatching success of those mounds which are very close to the shore.



5.2. Status of the Nicobar megapode

Knowledge of population size of a threatened species is crucial to monitor the success of any conservation actions. Since, there is a relationship between the number of pairs that use a mound and mound size (Sivakumar 2000), better way of estimating the population size of the Nicobar megapode is to count the inanimate stationary mound nests of this species along with estimating mound size. Larger mounds attract more pairs than smaller one (Sivakumar 2000, Sivakumar & Sankaran 2003). And also it is imperative to know the number of birds that use a mound in a year to estimate the population. Mound nesting Nicobar megapodes are mostly seen in pairs (Dekker, 1992, Sankaran, 1995b, Sivakumar, 2000). Dekker (1992) estimated an average of two pairs per mound as a conservative

lower limit but Sankaran (1995b) estimated two pairs per mound for the lower limit and 3.5 pairs per mound for a upper limit and Sivakumar (2000) estimated 2.5 pairs per mound based on his observation on more than 30 mounds for the period of three years. However, in this survey most of the mounds found were too small to accommodate more than one pair, although, I estimated two pairs per mound as a conservative upper limit.

Table 5.1. Past and present status of the Nicobar megapode

Island	Estimated no. of active mounds in 1994*	Estimated no. of breeding pairs 1994*	Estimated no. of active mounds in 2006	Estimated no. of breeding pairs 2006
Great Nicobar	515	1416	203	405
Kondul	11	31	1	2
Little Nicobar	311	855	82	165
Menchal	2	6	6	12
Meroe	1	3	2	4
Pilo Milo	0	0	0	0
Trax	3	9	0	0
Treis	4	10	3	6
Nancowry	60	165	7	15
Katchal	69	190	9	17
Camorta	20	55	7	13
Tillanchang	10	28	27	53
Trinket	8	22	26	52
Teressa	119	328	9	18
Bampoka	26	72	13	25
Total	1159	3190	394	788

* Source Sankaran, 1995b.

Of the total 687 km long coastal line of megapode lands, 328 km long coastal forest was identified as the 'Potential Coastal Habitat for Megapode' and remaining 359 km long coastal forests were identified as 'Non-conductive coastal habitat for megapode'. It was estimated about 800 breeding pairs of the Nicobar megapode occur on the coastal habitat of the Nicobar islands after tsunami, which is nearly 70% less than what was reported a decade before (Table 5.1 & 5.2.).



5.2.1. *Megapodius nicobariensis nicobariensis*

Megapodius nicobariensis nicobariensis occurs on all seven islands of Nancowry group of islands. The potential coastal habitat of this sub species is shrunken and only 37% of the coastal habitats is now available for them for mound building. It is also estimated to hold 97 active mounds. A total of maximum 194 breeding pairs occurs in the coastal habitat of these islands. There is no active mound found in the Non-conducive coastal habitat of these islands which comprises 63% of total coastal habitat mainly with coconut plantation, mangroves, habitations and mountain cliffs.

Good population of megapodes nearly 50% occurs in Tillanchang and Trinket islands despite their smaller sizes. However, in 1993-94, good density of megapodes have found in Teresa and Bompoka islands (Sankaran 1995b) of this islands group. Bompoka Island is again better off when compared to Teresa where more than 90% of population vanished. Sankaran (1995b) could estimate 119 active mounds and observed 113 abandoned mounds on Teresa Island but with almost similar sampling effort I could estimate only nine active mounds and there was no abandoned mounds observed on coastal forests.

The megapodes populations on major islands such as Camorta, Katchal, Teresa and Nancowry are estimated around 63 breeding pairs which is 88% less than what was in 1993-94. All major islands in this group is thickly populated by mainly indigenous people who are known to hunt megapodes.

Sankaran (1995b) has earlier cautioned about the growing tribal population and the resultant conversion of primary coastal forest to coconut and other plantations, which continue to encroach into megapode habitat. Though, tsunami is suspected to be one of the factors for the decline of



Largest mound nest of the Nicobar megapode seen in Tilanchong Island

megapodes in Nancowry groups, the other factor which might have adversely affected the megapodes is the large scale encroachment of coastal forest for coconut and other plantations. Hunting of this species should not also be ruled out here. The Tillanchang Island is a protected Wildlife Sanctuary where the megapode population shows an increasing trend. In Tillanchang, few mounds have however been observed with leg-snarens on it probably fishermen. Though, the larger portion of Trinket Island is inhabited by humans, the southern part is comparatively undisturbed where good numbers of megapodes are found.

In general, the population of *Megapodius nicobariensis nicobariensis* has been continuously declining on all islands except Tillanchang and Trinket, where their populations have increased moderately. In overall, there is a 70% of population decline in this sub species in the last decade.

5.2.2. *Megapodius nicobariensis abbotti*

Megapodius nicobariensis abbotti occurs on all southern group of Nicobars barring Pilo Milo, Megapode and Trax islands where the populations of megapodes either became extinct or too small to detect.



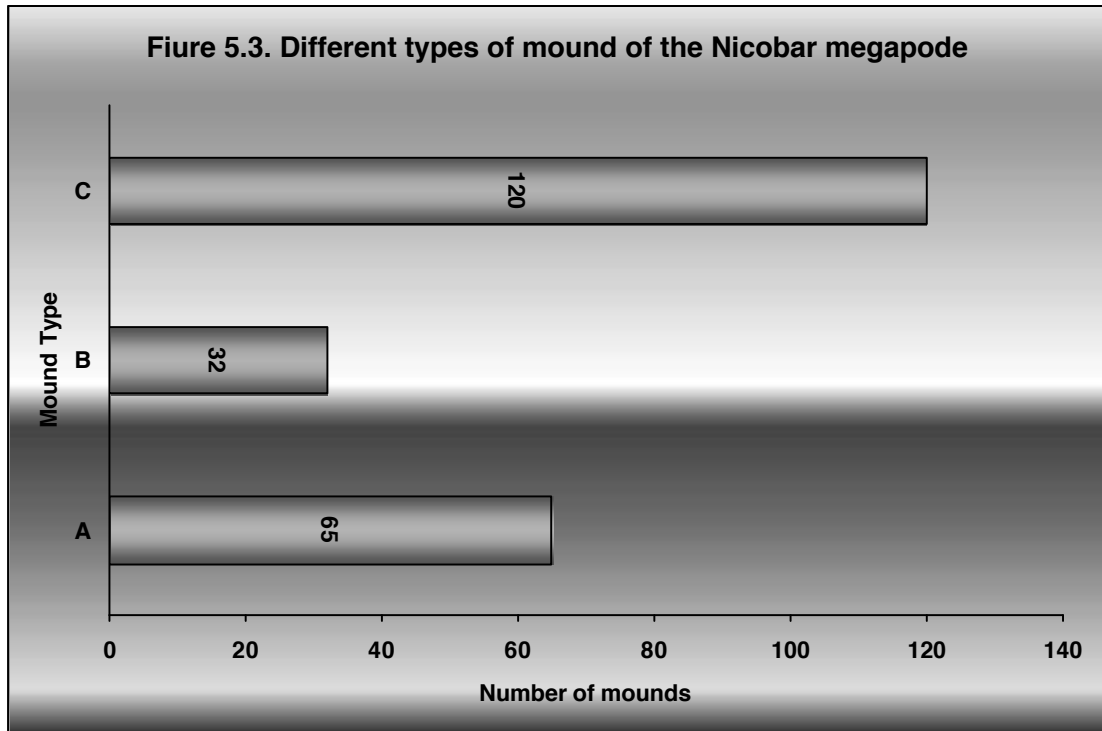
Of the 314 kilometer long coast line, 61% of coastal low-lying forests have been identified as the potential coastal habitat of megapodes. On this potential coastal habitat, it was estimated that 286 active mounds were found here. On the non-conductive coastal habitat of this group of islands, 11 mounds have been estimated. Collectively, the total number of active mounds found on the coastal forests of southern group of Nicobars was 297. It has been estimated that a total of 594 breeding pairs occurs on the coastal habitat of these islands.

The largest population of megapodes occurs on Great Nicobar Island where 405 breeding pairs have been estimated (Table 5.1). The second largest population is in the Little Nicobar Island. Both islands are largest in this group and own 96% of megapodes. However, when compared to previous survey (Sankaran 1995b), 65% of megapode *Megapodius nicobariensis abbotti* have disappeared from these two islands.

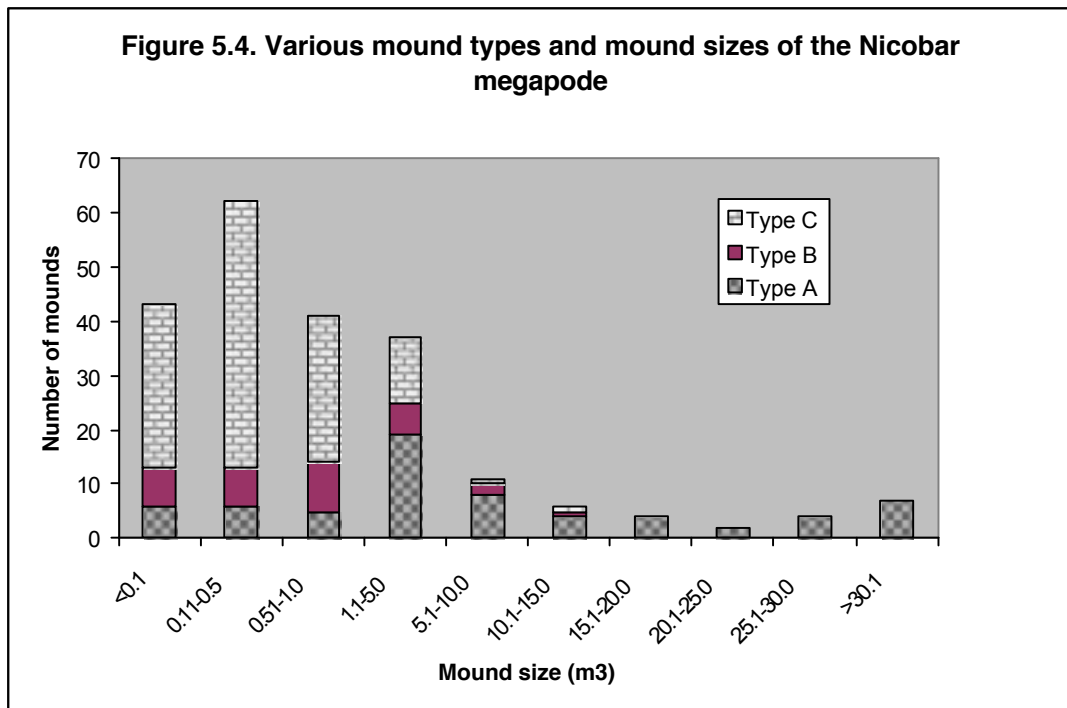
Good population of megapodes are present on both north-eastern and western coastal forests of the Great Nicobar. However, most of active mounds found were smaller in size. High density of megapodes found on the southern tip of the Great Nicobar (Sankaran 1995b, Dekker 1992) in the past has been washed away where the influence of tsunami waves were witnessed up to five kilometer inside the forests. Large sized mounds have been located on the north-eastern coastal areas of the Great Nicobar, where the indigenous Shompens live, and they were not affected by tsunami much.

5.3. Mound types, status and ecology

The Nicobar megapode builds three types of mounds in general (Dekker 1992, Sankaran 1995b, Sankaran and Sivakumar, 1999 and Sivakumar 2000). Of the observed mounds, 55% of mounds were Type C, mounds built at the base of dead trees (Fig 5.3). A good number of Type A, mounds built on open area were also found. However, the number of Type B, mounds, built at the base of live trees, were less probably due to non-availability of larger live trees on the coastal areas.

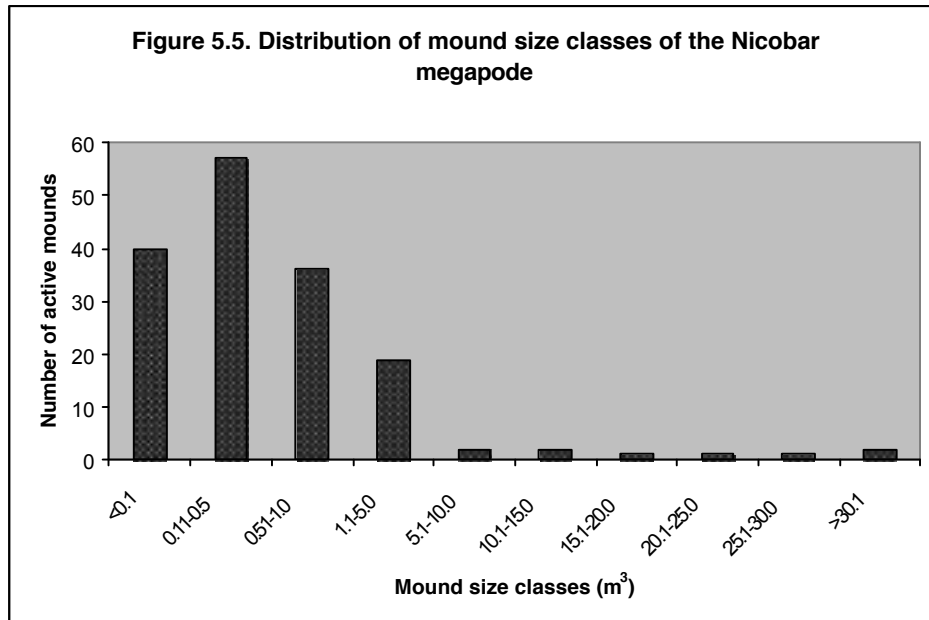


Most of the Type C mounds were one or two year(s) old and smaller in sizes.



Mounds varied in sizes between 0.01 m³ and 71.45 m³. Of the observed 217 mounds, majority of mounds (84%) were less than 5 m³ and 67% of mounds were less than one cubic meter in size. Larger mounds such as above 20 m³ in size were less than 6% and all of them were Type A. Since, most of the mounds were new and constructed after tsunami the average size of the mound (3.78±0.62 m³) was smaller when compared to previous study (Sivakumar and Sankaran, 2003). Type A mounds were found in different size classes. However, type B and C mounds were smaller in sizes with no bigger size mounds (Fig 5.4).

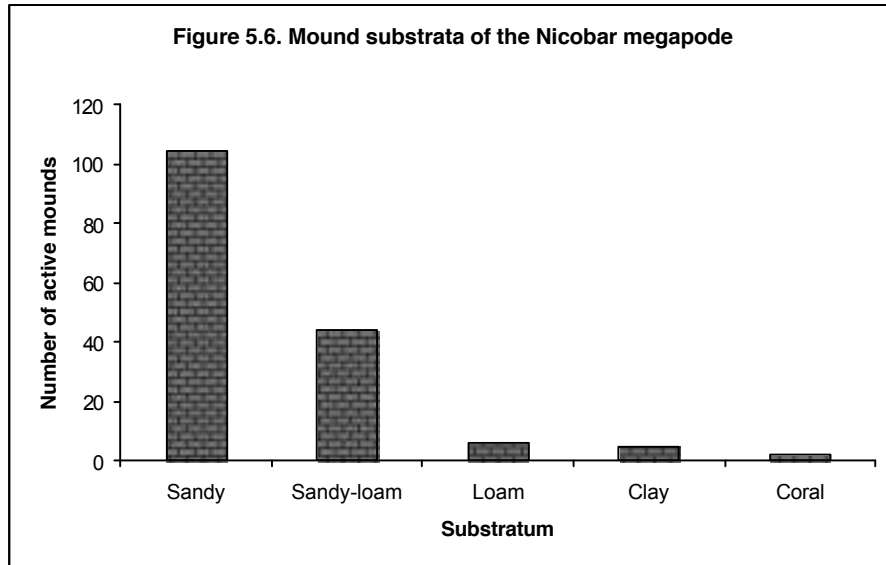
Among the active mounds, most were smaller in size (fig 5.5) and it confirmed the fact that most of active mounds were constructed after tsunami and old active mounds near the shore must have been washed away.



As reported earlier, sand and sandy-loam substratum was preferred for mound construction, as majority of the mounds were found on these substratum (Fig 5.6). Of the five major types of soil substrates present in the coastal area, the Nicobar megapode preferred to construct mounds in sandy substratum, followed by sandy-loam, probably because those substrates are easier to dig into, and of superior drainage. There were few mounds found on clay substratum and corals. Since the coastal habitat of the Nicobar

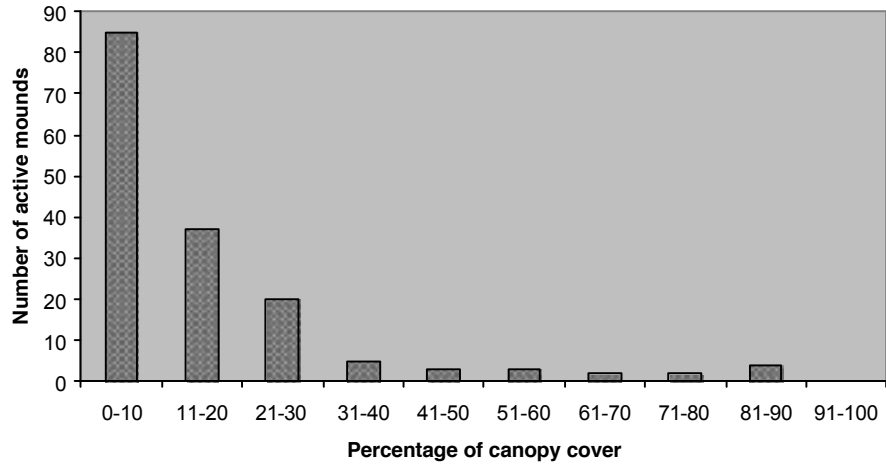


Islands is mainly composed of sand and sandy-loam soil (Thothathri 1962; Saldanha 1989), this would account for the clumped distribution of the Nicobar Megapode towards the coastal region (Dekker 1992; Sankaran 1995b; Jones *et al.* 1995, Sivakumar 2000, and Sivakumar and Sankaran 2003).



It is believed that the temperature generated through fermentation of vegetative materials inside the mound is a major source of incubation temperature (Sivakumar and Sankaran 2003), however, ambient temperature is also thought to contribute to the incubation process especially in the case of type A mounds. Most of active mounds found on Nicobars were built at the base of available trees on the coastal area. Since most of trees dried due to tsunami waves, green canopy cover over mounds was less or nil (Fig 5.7). It is expected that all the dead trees (snag) would decompose soon and in that case these type C mounds would become type A mounds. Direct fall of sunlight on the mound through day may not be good for the incubation mound of the Nicobar megapode, as direct sunlight for a longer period may warm up the mound quickly and killing the embryo in an egg. It is a serious concern for the long term survival of this species. However, natural resilience of coastal ecosystem of islands may change this situation provided there is no human intervention.

Figure 5.7. Canopy cover over the mound of the Nicobar megapode



Chapter 6

Threats

6.1. Habitat loss and degradation

Apart from stochastic events such as tsunami which had adversely affected almost all potential coastal habitat of Nicobar megapode, the habitat loss due to human activities is suspected to be a major cause for the decline of the Nicobar megapode. The Nicobar megapode preferred to construct mounds on sandy & sandy-loam substrates of coastal forests,

probably because those substrates are easier to dig into, and of superior drainage (Sivakumar 2000). Since the coastal habitat of the Nicobar islands are mainly composed of sand and sandy-loam soil, this would account for the clumped distribution of the Nicobar Megapode towards the coastal region. Coasts are also favoured by human who could establish their hamlets surrounded with



Tsunami has devastated the coastal habitat of the megapode

horticulture crops such as coconut and arecanut. Because of increase in population there is a continuous expansion of the coconut plantation on the coastal areas which ultimately led to shrinkage of megapodes habitat. Habitat loss remains the single biggest threat to the megapode even after a decade (Sankaran, 1995b).

6.2. Inadequate PA coverage

The existing protected area network is inadequate in the Nicobar islands to safeguard the megapode and its habitat. Currently, less than 40% of potential coastal habitat of megapode under protection. Out of these, *M. n. abbotti* has been fairly protected in Great Nicobar but *M. n. nicobariensis* was not given much attention earlier and this apathy pushed this sub-species into the verge of extinction. Tillanchang Wildlife Sanctuary is the only Protected Area for *M. n. nicobariensis*, covering less than 3% of total habitat of this sub-species, though 27% of population occur in this island, which is also not having permanent human settlement. Remaining 73% of *M. n. nicobariensis* is not protected and their habitat under the severe threat after tsunami due to post-tsunami rehabilitation process.

The largest population of the Nicobar megapode occurs in the Great Nicobar Island. Major portion of this Island is notified as Biosphere Reserve but has not been designed to sufficiently protect the prime coastal habitat of the Nicobar megapode owing to settlement of indigenous people all along the coastal areas.

The unique culture and lifestyle of the indigenous people such as Shompens and Nicobarese is now threatened by a rapid influx of modern lifestyle through contact with mainlanders, along with road building, agricultural expansion and other developmental activities. Because of this shift in lifestyle, the existing Protected Areas in Nicobars for megapodes are under threat and other megapode habitats occurring outside Protected Areas are also threatened.



6.3. Introduction of Alien Invasive Species and agricultural plants

Alien invasive species (AIS) are one of the major threats to the ecological and economic well being of the planet (McNeely et al. 2001). It is widely known that island ecosystems are particularly vulnerable to AIS, and that their impacts are especially severe (Veitch & Clout 2002) on endemic species. The island ecology is continually changing as a result of intensified land use and modifications due to human pressure. These changes alter the conditions of the dynamic relationships between the introduced and native species interactions. Symptoms of avian cholera were noticed in megapodes when the outbreak of this disease killed more than 50% of introduced domestic fowl in the Great Nicobar in 1997 (Sivakumar, 2004). After tsunami, the State Administration had a plan to supply 4,00,000 fowl and 9000 ducks to farmers and tribals which may threaten the native birds including megapode. Introduced dogs and cats are also known for threatening egg laying megapodes (Sivakumar 2004 & 2000).

After tsunami, the state agricultural departments initiated several projects as a part of the rehabilitation process, to restore the livelihood of locals including the plantation of cashew in a larger scale in the Nancowry group of islands. This again poses a grave threat to already shrunken habitat of megapodes. Bamboo might be a better alternative for cashew which is exotic and known for not allowing any undergrowth in it.

6.4. Hunting and egg collection

It was believed that the Nicobarese do not hunt or collect eggs of megapodes extensively because megapodes have spiritual and medicinal values (Sankaran 1995b) but this spiritual value seems to be gradually disappearing and almost all Nicobarese whom I met have admitted that they have eaten the meat and eggs of megapodes. Traditionally,



After tsunami hunting birds become the important recreational activities of tribals. One to five airguns have been seen in a tribal house.

Nicobarese are hunter gatherers but in the course of modernisation they have taken to more of horticultural activities and less of hunting. After tsunami, they lost most of the horticulture crops in Great Nicobar, Little Nicobar, Pilo Milo islands) and partially in Nancowry group of islands which forced them to hunt whatever

they could get from the forest. One to five airguns could be seen in a house and megapodes

were one of their favourite targets.

Mainlanders are also known for hunting the megapodes. This is borne out by the fact that areas of mainlander settlement or their presence have no sign of megapodes or highly depleted population, especially in Nancowry group of islands and some part of Great Nicobar. Compared to areas of mainlanders settlements, the indigenous people habitations are still recognized as the potential coastal habitat for megapodes and megapodes are seen there. However, this may change in future as life style of native people gradually matching with that of mainlanders.

Evidence for megapode hunting i.e. leg traps on or near the mound were also seen near the Shompen-inhabited areas such as Lawful and Trinket Bay of Great Nicobar Island, where several large sized old active mounds were found. Leg traps were also seen in Tillanchang Wildlife Sanctuary possibly by the Nicobarese who occasionally visit this island for coconut harvesting or non-native fishermen who illegally camps here.

6.5. Post tsunami impact

Since the tsunami waves have washed away most of the planted as well as wild coastal coconut and acrcanut palms, plantation of these palms has become important for the future survival of tribals in this region. There is a lot of possibility that the plantations will encroach the majority of the potential coastal habitats of the Nicobar megapode and its associated species if the necessary care in this regard is not taken. After tsunami most

of the low-lying coastal areas submerged and megapodes have built their mounds in evacuated villages. But when the tribals started returning, they began hunting the megapodes. More than 95% of coconut plantations on the southern group of Nicobar islands were washed away, which was the major source of income for tribals. In years to come, it is expected that tribals will be left with fishing and hunting of wildlife for their survival apart from livelihood support from the Government. Each tribal family has one to four airguns. The Nicobar megapode, Pied Imperial Pigeon, Andaman Green Imperial Pigeon, Green Pigeon and Nicobar Pigeon are most favoured targets of these airguns. Near Koshingdon (a village on west coast of Great Nicobar) I came across an abandoned camp which was probably used by the poachers a week before our survey. There is a possibility that poachers may be taking advantage of absence of people in this region.

Chapter 7

Conservation perspectives

7.1. Management of Habitat

The Nicobar megapode is included in the Schedule I of the Indian Wildlife (Protection) Act, 1972 and this species is considered as globally 'Vulnerable' (IUCN, 2006). This was in response to its dwindling population size and being the flagship species of the Nicobars. Around 70 % of the population of Nicobar megapode had disappeared over the last 12 years. The major reason for the sharp decline is believed to be the tsunami which washed away their habitat along with nests. However, habitat destruction and hunting are the major human induced factors still adversely affect the megapodes, and these forces are likely to continue until a serious conservation programme is implemented. As per the IUCN criteria for endangered species, the Nicobar megapode is now globally endangered (Criteria A1, B2 and C1). The link between local people and the megapode has a long tradition and there are many cultural references to this species. While the threats to megapodes are many and varied, the principal concern is loss of habitat through forest removal/modification especially for plantation. A growing tribal population and its pressure on megapode habitat are expected to be continuing. The following actions are required to minimize further habitat loss.

Action 1: Restoration of the megapode habitat on the west coast of the Great Nicobar Island is urgently required. Most of the

people from this coast were killed by tsunami waves and less than 10 persons belong to this coast survive that too in

rehabilitation camps. Since, the west coast of this island is no more suitable for people to live, therefore, the entire coastal areas need to be included in the existing Protected Areas and there should not be any plantation project initiated in this region. More than 100 km long coastal line of west coast has a lot of potential to become a better habitat for megapodes as well as other coastal species including sea turtles to nest.

Action 2: A conservation awareness programme needs to be initiated immediately through tribal captains of Nicobarese villages. This programme should clearly address reasons for the decline in Nicobar megapode populations, and how these trends can be arrested or reversed (Dekker *et al.* 2000). Since the habitat destruction is a major human induced cause for the decline of megapodes, it needs to be communicated properly.



Regeneration of *Terminalia spp.* and *Barringtonia spp.* was observed on the tsunami affected coastal area of the Nicobar islands

Action 3: Further plantation or developmental activities must be contained and expansion of plantation area in newer forest land should not be allowed.

Action 4: Since there is a strong relationship between poverty, development and wildlife conservation, further developmental activities aimed to eliminate poverty need to be encouraged without undermining the importance of biodiversity. A proper EIA studies by genuine experts should become a mandatory step to take up any developmental projects in Nicobar islands.

Action 5: A long term monitoring of habitat of Nicobar islands needs to be initiated with help of experts. A section in the Forest Department should involve in the research and monitoring part of the wildlife and its habitat.

Action 6. Major developmental/infrastructural projects (for example a proposal to make Great Nicobar a free port for international shipping at the mouth of the Galathea river) should not be encouraged as they are expected to damage the highly sensitive insular ecosystem and its wildlife.

7.2. Review on Existing PA Network for the Nicobar megapode :

At present, two National Parks and two Wildlife Sanctuaries cover the megapode populations. Both the National Parks are in the Great Nicobar Island where *Megapodius nicobariensis abbotti* occur and one Wildlife Sanctuary 'Megapode Island' is submerged fully, after tsunami. Tillanchang Wildlife Sanctuary is the only protected area that protects the *Megapodius nicobariensis nicobariensis*. Though the habitat of *M. n. abbotti* has been fairly protected in the Great Nicobar Island, yet major portions of the potential coastal habitat especially along the west coast are outside protected areas. It is even worse in the case of *M. n. nicobariensis*. Following actions are required to review the existing PA Network:

Action 1: Entire portion of west coast and southern part of the Great Nicobar Island needs to be included in the adjoining National Parks as these areas are devoid of human settlement and known to have better habitats for megapodes. This will also protect all other insular fauna of this region including the nesting beaches of sea turtles.

Action 2: If possible, after having consensus with the local communities, the Little Nicobar may be declared as a 'Conservation Reserve', so that, the degraded habitat can be restored with the participation of local communities.

Action 3: Entire Nancowry group of islands may also be declared as the 'Conservation Reserve'. However, opinions of the local communities should be obtained before declaring these areas as the Conservation Reserve. Since these islands are thickly populated and disturbed heavily, conservation reserve concept is expected to help to restore the natural habitat as well as to protect wildlife of this region, without jeopardizing the livelihood of local human populations. Indigenous people must be given a major stake in the proposed conservation reserves.

7.3. Management of alien invasive species

Since the symptoms of avian cholera were noticed in megapodes when the outbreak of this disease killed more than 50% of introduced domestic fowl in the Great Nicobar in 1997 (Sivakumar, 2004). After tsunami, the State Administration had a plan to supply 4,00,000 fowl and 9000 ducks to farmers and tribals which may threaten the native birds including megapode. Introduced dogs and cats are also known for threatening egg laying Nicobar megapodes (Sivakumar 2000). The following actions are recommended to manage the invasive species in the habitat of megapodes.

Action 1. Awareness programme targeting all stakeholders and get the support of local communities to manage the invasive species such as domestic fowl, cat and dogs in Nicobar islands.

Action 2. Immediate removal of all major vertebrate invasive species from the Protected Areas in the Nicobar islands.

Action 3. A study on invasive species ecology and its management in the Nicobar islands for their successful eradication.

7.4. Hunting and egg collection:

After tsunami, hunting on megapodes seems to be on increase in several folds. Though, the Nicobarese attach traditionally cultural values to megapodes, scarcity of animal protein has forced them to hunt megapodes intensively. The two aboriginal tribes of Nicobar islands viz Nicobarese and Shompens are exempt from the Indian Wildlife (Protection) Act, 1972. Considering the changing lifestyle of these tribes, this immunity may be reviewed. In particular, the Nicobarese should be brought under the purview of the Wildlife Protection Act, 1972, while Shompens may be allowed to hunt wild animals.

Action 1. Awareness programme targeting all people through tribal captains needs to be initiated. This programme should clearly address reasons for the decline in Nicobar megapode populations, and how these trends can be arrested or reversed (Dekker *et al.* 2000). Since, hunting is the second major human induced cause for the decline of megapodes, it needs to be communicated properly.

Action 2. Use of air guns may be prohibited in the Protected Areas and in the proposed Conservation Reserves.

Action 3. Food for guns programme needs to be initiated. Guns from the tribal people may be compensated with food by opening up controlled poultry or piggery farms. This will also give the employment opportunities to tribal people.

7.5. Research and monitoring

Scientific knowledge on the ecology of a species is necessary for *in situ* management of populations. Though, the habitat use and social organisation of this species is fairly known (Sivakumar, 2000, Sivakumar & Sankaran 2003), it is important to know the

population dynamics and the factors which govern the population dynamics of this species. Following projects are proposed for future researches on this species.

Project 1. Long term monitoring of the Nicobar megapode and its habitat. Since, information on population trends is essential for understanding the long term conservation status of this species (Dekker et al 2000), one of the objectives of the current survey was to identify permanent sampling sites to monitor the populations of megapodes for a longer period. In this context, more than 30 transects have been identified (Table 9) which represent various habitats of Nicobar islands and a simple data sheet has been prepared (Data sheet 1) to collect data from this transect. People who has just working knowledge of Hindi or English can use this data sheet with one day training. The data collected can be used to highlight particular regions of concern and establish where further conservation effort should be targeted. This project has also been mentioned in the IUCN Megapode Conservation Action Plan (Dekker et. al. 2000).

Project 2. Population dynamics of the Nicobar megapode. This project is to investigate the viability of small populations by developing population. This project should culminate in a strategic assessment of the best way forward for the long-term conservation of the species. This project has also been mentioned in the IUCN Megapode Conservation Action Plan (Dekker et al 2000).

Project 3. A detailed study on social organization and breeding biology of the Nicobar megapode. Though such intensive study on breeding biology and social organization have been carried out (Sivakumar 2000), it is essential to address several questions that still remain unanswered. Especially, the fate of chicks, fate of solitary birds, pair formation, reason for low clutch size and reason for multiple mound use of a pair need to be investigated..

Project 4. A detailed survey on the Nicobar megapode in interior forests. Till now there was no detailed survey on the megapode population occurring in the interior forest. In the current survey, some transects were laid to look for mounds but the detection probability was very low due to inaccessible terrain and thick vegetation cover. It is essential to know the population size of megapodes inside the interior forests.

Project 5. Habitat use of the Nicobar megapode. A detailed study on this aspect has already been carried out (Sivakumar 2000). However, there was no study on their habitat with reference to food resources.

7.6. Protection measures

Protection of habitat and megapode populations is essential as habitat loss and hunting are the two major factors for population decline. The State Forest Department lost their entire infrastructure in the Nicobar group of islands due to tsunami, and it needs to be restored immediately with the provision of modern facilities such as good patrolling boats, wireless communication etc. The following actions are recommended to strengthening the wildlife protection in the Nicobar islands.

Action 1. Re-establishment/establishment of 'Wildlife monitoring-cum-anti poaching camps' in Navy Dera, Kopenkeat, Chingham/38 km, Kondul, Pilo Milo, South Katchal, Kakkana (Kamorta), Trinket, Tillanchang and Bamboka is urgently required. These camps may be established on nearby hill areas where freshwater is also (except Trinket and Bamboka).

Action 2. Recruitment of adequate staff for patrolling and vigilance

Action 3. Minimum two patrolling motorboats with communication systems are immediately required for the Great Nicobar group of Nicobar islands. Two more boats required for Katchal and Kamorta islands. These boats may also useful for the staff to travel to anti-poaching camps.

Action 4. Creation of a post of the Assistant Conservator of Forests for Nancowry group of islands is essential. He may be given a responsibility of formulation of detailed proposal for creation of Conservation Reserves in this region. Range Forest Officers of Katchal and Camorta islands may report to this ACF.

Action 5. Special incentives need to be provided to staff who have been posted in the anti-poaching camps.

Chapter 8

Protocol for monitoring megapodes and their habitats

As mounds are stationary, inanimate and represent breeding, the best way to estimate and monitor the megapode populations is by counting mounds. The coastline of 15 islands where the species is present was surveyed for mounds and I have identified 38 transect sites (including Trax Island where mounds were not seen after tsunami) for long term monitoring of this species. Average length of these transects was 2 km, however, in some cases the length of the transects was small due to smaller size of islands. All the mounds inside the transect need to be counted. The width of the transect is between sea shore and till end of the low-lying forests or 300 m distance whichever is less. Total number of active mounds, abandoned mounds, mound size (circumference and height), number of pits present in a mound and a distance between high tide mark and mound are to be collected on the transect. Habitat parameters such as plantation, fire, logging, wood cutting, evidence for hunting and invasion of weeds in the transect area are also to be collected. A data sheet to collect the information from the field is available with the State Forest Department (Data sheet 1).

Active mounds in use are identified by signs of recent digging by megapodes or by checking the mound whether the soil is compact and hard with vegetation growth over on it (abandoned mound) or loose and easily penetrable with a stick (active mound).

Table 8.1. Present status of active mounds in the permanent monitoring plots.

Island	No. of permanent transects (PT)	Active mounds observed in PT in 2006	Abandoned mounds observed in PT in 2006	Proportion of abandoned mounds
Great Nicobar	11	46	12	0.26
Kondul	1	1	0	0.00
Little Nicobar	4	15	6	0.40
Menchal	1	3	1	0.33
Meroe	1	2	1	0.50
Pilo Milo	1	0	0	
Trax	1	3	1	0.33
Treis	3	3	0	0.00
Nancowry	3	3	0	0.00
Katchal	2	2	0	0.00
Camorta	3	3	2	0.67
Tillanchang	3	9	5	0.56
Trinket	2	10	0	0.00
Teressa	4	6	0	0.00
Bampoka	1	5	1	0.20

A total of 111 active mounds observed from 38 transects are identified for permanent monitoring (Table 8.1), which is 65.68% of the total active mounds observed from all transects surveyed in 2006. Hence, it is believed that any major changes in the abundance of active mounds from these permanent transects would directly reflect the total population of mounds as well as megapodes.

Monitoring the megapodes from permanent transects will give an idea about the trends in the population and changes in the habitat, but not the actual size of the population. For estimating the total coastal population of megapodes, a total survey of mounds in all transects at five years interval is shyly recommended.

Survey Time: February to April

Survey Programme

Sl. No.	Activity	Days
1	Orientation for surveyors at Campbell Bay and Kamorta	1
2	Mound count by concerned islands forest staff	10
3	Data entry and compilation at Campbell Bay by DFO	3
4	Report preparation by DFO, Campbell Bay	5
5	Discussion on survey findings at Head Quarter under the chairmanship of PCCF(WL)	1
6	Action on Report	To be initiated within 15 days

Table 5.2. Summary of the Nicobar megapode *Megapodius nicobariensis* survey 2006.

Island	Potential Coastal Habitat for mound building										Non-conductive coastal habitat for mound building				Total no. of active mounds	Total no. of breeding pairs
	Total area (km)	Total area sampled (km)	No. of transects	Observed active mounds	Estimated active mounds	Estimated abandoned mounds	Estimated inactive mounds	Active mound/km coastal stretch	SD	SE	Total area (km)	Total area sampled (km)	Observed active mounds	Estimated active mounds		
Great Nicobar	130	42.5	20	64	195.8	45.9	21.4	1.46	1.07	0.24	83	12	1	7	203	405
Kondul	1	1	1	1	1.0	0.0	0.0	NA	NA	NA	6.5	2	0	0	1	2
Little Nicobar	55	17.5	9	25	78.6	31.4	9.4	1.46	1.16	0.39	23	6	1	4	82	165
Menchal	1	0.5	1	3	6.0	2.0	0.0	NA	NA	NA	2.3	1	0	0	6	12
Meroe	2	2	1	2	2.0	1.0	0.0	NA	NA	NA	3.25	1	0	0	2	4
Pilo Milo	0	1.5	1	0	0.0	1.0	0.0	NA	NA	NA	3	3	0	0	0	0
Trax	0	0	0	0	0.0	0.0	0.0	NA	NA	NA	1.2	1.2	0	0	0	0
Treis	2	2	1	3	3.0	1.0	0.0	NA	NA	NA	0.7	0.7	0	0	3	6
Nancowry	17	16	8	7	7.4	1.0	0.0	0.44	0.56	0.20	27.3	10	0	0	7	15
Katchal	30	14	7	4	8.6	2.1	0.0	0.29	0.49	0.18	48	12	0	0	9	17
Camorta	35	21	11	4	6.7	6.7	0.0	0.23	0.34	0.10	77.5	12	0	0	7	13
Tillanchang	15	9	5	16	26.7	16.7	0.0	1.80	0.27	0.12	27	6	0	0	27	53
Trinket	15	11.5	6	20	26.1	0.0	0.0	1.75	1.26	0.51	15	4	0	0	26	52
Teressa	20	16	7	7	8.8	0.0	0.0	0.46	0.59	0.22	33.25	6	0	0	9	18
Bampoka	5	2	1	5	12.5	2.5	0.0	NA	NA	NA	7.75	1	0	0	13	25
Total	328	157.5	80	161	383.0	111.3	30.8				358.75	77.9	2	11	394	788

References:

- Abdulali, H. 1964. The birds of the Andaman and Nicobar Islands. *J. Bombay Nat. Hist. Soc.* **63**, 140-190.
- Abdulali, H. 1967. The birds of the Nicobar islands with notes on some Andaman birds. *J. Bombay Nat. Soc.* **64**, 140-190.
- Ali, S. and Ripley, S.D. 1983. Handbook of the birds of India and Pakistan, Compact edition. Oxford University Press, Bombay.
- Beehler, B. M., Pratt, T.K., and Zimmerman, D.A. 1986. Birds of New Guinea. Princeton University Press.
- Butler, A.L. 1899. The birds of the Andaman and Nicobar Islands. *J. Bombay Nat. Hist. Soc.* **12**, 386-403.
- Collar, N.J. and Andrew, P. 1988. Birds to watch. The ICBP world checklist of threatened birds. *International Council for Bird Preservation*, Cambridge.
- Dagar, J.C., Mongia, A.D. and Bandopadhyay, A.K. 1991. Mangroves of Andaman and Nicobar Islands. *Oxford & IBH Publ. Co.* New Delhi.
- Dekker, R.W.R.J. 1989. Predation and the western limits of megapode distribution (Megapodiidae;Aves). *Journal of Biogeography*, **16**, 317-321.
- Dekker, R.W.R.J. 1990. Conservation and biology of megapodes (Megapodiidae, Galliformes, Aves). *Unpublished D.Phil. thesis*, University of Amsterdam.
- Dekker, R.W.R.J. 1992. Status and breeding biology of the Nicobar Megapode *Megapodius nicobariensis abbotti* on Great Nicobar, India. Report, National Museum of Natural History, Leiden.
- Dekker, R.W.R.J., and Brom, T.G. 1992. Megapode phylogeny and the interpretation of incubation strategies. In Proceedings of the first international megapode symposium, Christchurch, New Zealand, December 1990, (ed. R.W.R.J. Dekker and D.N. Jones). *Zoologische Verhandelingen*, **278**, 19-31.
- Frith, H.J. 1956. Breeding habits in the family Megapodiidae. *Ibis*, **98**, 620-640.
- Frith, H.J. 1959. Breeding of the Mallee Fowl, *Leipoa ocellata* Gould (Megapodiidae). *CSIRO Wildlife Research*, **4**, 31-60.
- Hume, A.O. 1874. Contributions to the ornithology of India. The islands of the Bay of Bengal. *Stray feathers*, **2**, 29-324.
- Hume, A.O. and Marhsall, A. H. T. 1878. The game birds of India, Burmah and Ceylon. Publ. By authors. Calcutta.

- Jones, D.N. 1989. Modern Megapode Research. A post-Frith review. *Corella* **13**, 145-154.
- Jones, D.N. and Birks, S. 1992. Megapodes: recent ideas on origins, adaptations and reproduction. *Trends in Ecology and Evolution*, **7**, 88-91.
- Jones, D.N., Dekker, R.W.R.J., and Roselaar, C.S., 1995. The Megapodes. *Oxford University Press*. 262 pp.
- Kloss, C.B. 1903. In the Andaman and Nicobar Islands. *John Murray*. London.
- Lister, J. J. 1911. The distribution of the avian genus *Megapodius* in the Pacific Islands. *Proceedings of the Zoological Society of London*, **52**, 749-759.
- Olson, S.L. 1980. The significance of the distribution of the Megapodiidae. *Emu*, **80**, 21-24.
- Sahni, K. C. 1953. Botanical exploration in the Great Nicobar. *Indian For.* **79**, 3-7.
- Saldanha, C.J. 1989. Andaman, Nicobar & Lakshadweep. An environmental impact assessment. *Oxford & IBH Publ. Co.* New Delhi.
- Sankaran, R. 1995a. The distribution, status and conservation of the Nicobar Megapode *Megapodius nicobariensis*. *Biological Conservation*, **72**, 17-25.
- Sankaran, R. 1995b. The Nicobar Megapode and other endemic Avifauna of the Nicobar Islands (Status and conservation). *SACON technical report* **2**.
- Sankaran, R. 1997. Developing a protected area network in the Nicobar Islands: The perspective of endemic avifauna. *Biodiversity and Conservation* **6**, 797-815.
- Sankaran, R. and Sivakumar, K. 1999. Preliminary results of an ongoing study of the Nicobar Megapode *Megapodius nicobariensis* Blyth. *Zoologische Verhandelingen*, **327**, 75-90.
- Sankaran, R. 2005. The islands: In: The Ground Beneath the Waves: Post-tsunami impact assessment of wildlife and their habitats in India. Volume II. Kaul, R. and Menon, V (Eds.). Wildlife Trust of India, New Delhi.
- Sewell, S.R.B. 1922. A survey season in the Nicobar Islands on the R.I.M.S. "Investigator", October, 1921, to March, 1922. *J. Bombay Nat. Hist. Soc.* **28**, 970-989.
- Sibley, C. G., and B. L. Monroe, Jr. 1990. Distribution and Taxonomy of Birds of the World. Yale University Press, New Haven, Connecticut.
- Sivakumar, K. 2000. A study on breeding biology of the Nicobar megapode *Megapodius nicobariensis*. Unpublished Doctoral Thesis, Bharathiyar University, Tamil Nadu.
- Sivakumar, K. 2000. *Varanus salvator* (Water monitor). Nesting behavior. *Herpetological Review*.

31(4):243-244.

Sivakumar, K. 2004. Introduced mammals in Andaman & Nicobar Islands (India): A conservation perspective. *Aliens*. 17 : 11

Sivakumar, K and R. Sankaran, 2003. Incubation mound and hatching success of the Nicobar Megapode *Megapodius nicobariensis*. *Journal of Bombay Natural History Society*. 100 (2&3): 375-387

Sivakumar, K and R. Sankaran. 2005. Natural history notes on chicks of the Nicobar Megapode *Megapodius nicobariensis*. *Journal of Bombay Natural History Society*. 101(3):452-453

Smith, M.A. 1930. The Reptilia and Amphibia of the Malay peninsula from the islands. A supplement to G. A. Boulengers Reptila and Batrachid, 1912. *Bull. Raffles. Mus.* **3**, 1-149.

Stoliczka, F. 1870. Observation on some Indian and Malyan Amphibia and Reptilia. *J. Asiat. Soc. Bengal*, **39**, 136-138.

Thothathri, K. 1962. Contributions to the flora of the Andaman and Nicobar Islands. *Bull. Bot. Surv. India*. **4**, 281-296.

Tikadar, B.K. and Das, A.K. 1985. Glimpses of Animal Life of Andaman and Nicobar Islands. *Zoological Survey of India*, Calcutta. 170 pp.

Annexure I (Table 9). Details about transects surveyed in the potential coastal habitat and the location of permanent transects for the continuous monitoring of the Nicobar megapode population.

sl. no	Island	Place	Total Length			Substratum	Mega pde sighti ng	GPS N	GPSE	Direction from GPS location	Transect for Permanent monitoring
			Active	Abandoned	Inactive						
1	Great Nicobar	Trinket Bay	2	5	0	Sandy	Yes	71247.7	935103.2	North	Y
2	Great Nicobar	South Trinket	2	4	1	Sandy-loam	Yes	71305.5	935208.5	North	
3	Great Nicobar	Lawful North	2	4	1	Sandy-loam	Yes	71143.7	935255.9	North	
4	Great Nicobar	lawful	2	8	4	Sandy-loam	Yes	71018.1	935242.8	North	Y
5	Great Nicobar	North Dungi nala	2	3	1	Sandy	No	70352.9	935419.1	North	
6	Great Nicobar	Navy Dera South	2	1	0	Sandy-loam	No	70438.5	935341	North	
7	Great Nicobar	Navy Dera	2	2	2	Sandy	Yes	70814.4	935306.8	North	Y
8	Great Nicobar	Chodi nala	2	5	4	Loamy	Yes	70726.7	935314.8	North	Y
9	Great Nicobar	Ganges creek	2	0	0	Clay	No	71405.9	934951.5	West	Y
10	Great Nicobar	Indira point	2	0	0	Sandy	No	64525.2	934936.1	North	
11	Great Nicobar	Megapode camp	2	2	0	Clay	No	64552.1	935010.7	North	Y
12	Great Nicobar	Binfen	2	0	0	Sandy	No	64811.7	935247.1	South	
13	Great Nicobar	Pulo Bhabi	2	4	1	Sandy	No	65402.4	934613.3	South	Y
14	Great Nicobar	Kosingdon	4.5	10	1	Sandy	Yes	65616.8	934508.8	North	Y
15	Great Nicobar	Alexandria	2	3	0	Sandy	No	65851.8	934358.9	North	
16	Great Nicobar	Pulo Kunj	2	1	0	Sandy	No	70148.9	934016.8	South	
17	Great Nicobar	Pilo Bakka	2	2	0	Sandy-loam	No	64941.1	934735.8	South	Y
18	Great Nicobar	Pulo Bed	2	2	0	Sandy	No	70352.1	934010.6	South	
19	Great Nicobar	Rekoret	2	6	0	Sandy	No	70810.5	934021.2	South	Y
20	Great Nicobar	Habra Bay	2	2	0	Sandy	No	71119.3	934220.1	West	Y
21	Kondul	Kondul	1	1	0	Sandy	Yes	71231.8	934307.9	North	Y
22	Little Nicobar	Pulo Patia	2	2	1	Loamy	Yes	71918.5	934341.6	North	
23	Little Nicobar	North Patia	1.5	6	1	Sandy	Yes	72121.2	934511.6	North	Y
24	Little Nicobar	Pulo Panja	2	2	2	Sandy-loam	Yes	72256.1	934437.1	North	
25	Little Nicobar	School Point	2	1	3	Loamy	No	72339.4	934333.2	North	Y
26	Little Nicobar	Minlana	3	5	2	Clay-Loam	No	72505.9	934236.1	South	Y
27	Little Nicobar	Pulo Kiyang	1.5	0	1	Sandy-loam	No	71504	933827.8	South	
28	Little Nicobar	Muhincohin	2	4	0	Sandy-loam	No	71812.6	933748.2	South	
29	Little Nicobar	Bahua	2	2	0	Sandy	No	71933.7	933817.4	North	
30	Little Nicobar	Enfok	1.5	3	0	Sandy	No	72217.7	933829.9	West	Y

31	Menchal	Men	0.5	3	1	0	Loamy	No	72343	934554.2	North	Y
32	Meroe	Meroe	2	2	1	0	Sandy	No	73257.1	932450.4	South	Y
33	Pilo Milo	Pilo Milo	1.5	0	1	0	Clay	No	72402.3	934134.1	North	
34	Trak	Trak (NCHM)	<1	0	0	0	Sandy	No	72839.1	933755.5	South	Y
35	Treis	Treis	2	3	1	0	Sandy	No	72831.5	933852.8	North	Y
36	Nancowry	North to Tapang	2	0	0	0	Sandy	No	80044.4	933411.7	North	Y
37	Nancowry	Tapang	2	0	0	0	Sandy	No	75913.5	933448.1	North	
38	Nancowry	Connaught Bay	2	3	0	0	Sandy	Yes	75605	933446.1	North	Y
39	Nancowry	North to Cape Connaught	2	1	1	0	Sandy-loam	No	75627	933342.6	North	
41	Nancowry	South to Hindrah	2	1	0	0	Sandy-loam	No	75716.1	933243.6	North	
42	Nancowry	South to Lapat	2	0	0	0	Sandy-loam	No	75847.5	933058.3	North	Y
43	Nancowry	North Lapat	2	2	0	0	Sandy	No	75918.7	933032.3	North	
44	Nancowry	Chinla	2	0	0	0	Sandy-loam	No	75947.5	933310	West	
45	Katchal	South Point	2	2	0	0	Loamy	No	75508	932753.7	South	Y
46	Katchal	South to Kallatopaini	2	0	0	0	Sandy-loam	No	75541.4	932742	South	
47	Katchal	East Bay	2	0	1	0	Sandy-loam	No	75736	932527.7	South	
48	Katchal	Yuns Yenkui	2	0	0	0	Sandy-loam	No	75313	932157.2	North	Y
49	Katchal		2	0	0	0	Sandy	No	80034.8	932423.2	North	
50	Katchal	South to Julia	2	2	0	0	Sandy	No	80120.8	932301.9	West	
51	Katchal	Julia	2	0	0	0	Sandy	No	80034.7	932122.7	East	
52	Camorta	Near Pullaw (Expedition harbour)	2	0	0	0	Sandy	No	80427.2	933030.2	South	
53	Camorta	Dring	2	1	1	0	Loamy	Yes	80618.4	932929.8	South	Y
54	Camorta	South to Dring Harbour	2	1	1	0	Clay	No	80445.5	932903.6	South	
55	Camorta	North to Ittiya Harbour	2	0	0	0	Clay	No	81038.6	932740.6	South	
56	Camorta	Ronyok	2	1	1	0	Sandy-loam	No	80812.8	932741.9	South	Y
57	Camorta	Oi Hinpun	2	0	0	0	Sandy	No	80953.8	932723.7	South	
58	Camorta	Nighreak	2	0	0	0	Sandy	No	81157.7	932938.8	South	
59	Camorta	Bada Eneka	2	0	1	0	Clay	No	80447.6	933244.1	North	
60	Camorta	Kakana	2	0	0	0	Sandy	No	81005.6	933133.3	North	
61	Camorta	Kakana North (Interior)	1	1	0	0	Loamy	No	81235.5	933222	North	Y
62	Camorta	Kakana Noth coastal	2	0	0	0	Sandy	No	81139.5	933232.1	North	
63	Tillanchang	Castle bay	1	2	1	0	Sandy	Yes	82634.8	933823.9	North	Y
64	Tillanchang	South to Cape	2	3	1	0	Sandy	No	83215.3	933757.7	South	Y

		Mand											
65	Tillanchang	Near Maharani Peak	2	3	2	0	Sandy-loam	No	83042.4	933841.9	South		
66	Tillanchang	Noth cheela	2	4	3	0	Sandy	No	82925.4	933745.8	North		
67	Tillanchang	Cape Winifred	2	4	3	0	Sandy	No	82624.9	933712.8	South	Y	
68	Trinket	Piyang	2	4	0	0	Sandy	No	80513.8	933522.5	South		
69	Trinket	Muk Kang	1.5	3	0	0	Sandy	No	80346.5	933529.8	South		
70	Trinket	Safed Balu	2	1	0	0	Sandy-loam	No	80712.5	933354.4	East		
71	Trinket	Trinket (Laful)	2	2	0	0	Sandy	No	80338.3	933432.5	North	Y	
72	Trinket	Trinket	2	2	0	0	Sandy-loam	No	80455.8	933500.5	North		
73	Trinket	Near Light House	2	8	0	0	Sandy	Yes	80303.5	933458.1	South	Y	
74	Teressa	North to Bangala	4	1	0	0	Sandy-loam	Yes	81854.5	930754.1	North	Y	
75	Teressa	Alurang	2	2	0	0	Sandy-loam	No	81944.3	930548.5	North	Y	
76	Teressa	Hiram	2	0	0	0	Sandy	No	81534.3	930546.1	South		
77	Teressa	Minyuk	2	0	0	0	Sandy	No	81528.6	930813.6	South	Y	
78	Teressa	Laksi	2	0	0	0	Sandy	No	81219.4	930934.1	North		
79	Teressa	Kolaru	2	1	0	0	Sandy	No	81328.4	931108.1	South		
80	Teressa	Rakraka	2	3	0	0	Sandy	No	81206.4	931209.8	West	Y	
81	Bampoka	Poakat	2	5	1	0	Sandy	No	81432.9	931325.9	North	Y	

Annexure II (Table 5.2). Summary of the Nicobar megapode *Megapodius nicobariensis* survey 2006.

Island	Potential Coastal Habitat for mound building										Non-conductive coastal habitat for mound building				Total no. of active mounds	Total no. of breeding pairs
	Total area (km)	Total area sampled (km)	No. of transects	Observed active mounds	Estimated active mounds	Estimated abandoned mounds	Estimated inactive mounds	Active mound/km coastal stretch	SD	SE	Total area (km)	Total area sampled (km)	Observed active mounds	Estimated active mounds		
Great Nicobar	130	42.5	20	64	195.8	45.9	21.4	1.46	1.07	0.24	83	12	1	7	203	405
Kondul	1	1	1	1	1.0	0.0	0.0	NA	NA	NA	6.5	2	0	0	1	2
Little Nicobar	55	17.5	9	25	78.6	31.4	9.4	1.46	1.16	0.39	23	6	1	4	82	165
Menchal	1	0.5	1	3	6.0	2.0	0.0	NA	NA	NA	2.3	1	0	0	6	12
Meroe	2	2	1	2	2.0	1.0	0.0	NA	NA	NA	3.25	1	0	0	2	4
Pilo Milo	0	1.5	1	0	0.0	1.0	0.0	NA	NA	NA	3	3	0	0	0	0
Trax	0	0	0	0	0.0	0.0	0.0	NA	NA	NA	1.2	1.2	0	0	0	0
Treis	2	2	1	3	3.0	1.0	0.0	NA	NA	NA	0.7	0.7	0	0	3	6
Nancowry	17	16	8	7	7.4	1.0	0.0	0.44	0.56	0.20	27.3	10	0	0	7	15
Katchal	30	14	7	4	8.6	2.1	0.0	0.29	0.49	0.18	48	12	0	0	9	17
Camorta	35	21	11	4	6.7	6.7	0.0	0.23	0.34	0.10	77.5	12	0	0	7	13
Tillanchang	15	9	5	16	26.7	16.7	0.0	1.80	0.27	0.12	27	6	0	0	27	53
Trinket	15	11.5	6	20	26.1	0.0	0.0	1.75	1.26	0.51	15	4	0	0	26	52
Teressa	20	16	7	7	8.8	0.0	0.0	0.46	0.59	0.22	33.25	6	0	0	9	18
Bampoka	5	2	1	5	12.5	2.5	0.0	NA	NA	NA	7.75	1	0	0	13	25
Total	328	157.5	80	161	383.0	111.3	30.8				358.75	77.9	2	11	394	788

ANNEXURE 18



**WAPCOS LIMITED
(PORTS, HARBOURS AND INLAND WATERWAYS DIVISION)**

TENDER DOCUMENT

FOR

**TRAFFIC STUDY FOR “CREATING TRANSSHIPMENT PORT AT SOUTH BAY, GREAT
NICOBAR ISLAND OF A&N ISLANDS”**

Tender No. WAP/PH&IW /PMB/TRAFFIC /2019-20 dated 26th December 2019

**General Manager
(Ports, Harbours & Inland Waterways)
WAPCOS LIMITED
76-C, Sector-18, Institutional Area, Gurugram (Haryana)
Contact Officer: Jatinder Kumar, General Manager
Contact No. 0124 – 2341859/2397395**

December, 2019

NOTICE INVITING TENDER (NIT)

TENDER NO. WAP/PH&IW /PMB/TRAFFIC /2019-20

Dated: 26-12-2019

WAPCOS LIMITED (A Govt. of India Undertaking) invites proposals from experienced and competent bidders, meeting prescribed eligibility criteria mentioned in tender document

1.	Name of Work/Project	:	TRAFFIC STUDY FOR "CREATING TRANSSHIPMENT PORT AT SOUTH BAY, GREAT NICOBAR ISLAND OF A&N ISLANDS"
2.	Cost of Tender document	:	Rs. 1500/-
3.	Earnest Money Deposit(EMD)	:	Rs. 72,000/-
4.	Validity of proposal	:	90 days
5.	Project Completion period	:	8 Weeks
6.	Offline Submission of Technical bid along with EMD and tender fee	:	09:01:2020 up to 15:00 hours in the office of General Manager, Ports, Harbours and Inland Waterways Division
7.	Last date and time for submission of online bid	:	09:01:2020 up to 15:00 hours
8.	Opening of Technical Bid	:	09:01:2020 up to 15:30 hours
9.	Address for Communication	:	General Manager (Ports, Harbours & Inland Waterways) WAPCOS LIMITED 76-C, Sector-18, Institutional Area, Gurugram (Haryana) Contact No. 0124 – 2341859/2397395 Mobile No. 9818636511/8447876136

Tender document can be downloaded from www.wapcos.gov.in, <https://www.mstcecommerce.com/eprhome/wapcos>, www.eprocure.gov.in/eprocure/app till the last date of submission

Note: Exemption in tender document fee and EMD by Micro, Small and Medium Enterprises registered with NSIC: the companies who are registered with Micro, Small and Medium Enterprises and also have the NSIC Certificate are exempted from tender document fee and EMD

**General Manager
(Ports, Harbours & Inland Waterways)
WAPCOS LIMITED**

TRAFFIC STUDY FOR "CREATING TRANSSHIPMENT PORT AT SOUTH BAY, GREAT NICOBAR ISLAND OF A&N ISLANDS"

1.0 INTRODUCTION

1.1 WAPCOS Limited intends to undertake Traffic Study for "Creating transshipment port at South Bay, Great Nicobar island of A&N Islands". Accordingly, WAPCOS Ltd. invites online Bids from experienced, technically and financially sound reputed Indian firms for carrying out Study for the same.

2.0 GENERAL INFORMATION

2.1 In the Indian sub-continent, due to geographical and logistic constraints deep water berths in the ports existing on its East & West Coast could not be developed so as to accommodate large inter-continental vessels with drafts higher than 15m. This situation has resulted in depending upon transshipment ports which are available in other countries/ports such as Sri Lanka, Singapore and Hongkong etc. Due to these limitations on available facilities and transshipment activities being undertaken in other countries, India is losing substantial revenue in terms of facilities and higher rate of landings. The quantum of such losses is enormous in consideration with the cargo being presently handled on the Indian coasts. With the passing years, the situation is expected to be more severe. In addition, from the logistic point of view, it is preferred that transshipment port facilities are existing within Indian waters so that sustained maritime trade can be ensured. It has also been observed that there are some indications that other countries like Myanmar, China and Srilanka are gearing up their resources to develop deep water facilities for taking care of their trade requirements by developing suitable harbour facilities.

2.2 It is high time that India also moved towards setting up deep water berths to carry out primarily, transshipment activities in its waters and thereby generates dollars/additional revenue through such activities. Basically a transshipment port would comprise of deep water berths and facilities to transfer the cargo in bulk/break bulk to other vessels which can be accommodated in the other/smaller draft ports where such vessels can be catered to. Along with deep water berthing facilities, some of the logistic requirements on-shore like suitable and efficient cargo handling systems and allied facilities to operate such activities in terms of infrastructure and services such as power, water, suitable access and well trained/skilled manpower etc. may need to be provided for/considered. However, the major deviations in transshipment port from other conventional ports come from the components of development of access to hinterland. In an exclusive Transshipment Port, this can be done away with. In addition to providing transshipment port facilities, facilities for vessels plying in high seas may also be considered, such as Emergencies, recouping, short time calls, distress shelters etc. Thus in consideration with the requirements for a transshipment port the location proposed by Government of India at South Bay, Great Nicobar Island of Andaman & Nicobar Islands, prima-facie appears quite opt/reasonable.

- 2.3 There is no transshipment port on the East Coast of India which makes the entire coast dependable on the proposed facilities at Great Nicobar Islands. The sea route passing through Great Nicobar Island is one of the busiest routes with about 95000 ships per annum passing through Indian Ocean & Pacific Ocean via Malacca Strait. For developing countries like India, Indonesia and China, the Malacca strait is thus the gate way for Maritime Trade. The strait carries around one fifth to one quarter of the world sea trade. It is expected that it will expand as the oil consumption in user countries as the region expands. **Great Nicobar Island** situated towards the south of Nanwocory group of Islands, forms the best site being a nodal point, in the Australia, Japan, Korea navigational route for creating a transshipment port. **The topography of the island is the best suited, which has not been damaged much even by Tsunami on 26.11.2004.** Accordingly, South Bay at Great Nicobar Island is a good site for creating a container transshipment port. This will not only boost Indian economy, but also serve other neighbouring international port at Bangladesh, Myanmar, Thailand, Cambodia, Vietnam and Philippines too.
- 2.4 A rapid expansion in global port activity and cargo handling of containerized and bulk cargo is reported during 2017, following two years of weak performance. This expansion was in line with positive trends in the world economy and seaborne trade. Ports have gone through a structural and functional evolution during the recent past. Technological advancements offer ports new business model opportunities and the potential to transform into smart ports. The trend is towards development of smart ports with technological integration and innovation. During the intervening period between 2010 and 2019 there have been number of developments in the transshipment industry along the East-West Corridor around Singapore. Subsequent to year 2010, there is further increase in the vessel sizes and some of the freight and terminal operators have introduced vessels of 20000 TEU requiring water depths up to 20 m and vessels of 22,000 TEU are in design stage. Bigger ship sizes mean longer berths, deeper draughts, larger cranes and container yards at the terminals. This also means quick and efficient ship-to-shore and evacuation operations to attain low turnaround time. The proposed Transshipment Port will have to compete with the existing Transshipment Hubs and Gateways in the region. The expansion of the Colombo Port which was commissioned in 2012 has added additional capacity of 7.2 Million TEU to be handled at three Terminals of length 1200 m each. The large scale expansion of Port Klang Container Terminals have taken place after year 2000 with a total length of 6000 m and additional container handling capacity of 30 Million TEU. The other dominant container ports of Malaysia are Port of Tanjung Pelepas and Penang Port.

3.0 MINIMUM ELIGIBILITY CRITERIA

3.1 Conditions of Eligibility of Applicants

Applicants must read carefully the minimum conditions of eligibility (the "**Conditions of Eligibility**") provided herein. Proposals of only those Applicants who satisfy the Conditions of Eligibility will be considered for evaluation.

3.1.1 Pre-qualifying Criteria

The bidder must satisfy the following pre-qualification criteria to be eligible for the selection process.

- a. Average annual financial turnover of the intending tenderer during last 3 financial years (F.Y. 2016-17, 2017-18, 2018-19) should be at least **Rs. 18 Lakhs**.
- b. Company's Audited Balance Sheet and Profit/Loss account for the last 5 years shall be submitted as proof). Bidders should not have incurred any **loss in more than two years** during the last five years.
- c. Solvency Certificate -The Bidders to provide latest Solvency certificate from any nationalized bank not less than **Rs. 14.4 Lakhs** in original from the date of issue of this tender.
- d. The bidder should not be blacklisted/ De-registered/ debarred by any Government department/ Public Sector Undertaking/ Private Sector/ or any other agency for which they have Executed/ Undertaken the works/ Services in the past. Declaration in this regard shall be submitted.

3.1.2 Eligibility for Evaluation

To be eligible for evaluation of the Proposal, the Applicant shall fulfill the following:

- (a) **Technical Capacity:** The Applicant shall have, experience over the past 7 (Seven) years preceding the last date of submission of Proposal, undertaken similar works, means carrying out Traffic studies, Market Demand Assessment Studies for port projects. Experience of successfully completed similar works during last 7 years from the project due date should be either of the following;

- **THREE (3)** similar works costing not less than **14.4 Lakhs** as Consultancy Fee.

OR

- **TWO (2)** similar works costing not less than **18.0 Lakhs** as Consultancy Fee.

OR

- **ONE (1)** similar works costing not less *than* **28.8 Lakhs** as Consultancy Fee.

Experience details as asked for are to be submitted as per the format given in **Tech Form -2** with documentary evidence from the client. Works without documentary evidence shall not be considered for evaluation.

(b) Financial Capacity: Average Annual Turnover during last three financial years (i.e. F.Y. 2016-17, 2017-18 & 2018-19) should not be less than **Rs. 18.0 Lakhs.**

Chartered Accountant Certificate in support of the list given as in the format given at **Tech Form-3** is to be submitted in support of the same along with copies of Audited Balance Sheets and Income Tax Returns for last Five Financial Years.

The Applicant shall enclose with its Proposal, certificate(s) from its Statutory Auditors stating its total revenues from fees during each of the past three financial years. In the event that the Applicant does not have a statutory auditor, they shall provide the requisite certificate(s) from the firm of Chartered Accountants that ordinarily audits the annual accounts of the Applicant.

(c) Availability of Key Personnel: The Applicant shall offer and make available all Key Personnel meeting the requirements specified in **sub clause (d) below.**

(d) Conditions of Eligibility for Key Personnel: Each of the Key Personnel must fulfill the conditions of eligibility specified below:

Key Personnel	Educational Qualification	Length of Professional Experience	Experience on Eligible Assignments
Team Leader/Traffic Expert	Bachelor Degree in Marine With experience in Foreign trade/logistic/ Transport Planning/Traffic Studies	15 years	He should have led the project team for 3 (three) Eligible Assignments
Market Expert	Post Graduate in Market/Business	10 years	He should have worked as marketing & strategy expert for 3 (three) Eligible Assignments
Finance Expert	Masters in Finance with minimum experience in Financial Analysis of the projects.	10 years	He should have worked as Finance Expert for 3 (three) Eligible Assignments

4.0 Tender Document Fee

The bids should be accompanied by Tender Document fee **Rs. 1500 (Rupees One Thousand five hundred only)** in the form of a Demand Draft drawn from any nationalized/scheduled bank in favour of WAPCOS Limited payable at Gurugram.

5.0 EARNEST MONEY DEPOSIT (EMD)

- 5.1 The bids should be accompanied by an Earnest Money Deposit (EMD) of **Rs. 72000/- (Rupees Seventy Two Thousand only)** in the form of a Demand Draft drawn from any nationalized/scheduled bank in favour of WAPCOS Limited payable at New Delhi / Gurgaon. No other form of EMD shall be accepted. The bids received without EMD or any other form of EMD shall be summarily rejected. The EMD of unsuccessful bidder shall be returned. However, in case of successful bidder the EMD shall be returned on submission of Bank Guarantee towards the Security Deposit. **Firms registered with MSME are exempted from furnishing EMD. (MSME registration certificate must be submitted with the bid)**

Note: Exemption in tender document fee and EMD by Micro, Small and Medium Enterprises registered with NSIC: the companies who are registered with Micro, Small and Medium Enterprises and also have the NSIC Certificate are exempted from tender document fee and EMD

6.0 INSTRUCTIONS TO BIDDERS FOR SUBMISSION OF BIDS

- 6.1 Tender document can be downloaded from following websites till the last date of submission:

- (i) www.wapcos.gov.in
- (ii) <https://www.mstcecommerce.com/eprochome/wapcos>
- (iii) www.eprocure.gov.in/eprocure/app

Tenders should be uploaded on <https://www.mstcecommerce.com/eprochome/wapcos> by 9th January 2020 up to 1500 hrs (the procedure for uploading the tender is enclosed with this Tender). The bidder shall submit only cost in the financial bid. The financial bid shall not contain any conditions.

- 6.2 **The hard copy of technical proposal along with the DD/ FD** drawn in favour of WAPCOS, payable at Gurgaon should be addressed to General Manager, Ports Harbours & Inland Waterway, WAPCOS Limited, 76-C, Sector-18, Institutional Area, Gurgaon (Haryana)-122015, should reach by 9th January 2020 up to 1500 hrs. We shall not be responsible for any delay in receipt of the tender. Late tenders shall not be considered. WAPCOS reserves the right to reject any or all the tenders, without assigning any reasons thereof. The technical proposal shall

be opened on the same day at 1530 hrs in the presence of bidders who wish to be present.

6.3 Special instructions to Bidders for e-Tendering

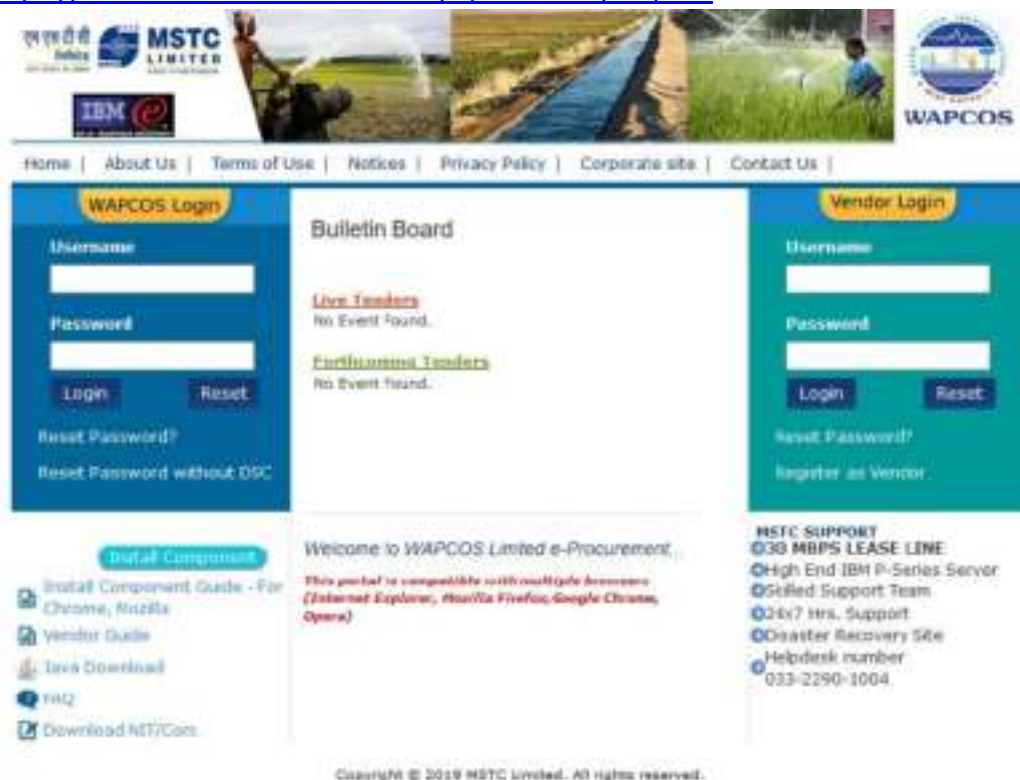
General

The Special Instructions (fore-Tendering) supplement 'Instruction to Bidders', as given in these Tender Documents. Submission of Online Bids is mandatory for this Tender.

E-Tendering is a new methodology for conducting Public Procurement in a transparent and secured manner. Now, the Government of India has made e-tendering mandatory. Suppliers / Vendors will be the biggest beneficiaries' of this new system of procurement. For conducting electronic tendering, WAPCOS has decided to use the portal <https://www.mstcecommerce.com/eprochome/wapcos> through MSTCE, a Government of India Undertaking. This portal is based on the world's most 'secure' and 'user friendly' software from Electronic Tender[®]. A portal built using Electronic Tender's software is also referred to as Electronic Tender System[®] (ETS).

Instructions

1. Use Internet Explorer to go to <https://www.mstcecommerce.com/eprochome/wapcos>



2. On the right side of the page click on Register as a Vendor:



3. Fill the form that appears to create username and password.

4. Once the registration is done, login with your user name and password:



5. System will ask you to verify your digital signature



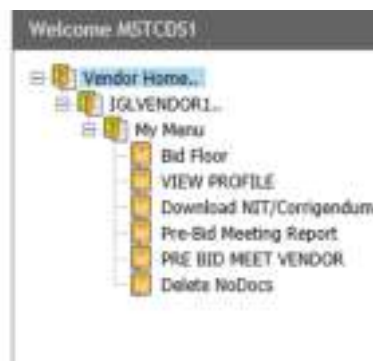
6. Press Ok and select your digital signature from the List:



7. Your digital signature will be verified



8. Once login is complete, a bidder can access My Menu through the left side of the page:



9. Here click on Download NIT/Corrigendum button to download the NIT/Corrigendums. Select Event number and click on download to download the files:



10. To submit the bid a bidder can proceed to Bid Floor through the left side My menu. In Bid Floor click on live events to view a list of Live events. In live events select the tender number where you wish to submit a bid.



11. On clicking the event number, if the bidder has not paid transaction fee, system will prompt them to pay the transaction fee. They can pay the transaction fee by going to Transaction Fee payment link in their login, and pay the same through online payment (debit card, credit card, net banking etc) or RTGS/NEFT (Challan).



12. Tender can be of multiple types with price bid uploading in Excel or Technical-Price type. The bid floor for each type of event will change automatically.

On clicking the tender number one of the following screens will appear:
For 2 cover with price bid in excel



E-Tender Technical Cum Price Bid



13. For each type of event the event details including start time and close time the details will be given on the top of the page.

14. To submit the tender the bidder has to start from top left and submit the details one by one.
15. For 2 cover with price bid in excel, the bidder has to submit technical bid, by filling the details and clicking the save button.

- a) After the technical bid is saved, a bidder can proceed to uploading documents through the link upload docs:

- b) Please note that under no circumstance the price bid excel has to be uploaded here.
- c) After the documents have been uploaded, the bidder can click on download excel to download the excel format.
- d) Fill up the excel sheet as per the details given therein and tender document.
- e) To upload the filled up excel click on Upload Price Button, click on browse to select the file and then click on Upload and Save encrypt file.

- f) The bidder can then click on final submit to finally submit the bid. In case of any amendments after final submit, click on delete bid button to delete the techno-

commercial and price bids and resubmit the same. Please note that at the end the bid must be final submit, otherwise the same will not be considered.

16. For E-Tender Technical Cum Price Bid:

- a. In the manner similar to above the bidder has to fill up Common terms, then press save button to submit.
- b. Then the bidder has to upload documents as per the list shown therein.
- c. Once the documents are uploaded the bidder has to submit the Technical and Price bids.
- d. The bidder can then click on final submit to finally submit the bid. In case of any amendments after final submit, click on delete bid button to delete the techno-commercial and price bids and resubmit the same. **Please note that at the end the bid must be final submit, otherwise the same will not be considered.**

Bidder's may note that in each case using the Delete bid button will only delete the bids and then the bidder can resubmit upload tender closing time.

Using the withdraw button the bid will be withdrawn and the bidder will not be allowed to submit any further bid in that event.

For any assistance during bid submission, system settings etc. bidders may contact at MSTC:

Phone Number
03322901004, 01123212357, 01123215163, 01123217850
Email
mstcnro@mstcindia.co.in
Please mention "Helpdesk" as subject while sending emails
Availability
10 AM to 5:30 PM on all working days.

7.0 ESSENTIAL DOCUMENTS

7.1 The Technical Bid should contain only the following documents as per the listed sequence. In case, if a bidder fails to submit any of the following documents in the Technical Bid, it shall be considered non-responsive and liable to be rejected.

- (i) Bid Submission form as per the format given in **Tech Form -1**.
- (ii) Proof of Tender document fee and EMD or MSME Registration Certificate

- (iii) Organization profile, General organizational capability and resources including manpower, other resources etc.
- (iv) List of similar works undertaken (both completed and ongoing) along with the cost and project duration as per format given at **Tech Form -2.**
- (v) Documentary evidence from Clients for the works to be considered for evaluation
- (vi) Detailed methodology to be adopted for carrying out this Study
- (vii) Activity Schedule for the completion of study preferably in week wise.
- (viii) An undertaking that financial proposal does not contain any condition (s). Deviations, if any, shall be mentioned in the technical proposal itself.
- (ix) Documents in Support of Registration, Ownership as well as Constitution and legal status of the Applicant
- (x) Chartered Accountant Certificate mentioning Turnover of the Company during Last three financial years (as per format given in **Tech Form -3)**
- (xi) Auditor Certified Copies of Audited Balance Sheets for last five financial Years
- (xii) Auditor Certified Copies of Income Tax Returns of Last three Financial Years
- (xiii) List of Key Staffs Proposed along with their detailed CV as per format given in **Tech Form -4.**
- (xiv) Self-Declaration of Litigation History / Arbitration cases pending with details, if any
- (xv) Self-Declaration as per clause 3.1.1 (d)
- (xvi) Copy of GST Registration Certificate
- (xvii) Copy of PAN Card
- (xviii) Solvency Certificate

8.0 EVALUATION CRITERIA

8.1 In the first stage, the **Technical Proposal** will be evaluated on the basis of Applicant's experience, its understanding of TOR, proposed methodology and Work Plan, and the experience of Key Personnel. Only those Applicants whose Technical Proposals get a score of 70 marks or more out of 100 shall qualify for further consideration, and shall be ranked from highest to the lowest on the basis of their technical score (S_T).

8.2 The scoring criteria to be used for evaluation shall be as follows:

Sl.	Description	Maximum Marks	Breakup of Scoring System	
1	Relevant Experience of the Applicant	40		
	Number of Eligible Assignments specified in Clause 3.1.2 undertaken by the Applicant shall have, over the past 7 (Seven) years preceding to last date of submission of proposal	25	>5 Projects	25
			4 Projects	20
			3 Projects	15

	Overall turnover of the firm	15	>50 Lakhs	15
			18-50 Lakhs	10
2	Proposed Methodology & Work Plan	30	Evaluation based on quality of submission	30
3	Experience of Key personnel	30		
A.	TEAM LEADER	14		
	i. No. of Years / status of Association with Firm	6	Permanent and more than 5 years	6
			Permanent and less than 5 years / Independent Expert	3
	ii. Qualification field	4	Post Graduate	4
			Graduate	3
	iii. Total Work Experience relevant field	4	>15 yrs	4
			15 yrs	3
B	Finance Expert	8		
	i. No. of Years / status of Association with Firm	3	Permanent and more than 5 years	3
			Permanent and less than 5 years / independent Expert	2
	ii. Qualification	3	Post Graduate	3
			Graduate	2
	iii. Total Work Experience relevant field	2	>10 yrs	2
			10 yrs	1
C	Market Expert	8		
	i. No. of Years / status of Association with Firm	3	Permanent and more than 5 years	3
			Permanent and less than 5 years / independent Expert	2
	ii. Qualification	3	Post Graduate	3
			Graduate	2
	iii. Total Work Experience relevant field	2	>10 yrs	2
			10 yrs	1

8.3 Evaluation of Financial Proposal

For financial evaluation, the total cost indicated in the Financial Proposal will be considered.

The tender committee will determine whether the Financial Proposals are complete, qualified and unconditional. The cost indicated in the Financial Proposal shall be deemed as final and reflecting the total cost of services.

Omissions, if any, in costing any item shall not entitle the survey firm to be compensated and the liability to fulfil its obligations as per the TOR within the total quoted price shall be that of the survey firm. The lowest Financial Proposal (F_M) will be given a financial score (S_F) out of 100 points. The financial scores of other proposals will be computed as follows:

$$S_F = 100 \times F_M / F$$

(F = amount of Financial Proposal)

8.4 Combined and Final Evaluation

Proposals will finally be ranked according to their combined technical (S) and financial (S) scores as follows: $S = S_T \times T_w + S_F \times F_w$

Where, T_w and F_w are weights assigned to Technical Proposal and Financial Proposal that shall be 0.7 and 0.3 respectively. The Selected Applicant shall be the Applicant having the highest combined score.

9.0 SCOPE OF WORK

Assess the overview of the whole container industry of the region (A&N, Myanmar, Bangladesh and East Coast of India) in order to define the areas of opportunities for proposed Andaman & Nicobar Transshipment Terminal. Following are the key activities to be undertaken

- Study the target region as market for hinterland of the port in terms of primary, secondary and tertiary countries/ports to be serviced from proposed Andaman & Nicobar Transshipment Terminal
- Key industrial and infrastructural developments proposed in the South Asia and South East Asia that would impact container Transshipment terminal at Andaman & Nicobar
- Assess containers from manufacturing hubs preferably China that can be attracted to the proposed Transshipment terminal for distribution to feeder ports
- Comparison of landed cost of containers at target country/ports using Andaman & Nicobar Transshipment Terminal compared to other International transshipment terminals

Market Assessment (Micro & Macro)

- Identify hinterland for proposed Andaman & Nicobar Transshipment Terminal.
- Study local and international reports related to future container volume projections
- Analyse historic trade of all the targeted countries and their port traffic (O-D).
- Breakdown the container traffic to country/ports in various categories such as Transshipped container, direct delivery, coastal container, local feeder, commodities, etc
- Detail analysis of local issues and factors that influence container traffic in the hinterland and derive container volumes likely to be generated in future due.

- Undertake a correlation analysis of the container traffic with the key macro and micro economic indicators and develop a forecast for total seaborne container trade (individual target country wise & O-D Pair) in the hinterland for next 30 years.
- Develop next 30 years traffic forecast for proposed Andaman & Nicobar Transshipment Terminal – Region and Commodity wise
- Turnaround required for the vessels at the Proposed Container Transshipment terminal of Andaman
- Phasing of infrastructure for development of container terminal inline with Traffic Development and Projections

Infrastructure Assessment

- Identify and study all the Feeder and Transshipment container terminals in the region – existing and upcoming
- Infrastructure expansion plans of all the identified terminals
- Evaluate Productivity & Throughput of each identified terminals

Container Fleet & Vessel Design

- Study container fleet in the region – Mother & Feeder Vessel
- Impact of fleet on planning and designing of proposed terminal
- Study order book of vessels likely to deliver in region
- Study and advise on the changing container sizes in the market
- Advise on the type of vessels likely to call to proposed terminal

Competition & Benchmarking

- Define the main competitors and their future potential – Volume, Market share, Infrastructure, Tariff structure, services provided, etc.
- Identify the key drivers of container port traffic of each of the individual countries falling in the hinterland
- Undertake LCA under various scenarios
- Establish competitive tariff for proposed terminal
- Benchmark proposed terminal for existing infrastructure in the region

Financial Model & Project Viability

Detailed financial analysis is required to be undertaken for assessment of the financial viability of the Project. Consultant should submit detailed break-up of calculations, basis, assumptions, justifications, etc. This would include preparation of following factors over a concession of 30 years with 5 years interval respectively

- Estimate Cost & Revenue
- Project revenue from various activities to be calculated for projected traffic

- IRR Calculation (Financial and Economic)
- Sensitivity Analysis
- Recommendation on project viability
- Develop a model for financial viability for project

10.0 PROJECT DELIVERABLES AND TIMELINE

10.1 The proposed study should be completed from the date of award of work in manner as listed below:

Sl. No	Deliverable	Timeline
1	Inception Report	2 weeks from the date of award of the work
2	Draft Traffic Study Report	6 weeks from the date of award of the work
3	Final Traffic Study Report	8 weeks from the date of award of the work

The Consultant shall prepare and submit the above deliverables each one hard copy along with soft copy (pdf., doc., xls., format of report in CD/DVDROM/e-mail). In addition to the reports, the consultant should also submit all the raw data collected and analysed.

11.0 GENERAL INSTRUCTIONS TO BIDDERS

- (i) Bid document shall be a self-contained one and no reference to any previous submissions will be permitted
- (ii) All the Pages of Bid document shall be signed and numbered serially, If any information in Bid is missing or not clearly specified or found ambiguous, it will be assumed that the bidder is not in a position to supply/ share the information and therefore will be evaluated accordingly
- (iii) Bid document shall not include any financial conditions and Bid containing such conditions shall be liable to be ignored
- (iv) Any direct or indirect attempt made to influence WAPCOS in deciding qualifying criteria will result into disqualification from Tender Participation.
- (v) WAPCOS reserve the right to reject any or all Bid documents without assigning any reason whatsoever.
- (vi) ***The bidder shall submit only lump sum cost in the financial bid as per the format given in Fin. Form – 1. The financial bid shall not contain any conditions.***
- (vii) Bid Validity period is 90 days.

12.0 GENERAL TERMS AND CONDITIONS

12.1 Any Indian Firm, Sole Proprietorship Firm, Partnership Firm, Public Limited Company or a Private Limited Company may apply for this tender, provided the eligibility criteria and other conditions are satisfied.

- 12.2 The bidder shall make their own arrangement for boarding, lodging, travel, transportation equipment, boats/launches, labourers, local transport etc. required for this work and shall include cost in their offer.
- 12.3 Time is the essence of this contract. Therefore, WAPCOS will be at liberty to levy Liquidated Damages @ 0.5% per day subject to maximum of 10% of the contract value. However, the provision of this clause would not be invoked where the delay is due to Force Majeure only in the event of time-overruns not attributable to survey firm.
- 12.4 **Performance Guarantee:** The successful bidder shall submit a Performance Bank Guarantee (PBG) amounting to 10% of the contract value on award of work. The BG shall be valid till the completion of work and shall be released on successful completion of work.
- 12.5 **Security Deposit:** The successful bidder shall also submit Security Deposit of 2.5% of the contract value in the form of RTGS otherwise it will be deducted from the running bills.
- 12.6 **If liquidity damages are imposed on WAPCOS by PMB due to delay in deliverable by the firm, the PBG and security deposit submitted by the firm in such case may be forfeited.**
- 12.7 The successful bidder has to commence the work (including mobilization) within 10 days from the date of award of work. On non-compliance the EMD of the bidder would be forfeited.
- 12.8 **Permission/authorization:** It shall be the responsibility of the successful bidder to seek and obtain, well in time, necessary permission or authorization from concerned local or other offices as may be required to carry out the work. However, necessary authorization and assistance in getting permission may be extended by WAPCOS at its discretion.
- 12.9 **Data Collection:** Data required for carrying study shall be collected by the successful bidder. However, WAPCOS shall issue necessary authorization letters required, if any for collecting the same.
- 12.10 Incomplete bids or bids received after the last date shall not be considered under any circumstances.
- 13.0 FINANCIAL CONDITIONS**
- 13.1 **Terms of Payment:** The Payment towards carrying out various items of works as detailed shall be made to the successful bidder in the following manner:

Sl. No	Deliverable	Payment Terms
1	Approval of Inception Report	20%
2	Approval of Draft Traffic Study Report	40%
3	Approval of Final Traffic Study Report	40%

“WAPCOS will be only working as intermediary between PMB being Principal Employer/Client and Sub-consultant. Thus the Sub-consultant unconditionally acknowledges that the payments shall be made proportionately by WAPCOS only on back to back basis i.e. after 21 days subject to receipt of payment from PMB being Principal Employer/Client. Sub-consultant unconditionally agree that in the event the payment or part thereof, is not received from PMB (Principal Employer/Client) then WAPCOS &/or any of its Employee/Officer shall not be responsible to pay any amount to Sub-consultant.

The Bidders should quote their price only in Indian Rupees (INR). The bidders shall familiarize themselves about applicable costs, taxes etc. in A & N Islands required carrying out the assignment.

All rates quoted shall be inclusive of all duties, taxes (except GST), octroi etc. as may be applicable. GST shall be paid as applicable on production of documentary proof. No extra claim shall be payable. WAPCOS shall however deduct taxes at source, demand draft charges etc. as may be applicable and shall provide a certificate to this effect. The quoted rate shall also include cost towards making presentations at Delhi/Gurugram, Port Blair and at Stakeholders meet, Site visit, etc.

14.0 SPECIAL CONDITIONS OF CONTRACT

- 14.1 WAPCOS may, at its discretion, award total or part of the work and may split the work among more than one bidder depending upon their technical capabilities and financial offers.
- 14.2 The firm shall be solely responsible for the safety of their personnel and shall get the same appropriately insured. WAPCOS shall not be liable for any injury or loss of life of the firm’s personnel.
- 14.3 The data collected shall not be passed on to any other person or organization or used anywhere else by the firm without the prior permission of WAPCOS Ltd.

15.0 FORCE MAJEURE

- 15.1 For the purposes of this Contract, “Force Majeure” means an exceptional event or circumstance which is beyond the reasonable control of a Party, is not

foreseeable, is unavoidable and not brought about by or at the instance of the Party claiming to be affected by such events and which has caused the non-performance or delay in performance, and which makes a Party's performance of its obligations here under impossible or so impractical as reasonably to be considered impossible in the circumstances, and includes, but is not limited to, war, riots, civil disorder, earthquake, fire, tsunami, explosion, storm, flood or other extreme adverse weather conditions, strikes, lockouts or other industrial action (except where such strikes, lockouts or other industrial action are within the power of the Party invoking Force Majeure to prevent), confiscation or any other action by Government agencies.

15.2 Force Majeure shall not include (i) any event which is caused by the negligence or intentional action of a Party or by or of such Party's Sub-Survey firms or agents or employees, nor (ii) any event which a diligent Party could reasonably have been expected both to take into account at the time of the conclusion of this Contract, and avoid or overcome in the carrying out of its obligations hereunder.

15.3 No Breach of Contract

The failure of a Party to fulfill any of its obligations hereunder shall not be considered to be a breach of, or default under, this Contract insofar as such inability arises from an event of Force Majeure, provided that the Party affected by such an event has taken all reasonable precautions, due care and reasonable alternative measures, all with the objective of carrying out the terms and conditions of this Contract.

15.4 Measures to be taken

(a) A Party affected by an event of Force Majeure shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall take all reasonable measures to minimize the consequences of any event of Force Majeure.

(b) A Party affected by an event of Force Majeure shall notify the other Party of such event as soon as possible and in any case not later than fourteen (14) days following the occurrence of such event, providing evidence of the nature and cause of such event, and shall similarly give written notice of the restoration of normal conditions as soon as possible.

(c) Any period within which a Party shall, pursuant to this Contract, complete any action or task, shall be extended for a period equal to the time during which such Party was unable to perform such action as a result of Force Majeure.

(d) During the period of their inability to perform the Services as a result of an event of Force Majeure, the survey firm, upon instructions, shall either:

- (i) Demobilize; or
- (ii) Continue with the Services to the extent possible

(e) In the case of disagreement between the Parties as to the existence or extent of Force Majeure, the matter shall be settled according to Clause on dispute resolution /Arbitration.

16.0 Arbitration

16.1 Any dispute, controversy or claims arising out of or relating to this Agreement or the breach, termination or invalidity thereof, shall be settled through following mechanism:

- a) Firstly, the aggrieved party shall write a letter to the other party detailing its grievances and calling upon the other party to amicably resolve the dispute by convening a joint meeting. Accordingly, the parties as per their convenience shall jointly convene the said meeting(s), wherein minutes of the said meeting(s) be prepared and countersigned by all the parties. It is mandatory to prepare minutes of meeting(s) and to be countersigned by all the parties, irrespective of the outcome of the said meeting(s).
- b) In the event the parties are unable to reach on any settlement in the said meeting(s), then the aggrieved party shall mandatory resort to pre-litigation mediation mechanism with Delhi High Court Mediation Cell, New Delhi.
- c) It is only upon failure of the pre-litigation mediation mechanism with Delhi High Court Mediation Cell, then the aggrieved party shall resort to resolution of disputes through arbitration of a Sole Arbitrator. The appointing authority of Sole Arbitrator is CMD, WAPCOS Limited, to which neither of the parties have any objection nor they shall ever object.
- d) Subject to the parties agreeing otherwise, the Arbitration proceedings shall be conducted in accordance with the provisions of the Indian Arbitration and Conciliation Act, 1996 (amended as on date).
- e) It is also acknowledged and accepted that WAPCOS is only working as Intermediary between the Sub-Consultant and the Principal Employer/Client, thus in the event, any dispute arises and referred to Arbitration for adjudication, then subject to corresponding clause in the Contract/Agreement/Work Order/Arrangement between Principal Employer/Client & WAPCOS, Principal Employer/Client shall also be made party to the said Arbitration proceedings. Also, the award including costs if any passed against WAPCOS and costs incurred in the proceedings shall be the sole responsibility of Principal Employer/Client. The said clause if found inapplicable, even then the other terms of the Arbitration Clause shall survive and shall be acted upon.
- f) The palace/seat of arbitration shall be Delhi and any award whether interim or final, shall be made and shall be deemed for all purposes between the parties to be made, in Delhi. The Arbitral procedure shall be conducted in English and any award of awards shall be rendered in English. The procedural law of the

- arbitration shall be Indian Law. The award of the arbitrator shall be final and conclusive and binding upon the parties.
- g) The Contract and any dispute or claim arising out of or in connection with it or its subject matter or formation (including non-contractual disputes or claims) shall be governed by and construed in accordance with the laws of India and the Parties submit to sole & exclusive jurisdiction of courts at Delhi."

Tech Form – 1

Bid Submission Form

To

The General Manager

Ports Harbour & Inland Waterway Division,
WAPCOS Limited,
76-C, Sector-18, Institutional Area,
Gurugram, Haryana – 122015.

Sub: Traffic Study for "Creating Transshipment Port at South Bay, Great Nicobar Island of A&N Islands"

Ref: Notice Inviting Tender (NIT) in WAPCOS portal, No..... & dated

Sir,

With reference to the NIT No....., published in WAPCOS portal on, I/we, the undersigned, having examined, understood the Employer's Requirements for Carrying out the work for the above mentioned project and on behalf of(Name of Firm/ Agency) do hereby submit our application along with all the essential documents for consideration please.

I/ We hereby declare that the information furnished herewith is correct to the best of my / our knowledge and belief. However, I/ We agree to abide by the decisions of the Employer for dismissal of our candidature in case any information furnished along with this application is found to be false and / or inaccurate at any point of time in future.

Thanking you.

Yours faithfully,

Signature
Position
Seal
Dated:
Place:

Details of Similar Works

Assignment No.

Name of Work	
Name of the Client	
Contact Details of Client	
Cost of project in Rs.	
Fee of the Project in Rs.	
Commencement of Date	
Scheduled date of Completion	
Actual Completion Date	
Reason for Delay, if any	
Details of Services provided by the firm	
Key Professionals involved in the Study and their proposed position	

We hereby certify the information as given in below in table is correct and we have attached Client Completion Certificates in support of list of works given as above.

Note:

1. For the purpose of evaluation, Bidders should assume 7% inflation for Indian Rupees every year and 2% for foreign currency portions per year compounded annually.
2. In case of foreign currency, it should first be escalated at the rate mentioned above and then the amount so derived shall be converted to INR at the exchange rate INR 65 per USD.

Signature of Bidder

Date

Place

Turnover Details

Name of firm:

Sr. No.	Financial Year	Turnover (In Lakh Rs.)
1.	2016-2017	-
2.	2017-2018	-
3.	2018-2019	-
	Avg. Annual Turnover	-

Certificate from the Statutory Auditor

This is to certify that..... (Name of the Applicant) has received the payments shown above against the respective years on account of professional fees.

Name of the audit firm:

Seal of the audit firm

Date:

(Signature, name and designation of the authorized signatory)

In case the Applicant does not have a statutory auditor, it shall provide the certificate from its chartered accountant that ordinarily audits the annual accounts of the Applicant.

List of Key Professionals Available

Name of Firm:

Sr. No.	Name	Education qualification	Total Experience in years	Years with firm	Summary of Professional Experience

Note: A detailed CVs of Persons as in above list required to attached along with this form

Signature of Bidder

Date

Place

Form Fin – 1: Financial Bid Submission Form

Date:

To,
General Manager
Ports, Harbours and Inland Waterways
WAPCOS Limited
76-C, Sector-18, Gurugram– 122015

Dear Sir:

We, the undersigned, offer to provide the consultancy services for "-----
-----" in accordance with your notice inviting tender dated ----- and our
Technical Bid. Our attached Financial Bid is for the sum of -----, amount is
exclusive of GST. We hereby confirm that the financial Bid is unconditional and we
acknowledge that any condition attached to financial Bid shall result in rejection of our
financial Bid.

Our Financial Bid shall be binding upon us subject to the modifications resulting from
Contract negotiations, up to expiration of the validity period of the Bid.

We understand you are not bound to accept any Bid you receive.

We remain,

Yours sincerely,

Authorized Signature

Name and Title of Signatory :

Name of Firm :

Bill of Quantity

NAME OF THE WORK : Traffic Study for "Creating Transshipment Port at South Bay, Great Nicobar Island of A&N Islands"

SUMMARY OF COST

Sl.No.	Item	Price (in INR)
1.	<p><u>Traffic Study For "Creating transshipment port at South Bay, Great Nicobar Island of A&N Islands"</u> in accordance with Tender document Clause No. 9.0 , <u>(excluding GST)</u>.</p>	

Rupees..... only (in words).

ANNEXURE 19

Learning from Earthquakes

The Great Sumatra Earthquake and Indian Ocean Tsunami of December 26, 2004

Editor's Note: In the March issue, we published reports on earthquake and tsunami impacts in northern Sumatra and along the southeast Indian coast. The May issue will carry a report on Sri Lanka. Here we present a report by an Indian team funded by the Government of India. Publication of this report is supported by funds from the National Science Foundation through EERI's Learning from Earthquakes Program under grant # CMS-0131895.

Report #3

The Effects in Mainland India and in the Andaman-Nicobar Islands

This report presents the preliminary findings of the tsunami reconnaissance conducted by a team of 13 Indian engineers, earth scientists, architects, and graduate students. The investigators were divided into six groups to survey the areas affected in India, both in the Andaman and Nicobar Islands (aerial and field surveys) and along the affected coastline on the mainland (field surveys).

Each of the groups spent about eight days in the field between January 1 and 13, 2005. The team included Sudhir K. Jain (structural engineer, Indian Institute of Technology, Kanpur); C. V. R. Murty (structural engineer, IIT Kanpur); Durgesh C. Rai (structural engineer, IIT Kanpur); Javed N. Malik (paleoseismologist, IIT Kanpur); Alpa R. Sheth (structural engineer,

Mumbai); Arvind Jaiswal (structural engineer, Secunderabad); Snigdha A. Sanyal (architect, IIT Kanpur); and graduate students Hemant B. Kaushik (IIT Kanpur), Pratibha Gandhi (IIT Madras), Goutam Mondal (IIT Kanpur), Suresh R. Dash (IIT Kanpur), Lt. Col. Jasinder S. Sodhi (IIT Kanpur), and Lt. Col. G. Santhosh Kumar (IIT Kanpur). The study was sponsored by the Department of Science and Technology, Government of India, New Delhi.

Introduction

The M_w 9.0 earthquake of December 26, 2004 struck at 06:28:53 a.m. Indian Standard Time. Shaking-related damage was recorded only in the Andaman and Nicobar (A&N) Islands. The maximum intensity of

shaking (on the MSK scale) was VII; along the mainland Indian coast, it was V. The tsunami arrived in the A&N Islands between 40 and 50 minutes after the earthquake, with Port Blair recording its arrival at 7:15 a.m., and it caused extensive devastation of the built environment. The tsunami arrived in the states of Andhra Pradesh and Tamil Nadu along the southeast coast of the Indian mainland shortly after 09:00 a.m. At least two hours later, it arrived in the state of Kerala along the southwest coast. Tamil Nadu and Kerala were extensively damaged, while Andhra Pradesh sustained moderate damage (Figure 1).

In the A&N Islands, aerial surveys were carried out along most of the Nicobar Islands and over Little,

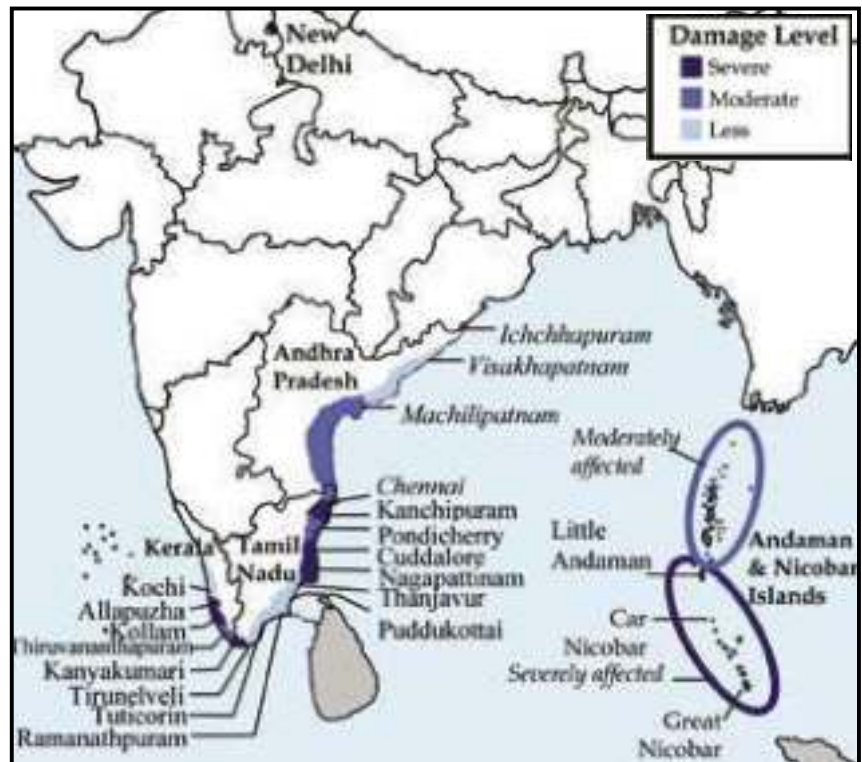


Figure 1. Map showing relative tsunami-induced damage along the coastal districts (in mainland) and in the islands (in A&N Islands).

South, and Middle Andaman Islands (Figure 2). Field investigations were carried out in the North, Middle, South, and Little Andaman islands and the Car and Great Nicobar islands. In mainland India, more than 2600 km of the coastline were surveyed from Kochi (the southwest India city in the state of Kerala) to Ichchhapuram (the southeast India town in the state of Andhra Pradesh). The distribution of damage was complex across these areas. This report describes observations related to the earthquake ground shaking and the tsunami wave damage, the emergency response of the community, and major concerns that arose after the disasters.

The total number of Indian fatalities were 10,805, with over 5,640 persons missing, according to official statistics (www.ndmindia.nic.in 2005). The state of Tamil Nadu had the highest number of fatalities — 8,010 (www.tn.gov.in/tsunami 2005) — with the district of Nagapattinam alone accounting for 6,065



Figure 2. Overall map of A&N Islands showing some of the larger islands of the region.



Figure 3. RC frame building (MES Inspection Bungalow) now stands in water on the eastern coast of Car Nicobar Island (photo: C.V.R. Murty).

deaths. However, as a percentage of the total population, the statistics from the Nicobar Islands indicate the most severe losses: out of the total population of 42,068, about 1,395 are reported dead, 5,764 missing, and 27,497 were in the relief camps (as of March 10, 2005). Most of the tsunami victims on the mainland belonged to the fishing community or lived in houses within 500 m of the water. Tourists in Velankanni in the state of Tamil Nadu and morning walkers in urban areas (Karaikal, Chennai and Pondicherry) were also among the dead. Since December 26 was the day after Christmas, many visitors came to the seacoast for a holy bath on an auspicious day, and lost their lives.

In many of the districts, there were fewer male casualties than those of women and children. For instance, in the Karaikal region of the Union Territory of Pondicherry, the total number of fatalities was 484, of which 33% were women, 21% were male children, and 30% were female children. The reasons for this are the vulnerability of small children to the big waves, the tendency of women to protect children and belongings, their being indoors and having less lead time to flee, and the inability of women to climb trees or run fast (particularly when wearing sarees).

Impacts in the Andaman-Nicobar Islands

The A&N Islands consist of a narrow broken chain of about 572 picturesque islands, islets and rocks extending along a general north-south direction in the southeastern part of the Bay of Bengal. Great Nicobar Island, the southernmost major island, lies about 450 km northwest of the epicenter (Figure 2). Only about 36 islands are inhabited by people. The islands are grouped into two, with the 10° international shipping channel as the divider: the Andaman Islands are north of N10° latitude, and the Nicobar Islands are south. North, Middle, South, and Little Andaman Islands are most populated amongst the former islands, and Car Nicobar, Great Nicobar, Katchal, and Kamorta are most populated amongst the latter. The total population in the A&N Islands per the 2001 census is about 356,152, with 314,084 people in the Andaman Islands and about 42,068 in the Nicobar Islands.

Though the intensity of shaking was VI-VII on the MSK intensity scale, the long duration of shaking, coupled with the low water table in many coastal areas, may have contributed to liquefaction. Evidence

of liquefaction was noted in the South, Middle, and North Andaman Islands. However, no signs of liquefaction were available in the Little Andaman and three Nicobar islands, perhaps because the giant tsunami waves carried away the evidence and deposited layers of fine soil on the land. Detailed investigations with trenching at strategic locations may provide clarity.

Persons interviewed at Port Blair recall that the water receded before the first wave, and the third wave was the tallest and caused the most damage. However, persons at Hut Bay, Malacca, and Campbell Bay — locations far south of Port Blair — reported that the water level rose by about 1-2 m from the normal sea level and remained there before the first wave crashed ashore. Eyewitness reports put the tallest of the waves at about 8 m high at Campbell Bay (in Great Nicobar Island), about 10-12 m high at Malacca (in Car Nicobar Island) and at Hut Bay (in Little Andaman Island), and about 3 m high at Port Blair (in South Andaman Island). The significant shielding of Port Blair and Campbell Bay by steep mountainous outcrops may have contributed

to the relatively low wave heights at these locations, whereas the open terrain along the eastern coast at Malacca and Hut Bay likely contributed to the great height of the tsunami waves there.

Topological Changes: The A & N Islands lie to the east of the Sunda-Andaman arc of the boundary between Indo-Australian Plate and the Burma Micro-Plate of the Eurasian Plate. Due to subduction of the former under the latter, the A&N Islands sustained uplift and subsidence. The lighthouse at Indira Point, the southernmost tip of the Great Nicobar Island, which was on high ground before the earthquake, is now under water, indicating a land subsidence of about 3-4 m. The MES inspection bungalow on the east coast of the Car Nicobar Island is now lapped by seawater, suggesting a subsidence of about 2 m and ingress of the waterline by about 50 m (Figure 3). The shopping arcade in Bamboo Flat near Port Blair (in South Andaman Island) now has water up to 0.3 m above the floor level, suggesting a land subsidence of about 0.9-1.2 m. The western coast of the Middle Andaman Islands shows emergence of new shallow coral beaches near Flat

Island, suggesting an uplift of up to 0.3 m (Figure 4). The increased exposure of the RC piles at the jetty structure at Diglipur Harbor at the northern region of North Andaman Island (the northernmost of the A&N Islands) indicates an uplift of about 1.2 m.

A mud volcano in the Middle Andaman became active after the earthquake, and gray mud and colorless gases were emitted; this resulted in the formation of a subcircular mound of about 70 m in diameter. The volcano had earlier erupted in 1983, 1996, and 2003. A number of other small mud volcanoes have formed since the earthquake. Close to this region, deep and wide cracks in the ground were observed, which caused severe damage to road pavements.

Building Damage: While damage in Little Andaman Island and all Nicobar Islands was predominantly tsunami-related, that in the islands north of Little Andaman was primarily due to earthquake shaking, though tsunami waves and high tides were also an issue. In general, the building stock consists of a large number of traditional and nonengineered structures. Many traditional structures are made of wood, and they performed well in the earthquake shaking (Figure 5a). However, a number of new, poorly constructed reinforced concrete (RC) structures suffered severe damage or even collapse due to shaking (Figure 5b).

The tsunami waves caused severe destruction in the coastal areas of the southern islands (Figure 6). Structures near the water were subjected to (1) a positive water pressure when the waves arrived, and (2) a suction pressure when the waves receded. A large number of buildings right on the water in Little Andaman and Car Nicobar islands were washed away, regardless of how they were constructed.



Figure 4. Up-throw of coral beds and rock strata due to uplift on the western coast of Middle Andaman Island near Flat Island (photo: Javed N. Malik).



Figure 5a.
Single-story wood house in Port Blair with light roof had no damage (photo: C.V.R. Murty).



Figure 5b.
A three-story RC frame building in the same town collapsed in a brittle manner (photo: Sudhir Jain).

However, an occasional well-designed RC structure was seen standing even in the devastated areas. In the best of the cases, the frame of the infilled building was intact, while the infills were pushed out of plane (Figure 7). In some cases, where there were a number of buildings in a row normal to the shore, the waves destroyed the structures towards the shore, but buildings in the rear were shielded. However, the number of buildings that survived is a very small fraction of the total houses near the shore.

In the northern A&N Islands, tsunami-induced damage to the contents of buildings was significant, but there was less damage to the structure of buildings. For instance, in the Bamboo Flat area, the street front shops were inundated by the tsunami and the subsidence of land. The steel shutters of the shops were damaged. In some other buildings in the same region, the boundary walls collapsed. Substantial shaking-induced damage was observed.

Often, in masonry dwellings with load-bearing walls and light roof trusses made of either steel pipes or timber, walls are not tied together to create lateral resistance. Large



Figure 6. *General destruction of built environment at Hut Bay in Little Andaman Island (photo: C.V.R. Murty).*



Figure 7. *Shore-front building on Car Nicobar Island was inundated by the waves, but the frame resisted the wave effects (photo: C.V.R. Murty).*

movement of the flexible roofs from earthquake forces caused out-of-plane masonry wall collapse. Similar damage was observed at a much larger scale in many school buildings, where the long partition walls separating two classrooms were either badly damaged or had fallen due to out-of-plane instability (Figure 8).

In general, RC frame structures suffered a variety of damage due to earthquake shaking, from frame-infill separations and hinging at the ends of frame members, to collapse of structures. Despite the fact that ductile detailing is mandatory according to the code for this seismic zone (V), not all buildings are properly designed and built to ensure ductile response.

Generic RC structures are built in the A&N Islands for community facilities and for government office buildings. These structures were severely damaged during the shaking intensity of VII manifested in the islands. For instance, the Panchayat Bhavan Building in North Andaman Island sustained severe cracking to its infill walls and its brittle RC columns in the open ground story (see Figure 9). This building had experienced column damage due to inadequate lateral reinforcing ties in the 2002 M_w 6.5 Diglipur earthquake. Though the building was apparently retrofitted, this retrofit did not ensure safer building behavior, and similar damage patterns recurred.

Damage to Infrastructure: A newly constructed 268 m-long RC bridge over the Austen Strait, connecting the North and Middle Andaman Islands on the Andaman Trunk Road, had to be closed to even light vehicles. Three middle spans of the superstructure were displaced laterally by about 70 cm and vertically by about 22 cm and fell off the bearing (Figure 10). Some other spans were also



Figure 8. Slender masonry walls dislodged due to out-of-plane instability and poor or no connection to the surrounding structural elements (photo: Durgesh C. Rai).



Figure 9a. The Panchayat Bhavan building showed severe cracking and damage to the soft first-story columns and infill walls (photo: Durgesh C. Rai).



Figure 9b. Detail of column failure in the ground story (photo: Durgesh C. Rai).

moved laterally by about 2 cm to 15 cm. Two of the authors of this report visited this region two years ago after the moderate 2002 Diglipur earthquake. Their published reconnaissance report (Rai and Murty 2003) expressed the following concerns about this bridge:

“Inadequate seating of bridge deck over piers and abutments is a serious concern for its safety during a stronger earthquake in the future. The bearings are simple neoprene pads which are far from satisfactory for a bridge located in seismic

zone V. Bridge deck restrainers are the minimum that need to be provided to ensure that the spans are not dislodged from the piers in future earthquakes.”

The armed forces and the coast guard use air transportation in the A&N Islands, particularly to reach the islands south of Port Blair. There are only a few airstrips, namely at Diglipur (North Andaman Island), Port Blair (South Andaman Island), Malacca (Car Nicobar Island), and Campbell Bay (Great Nicobar Island). The airstrip at Car Nicobar has rigid pave-

ment, but all the others have flexible pavement. The Car Nicobar runway was damaged at the junctions of the panels during the ground shaking. The damage was accentuated by the numerous landings made by the large transport aircraft bringing relief in the aftermath of the disaster. When spalling of the plain concrete was noticed at the junctions, landings of the large aircraft had to be discontinued and repairs were made. The flexible pavements at Port Blair and Diglipur also were cracked, though not seriously. The runway at Campbell Bay suffered no damage, though it was closest to the epicenter.

Civilians use ships and steamers for transportation between Port Blair and the Nicobar Islands and Little Andaman Island. Unfortunately, a number of jetties were damaged or collapsed during the earthquake shaking and the tsunami waves that followed. An 80 m segment of the approach jetty in Campbell Bay in Great Nicobar Island collapsed, thereby hampering relief efforts. Similarly, the collapsed jetty in Car Nicobar Island, and the breaching of one breakwater-cum-approach jetty and collapse of another approach jetty in Little Andaman Island also hampered relief efforts (Figure 11). In Port Blair, the Jangli-ghat jetty collapsed. In the North Andaman Islands, jetties at Sagar Dweep and Arial Bay were damaged due to ground shaking, and the berthing jetty and a portion of the approach jetty at Gandhinagar collapsed. Pounding damage at several sections of jetties was observed.

The main source of electric power is from captive diesel-generator power plants. The 20 MW Suryachakra power plant in the Bamboo Flat area of Port Blair was adversely affected by the tsunami waves, which flooded the entire plant. Severe damage to mechanical and electrical equipment from the sea water



Figure 10a. Chengappa Bridge over Austen Strait was rendered dysfunctional by displacement of the middle spans (photo: Durgesh C. Rai).



Figure 10b. Detail of the bridge deck showing lateral and vertical displacement due to shifting of the decks on their neoprene bearings (photo: Durgesh C. Rai).

forced the plant to shut down. On Car Nicobar Island, power generation was disrupted by both flooding of the generators with saline water and displacement of generators by the tsunami waves. The diesel oil tanks were carried away by the waves to the military airport runway about 2 km away.

Longitudinal cracks developed at the crest of the 27-m-high, 146-m-long rock-fill dam of the 5.25 MW Kalpong hydro-electric project near Diglipur in North Andaman Island. The cracks developed near the curved end along the axis of the straight portion of the dam. Movement was also noted across the block joints near both ends of a concrete dam and water seepage through the dam doubled after the earthquake. Misalignment of turbines caused disruption of electric generation, which was only partly restored after ten days.

Other facilities like hospitals and seaport/airport control towers collapsed due to shaking and/or wave pressure. The airport control tower at Car Nicobar is a three-story RC frame with masonry infills, and its upper story collapsed in the shaking (Figure 12a). The seaport control tower at Hut Bay on the east coast of Little Andaman Island also collapsed due to the tsunami waves (Figure 12b). This square-plan three-story RC frame building with masonry infills had only four-corner columns and, hence, limited redundancy. The large positive pressure created by the tsunami waves toppled the building. Similar tower designs are being used elsewhere in the country, particularly in the seismic zones, so there is an urgent need for corrective action to strengthen them.

Emergency Response: Though the entire Andaman & Nicobar Islands have been classified in the highest Indian seismic zone (V) and have had a history of earthquakes



Figure 11. Shortage of appropriate construction material forced the use of porous coral stones from local quarries for building the breakwaters. The stones were easily uplifted during the tsunami and breached a large segment of the approach to the RC jetty at Hut Bay (photo: C.V.R Murty).

and some tsunamis, the level of preparedness for such an event was rather low. Being Union Territory, the islands are governed by the Home Ministry of the Government of India through a lieutenant governor based in Port Blair.

While government officials in New Delhi knew about the earthquake, it seems that they did not learn about the tsunami until after 9:00 a.m., when TV stations started reporting the tsunami on the mainland coasts. A Navy officer at Port Blair mentioned that while they faced the crisis, it did not occur to them to communicate this to the mainland and, furthermore, communications with the islands were disrupted. The lieutenant governor undertook an air reconnaissance to the Car Nicobar island on the evening of December 26 and realized that the southern islands had suffered extensively.

The islands have a sizable presence of the Indian armed forces and coast guard, and they took the lead in the rescue and relief work. A number of

Navy ships left Port Blair for the southern islands on a relief mission on December 27. The air force made many sorties, carrying relief materials to the islands, and bringing back affected people. Anyone who wanted to leave the island was evacuated and put in the relief camps. Civil ships started operations the same afternoon from Port Blair, with seven ships sailing from Port Blair (including one to Chennai with 1,197 passengers). After about three days, the Directorate of Shipping Services was able to restore an almost normal schedule of shipping.

To improve coordination between the civil and the defense services, an Integrated Relief Command (IRC) was formed on January 1, 2005, with the lieutenant governor as chairman, and the commander-in-chief of the A&N command as the vice-chairman, operations head, and spokesperson. The A&N Islands Command was the first in India in which the concept of Integrated Defense Service had been



Figure 12a. Partial-collapse of the upper storey of the air traffic control tower at airport on Car Nicobar Island (photo: C.V.R. Murty).



Figure 12b. Laterally toppled three-storey seaport traffic control tower at Hut Bay in Little Andaman Island (photo: Suresh R. Dash).

implemented, with army, navy and the air force reporting to the same commander-in-chief. Initially, the defense officers had handed over relief materials to the civil authorities on the island and had not been involved in their distribution. After the formation of the IRC, and in view of complaints of uneven relief distribution, the armed forces post-

ed two officers and 20 soldiers on each island to keep an eye on the distribution.

A number of knowledgeable persons expressed concern about rather slow decision making by the civil authorities in the A&N Islands; this may have been a consequence of the fact that the Islands do not have their own

elected state government. With no local political leadership to demand action, the officers may have been cautious and conservative. However, there were instances of good performance as well. It must be understood that the tsunami caused a much greater level of trauma than did the major earthquake disasters in India in recent years. Even senior professionals in Port Blair frankly admitted that two weeks after the event they still felt traumatized.

Tsunami Impacts on the Mainland

The mainland suffered significant tsunami-induced damage, but no shaking-induced damage. Areas outside a strip about 500-1000 m wide along the shore looked as if nothing had happened. The arrival time of the tsunami wave front varied along the coast. On the south-east coast it was at 9:05 a.m. at Visakhapatnam, 9:05 a.m. at Kakinada, 9:05 a.m. at Chennai, and 9:37 a.m. at Tuticorin; on the south-west coast it was at 11:10 am at Kochi and 12:25 pm at Marmugoa (Figure 13). There were two to five waves of varying amplitude. The water receded after the first wave struck.

Figure 13 shows variations in run-up height along the coast. It was only 1.6 m in areas in the state of Tamil Nadu that were shielded by the island of Sri Lanka, but was 4-5 m in coastal districts such as Nagapattinam in Tamil Nadu that were directly across from Sumatra. On the western coast, the runup elevations were 4.5 m at Kanyakumari District in Tamil Nadu, and 3.4 m each at Kollam and Ernakulam Districts in Kerala. Some of these amplitudes are based on eyewitness accounts and may be subjective. The time lapse between the waves also varied from about 15 minutes to about 90 minutes.

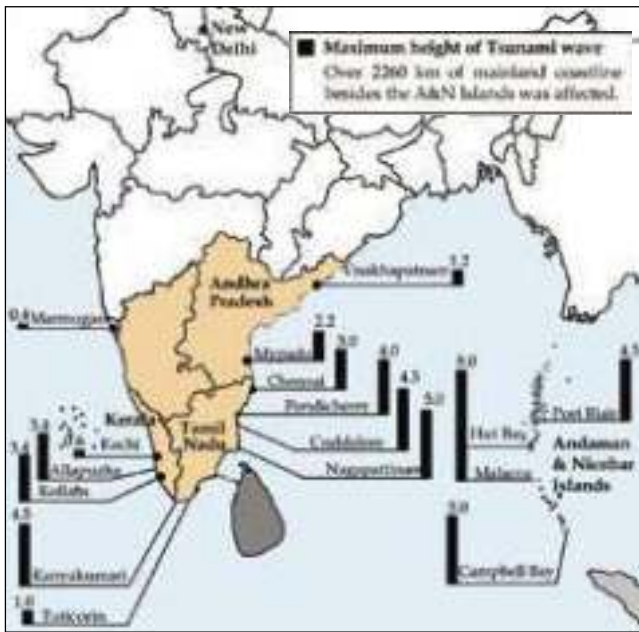


Figure 13. Maximum tsunami wave heights at various locations. The vertical bar indicates the amplitude of wave height and the number indicates the value in meters.

The maximum inundation distance varied between 100-500 m in most areas, except at river mouths, where it was more than 1 km. The inundation distance varied with topology and vegetation. Areas with dense coconut groves or mangroves had much smaller inundation distances, and those with river mouths or backwaters saw much larger inundation distances. The Kerala coast and some of Tamil Nadu coast have seawalls located 100-600 m from the shoreline, and these helped to reduce the impact of the waves. However, when the seawalls were made of loose stones, the stones were carried inland 20-30 m.

Tide levels did not return to normal until after December 29th.

Structural Damage: The damage was mainly to fishing communities and their infrastructure: homes, boats, and fishing nets were destroyed in the belt 200-300 m from the shoreline. Major ports and some coastal towns along the Kerala coast have breakwaters

offering protection to the harbors, but many small fishing towns do not. Therefore, it is a practice to anchor all boats 200-500 m from the shore; fishermen swim to and from their boats. During the tsunami, these boats were tossed around and onto the land, and many of them were severely damaged or destroyed.

In ports and harbors, the major problem was caused by vessels breaking their ropes and hitting others. Small boats were

tossed onto land by the incoming wave, while others were sunk in the harbor by the returning wave. Most breakwaters were not damaged, but siltation/erosion was observed.

Seawater intrusion was less in areas covered with thick vegetation as compared to those with bare lands (Pakala beach). Bare land sustained heavy erosion due to the returning

wave. Intrusion of water with silt resulted in changes in land use pattern. Sand depositions from the tsunamis damaged standing crops in delta areas, and rendered the fertile soil non-irrigable.

Almost all the housing in the affected areas was nonengineered. Much of it was made of plastered masonry walls (usually brick) and sometimes of reeds, with roofs either of thatch, Mangalore tiles, or reinforced concrete (Figure 14). A large number of traditional structures built within 500 m of the water were destroyed (Figure 15). Along the Kerala coast, the damage and collapses of the housing stock appeared to be largely due to the scouring action of the waves (Figure 16), primarily the receding ones. Along the Tamil Nadu coast, there was significant damage due to the direct pressure of the water waves; however, no instances of fatalities in collapsed structures were noted.

Bridges and culverts were affected. At least three bridges were damaged, with one of them losing all four spans (Figure 17). Roads suffered significant scouring at numerous places along the coast, as did railway lines. Road embankments were eroded. Compound walls



Figure 14. Houses destroyed by the waves at Nagapattinam in Tamil Nadu (photo: Alpa R. Sheth).



Figure 15. Mud house with thatch roof built within 100 meters of the sea at Pakala Beach in Andhra Pradesh (photo: Arvind Jaiswal).

toppled at numerous places along the coast. Communication towers were also damaged or destroyed.

Sea ingress into a fresh water pond contaminated the water supply of one community. The intake water pipeline of one industry was damaged and shut down the facility for some time. Water pipe lines were broken or severely bent in numerous locations, rendering them unusable.

Emergency Response: Recent major earthquake emergencies in India affected only one state, but this disaster struck several states at the same time, affecting a much larger geographical region than ever before. As a result, the role for the central government in New Delhi became more critical. Moreover, the Government of India decided to extend substantial help to neighboring Sri Lanka.

Initial rescue efforts needed massive assistance of the Coast Guard and the defense services. Since 2002, disaster management is the responsibility of the Ministry of

Home Affairs, but there were remarks about the lack of coordination between the Home Ministry and the Defense Ministry.

A major crisis and an embarrassment were created on the morning of December 30, 2004, when the Home

Ministry issued a warning to the affected states of an earthquake and impending tsunami in the afternoon of the same day. This led to massive panic, and the state governments diverted their resources from relief to evacuation of the public from the coastal areas. Apparently an individual in the United States was behind the hoax, but the government should have considered it more thoroughly before issuing the warning. Considering that many coastal regions have effective warning systems for cyclones, this false warning may have deleterious effects on future warning response.

Relief was more timely on the mainland than in the A&N islands. The television focused on the disaster in the areas adjoining Nagapattinam, which brought a large number of NGOs to the area. To systematize the relief efforts, an NGO Coordination Cell was set up with the help of three NGOs: the South Indian Federation of Fishermen Societies (SIFFS), Nav Nirmaan Abhiyaan (Gujarat), and ACCORD (Nilgiris). Of these, Abhiyan had done considerable work in Gujarat after the



Figure 16. Scouring action at the base of houses due to returning wave of the tsunami in Kollam district in Kerala (photo: Alpa R. Sheth).



Figure 17. Complete loss of spans of the four span RC bridge at Melmannakudi in Tamil Nadu (photo: Alpa R. Sheth).

2001 earthquake, and SIFFS had been very active with the fishing community across the affected states. The large number of volunteers working in these NGOs significantly helped in the assessment of needs, the soliciting of useful relief materials, and the distribution of them.

After losing their homes, their boats, and their fishing equipment, fishermen and their dependents continued to suffer. At first there were no fish; when there were fish again, there were no buyers of the fish. The state governments gave livelihood restoration compensation to the fishermen, with the state of Tamil Nadu being the most generous. More than Rs.450 Crores (~US\$100 million) were allocated for various expenditures: (1) replacement of nets, (2) repair and rebuilding of boats, and (3) repairs to outboard motors/inboard engine fitted in traditional craft.

Findings and Recommendations

A number of issues have emerged from this earthquake and the consequent tsunami that need to be attended to. Those related to earthquake vulnerability are directly below.

1) In general, earthquake-resistant design and construction

are not being practiced in the A&N Islands, even though these islands lie in the most severe seismic zone (V) of the country. In certain instances, even major construction by government agencies, with the support of private structural engineers, shows noncompliance with seismic codes. This could be because the islands are logistically connected to Chennai and Kolkata (Calcutta), both in zone III. Hence, the structural engineers practicing in these cities may not be aware of the special requirements of constructions in zone V.

- 2) The traditional wood houses in the A&N Islands performed well during the seismic shaking, while many recently built masonry and RC structures suffered due to lack of adequate expertise locally to use the modern materials in earthquake regions. Unfortunately, the region is moving from traditional timber construction toward masonry and RC construction. Thus, the vulnerability of the islands to earthquakes will continue to increase.
- 3) The damage to the Austin Creek Bridge highlighted the fact that the Indian seismic code provisions for bridges are highly inadequate, and require urgent modifications.
- 4) In recent years, considerable

investment has been made by the Government of India in seismic instrumentation. As a result, the observatory of the India Meteorological Department at Port Blair did have a digital strong-motion instrument, but it did not record the main event. This has been a major missed opportunity, and raises concern about the quality of training given to the concerned personnel.

- 5) The structures damaged during the 2002 M_w 6.5 earthquake in Diglipur in the North Andamans and repaired subsequently showed poor performance in this earthquake. Lack of expertise among local engineers and few guidance documents on retrofitting continue to obviate major opportunities for seismic retrofitting. It is again not clear whether the damaged buildings in the islands will receive appropriate remedial measures after this earthquake.
- 6) Much critical infrastructure has shown vulnerability to seismic shaking. During this earthquake, harbor structures and airport and seaport control towers were added to the list of vulnerable lifelines structures that was drawn up after the 2001 Bhuj earthquake in Gujarat. There is a serious need to conduct strict structural

evaluation of lifeline structures in moderate to severe seismic zones of the country, and to strengthen them if they are found deficient. In addition, Indian standards need to be developed for seismic design of new harbor structures.

Issues related to tsunami vulnerability follow.

- a) There was a total lack of awareness about tsunamis not only amongst the public, but also amongst officials and scientists. Senior government officials, scientists, and ministers were often seen on the TV stating that this was the first time a tsunami has hit India and hence nothing could have been done about tsunami warning systems. The fact that several damaging tsunami have hit Indian coasts in historical times came to be acknowledged much later.
- b) An early warning could have saved lot of precious human and economic loss. The cyclone warning system, which is already in place in the country, may be enhanced to address the tsunami issue also. However, such a system can be effective only when scientific infrastructure in terms of quality of manpower and of instrumentation is enhanced.
- c) Basic issues of earthquake safety in buildings (like an integral structure with good configuration, good quality of building materials and workmanship) are also helpful in resisting the tsunami effects.
- d) Bridges in the coastal areas need to have lateral restraints to prevent the loss of spans during the buoyant conditions developed under high-tide levels.

- e) Violations of Coastal Regulation Zone norms led to heavy damage to buildings and structures. The CRZ norms need to be strictly followed and implemented.
- f) Buffer zones (raised land masses or forests) helped in curtailing the sea intrusion into the mainland, while the felling of trees, removal of mangrove forests, and construction of water channels invited severe damage. Preventing deforestation and protecting mangrove forests are priorities.
- g) Safer mooring should be developed for the fishing boats in towns and villages along the coast that do not have a harbor.

Finally, we must mention that after every earthquake, the country has been putting more and more resources into instrumentation programs and into seismology, ignoring the need to strengthen engineering practice and research. Four years after the Bhuj earthquakes, no major municipal authority has a system in place to ensure that new construction actually complies with seismic code provisions; most cities require a structural engineer to certify that the building complies with the codes, but there are no mechanisms to ensure that such certifications are genuine.

It will be very regrettable if the large number of deaths caused by the 2004 tsunami further diverts attention from the variety of necessary engineering and code programs by focusing attention only on setting up tsunami warning systems.

Acknowledgments

The field investigation was financially supported by the Department of Science and Technology, Government of India, which is gratefully acknowledged. Numerous government organizations and NGOs in the A&N Islands and mainland India provided

valuable support by offering access to earthquake effects, sharing information, and arranging the logistics. These organizations include the public works departments of various states in mainland India and the Andaman Public Works Department; the Andaman Lakshadweep Harbour Works; the Department of Shipping Services; the Coast Guard; the Indian Navy, Army, and Air Force; port administrations, fire departments, and South Indian Federation of Fishermen societies. The investigators sincerely thank these organizations and individuals for their wholehearted support.

References

- Jain, S.K, C.V.R. Murty, D.C. Rai, J.N. Malik, A.R. Sheth, A. Jaiswal, 2005. "Effects of M9 Sumatra Earthquake and Tsunami of 26 December 2004," *Current Science*, Vol. 88, No. 3, February 10, 357-359.
- Rai, D.C, and C.V.R. Murty, 2003. "North Andaman (Diglipur) earthquake of 14 September 2002," Reconnaissance Report, Department of Civil Engineering, Indian Institute of Technology Kanpur. Available at www.nicee.org.
- www.asc-india.org. Web site of Amateur Seismic Centre, Pune, India, 15 January 2005.
- www.ndmindia.nic.in. Web site of National Disaster Management, Ministry of Home Affairs, Government of India, New Delhi, 15 January 2005
- www.noaa.gov. Web site of National Oceanic and Atmospheric Administration, U.S. Department of Commerce, Washington DC, 15 January 2005
- www.tn.gov.in/tsunami/damages.htm. Web site of Government of Tamil Nadu, Madras, 15 January 2005

ANNEXURE 20

F. No. 1-999/2020-TW/52
अण्डमान तथा निकोबार प्रशासन
ANDAMAN AND NICOBAR ADMINISTRATION
जनजाति कल्याण निदेशालय
DIRECTORATE OF TRIBAL WELFARE


Port Blair dated the 21st January, 2021

MEETING NOTICE

In continuation to the meeting notice dated 4.1.2021, the meeting of Empowered Committee shall now be held on 4.2.2021 (Thursday) at 1130 Hours under the Chairmanship of Chief Secretary, A&N Administration to discuss the following agenda:-

- (i) To examine the extent of de-notification of tribal reserved areas of Little Andaman Island under the provisions of the A&N (Protection of Aboriginal Tribes) Regulation, 1956 for development of various projects proposed by NITI Aayog and applied by the Project Proponent, Andaman and Nicobar Islands Integrated Development Corporation Limited (ANIIDCO Ltd)
- (ii) Any other point with the permission of the Chair.

The agenda folder/ material for the meeting has already been provided with the meeting notice dated 4.1.2021. You are requested to kindly attend the meeting on the aforesaid date, time and venue.



Director (TW)/
Member Secretary

To

- 1) Ms. R. Jaya, Joint Secretary Ministry of Tribal Affairs, Govt of India with the request to attend the meeting virtually. The link of VC will be shared subsequently.
- 2) Director General of Police
- 3) Commissioner-cum-Secretary (E&F)/PCCF
- 4) Secretary (Shipping)
- 5) Secretary (Revenue)
- 6) Managing Director, ANIIDCO Ltd
- 7) Secretary (Tribal Welfare)
- 8) Dy Commissioner, South Andaman
- 9) Director (ANTRI) with the request to attend the meeting virtually. The link of VC will be shared subsequently.
- 10) Superintendent Anthropologist, Anthropological Survey of India, Port Blair
- 11) Executive Secretary, AAJVS

Copy to: -

- 1) Sr PS to Chief Secretary, A&N Administration for the kind information of the Chief Secretary


Director (TW)/
Member Secretary

AGENDA NOTE ON DE-NOTIFICATION OF TRIBAL RESERVED AREA IN LITTLE ANDAMAN ISLAND FOR SUSTAINABLE DEVELOPMENT

1) PROJECT PROPOSAL

NITI Aayog has proposed for sustainable development of Little Andaman Island in three phases for which 239.24 Sq Km land is required:-

- (i) Zone 1 is the Financial District and Medi City along the eastern coast of the island with the airport as the catalytic anchor. This zone has been further sub-categorised into four districts (a) Aerocity (b) Medicity, (c) Financial District and (d) Tourism and Hospitality District
- (ii) Zone 2 is the Leisure zone located on the southern area of the island. The zone would house tourism attractive activities of entertainment and leisure such as casino strip, sports institutes, film city, and water based recreation etc. This zone has been further sub-categorised into three districts (a) Film City, (b) Residential District and (c) Tourism SEZ
- (iii) Zone 3 is the Nature zone located on the western coast of the island. This zone has been further sub-categorised into three districts (a) Exclusive Forest Resorts (b) Nature Healing District and (c) West Bay Nature Retreat.

The A&N Administration has designated Andaman and Nicobar Islands Integrated Development Corporation Limited (ANIIDCO) as Project Proponent. M/s ANIIDCO Ltd. has applied to the Directorate of Tribal Welfare to consider de-notification of tribal reserved areas falling in Phase-1 for development of various projects in Little Andaman Island as proposed by the NITI Aayog.

Survey of India vide letter no. T-1516/1147-Project (TNP & ANI GDC) dated 1.9.2020 (**Annexure-A**) has reported the area of Little Andaman on the basis of existing available topographical maps published by them as 682 Sq kms.

The phase-wise area required for development as well as tribal area required to be de-notified is as follows:

Zone/ Phase	Development activities	Requirement of total area for development (in Sqkm)	Tribal area to be de- notified on land (in Sqkm)
I	Financial District and Medi City	104.663	7.734
II	Leisure zone	82.456	78.968
III	Nature Zone	52.121	52.121
	Total	239.24	138.823

2) ABOUT LITTLE ANDAMAN ISLAND

Little Andaman has an area of 682 Sq Km spread over five revenue villages. The total revenue area is 34.34 Sq Km and the notified Tribal Reserve area is 445.883 Sq Km. Little Andaman has a dense carpet of forest covering about 88% of the total area. The topography of the island is relatively flat (0-20 meters) along the coast, covering existing revenue area and creeks. A large part of the island has elevation between 41-60 meters, with elevation >80 meters concentrated in the central lower half of the islands. The island receives 2108 mm rainfall annually, which is much higher than the all India average of 1100 mm. There are several streams, formed due to undulating topography most of which are perennial in natural, making water available throughout the year.

As per 2011 census, Little Andaman had a population of 18823 which included 101 Onge (Particularly Vulnerable Tribal Group) at Dugong Creek and 1258 Nicobarese (aboriginal tribe) at Harminder Bay.

Presently two aboriginal tribes namely Onge and Nicobari inhabit in Little Andaman Island.

- **Onge tribe:** Initially the population of Onges, a Particularly Vulnerable Tribal Group (PVTG), was dispersed throughout Little Andaman Island, in bands, but after 1976 the Onge have been settled at two places viz. Dugong Creek and South Bay in Little Andaman Island. After Tsunami of 2004, the Onge of South Bay were shifted to the upper half of Little Andaman (Bumila Creek & Dugong Creek).

The estimated population of Onge tribe from 1901 to 1991 is as below: -

1901	1911	1921	1931	1951	1961	1971	1981	1991	2001	2011
672	631	346	250	150	129	106	97	98	96	101

While the Onge maintain their distinct identity, they are no longer isolated hunters and gatherers as they were 100 years ago and their traditional life style is out of step with march of history.

- **Nicobari tribe:** 50 Nicobarese families comprising 150 members of Car Nicobar rehabilitated in Little Andaman on 28th March, 1973 and settled at place called Harminder Bay, 5 Km South of Hut Bay. 200 Ha. of coconut plantation has been raised close to their settlement. Their population as per 2011 census is 1258.

About 500 families from East Pakistan, Tamil Nadu, Sri Lanka, Myanmar and Kerala were settled in Little Andaman during 1970-80 against the original plan of 7000 families.

Red Oil Palm plantation was established by A&N Forest Plantation and Development Corporation (ANFPDC). Against the original sanction for 2400 hect, the ROP plantation reached 1593 hect. by 1985, when the government called a halt to clear felling of trees on account of environment and viability concerns.

3) REGULATION

The Andaman and Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 (commonly known as PAT Regulation) (**Annexure-B**) promulgated by the President of India provides for protection of the interests of aboriginal tribes and declaration of the geographical area as reserved areas for tribes.

Section 3(1) of the Regulation provides that the Lieutenant Governor, A&N Islands may by notification, declare any area which is **predominantly inhabited** by aboriginal tribes to be a reserved area and specify the limits of such area; and may, from time to time, in like manner alter such limits.

Further, the following safeguards are provided to the aboriginal tribes under the PAT Regulations:

- (i) The areas inhabited by aboriginal tribes are notified as 'reserved area', entry to which by the outsiders is regulated under the provisions of PAT Regulation and its amendments. The Deputy Commissioner of the District is the statutory authority under the said Regulation to regulate the entry through a mechanism of issue of a Pass. Any violation of the provisions may lead to strict penalties.

- (ii) The Regulation also provides that no waste or unoccupied land at the disposal of the government in the reserved area shall be allotted/ transferred for agricultural purposes to any person other than the member of aboriginal tribes.

As on date, there is no approved policy for Onge tribe of Little Andaman Island and the same is under consideration.

4) TRIBAL RESERVE

Initially entire area of Little Andaman was notified as Tribal Reserve vide Notification No. ANPATR/1(3)/1 dated 2.4.1957 (**Annexure-C**). Later, part areas of Little Andaman were de-notified to implement settlement policy in the following manner:

- i) Notification No. 62/72/F. No. 81-9/71-J(I) dated 20.4.1972 (**Annexure-D**)
In clause (c), item (vii), for the words "upto and including Little Andaman" the following shall be substituted, namely: -

"upto and including Little Andaman except the area on the eastern coast of Little Andaman island located within the following co-ordinates

Landward side

- Longitude - between the longitude 92°28 minutes East and 92°35 minutes East.
- Latitude - between latitude 10°34 minutes North and 10°44 minutes 30 seconds North".

- ii) Notification No. 108/77/F.No. 15-222/76.JI dated 27.5.1977 (**Annexure-E**)
In the said Notification, under Amendment No I, the following entries shall be substituted for the existing entries against "latitude - between latitude 10°34 minutes North and 10°45 minutes 30 seconds North".

- iii) Notification No. 104/F. No. 1-582/91-TW dated 10.9.1991 (**Annexure-F**)
Seaward side

- For Onges tribe of Dugong Creek, Little Andaman:
The coastal sea extending upto 5 Km from the high water mark lying within the imaginary line commencing on the Eastern Coast of Little Andaman Island at the North Latitude of 10°45 minutes 30 seconds extending towards North and further North-West upto 92°25 minutes East Longitude.
- For Onges of South Bay & Nicobarese of Harminder Bay Little Andaman:
The coastal sea extending upto 5 Km from the high water lying within the imaginary line which commences on Eastern Coast of Little Andaman island at North latitude of 10°34 minutes extending towards South and further to South-west upto 10°35 minutes North latitude on the Western coast of West Bay of Little Andaman island.

Copy of map showing the tribal reserve, revenue villages and phase-1 project area is enclosed as **Annexure-G**.

5) WELFARE MEASURES FOR THE WELLBEING OF TRIBE

A registered society fully funded by the Govt. namely Andaman Adim Janjati Vikas Samiti (AAJVS), with the Hon'ble Lt. Governor as the President of its General Body, and the Chief Secretary as the Chairman of its Executive Council, oversee and monitor the implementation of various welfare programmes and policies of the Administration and the Central Government in regard to the PVTGs. Housing, health, Middle School, free Power Supply, treated piped drinking water through RO plant, Medical Sub-centre and free ration are provided at Dugong Creek, along with a playground and cemetery. 14 Onges have been employed in Govt Jobs (Police, Forest,

AAJVS, and Health etc). Further, an Onge Multipurpose Coop. Society has been formed and the coconut plantation is being managed by the OMPCS. Two Copra Drying Units are being set up for value addition of coconuts. Six new houses for the Onges are under construction.

6) LAND REQUIREMENT FOR PHASE - 1

- (i) Under Phase-1, the total development area required is 104.6 Sq Km including 7.733 Sq Km falling in tribal reserved area.
- (ii) Part area of three revenue villages namely Vivekanandapur (0.268 Sq Km), Ramakrishnapur (0.880 Sq Km) and Hutbay (0.148 Sqkm) is overlapping with tribal reserve which is required to be de-notified from tribal reserve even otherwise.
- (iii) The remaining tribal reserved area i.e. 6.437 Sqkms (7.733 - 0.268 - 0.880 - 0.148) is required to be de-notified from tribal reserve.

7) ANALYSIS

- (i) Section 3 of the PAT Regulation empowers the Lieutenant Governor, A&N Islands to declare or alter any area as tribal reserved area. Such area needs to be predominantly inhabited by aboriginal tribes.
- (ii) The revenue area overlapping the tribal reserved area is measuring 1.296 Sqkm (0.268+0.880+0.148) which is required to be de-notified from tribal reserve even otherwise as revenue land has been allotted to the settlers.
- (iii) The remaining tribal reserve falling in Phase-1 measures 6.437 Sqkm which is not contiguous to the tribal reserved area and is also far off from Dugong Creek (Onge settlement) and is not being used by them.

In view of the above, the tribal area falling in Phase-1 can be considered for de-notification as the same is not predominantly inhabited by aboriginal tribes.

8) PROPOSAL

- (i) 7.733 Sqkm of tribal reserved area required for development projects of Phase-1 may be de-notified from tribal reserved area with the approval of Hon'ble Lt Governor as per the provisions of Section 3 of A&N (PAT) Regulation, 1956. This area includes 1.296 SqKms of revenue area,
- (ii) In lieu of the proposed tribal reserved area to be de-notified, equal area can be considered for re-notification as tribal reserved area from the land de-notified in the year 1972 on the eastern coast of Little Andaman island in the interest of Onge (PVTG).

ANNEXURE 21

Minutes of the 258th meeting of Expert Appraisal Committee held on 17th -18th March, 2021 through Video Conferencing for the projects related to Infrastructure Development, all Ship breaking yards including ship breaking units 7(b); Industrial Estate/Parks/Complexes/Areas, Export Processing Zones, Special Economic Zones, Biotech Parks, Leather Complexes 7(c); Ports, harbours, break waters, dredging 7(e) and National Highways 7(f)

The 258th Meeting of Expert Appraisal Committee (EAC) of Infra-1 (IA-III) was held through Video Conferencing at the Ministry of Environment, Forest & Climate Change (MoEF&CC), Indira Paryavaran Bhavan, New Delhi on **17th – 18th March, 2021** under the Chairmanship of Dr. Deepak Arun Apte. A list of participants is annexed as **Annexure-A**.

1. OPENING REMARKS OF THE CHAIRMAN

At the outset, Dr. Deepak Arun Apte, Chairman, EAC welcomed the Members of the EAC and requested Shri Amardeep Raju, the Member Secretary of the EAC to initiate the proceedings of the meeting with a brief account of the activities undertaken by the Ministry under Infra-1 Division.

2. CONFIRMATION OF THE MINUTES OF THE LAST MEETING

The Committee confirmed the Minutes of 256th EAC meeting held on 3rd – 4th March, 2021.

3. AGENDA WISE CONSIDERATION OF PROPOSALS:

Agenda wise details of proposals discussed and decided in the meeting are as following:

Agenda No. 3.1

Development of Litibeda-Ranchi 4-lane access-controlled Greenfield Highway from Litibeda (Junction of SH-10 in Odisha) to Ranchi (Sithiyo) in the State of Jharkhand under Bharatmala Pariyojana (Ch 0+000) to Ch 147+500) [total length - 147.500 km) by M/s National Highways Authority of India - Further consideration for Terms of Reference (Proposal No IA/JH/NCP/186689/2020 File No 10-69/2020-IA.III)

“The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

3.1.1 The abovementioned proposal was earlier placed before the EAC during its 249th meeting on 14th December 2020. The proposal was deferred for the want of a) Details of the proposed alignment and its alternatives to be verified by the Project Elephant of the MoEF&CC to ascertain if the proposed alignment will be passing through the elephant corridor and if yes will it cause major fragmentation of the elephant corridor in the region,

and b) Details of the road alignment and existing and known elephant corridor to be provided to the Committee in KML file.

3.1.2 At this instance, the aforementioned proposal was further placed before the EAC during 258th meeting on 17th -18th March, 2021. The project proponent along with the EIA consultant M/s URS in Association with AECOM India Pvt. Ltd. & C. E. Testing Company Pvt. Ltd has made a presentation through Video Conferencing and provided the following information-

3.1.3 The proposed project is for Development of Litibeda-Ranchi 4-Lane access-controlled Greenfield Highway from Litibeda (Junction of SH-10 (Odisha)) to Ranchi (Sithiyo) in the State of Jharkhand under Bharatmala Pariyojana. The proposed alignment starts at Litibeda (Design Km 0+000) from Intersection of SH 10 and ends at Ch. 147+500 on Ranchi Ring Road. The proposed project includes 9 major bridges, 100 minor bridges, 136 culverts, 3 Interchanges, 51 VUP/LVUP/SVUP, 2 Vehicular Overpass, 2 Way side Amenities, 3 Toll Plaza, Truck Parking at four locations and 74.50 km length of embankment with average height of > 2.5 m.

3.1.4 Total Length of the Proposed Project is 147.500 Km. About 880.11 ha land (Govt./Pvt. Land 853.49 Ha + Forest Land 26.62 Ha) acquisition will be required for project implementation as per Land Acquisition Act, 1956. The width of proposed Right of way (PROW) is 60 m. At location of interchanges, highway amenities, toll plaza and truck parking, extra land has been proposed as per the actual design requirement.

3.1.5 The proposed project falls under 7(f), Category-A as per EIA notification 2006. Total investment/cost of the project is Rs 3015.06 Crore.

3.1.6 The terrain of the proposed alignment is plain (flat) land and is predominantly an agricultural land (91.2%) followed by built-up area (3.14%), Govt land (1.51%) and Forest/tree cover (4.15%).

3.1.7 The proposed Greenfield highway does not cross over Main Canal network at any locations. It is crossings over minor canals and natural drains. Construction of bridges and culverts has been proposed to prevent diversion of these minor canal and natural drains. Seven main water bodies will be impacted due to the proposed highway.

3.1.8 Total water demand for the project is 4532176 KL. No ground water will be extracted. If required, ground water extraction will be done after obtaining NoC from the CGWA/ State Ground Water Department.

3.1.9 Fly ash will be utilized for construction of embankment as per IRC Guidelines (IRC: SP: 58-2001). Quantity of fly ash to be utilized for the project is 2,340,000cum.

3.1.10 The Proposed project will involve diversion of about 26.62 ha of forest land. About 21498 trees are proposed to be felled in the forest and non-forest area. Prior permission would be taken from the concern authority before tree felling/cutting. There is no protected area within 10 km boundary of the PROW. The proposed project is 3.150 km away from the boundary of ESZ of Palkot Wildlife Sanctuary.

3.1.11 The socioeconomic survey will be undertaken on sample representative of the project influence area and population. The sample households would be selected from various socio-economic groups of the clusters/ settlements.

3.1.12 Benefits of the project: This Proposed Road will not only improve the mobility in between Jharkhand and Odisha, it will also improve the connectivity among other states like Chhattisgarh, Bihar, Uttar Pradesh and West Bengal. The mobility between industries in Jharkhand (Jamshedpur, Patratu, Bokaro, Dhanbad) and Odisha (Rourkela, Jharsuguda, Sambalpur, Angul) will increase. The proposed alignment will reduce travel length by 98 km (40%) and travel time by 4.5 hr. i.e. 70% (From 6.5 hr. to 2 hr.) from Ranchi (Jharkhand) to Litibeda (In Odisha) and thus will serve as life line between Jharkhand & Odisha. Besides above, about 1000 people during construction phase and about 100 people during operation phase at toll plaza and for road surveillance and maintenance work will be employed.

3.1.13 Details of Court cases: No court case is pending against the proposed project.

3.1.14 PP mentioned that a communication has been sent to Chief Wild Life Warden, Jharkhand for the information. Further, Member Secretary apprised the Committee that based on the Minutes of the Meeting, an internal communication has been sent to Project Elephant Division for vetting of proposed alignment. The Project Elephant Division will revert back with inputs/comments after seeking information from concerned CWLW, analysing the details and DSS analysis of road alignment vis-a-vis effect on elephant conservation issues.

3.1.15 The EAC, taking into account the submission made by the project proponent and the status provided by the Member Secretary for the aforementioned proposal had a detailed deliberation during its 258th meeting on 17th -18th March, 2021 and recommended the proposal for granting the Terms of Reference with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects.

- i. Approval of road alignment for the purpose of TOR is subject to approval of alignment by State CWLW and PE divn of MoEFCC. Any modification in alignment or any alternate alignment suggested by CWLW and approved by the PE division of MoEFCC will be considered final for the purpose of EIA study.
- ii. Provisions in the EMP shall be made as per the wildlife conservation plan approved by the CWLW and also as per the conditions stipulated by CWLW in approval of the alignment / modified alignment/ alternate alignment. Patrolling team and watch tower for the movement of animals to avoid human animal conflict should be provided alongwith the financial allocation in the mitigation plan.

- iii. Provisions shall also be made in Wildlife conservation plan and EMP for erection of watch towers and engagement of patrolling team for patrolling along the road stretches passing through forest area for monitoring the crossing of animals through these roads, initially for first 5 years at the project cost.
- iv. Details of animal crossing points/Corridors identified across the road alignment in forest area and the animal crossing structures proposed therein shall be given in the EIA study
- v. The proponent shall carry out a detailed traffic flow study to assess inflow of traffic from adjoining areas like airport/habitation such as urban cities. The detailed traffic planning studies shall include complete design, drawings and traffic circulation plans (taking into consideration integration with proposed alignment and other state roads etc.). Wherever required adequate connectivity in terms of VUP (vehicle underpass)/ PUP (Pedestrian underpass) needs to be included.
- vi. Cumulative impact assessment study to be carried out along the entire stretch including the other packages in the current stretch under consideration.
- vii. The alignment of road should be such that the cutting of trees is kept at bare minimum and for this the proponent shall obtain permission from the competent authorities. List of all tall and old trees made chainage wise and alignment be made in a way to avoid cutting such trees.
- viii. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent, based on the commitments made during the public hearing, shall include all the activities required to be taken to fulfil these commitments in the Environment Management Plan along with cost estimates of these activities, in addition to the activities proposed as per recommendations of EIA Studies and the same shall be submitted to the Ministry as part of the EIA Report. The EMP shall be implemented at the project cost or any other funding source available with the project proponent.
- ix. In pursuance of Ministry's OM no stated above the project proponent shall add one annexure in the EIA Report indicating all the commitments made by the PP to the public during public hearing and submit it to the Ministry and the EAC.
- x. The proponent shall carry out a comprehensive socio-economic assessment and also impact on biodiversity with emphasis on impact of ongoing land acquisition on the local people living around the proposed alignment. The Social Impact Assessment should have social indicators which can reflect on impact of acquisition on fertile land. The Social Impact Assessment shall take into consideration of key parameters like people's dependency on fertile agricultural land, socio-economic spectrum, impact of the project at local and regional levels.
- xi. The Action Plan on the compliance of the recommendations of the CAG as per Ministry's Circular No. J-11013/71/2016-IA.I (M), dated 25th October, 2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.

Agenda No. 3.2

Development of 6 Lane National Highway from the Junction of Eastern Peripheral Expressway at Khekra to Saharanpur bypass at Latifpur Village from Km 0.000 to Km 119.790 of Delhi to Dehradun Economic Corridor under Bharatmala Pariyojana by M/s National Highways Authority of India - Environmental Clearance (Proposal No. IA/UP/NCP/162955/2020 and File No. 10-44/2020-IA.III)

“The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

3.2.1 The project proponent along with EIA Consultant M/s PDCOR Limited Jaipur, has made a presentation through Video Conferencing and provided the following information:

3.2.2 The proposed project is a Greenfield Alignment project under the Bharatmala Pariyojna, which starts from the junction of Eastern Peripheral Expressway at Khekra village at Ch. 0+000 (28°53'4.09"N 77°14'45.19"E) passing through major districts such as Baghpat, Muzaffarnagar, shamli and terminated at Saharanpur bypass at Latifpur Village at Ch. 119+790 (29°53'13.67"N 77°35'15.08"E in the state of Uttar Pradesh. The proposed project includes 1 RoB, 7 Interchanges, 2 Major Bridges, 20 Minor Bridges, 5 Minor Bridge cum LVUP, 13 nos. VUP, 49 nos. LVUP, 271 nos. Culvert (Box -184, Pipe – 87) along the project stretch for free passage to villagers & domesticated animals and to avoid any impact on local hydrology.

3.2.3 The proposed project falls under 7 (f) Category A, Highways. Terms of Reference (ToR) was issued vide File No. 10-44/2020-IA.III dated 24th August 2020. Total Investment/Cost of the project is Rs. 5524.46 crores (including R&R, LA and utility).

3.2.4 Total length of proposed alignment is 119.790 Km with proposed Right of Way (ROW) 70 m having 6 lane carriageway all through the project road other than the area of Toll Plaza, and way side amenities.

3.2.5 About 959.36 ha of land shall be acquired for the project as per NH Act, 1956 and RFCTLARR, 2013. About 4.328 ha forest land is proposed for diversion. The joint survey is under progress with Forest Department. The terrain of the proposed alignment is plain (flat) land and is predominantly an agricultural land.

3.2.6 Public hearing was conducted on the following date and place.

S. No	Date	Venue	Districts	State
1.	18.02.2021	Zilla Panchayat, Sabhagar, Muzaffarnagar, U.P.	Muzaffarnagar	Uttar Pradesh
2.	22.02.2021	Collectorate Sabhagar, Shamli, U.P.	Shamli	Uttar Pradesh
3.	23.02.2021	Public Forum Auditorium, Saharanpur, U.P.	Saharanpur	Uttar Pradesh
4.	03.03.2021	Magistrate Office, Baghpat, U.P.	Baghpat	Uttar Pradesh

3.2.7 The proposed project alignment is crossing 4 small private ponds, 1 major canal (Eastern Yamuna Canal) intersecting the alignment at few locations and 2 rivers (namely Hindon and Dhamola) intersecting the proposed alignment at 4 locations. Appropriate numbers of bridges and culverts have been proposed to maintain the natural flow of water bodies.

3.2.8 Total water requirement for the proposed project is approx. 8,79,302 KL (2409 KLD) during construction stage, which will be sourced from existing surface as well as from ground water. NOC for the same will be obtained from the concerned authority by the Concessionaire/ Contractor prior to start of construction work under supervision of Proponent/ supervision consultant.

3.2.9 Rainwater harvesting structures will be provided at the locations where the first aquifer of ground water table is more than 8-10 m. The provision of rain water harvesting will be executed as per IR: -SP:50-2013 guidelines. In general at 500 meter interval, rain water recharge pits are provisioned depending on site suitability.

3.2.10 Minimum debris/waste material will be generated and it will be re-utilized in project work, like in raising of embankment, making approach/haul road and will as in construction yard. Approx. 300 Kg/day domestic waste will be generated during construction phase of road, which will be disposed off in nearby approved landfill or with the construction yard in disposal pit. Mobile toilet will be provided at major construction site. Toilet with septic tank will be provided in worker camp/ construction yard.

3.2.11 Cross roadside and canal side trees to be felled for contraction of road, which are notified as protected forest. Other than this, majority of trees are private trees located in the agricultural field and commercial garden. Total 11,840 nos. of trees are proposed to be felled. Approx. 50,000 nos. of avenue trees are proposed to plant on available RoW in both side of project as per IRC:SP:21-2009.

3.2.12 During the socio-economic survey, it has been found that total 309 nos. of structures (includes tubewells, borewells, brick kiln, boundary wall, temples, House etc.), 1438 nos. of families (PAFs) are getting affected. The R&R plan has been prepared based on Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 and National Highway Act, 1956. The R&R cost is INR 2182.6 Cr.

3.2.13 Safety measures will be provided as per NHAI Safety Manual and IRC: SP 88 and Expressway Manual IRC: SP 99. Safety Measures, as provided in NHAI Safety Manual i.e. Unit-3 (pertaining to Traffic Safety, such as traffic control zone, advance warning zones, traffic control devices, regulatory & warning signs cylindrical cones, drums, flagman, Barricades, Pedestrian Safety, Speed control, etc.) and other safety guidelines and measures suggested in Unit-4 (Construction Zone Safety), Unit-5 (Temporary Structures Safety), Unit-6 (Workers & Work Zone Safety), Unit-7

(Electrical & Mechanical Safety) will be strictly implemented. All required illustrative plans for safety at construction sites keeping in view all situations highlighted in IRC:SP 55 and NHAI Safety Manual will be prepared and strictly implemented.

3.2.14 Benefits of the Project: The entire region will be benefitted from the proposed project, as it provides connectivity to important districts of Uttar Pradesh such as Baghpat, Shamli, and Saharanpur further given connectivity to Meerut and Muzaffarnagar and at the end point of Saharanpur bypass and provides spur connectivity to Dehradun. It also gives connectivity to important tourist place/places of Uttarakhand through Dehradun. Project corridor is a shorter route for freight from Delhi to Saharanpur bypass and also to Dehradun. Approx. 1000 people during construction and approx. 100 people will be employed during the operation phase.

3.2.15 Details of Court cases: No court case is pending against the proposed project.

3.2.16 The EAC, taking into account the submission made by the project proponent had a detailed deliberation during its 258th meeting on 17th -18th March, 2021 and **recommended the proposal for grant of Environment Clearance** with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects:

- i. Project alignment should be managed in such a way to save the Heritage/old trees supposed to be affected by the proposed alignment.
- ii. Faunal bio-diversity study has to be conducted and a report shall be submitted along with 6 monthly compliance report.
- iii. The proponent shall obtain Forest Clearance for diversion of forest land as per Forest (Conservation) Act, 1980. Proponent shall submit an undertaking that work on non-forestry land may only be executed upto such point (to be selected by the user agency) on either side of forest land if it is explicitly certified by the user agency that in case approval under the Forest (Conservation) Act, 1980, for diversion of forest land is declined, it is technically feasible to execute the project along an alternate alignment without involving diversion of forest land. Details of all such stretches along with alternate alignment identified to bypass the forest land should be explicitly provided in the proposal seeking approval under the Forest (Conservation) Act, 1980 and the EIA Notification, 2006.
- iv. EMP be revised to the extent that provisions are made in EMP for erection of watch towers (at intervals suggested by concern DFO) and engagement of patrolling team for patrolling along the road stretches passing through forest area for monitoring the crossing of animals through these roads, initially for first 5 years at the project cost.
- v. Commencement of work in non-forest land will not confer any right to NHAI for granting approval under the Forest (Conservation) Act, 1980.
- vi. In borrow pits, the depth of the pit shall be regulated such that the sides of the excavation will have a slope not steeper than 1:2, from the edge of the final section of bank. Soil erosion checking measures shall be carried out. A general guideline for Borrow area operation and rehabilitation given in Annexure 5.3 of the EIA report shall be followed.

- vii. Quarry areas shall be barricaded during mining operations. The abandoned quarry shall be developed as water reservoirs with proper fencing around quarry area. Guidelines for Quarry area operation and rehabilitation given in Annexure 5.3 of the EIA report shall be followed.
- viii. In all the construction sites within 150m of the nearest habitation, noisy construction work such as crushing, concrete mixing will be stopped during the night time between 10.00 pm to 6.00 am. No noisy construction activities will be permitted around educational institutions/health centres (silence zones) up to a distance of 100 m from the sensitive receptors. All plants and equipments used in construction shall strictly conform to the CPCB/SPCB noise standards.
- ix. Traffic Control Devices/Road Safety Devices/ Roadside Furniture including various types of cautionary, informatory, regulatory as mandatory signboards, road markers, studs, etc. shall be provided at appropriate locations all along the project stretch in accordance with the specifications laid down in Manual of Specifications and Standards for Expressways (IRC: SP:99-2013) and IRC:8, IRC:25, IRC:26, IRC:35, IRC:67, IRC:79, IRC:103 and Section 800 of MORTH Specifications.
- x. All the major, minor bridges and culverts should not affect the drainage systems. Flood plains of the rivers/ drainage systems are not to be disturbed.
- xi. About 24700 nos. of trees and 5500 saplings (size less than 30 cm) are likely to be felled. Afforestation using compensatory plantation in the ratio of 1:10 shall be carried out. Native tree species shall be provided as per the IRC Guidelines on Landscaping and Tree Plantation (IRC:SP:21-2009). Effort should be made to plant native trees and Ficus species on both sides of the alignment. Special attention shall be given for protecting giant trees, and locally important trees (having cultural importance) and should be identified chainage wise.
- xii. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent shall abide by all the commitments made by them to address the concerns raised during the public consultation. The project proponent shall initiate the activities proposed by them, based on the commitment made in the public hearing, and incorporate in the Environmental Management Plan and submit to the Ministry. All other activities including pollution control, environmental protection and conservation, R&R, wildlife and forest conservation/protection measures including the NPV, Compensatory afforestation etc., either proposed by the project proponent based on the social impact assessment and R&R action plan carried out during the preparation of EIA report or prescribed by EAC, shall also be implemented and become part of EMP.
- xiii. Proponent shall keep the finish road level sufficiently elevated from ground level with provision of railing on both sides to restrict animal crossing in order to avoid the possibility of wildlife injury/death. Major water bodies have been observed in the vicinity of the proposed road alignment & may be potential human elephant conflict points, appropriate nos of animal safe passages as per the guideline framed by the Wildlife Institute of India and in consultation with Chief Wildlife Warden.
- xiv. Prepare the traffic prediction report for complete project (including all packages of this project) considering the cumulative impact of the traffic on the environment and submit

- to the Ministry and concerned Regional Office within 3 months.
- xv. No Ground water shall be extracted and used. Approval/permission of concerned authority shall be obtained before drawing surface water from canal or any other sources.
 - xvi. The proponent shall obtain permission from the competent authorities for tree felling along the proposed alignment.
 - xvii. Rain water harvesting pit shall be at least 3 - 5 m above the highest ground water table.

Agenda No. 3.3

Development of Economic Corridors, Inter-Corridors, feeder routes and Coastal Road primarily to improve the efficiency of freight movement in India (Lot-3Odisha & Jharkhand/Package-2) Raipur-Vishakhapatnam (Ch.124.661 - Ch. 365.033 km) (Length 240.372 km) in the State of Odisha by M/s National Highways Authority of India under Bharatmala Pariyojana - Further consideration for Environmental Clearance (Proposal No. IA/OR/NCP/131730/2019 and File No 10-4/2020-IA.III)

“The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

3.3.1 The abovementioned proposal was earlier placed before the EAC during its 256th meeting on 4th March, 2021. The proposal was deferred for the want of some requisite information/documents.

3.3.2 At this instance, the aforementioned proposal was further placed before the EAC during 258th meeting on 17th -18th March, 2021. The project proponent alongwith EIA consultant M/s Enviro Infra Solutions Pvt. Ltd., Ghaziabad in association with CEMC Pvt. Ltd., made a presentation through Video conferencing and provided the following information-

3.3.3 The Ministry of Road Transport and Highways (MoRTH) through National Highways Authority of India (NHAI) has decided the assignment of Development of Economic Corridors, Inter-corridors and feeder routes and Coastal road primarily to improve the efficiency of freight movement in India under Bharatmala Pariyojana Lot-3/Odisha & Jharkhand/Package-2 having length of proposed alignment 464.662 km (which is totally green field) which starts from near Abhanpur (ch. 0.000) and ends at Sabbavaram village in Vishakhapatnam district.

3.3.4 The proposed NH is a Green field alignment project and proposed for 6 lane carriageway. The project highway starts from Dhanara village in Nabarangpur district to Tumbigura village in Koraput district in the state of Odisha from CH: 124+661

(20°01'44.59"N 81°51'58.13"E) to 365+033 (18°25'42.52"N 83°02'29.23"E) having a total length of 240.372 Kms.

3.3.5 The proposed project falls under 7 (f) Category A, Highways. Terms of Reference (ToR) was issued vide File No. 10-4/2020-IA.III dated 02nd March 2020. Total Investment/Cost of the project is Rs. 723800 Lakhs (Rs. 7238 Cr.).

3.3.6 Public Hearing was conducted on different dates and places as below-

S. No.	Date	Location
1.	07.12.2020	Police Ground Nabarangpur (Near Police Station, Nabarangpur), Nabarangpur district
2.	21.01.2021	Govt. Boys High School Play Ground (Near R.T.O Koraput), Koraput District

3.3.7 The existing land use pattern around the proposed National Highway is primarily comprises of predominantly agricultural land, followed by Reserve & Protected forest land, land for cattle grazing, village settlements and village ponds/nallah. The proposed alignment passes mostly through uninhabited area avoiding village establishments. The agriculture practiced is mostly multicrops due to the network of canals/rivers and main crops grown in the area are Wheat, maize, soybean etc. The proposed highway lies generally in plain terrain. However certain length of highway lies in rolling & hilly terrain.

3.3.8 The land acquisition for the proposed highway is 1308.024 ha (Private land 702.520Ha + Government land 244.360 ha + Forest land 361.144 ha). The compensation towards the acquisition of land will be made as per the provisions of the NH Act 1956 and applicable clauses and procedures as laid down in the RFCT LARR Act, 2013. The estimated cost for Rehabilitation & Resettlement including land cost has been worked out to Rs. 149.70 Crores.

3.3.9 The stage-1 forest clearance for diversion of 361.144 ha forest land is under process at DFO level. The proposed RoW of the project is 60 m in General & 45 m in Forest area. The alignment will involve cutting of approx. 67,050 nos. of trees.

3.3.10 The natural drainage of the project impacted area shall be maintained through improvement of 295 nos. of culverts, 16 nos. of major bridges and 76 nos. minor of bridges. The proposed alignment does not pass through any flood prone area.

3.3.11 The water requirement is 7046473 KL during construction stage and will be extracted from local surface water resources i.e. from nearby canals/rivers after getting necessary permission from concerned authority by the appointed contractor. No ground water shall be extracted.

3.3.12 About 1000 kg/day Municipal solid waste shall be generated during construction phase and 50 kg/day (approx.) during operation phase at tolls and wayside amenities area within PROW. Bio-degradable waste shall be disposed through bio composting and other waste through landfill site.

3.3.13 Energy conservation: Provision for solar power plant has been recommended in the nearby villages and its budget has been incorporated in EMP budget.

3.3.14 Rainwater harvesting structures shall be provided at the interval of 500 m on either sides of carriageway as per availability of RoW and depending on the water table of first aquifer. The cost for construction of 180 rainwater harvesting structures is Rs 9.00 Crores including its maintenance.

3.3.15 The proposed alignment does not pass through Wildlife Sanctuary/National Park and its eco sensitive zone. The proposed project does not passes through any CRZ locations.

3.3.16 The site specific Wildlife Conservation Plan (including construction of 25 nos. of animal underpasses of adequate length) and 20 nos. of canopy bridges with appropriate mitigation measures in consultation with the Chief Wildlife Warden of the state along with implementation schedule and appropriate monitoring mechanism have been prepared. Two tunnels have been proposed at Ch. 339.240 and at Ch. 346.560 having total length of 3.030 km and 1.930 km, respectively.

3.3.17 Benefits of the project: The proposed project would act as the prime artery for the economic flow to this region. It will enhanced connectivity between rural & urban population which will benefit the all sections of the society like general population, small-medium-large scale industries, farmers, businessmen etc. The project will improve access to higher education facilities & modern health facilities and will strengthen both rural & urban economies which in turn will improve economic scenario of the state and country. Faster transportation will strengthen tourist development in the area. During the construction of the road project around 3000 persons would be employed temporarily. However due to construction of toll plazas approx. 100 persons will be employed on permanent basis.

3.3.18 Details of Court cases: No court case is pending against the proposed project.

3.3.19 The EAC, taking into account the submission made by the project proponent had a detailed deliberation during its 258th meeting on 17th -18th March, 2021 and **recommended the proposal for grant of Environment Clearance** with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects:

- i. Apart from land compensation, the loss for crop has also to be compensated.
- ii. There shall be no activity of wall construction in the forest zone.
- iii. EMP be revised to the extent that provisions are made in EMP for erection of watch towers (at intervals suggested by concern DFO) and engagement of patrolling teams

- for patrolling along the road stretches passing through forest area for monitoring the crossing of animals through these roads, initially for first 5 years at the project cost.
- iv. The proponent shall obtain Forest Clearance for diversion of forest land as per Forest (Conservation) Act, 1980. Proponent shall submit an undertaking that work on non-forestry land may only be executed upto such point (to be selected by the user agency) on either side of forest land if it is explicitly certified by the user agency that in case approval under the Forest (Conservation) Act, 1980, for diversion of forest land is declined, it is technically feasible to execute the project along an alternate alignment without involving diversion of forest land. Details of all such stretches along with alternate alignment identified to bypass the forest land should be explicitly provided in the proposal seeking approval under the Forest (Conservation) Act, 1980 and the EIA Notification, 2006.
 - v. Commencement of work in non-forest land will not confer any right to NHAI for granting approval under the Forest (Conservation) Act, 1980.
 - vi. In borrow pits, the depth of the pit shall be regulated such that the sides of the excavation will have a slope not steeper than 1:2, from the edge of the final section of bank. Soil erosion checking measures shall be carried out. A general guideline for Borrow area operation and rehabilitation given in Annexure 5.3 of the EIA report shall be followed.
 - vii. Quarry areas shall be barricaded during mining operations. The abandoned quarry shall be developed as water reservoirs with proper fencing around quarry area. Guidelines for Quarry area operation and rehabilitation given in Annexure 5.3 of the EIA report shall be followed.
 - viii. In all the construction sites within 150m of the nearest habitation, noisy construction work such as crushing, concrete mixing will be stopped during the night time between 10.00 pm to 6.00 am. No noisy construction activities will be permitted around educational institutions/health centres (silence zones) up to a distance of 100 m from the sensitive receptors. All plants and equipments used in construction shall strictly conform to the CPCB/SPCB noise standards.
 - ix. Traffic Control Devices/Road Safety Devices/ Roadside Furniture including various types of cautionary, informatory, regulatory as mandatory signboards, road markers, studs, etc. shall be provided at appropriate locations all along the project stretch in accordance with the specifications laid down in Manual of Specifications and Standards for Expressways (IRC: SP:99-2013) and IRC:8, IRC:25, IRC:26, IRC:35, IRC:67, IRC:79, IRC:103 and Section 800 of MORTH Specifications.
 - x. All the major, minor bridges and culverts should not affect the drainage systems. Flood plains of the rivers/ drainage systems are not to be disturbed.
 - xi. About 67,050 nos. of trees are likely to be felled. Afforestation using compensatory plantation in the ratio of 1:10 shall be carried out. Native tree species shall be provided as per the IRC Guidelines on Landscaping and Tree Plantation (IRC:SP:21-2009). Effort should be made to plant native trees significant number of Ficus species on both sides of the alignment. Special attention shall be given for protecting giant and old trees and locally important trees (having cultural importance) and should be identified chainage wise.

- xii. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent shall abide by all the commitments made by them to address the concerns raised during the public consultation. The project proponent shall initiate the activities proposed by them, based on the commitment made in the public hearing, and incorporate in the Environmental Management Plan and submit to the Ministry. All other activities including pollution control, environmental protection and conservation, R&R, wildlife and forest conservation/protection measures including the NPV, Compensatory afforestation etc., either proposed by the project proponent based on the social impact assessment and R&R action plan carried out during the preparation of EIA report or prescribed by EAC, shall also be implemented and become part of EMP.
- xiii. Proponent shall keep the finish road level sufficiently elevated from ground level with provision of railing on both sides to restrict animal crossing in order to avoid the possibility of wildlife injury/death. Major water bodies have been observed in the vicinity of the proposed road alignment & may be potential human elephant conflict points, appropriate nos of animal safe passages as per the guideline framed by the Wildlife Institute of India and in consultation with Chief Wildlife Warden.
- xiv. Prepare the traffic prediction report for complete project (including all packages of this project) considering the cumulative impact of the traffic on the environment and submit to the Ministry and concerned Regional Office within 3 months.
- xv. No Ground water shall be extracted and used. Approval/permission of concerned authority shall be obtained before drawing surface water from canal or any other sources.
- xvi. The proponent shall obtain permission from the competent authorities for tree felling along the proposed alignment.
- xvii. Rain water harvesting pit shall be at least 3 - 5 m above the highest ground water table.

Agenda No. 3.4 (This will be moved to any other item during compilation)

Development of Urban Extension Road-II (NH-344M) from Design chainage Km 0.000 to Km 38.111. Development of link road (new NH344P) (Km 0.000 to Km 29.600) between Bawana Industrial Area Delhi (from Km 7.750 of UER II) till bypass of NH-352A at village Barwasni, Sonipat in Haryana as spur of Urban Extension Road-II (NH-344M) in the state of Delhi/Haryana. Development of link road (new NH-344N) (Km 0.000 to Km 7.500) between Dichaon Kalan till Bahadurgarh Bypass/NH10 in the state of NCT of Delhi/Haryana. (Total Length of Project: 75.211 Km) by M/s National Highways Authority of India (NHAI) - Reconsideration for Environmental Clearance (Proposal No. IA/DL/MIS/104396/2019 and File No 10-30/2019-IA.III)

“The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

3.4.1 The Terms of Reference (ToR) for the aforementioned project was accorded in 217th EAC meeting on 27th June 2019 *vide* F. No. 10-30/2019-IA.III dated 19th July 2019. Based on the recommendation of EAC in its 225th meeting held on 22nd October, 2019, the Ministry amended the ToR dated 19th July 2019 by removing the following specific condition no. 4(ii) at page no. 7.

"Study to be carried out on Acoustic and Light Proofing measures considering the Wildlife Institute of India manual and other studies by the reputed institutes on the matter. The study shall be carried by the qualified professionals, scientists from any national institute having requisite experience to conduct such study."

3.4.2 Subsequently, the proposal was submitted to the Ministry for the want of Environmental clearance. The EAC had a detailed deliberation during its 247th meeting during 23rd–24th November, 2020 and recommended the proposal for grant of Environmental Clearance with specific conditions which also includes condition no. (iii) that "A revised biodiversity survey to be undertaken with the help of institute of repute or a team of experts of national repute and submitted to the Committee that is duly endorsed by Chief Wildlife Warden of the state" as mentioned in the MoM of 247th EAC meeting under Agenda item No. 3.1.

3.4.3 The PP *vide* e-mail dated 30th December 2020 requested the Ministry to amend the above mentioned Para (iii) of recommendation in 247th EAC MoM, since, the said condition was already removed from the ToR dated 19th July 2019 as amended on 22nd October, 2019.

3.4.4 It is further informed to the Committee that the EC letter has not yet been issued for the project for the want of declaration letter from the PP for forest clearance.

3.4.5 After detailed deliberation it has been decided by the EAC that since, the specific condition Para no. (iii) has already been removed from the ToR, the same shall be omitted from the 247th EAC MoM and EC conditions, as well.

Agenda No. 3.5

Establishment of Devakothikoppa Industrial Area at by M/s Karnataka Industrial Areas Development Board - Extension of validity of Terms of Reference (Proposal No IA/KA/NCP/201623/2021 and File No 21-55/2017-IA.III)

"The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent."

3.5.1 The project proponent along with EIA consultant M/s Hubert Enviro Cares Systems Pvt Ltd has made a presentation through Video Conferencing before the EAC and requested for extension of validity of Terms of Reference for the period of one year as per MoEF&CC Notification dated 14th September, 2016. Terms of Reference for the aforementioned project

was granted vide letter No. 21-55/2017-IA-III dated 20th March, 2017, which is valid up to 19th March, 2021.

3.5.2 The PP *vide* on-line application dated 4th March 2021 alongwith a letter no. KIADB/EE/DVG/2020-21, dated 10th March 2021 has submitted that the EIA/EMP documents have been submitted to KSPCB for conducting the Public Hearing (PH) with required fees. However, due to pandemic situation, there is delay in getting date for PH.

3.5.3 In view of the above reason, the PP has requested to extend the validity period of ToR for one more year, so that they will upload the final EIA/EMP report for appraisal after conducting the PH.

3.5.4 It has been appraised to the Committee that as per Govt. notification, dated 18th January, 2021 *“the period from the 1st April, 2020 to the 31st March, 2021 shall not be considered for the purpose of calculation of the period of validity of Terms of Reference granted under the provisions of this notification in view of outbreak of Corona Virus (COVID-19) and subsequent lockdowns (total or partial) declared for its control, however, all activities undertaken during this period in respect of the said Terms of Reference shall be treated as valid.”*

3.5.5 The EAC, taking into account the submissions made by the project proponent and the Notification issued by the Ministry dated 18th January, 2021 stated that there is no need for the project proponent to extend the validity of ToR letter; in view of the Notification issued by the Ministry the ToR is valid upto 19th March, 2022. Project proponent will notify the Ministry in case of any changes in the proposed land area.

Agenda No. 3.6

Development of Integrated Manufacturing Cluster (IMC) under Amritsar Kolkata Industrial Corridor (AKIC) Project at Raghunathpur, Purulia, West Bengal by M/s West Bengal Industrial Development Corporation Ltd. - Terms of Reference (Proposal No. IA/WB/NCP/147335/2020 F. No. 21-32/2020-IA.III)

“The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

3.6.1 The aforementioned proposal was earlier placed before the EAC during its 234th meeting on 27th April, 2020. After detailed deliberations by the EAC, the proposal was returned in its present form.

3.6.2 At this instance, the aforementioned proposal was further placed before the EAC during 258th meeting on 17th -18th March, 2021. The project proponent alongwith EIA Consultant M/s EQMS India Pvt. Ltd., Delhi has made a presentation through Video Conferencing and provided the following information to the committee:

3.6.3 The proposed project is for development of Amritsar Kolkata Industrial Corridor Project (AKIC) in the States of Northern and Eastern region of India. The State of West Bengal has identified a site in Raghunathpur area of Purulia district for development of “Integrated Manufacturing Cluster” as RIMC under AKIC region after assessing feasibility and potential of proposed location. Land is in possession of West Bengal Industrial Development Corporation (WBIDC) which is also the nodal agency to coordinate and supervise project development activities related to RIMC Project. The project site is well connected to the Highway, airways, rail and waterways.

3.6.4 The proposed project falls under 7(c), Category A. Total project cost is Rs. 114877 Lakh (1,148.77 crore).

3.6.5 The total land area of the project is 952.0755 ha. The identified land is an industrial land under possession of WBIDC. Presently, majority of this Industrial land is barren and under developed. A small portion of this industrial land is under cultivation. The topography/terrain of this site is slightly undulated and required cutting and filling for development towards flat topography. The proposed development of this Industrial land is in the form of an Industrial township with Industrial Manufacturing cluster.

3.6.6 The identified land is under possession of WBIDC. There is no habitation present within the project area. The local people do not dependent on the identified land. Since, no population is living in the allocated land; hence, no R&R issue is involved with this project.

3.6.7 List of industries to be housed with the proposed project site is as following:

Sl. No.	Industry Proposed	Schedule as per EIA Notification-2006	Category with threshold limit	Category as per CPCB
1	Non - toxic secondary metallurgical processing Industries, each of capacity > 5000 metric tons/ annum.	3 (a)	Category B (ii)	Red
2	Standalone cement clinker grinding units, each of capacity <1.0 million metric tons/ annum.	3 (b)	Category B	Red
3	Engineering & manufacturing	Not applicable	Not applicable	Orange
4	Auto component and automobile	Not applicable	Not applicable	Orange
5	Refractory & ceramics	Not applicable	Not applicable	Orange
6	Machinery & equipment	Not applicable	Not applicable	Orange/Green
7	Ancillary & MSME cluster	Not applicable	Not applicable	Orange
8	Fabricated metal products	Not applicable	Not applicable	Orange
9	Electronics and electrical equipment	Not applicable	Not applicable	Orange

3.6.8 Details of water bodies, impact on drainage: Uttala river is flowing along the north-western boundary of the RIMC-I. Besides that, few ponds are also available within the project area. Storm water management approach in RIMC is envisaged to utilize existing water bodies as Flood Retention ponds to store runoff and reduce peak discharge.

3.6.9 Total water requirement during the construction phase is 3.750 MLD, which will be sourced from the surface water through tankers. Total water requirement during the operation phase is 20 MLD, which will be sourced from the Panchet Dam. Water will be arranged by WBIDC from Panchet dam operated by Damodar Valley Corporation (DVC). Panchet dam is a perennial water storage reservoir to be used as a source of water for RIMC as Distance from RIMC to Panchet dam is approximately 9 km (from intake point). The WBIDCL already approached for confirmation on availability of water vide letter WBIDC/AKIC/2016-17/2413 dated 25/03/2019. No ground water abstraction shall be done for the proposed project.

3.6.10 No major tree vegetation is present on the identified land. However, some tree species like Mahua (*Madhuca longifolia*), Imlı (*Tamarindus indica*), Arjun (*Terminalia arjuna*), Jamun(*Syzygium cumini*), Bargad (*Ficus benghalensis*), Neem (*Azadirachta indica*), Palash (*Butea monosperma*), Chatim (*Alstonia scholaris*), Tal (*Borassus flabellifer*), Khajur (*Phoenix dactylifera*), Simul (*Bombax ceiba*), Koroi (*Albizia procera*), Karanj (*Millettia pinnata*), Gulmohar (*Delonix regia*), Kadam (*Neolamarckia cadamba*), Shisam (*Dalbergia sissoo*) etc. are present on the site. Eucalyptus (*Eucalyptus globulus*) plantation also exists in the project area. Details of tree inventory shall be done in later stage during the baseline Environment Study. Forest clearance is not applicable as no diversion of forest land is involved in the proposed project.

3.6.11 There is no Protected Areas (PA) including National Parks, Sanctuaries and Tiger Reserves etc. within 10 km of the project site. The project area is also not located within the Eco-Sensitive Zone (ESZ) or Eco-Sensitive Area (ESA) notified by the MoEF&CC. The project area is not located within CRZ area.

3.6.12 About 29.3 MLD waste water/ effluent/ Sewage will be generated during the operation phase. Total sewage generated from the residential area is about 13.3 MLD. Gravity sewage collection network has been proposed to collect and convey domestic sewage to the proposed Sewage Treatment Plant (STP). The STP will be built in phases in modular and scalable approach. The sewage shall be treated to applicable standards and shall be utilized for non-potable uses, including horticulture, flushing and water bodies recharge etc.

3.6.13 Total wastewater generated in RIMC (Industrial area) is about 15.75 MLD. The treatment of this wastewater shall be done in centralized CETP which shall be built in phases in modular and scalable approach. The treatment of this wastewater shall be done in CETP of 7.5 MLD and remaining 8.8 MLD shall be treated by the individual industry operators. Individual industries shall pre-treat the effluent prior to discharge in effluent collection network. Gravity effluent collection network with intermediate pumping stations has been proposed for collection of pre-treated effluent. Pre-treated effluent shall be collected and treated up to desired level prior to recycling for non-potable requirements of industries for

process and non-process requirement i.e. flushing, horticulture etc. The proposed project will comply zero discharge plan.

3.6.14 Benefits of the Project: Macro policy level changes coupled with development and availability of ready to use Manufacturing Zones like Raghunathpur will be an impetus towards higher Gross State Domestic Product (GSDP) including higher job creation in the state. Financial benefits anticipated due to savings in taxes along with higher lease rates for developed Raghunathpur Industrial zone is expected to deliver an overall financial gain to the industrial units. Proposed Skill Development Framework suggests conducting skill mapping of region, organizing skill gap studies, assessment of employability, preparing delivery mechanism for enhancing the employability, quality assurance and certification. Total Working Population projected for RIMC is 71125. IMC at Raghunathpur Industrial Park aims to generate and transfer socio-economic benefit to local and regional population in terms of offering immense employment opportunities, skill development, and improvement in livelihood. Proposed Industry sectors are highly manpower intensive and have huge potential for indirect job creation in the region. According to National Manufacturing Policy 2011, every job created in the manufacturing sector creates two-three additional jobs in related activities resulting in up to approximately 1.7 Lakh indirect Job due to RIMC (considering multiplier factor of 2.5). A vocational Training (Skill development) Institute has also been proposed as part of RIP Master Plan.

3.6.15 Details of Court cases: No Court case is pending against the proposed project.

3.6.16 The EAC, taking into account the submission made by the project proponent had a detailed deliberation during its 258th meeting on 17th -18th March, 2021 and **recommended the proposal for grant of Terms of Reference** with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects:

- i. The proponent shall submit a detailed physical and fiscal targets and means of achieving as a part of the EMP in the EIA Report.
- ii. Both red and green category projects should be set aside in separate areas.
- iii. The planning of Industrial Estate should be based on the criteria mentioned in this Ministry's Technical EIA Guidance Manual for Industrial Estate (2009) as well as CPCB's Zoning Atlas Guidelines for siting industries.
- iv. No ground water shall be used in any case. Proponent is required to obtain permission from competent authority to use water from river or other surface water sources. Consent to Operate shall not be issued without obtaining permission competent authority for use of surface water.
- v. Provide detailed water balance statement a scheme to achieve ZLD by each industrial unit as well as for utilization of treated sewage.
- vi. Since, natural drainage pattern is seen in/around the proposed project site, it is important to have a detailed hydrogeological study on the catchment area of the drainage system within core zone of the project area
- vii. Detailed biodiversity study of the project area.
- viii. All tall and old and heritage native trees should be enumerated, GPS tagged and detailed in EIA EMP and plotting design should be such that all such trees are protected
- ix. The Action Plan on the compliance of the recommendations of the CAG as per Ministry's Circular No. J-11013/71/2016-IA.I (M) dated 25th October, 2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report

- x. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent, based on the commitments made during the public hearing, shall include all the activities required to be taken to fulfill these commitments in the Environment Management Plan along with cost estimates of these activities, in addition to the activities proposed as per recommendations of EIA Studies and the same shall be submitted to the ministry as part of the EIA Report. The EMP shall be implemented at the project cost or any other funding source available with the project proponent.
- xi. In pursuance of Ministry's OM No stated above the project proponent shall add one annexure in the EIA Report indicating all the commitments made by the PP to the public during public hearing and submit it to the Ministry and the EAC.
- xii. As proposed by PP themselves the cement clinker industry should be dropped from the list of industries in IMC.
- xiii. Extent of the green area and green belt should be increased. The width of green belt along the river bank/waterbodies shall be increase to at least 50 meters.

Agenda No. 3.7

Development of Zaheerabad National Investment and Manufacturing Zone (NIMZ) in Sangareddy District of Telangana by M/s Telangana State Industrial Infrastructure Corporation Limited - Environmental Clearance (Proposal No. IA/TG/NCP/71421/2017 and File No. 21-237/2017-IA.III)

"The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent."

3.7.1 The project proponent along with EIA Consultant M/s L&T Infrastructure Engineering Limited, Hyderabad has made a presentation through Video Conferencing and provided the following information.

3.7.2 The proposed project is for Development of Zaheerabad National Investment and Manufacturing Zone (NIMZ) in Sangareddy District of Telangana State. Telangana State Industrial Infrastructure Corporation Limited (TSIIC) has proposed to establish NIMZ at Nyalkal and Jharasangam Mandal's near Zaheerabad in Sangareddy District of Telangana in an area of ~12,635 acres (Acres 12,635.14 guntas, 5,113 ha) and will house both Category A and Category B Industries listed in the EIA notification, in pursuit of NMP of Department of Industry and Policy Promotion (DIPP) of Government of India.

3.7.3 The project land falls in 17 revenue villages i.e., Ganeshpur, Husselli, Ganjoti, Mungi, Rukmapur, Hadnur, Namtabad, Mamidgi, Kalbemal, Basanthpur, Metalkunta, Gangwar, Rejinthal and Malkanpahad villages of Nyalkal Mandal and Chilepalle, Yelgoi and Bardipur villages of Jharasangam Mandal, Sangareddy District. The infrastructure development being proposed includes water supply, water distribution, internal roads, storm water drains, electrical distribution network, internal street lighting, wastewater and waste management facilities, technical and support buildings, housing along with allied facilities, logistic zone with its necessary utilities, amenities and services.

3.7.4 The proposed project falls under 7(C), Category A. Total project cost is Rs. 3,095 Crore. The Terms of Reference was accorded vide letter no. F.No.21-237/2017-IA.III dated 01st March, 2018.

3.7.5 The topography of the site is almost flat terrain with levels varying from 605 m to 660 m. Project site falls in seismic zone II (Least Active Zone). Nearest Road Connectivity is SH-14 and SH-16 -passes through site and NH-65 (Pune – Machilipatnam Road) - 10km south. Nearest Rail Connectivity is Metalkunta (1.4 km)- railway station and Zaheerabad (10 km) railway station. Nearest Seaport is JNPT (600 km) on west coast and Krishnapatnam Port (465 km) on east coast. Nearest Airport is Rajiv Gandhi International Airport (RGIA) at Shamshabad, Hyderabad. It is located to the southeast of the site at a distance of 125 km by road (105 km aerial distance) and Bidar Airport is located at 17 km by road from the NIMZ site and is currently under Indian Air Force Station.

3.7.6 The project site is mostly comprised of barren and vacant lands. Few pockets of farmlands are also located within the site Land Use Type in project site are Scrub Land (44.6%), Agriculture Crop Land (27.65%), Fallow (26.21%), Plantation (0.8%), Rocky Area (0.43%), Built-up (Rural (0.31%)), Waterbodies (Tanks/pond/lakes; 0.02%).

3.7.7 Following industries are proposed to be housed with the project site-

Proposed Sector	Anticipated Types of industries/activities	Category as per EIA notification, 2006	Category as per CPCB
Electrical equipment	Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus (includes electric motors, generators and motor generator sets, switchgear and switchboard apparatus etc.)	Not Applicable	Orange
	Manufacture of batteries and accumulators (includes batteries, rechargeable batteries, etc.)		Red and Orange
	Manufacture of wiring and wiring devices (includes wires for live transmission, optical cables)		Orange
Metals	Manufacture of basic iron and steel (Ferro alloys, wire of steel by cold drawing, tube and tube fittings etc.)	Category A and B	Red and Orange
	Manufacture of basic precious and other non-ferrous metals (includes manufacture of copper from ore, lead etc.)		
	Casting of metals (includes manufacture of tubes, pipes and hollow profiles, casting of non-ferrous metals)		
Food and Agro Processing	Processing and preserving of meat (includes production, processing and preserving of meat and meat) products, aqua food related processing (fish and prawns etc.)	Not Applicable	Red
	Manufacture of dairy products (includes manufacturing of milk, milk powder, ice cream etc.)		Red
	Manufacture of grain mill products, starches and starch products (includes flour milling, rice		Orange and Green

	milling, milling of other grains)		
	Manufacture of other food products (includes manufacture of bakery products, noodles, Processing of edible nuts etc.)		Orange
	Manufacture of prepared animal feeds (manufacture of cattle feed, poultry feed, feed for pets etc.)		Orange
Non-metallic minerals (except Glass)	Manufacture of non-metallic mineral products etc. (Includes manufacture of refractory products, clay building materials-bricks, tiles, ceramic products, AAC blocks, kerb stones, etc.)	Not Applicable	Orange and Green
Automobile	Manufacture of motor vehicles (such as manufacturing of Tractors, Buses etc.)	Not Applicable	Red
	Manufacture of parts and accessories for motor vehicles (includes parts such as brakes, gearboxes, axles, seats, tyres, rubber products etc.)		Orange and Green
Machinery	Manufacture of general-purpose machinery (includes manufacture of hydraulic and pneumatic components, pumps, compressors, taps, valves, lifts, etc.), construction machinery, power machinery.	Not Applicable	Red, Orange and White
	Manufacture of special-purpose machinery (includes manufacture of agriculture implants, machine tools for drilling, milling, industrial machinery etc.)		
Transport equipment	Manufacture of Railway locomotives and rolling stock	Category A and B	Red
	Manufacture of Military fighting vehicles		

3.7.8 The nearest water bodies from the proposed development is Madhura Nadi at 0.2 km, S and Narinja Reservoir at 1.5 km, S. The existing streams/drains within the project site will be retained as per the ToR requirement from MoEF&CC. The drains passing through the area shall be routed as per the proposed drain routing plan. Due care will be taken during construction to avoid spillage of construction materials. An adequate drainage system will be provided at the site with separate collection streams to segregate the storm run-off from roads, open areas, material storage areas, vehicle wash water and other wastewater streams. Drainage system will be provided at construction yard. Measures will be taken to prevent silting of natural drainage due to runoff from construction areas. Proper drainage by providing surface drainage system from the development parcels and connecting to storm water network. Natural drainage wherever retained will be strengthened to receive the newly channelled drainage to withstand the increased flow rates. Storm water drainage network is to be designed wherever diversion of the drains is proposed. At all drains located near the discharge points into natural drains a desilting and filter chambers shall be provided at suitable intervals which shall be preferably located right below the manhole covers provided on top of the drain to enable periodic cleaning and de-silting of these wells.

3.7.9 Total water (one time) requirement for the proposed development is estimated as 119.34 MLD and 2.5 ML of fire water demand. After treatment of sewage in proposed STP of 43.64 MLD and effluent in CETPs of 27.3 MLD capacity, it is proposed to reuse the treated wastewater into the system which will be in the order of 61.64 MLD. Thus, the net water demand for the proposed NIMZ is 57.71 MLD and 2.5 ML of fire water demand. The

fresh water will be sourced from the Singur reservoir located at about 25 km from the project site. Water allocation consent letter has been obtained from Irrigation and CAD Department. The proposed development will not draw groundwater.

3.7.10 The public hearing was conducted on 20th January, 2021, by TSPCB. The meeting was conducted by the panel consisting of Collector, Joint Collector, Sangareddy District, and Environmental Engineer, Regional office Sangareddy, Telangana State Pollution Control Board. The budgetary estimate (Capital Cost) for Environmental Management is Rs. 300 Crores and the annual recurring cost is Rs. 29.7 Crores.

3.7.11 There is no Protected Areas (PA) including National Parks, Sanctuaries and Tiger Reserves etc. within 10 km of the project site. The project area is also not located within the Eco-Sensitive Zone (ESZ) or Eco-Sensitive Area (ESA) notified by the MoEF&CC. The project area is not located within CRZ area. No forest diversion is involved in the proposed project.

3.7.12 About 27.299 MLD Wastewater and 43.64 MLD Sewage will be generated. Member industry shall carry out primary treatment and shall discharge to CETP after meeting the inlet characteristics of CETP. Multiple CETPs will be developed and overall capacity of CETP will be in the order of 27.3 MLD. Sewage generated at site and at construction workers camp will be collected in holding tank and periodically transferred to temporary Sewage Treatment Plant (STP). In case of non-availability of nearby STP, mobile STP and septic tank with soak pits will be also be explored. No wastewater shall be disposed directly on land or on existing surface water resources without appropriate treatment. An STP of ~ 44 MLD capacities to handle sewage waste from overall site development is proposed and the treated wastewater is stored in an underground retention tank for 24hrs before conveyance for non-potable usage. The treated wastewater from CETP & STP shall be reused to reduce the usage of freshwater resources.

3.7.13 Municipal Solid waste of 154.37 TPD at 100% occupancy is estimated to be generated. Out of this, biodegradable waste constitutes to 123.5 TPD and the non-biodegradable waste constitutes to 30.87 TPD. Integrated solid waste management facility is proposed for handling of MSW generated. Industrial solid waste is estimated as 423 TPD which includes 85 TPD of hazardous waste and 338 TPD of non-hazardous waste. It has been estimated that about 13.2 tonnes of sludge will be generated daily (@300kg/MLD) from the proposed STPs and about 8.2 tonnes/ day of sludge from the CETPs. Hazardous waste will be sent to nearest Hazardous waste management facility is located at Dundigal (78km from project site) near Hyderabad ORR. Non-hazardous waste will be given to TSPCB approved recyclers/vendors for further treatment and disposal.

3.7.14 The overall power requirement for the proposed NIMZ is 678.63 mVA. The nearest 220 kV supply tapping point is Sadhashivpet 220/132 kV substation, which will be utilised initially. Solar Power Harnessing would be adopted within NIMZ built up areas particularly at available roof tops. Estimated Installation Capacity and Cost for Solar Power Harness 26.55 MW.

3.7.15 Rainwater Harvesting shall be implemented at NIMZ to conserve rainwater. Roof top area, greenbelt/green area, road/paved area, and open areas proposed in the NIMZ are considered for estimating the rainwater which can be harvested. Estimated Volume of run-off that can be harvested is 1930631.34 m³.

3.7.16 Approximately 2300 tree are envisaged to be cut. The total Green area planned in the layout is 1974.4 acres (15.6%) under layout periphery green belt, traffic rotaries, green buffer areas and open green spaces. In addition, each industrial plot will maintain 33% area of its area under Green areas around their industrial plot as per TSPCB guidelines. Approximately, 8,87,000 no. of trees are proposed to be planted in entire NIMZ at park level. The survival of the plantation shall be monitored frequently and survival rate of the plantation during operational phase shall not be less than 80%. A capital cost of INR 135 million (13.5 Crores) shall be earmarked for this purpose and INR of 6.75 million (0.675 Crores) shall be allocated for recurring expenses towards green belt development and maintenance. In addition to this, all other industrial units shall develop green areas within their premises as per the prevailing TSPCB provisions.

3.7.17 Benefits of the project: The development of the NIMZ is being envisaged by TSIIC taking into consideration the overall development of Industries in the state. The Nation, State and the region will have impetuous benefits from such development, such as Skill development and Training to the local population, technology transfer, shifting of manpower resources from low productivity to high productive activities, better quality of educational and medical facilities to the local people, improved local infrastructure, improved socio-economic conditions, employment opportunities, etc. NIMZ is envisaged to generate direct and indirect employment of 2,66,000 peoples. During operational phase, the NIMZ and associated facilities is likely to generate direct employment of 1,33,233 people. This project may generate indirect employment of around 1,33,233 people.

3.7.18 Details of Court cases: No Court case is pending against the proposed project. Land related cases are being dealt separately

3.7.19 The EAC, taking into account the submission made by the project proponent had a detailed deliberation during its 258th meeting on 17th -18th March, 2021 and **deferred** the proposal for want of following documents/ information:

- i. The planning of Industrial Estate should be based on the criteria mentioned in the Ministry's Technical EIA Guidance Manual for Industrial Estate (2009) as well as CPCB's Zoning Atlas Guidelines for positioning of industries. Phase wise industrial planning be submitted.
- ii. Automobile industry will be engaging in painting activity, which comes under **Red category**, hence industries can be clearly demarcated.
- iii. Several representations were received by the Ministry on the issues related to land acquisition and compensation paid to the land owners. The EAC suggested Ministry to forward representations to the PP so that a detailed response in a tabular form be submitted on the issues raised by the stakeholders.
- iv. The Proponent should submit a detailed report about direct and indirect type of employment opportunities during construction and operation phase.
- v. An elaborate report presiding land acquired, compensatory details and the period for settlement has to be sorted according to the State Government Policy.
- vi. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent, based on the commitments made during the public hearing, shall include all the activities required to be taken to fulfill these commitments in the Environment Management Plan along with cost estimates of these activities, in addition to the activities proposed as per recommendations of EIA Studies and the same shall be submitted to the ministry as part of the EIA Report.

- vii. Detailed Risk Assessment and Management of the project shall be prepared and submitted.
- viii. Hamlets proposed in the industrial area would lead to a negative impact hence settlements have to be planned in a safe zone and a modified plan be submitted.
- ix. The proponent should develop a Greenery and Conservation management plan to sustain existing greenery.
- x. All tall and old and heritage native trees should be enumerated, GPS tagged and detailed in EIA EMP and plotting design should be such that all such trees are protected

Agenda No. 3.8

Integrated development of International Container Transshipment Terminal (ICTT)- 14.2 Million TEU along with Greenfield International Airport (4000 Peak Hour Passengers-PHP), Township & Area development and 450 MVA Gas and Solar based power plant in 16610 ha. Great Nicobar Islands, Nicobar District by M/s Andaman and Nicobar Islands Integrated Development Corporation Ltd. - Terms of Reference (Proposal No. IA/AN/NCP/201159/2021 and File No 10/17/2021-IA.III)

“The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

[Note: The required documents of the proposed project were not submitted by the proponent on time for its appraisal by the committee.]

3.8.1 The project proponent along with EIA Consultant M/s AECOM India Private Ltd. Gurgaon made a presentation through Video Conferencing and provided the following information:

3.8.2 Andaman and Nicobar Islands Integrated Development Corporation Limited (ANIIDCO) propose Holistic Development of Great Nicobar Island in Andaman and Nicobar Islands. Integrated development of International Container Transshipment Terminal (ICTT) - 14.2 Million TEU along with Greenfield International Airport (4000 Peak Hour Passengers-PHP), Township & Area development and 450 MVA Gas, Diesel and Solar based power plant in Eastern and Southern parts of Great Nicobar Islands.

3.8.3 As a part of Holistic Development of Great Nicobar Islands, Deep Berth Port (with ancillary areas for International Trans-shipment terminal) as primary component is planned along with International airport (with ancillary area), power generation and distribution network and township are planned which are interlinked projects to ICTT.

3.8.4 The total area required for the proposed project is 16610 ha (Port (ICTT) - 766 ha + Airport - 845 ha + Township & Area Development- 14960 ha + Power Plant – 39 ha). This area excludes the reclamation areas for port and airport which are 227 ha and 194 ha of

reclamation area, respectively. The proposed Project site is in not connected through any road. Currently, the access is through sea and air route only. Approach roads shall be developed within the Islands.

3.8.5 The proposed project fall under 7 (e) Ports, harbours; 7 (a) Airport Project; 1 (d) Power Plant; and 8 (b) Township & Area Development project, Category A, Scheduled to the EIA Notification, 2006. The ICTT can be developed at a cost of Rs. 35,95,900 lakhs. The international airport can be developed over a 5-year period, including one year for procurement. The cost of the Airport is estimated at Rs. 10,35,900 lakhs. will requires development of simultaneous primary and secondary urban infrastructure networks such as roads, public transport, energy and electrical power, as well as water, wastewater, and storm water facilities and services, which will form the skeleton of the proposed township master plan. Therefore the PP has submitted the proposal to the EAC (Infra-1) in order to facilitate a comprehensive appraisal.

3.8.6 Land use has been worked out to get the most out of the planned Transshipment terminal. As per the estimated traffic of 14.2 Million TEU's during Final Phase, the total reclaimed land (227 Ha) has been redistributed between berths (13%), container storage (70%), building & utilities (1%), road & pavements (9%) & Green areas (6%). Green zone has been assigned keeping in view of the diverse flora & fauna of the Nicobar region.

3.8.7 There will be change in Terrain/topography due to the proposed project development, which will be covered with the integrated project and road network in the site. There will be optimum use of the undulating topography in landscaping and site planning for enhancing the image ability of the place.

3.8.8 Water bodies & impact on drainage: Adjacent to Andaman Sea some water bodies exist such as Matait Anla Near Gandhi Nagar, South Bay (Galathea), Mata Taruwa Bay, Pemayya Bay near Pulobaha, Nanjappa Bay near Pulo Bekka, Galathea River or Dak Kea, Dak Aleh, Dak Ubho, Dak Tolai Near Pulabaha, Dak Air, and Dak Thena. Impact on drainage is being studied.

3.8.9 Total Water Demand during Operational Phase shall be 160 MLD. 90 MLD shall be Potable/Fresh Water Demand. Source of Fresh/Potable Water will be River Water/ Sea Water. NOC shall be worked in during EIA study. No water ground water extraction/usage proposed.

3.8.10. Tree cutting: No details are available

3.8.11 Diversion of about 13,075 ha of forest land is involved in the proposed project.

3.8.12 Within 10 km of the proposed project sites includes some protected areas such as Galathea National Park (107.103 sq. km), Campbell Bay National Park (391.751 sq. km) and Biosphere reserve (732.798 sq. km). The proposed integrated developments are planned away from ESA/ESZ of these protected areas. The proposed project sites fall under CRZ area. The CRZ studies and mapping is being carried out by National Centre for Sustainable Coastal Management, MoEF&CC, Chennai

3.8.13 STP/CETP: The combined STP capacity shall be 110 MLD and design is being carried out. The Treated Wastewater/Sewage shall be used for non-potable purpose such as flushing, irrigation, washing etc

3.8.14 Owing to the naturally available water depths, relatively lower quantity of dredging is required. Backup area will be mainly created by way of reclamation. Part of material for reclamation shall be obtained from the dredged material and the balance requirement shall be met through the borrowed fill, either through back up land grading site or brought from distant locations through the barges/ships. Unsuitable dredged material shall be disposed at an identified offshore location in about 40 m contour. The location shall be duly selected after mathematical model studies of dredged plume dispersion.

3.8.15 Terminal yards for storage of cargo/containers and during construction temporary facilities will be provided to store construction materials. Open Storage Yard will be provided for container stacking, temporary storage for construction materials. Storage of HSD from DG sets and other equipment / Machinery.

3.8.16 Emissions from ships, vehicles during transportation and operational phase shall be controlled basis MARPOL convention protocol. Adequate pollution control measures will be taken during storage and handling of material. There shall be regular inspection, barriers at the perimeter of storage materials, proper maintenance of vehicles etc. The details of the emissions and control measures will be provided in EIA report.

3.8.17 Fugitive emissions are envisaged from material handling and transportation areas during the construction stage. These will be controlled by good housekeeping, sprinkling water in the dust prone areas, providing paved roads and proper fencing.

3.8.18 Spills are unlikely to occur during normal operations, as the primary in ICTT would be containers which would be handled using specialised equipment. In the event of accidental spills of cargo during transfer from / to the ships, Soil and groundwater remediation activity will be undertaken as per the requirement. Emission control norms and spill contingency shall be adhered to in all the cases.

3.8.19 The coastal stretches on the western coast are used both by Shompens and Nicobarese for fishing purposes. In terms of fisheries, the site has huge potential for oceanic tuna, which is virtually unexploited, and offers ample scope for deep sea fishing.

3.8.20 The area is inhabited by settlers from the mainland and aboriginal tribes Shompen and Nicobarese. No project activities are envisaged in the areas where the aboriginal tribes reside and therefore no impacts on the social and economic conditions are expected. However, due to the proposed development the likely change in the livelihood patterns, socio economic conditions, social behaviours, disease patterns, dependency on natural resource etc., for the settler community will be improved. The proposed development will generate significant number of jobs over the next two decades and catalyse the socio-economic growth of the local population in addition to improving connectivity and developing eco-tourism of the region.

3.8.21 Land acquisition and R&R issues are involved in 2 out of 7 revenue villages.

3.8.22 Benefits of the project: The proposed ICTT will allow India to participate in the regional and global maritime economy by becoming a major player in cargo transshipment. The proposed airport will support both the maritime sector and the tourism sector, which will attract international and national tourists to Great Nicobar to experience the outstanding natural environment and participate in sustainable tourism activities. A Mixed-use urban development in the vicinity of these major infrastructure works will also be necessary to support quality of life for the residents that will generate and enable growth in the various economic sectors over time. This will require the development of simultaneous primary and secondary urban infrastructure networks such as roads, public transport, energy and electrical power, as well as water, wastewater, and storm water facilities and services, which will form the skeleton of the proposed township master plan. It is estimated that after the project is fully implemented, it has the potential to generate around 2.6 Lakh jobs opportunity.

3.8.23 Details of Court cases: No Court case is pending against the proposed project. Land related cases are being dealt separately.

3.8.24 The EAC at the outset noted that this project encompasses development of simultaneous primary and secondary urban infrastructure networks such as roads, public transport, energy and electrical power, as well as water, wastewater, and storm water facilities and services, which will form the skeleton of the proposed township master plan. Therefore the PP has submitted the proposal to the EAC (Infra-1) in order to facilitate a comprehensive appraisal. The EAC taking into account the submissions made by the project proponent had a detailed deliberation during its 258th meeting on 17th -18th March, 2021 and **deferred** the proposal due to non-submission of the proper documents and for the want of following documents/ information:

- i. Details of Township & Area Development project for which 14960 ha of land will be require out of 16610 ha, however, no details have been provided. Details regarding component of Township & Area Development project along with proposed land use, site grading shall be submitted. A note on feasibility of habitation in light of hazards such as seismic, Tsunami etc to be included.
- ii. Detailed requirement of the freshwater along with the source of water for various component of the project detailing water budget shall be calculated and submitted.
- iii. The site proposed for Port be re-analysed in terms of impact on Leatherback Turtle and other geo-seismological view. Alternate site should also be explored as a precautionary principal.
- iv. Geographical Meteorological study report be obtained from Indian Meteorological Department and National Centre for Seismology and submit assessment with regard to the proposed activities.
- v. Conformity of proposed integrated development in relation to latest CZMP at 1: 4000 scale and Island Development plan for Great Nicobar should be provided.
- vi. Area statement indicating total area of great Nicobar, components of proposed activities, ecologically sensitives areas and non-development areas, forest area etc., to be provided.

Agenda 3.11

Any other item with the permission of Chair.

No other items were discussed by the Committee

Annexure-A

Following members were present during the 258th EAC (Infra-1) meeting held on 17th – 18th March, 2021:

S. No.	Name	Designation	Remarks
1.	Dr. Deepak ArunApte	Chairman	Present
2.	Sh. S. Jeyakrishnan	Member	Present
3.	Sh. Manmohan Singh Negi	Member	Present
4.	Sh. Sham Wagh	Member	Present
5.	Dr. MukeshKhare	Member	Requested absentia
6.	Dr. Ashok Kumar Pachauri	Member	Present
7.	Dr. V.K Jain	Member	Absent
8.	Dr. Manoranjan Hota	Member	Present
9.	Sh. R Debroy	Member	Absent
10.	Dr. Rajesh Chandra	Member	Absent
11.	Dr. M.V Ramana Murthy	Member	Present
12.	Smt. Bindu Manghat	Member	Absent
13.	Dr. Niraj Sharma	Member	Present
14.	Sh. Amardeep Raju,	Scientist 'E' & Member Secretary, MoEF&CC	Present
15.	Dr. Rajesh P Rastogi	Scientist 'C', MoEF&CC	Present

ANNEXURE 22

Minutes of the 260th meeting of Expert Appraisal Committee held on 5th - 6th April, 2021 through Video Conferencing for the projects related to Infrastructure Development, all Ship breaking yards including ship breaking units 7(b); Industrial Estate/Parks/Complexes/Areas, Export Processing Zones, Special Economic Zones, Biotech Parks, Leather Complexes 7(c); Ports, harbours, break waters, dredging 7(e) and National Highways 7(f)

The 260th Meeting of Expert Appraisal Committee (EAC) of Infra-1 (IA-III) was held through Video Conferencing at the Ministry of Environment, Forest & Climate Change (MoEF&CC), Indira Paryavaran Bhavan, New Delhi on 5th – 6th April, 2021 under the Chairmanship of Dr. Deepak Arun Apte. A list of participants is annexed as **Annexure-A**.

1. OPENING REMARKS OF THE CHAIRMAN

At the outset, Dr. Deepak Arun Apte, Chairman, EAC welcomed the Members of the EAC and requested Shri Amardeep Raju, the Member Secretary of the EAC to initiate the proceedings of the meeting with a brief account of the activities undertaken by the Ministry under Infra-1 Division. Dr. V.K. Jain requested leave of absence due to health issues.

2. CONFIRMATION OF THE MINUTES OF THE LAST MEETING

The Committee confirmed the Minutes of 258th EAC meeting held on 17th – 18th March, 2021.

- i. *In the 254th meeting of EAC held on 11th February, 2021 following table is inserted for the Agenda Item No 3.7*

PP has requested for the following amendments in the Environmental and CRZ Clearance issued by the Ministry vide letter no. 11-42/2013-IA.III, dated 4th July, 2016.

S. No.	Plant Facility	As per EC issued on 04.07.2016	Amendment requested
1	Handling Capacity	Phase 1: 3.60 MTPA; Phase 2: 7.20 MTPA	7.2 MTPA
2	Offshore LNG Facility	Offshore LNG FSRU, FSU etc	GBS with LNG storage and regasification
3	Mooring Dolphins	Six mooring dolphins each for FSU and LNGC	Four (04) mooring piles with walkways
4	Estimated project cost	Rs. 870 Cr Phase1 and Rs. 400 Cr for Phase2	Rs. 1270 Cr
5	Regasification technology- Intermediate Fluid Vaporiser	propane will be used as an intermediate fluid	glycol water will be used as an intermediate fluid

6	Loading/unloading Arms and Hoses	Eight (8) 16'' loading/unloading arms	Four (4) 16'' loading/unloading arms
7	Floating Storage and Regasification Unit (FSRU)	FSRU-barge with 6m draft, regasification modules	Regasification unit will be on top of GBS
8	LNG Carrier Capacity	75,000 m to 155,000 m	175,000 m
9	LNG Storage	LNG carrier-174,000m - 266,000m , buffer-40000m	210,000 m3 tank inside GBS
10	Breasting Dolphins	Three (03) breasting dolphins for each of FSU, LNG	Fenders are attached to GBS it self

ii. In the Minutes of 256th Meeting of Expert Appraisal Committee (EAC) held on 3rd - 4th March, 2021, following is inserted:

S. No	MoM of 256 th EAC	Revision
3.1 – 3(v)	No objection certificate from the Pardip port for this activity be submitted.	The master plan of Pardip port shouldn't overlap with activities of proposed port and hence, an undertaking in this regard may be submitted to the Ministry

3. AGENDA WISE CONSIDERATION OF PROPOSALS:

Agenda wise details of proposals discussed and decided in the meeting are as following:

Agenda No. 3.1

Development of 4 lane inter-corridor (Greenfield alignment) from Shiwrampur (Ch. 55+002) to Ramnagar (Ch. 109+327) under Bharatmala Pariyojna (Lot-5, Pkg-7) in state of Bihar (Package-2, Length- 54.325 km) by M/s National Highways Authority of India - Terms of Reference (Proposal No IA/BR/NCP/205173/2021 File No 10/18/2021-IA.III)

“The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

The project proponent along with the EIA consultant M/s P & M Solution, Uttar Pradesh has made a presentation through Video Conferencing and provided the following information-

3.1.1 The proposed project is for Development of 4 lane inter corridor (Green field alignment) starts from Shiwrampur District (Ch. 55+002), Jehanbad to Ramnagar District (Ch. 109+327), Patna under Bharatmala Pariyojna (Lot-5/Package-7) in the state of Bihar (Package-II). The

proposed road passes through three Districts viz. Jehanabad, Patna and Nalanda in the state of Bihar and is connected with Berka, Kukari, Sohjana, Jamalpur, Maheva, Malathi, Supi, Kako, Modanganj, Milkidrvra, Shadipur in Jehanabad District; Dhanrua, Nasaratpur, Chhati, Tadwa, Fatuha in Patna District, and Verthu, Abbupur, Salempur and Kandhauli in Nalanda District. The total length of the proposed alignment is 54.325 km approx.

3.1.2 The proposed project falls under 7(f), Category-A, Highway as per EIA notification 2006. Total investment/cost of the project is Rs 1,075.41 Crores.

3.1.3 The Proposed Right of Way (RoW) is 60 m. The terrain of the alignment area is mainly plain and rolling area. The project alignment involves acquisition of 341.66 ha of land which includes 309.89 ha of private land, 28.77 ha Government land and 3 ha forest land. Compensation for land acquisition will be given as per RFCT LARR Act, 2013. For diversion of forest land, the forest proposal shall be prepared after consultation with concerned forest officer, if it attracts FC under section 2, 1980.

3.1.4 The proposed alignment does not pass through any National Parks, Wildlife Sanctuary, and Tiger Reserve or any other Eco-Sensitive Zone (ESZ) or Eco-Sensitive Area (ESA) notified by the MoEF&CC within 10 Km radius of the project site.

3.1.5 There are 03 nos. of Rivers, 24 nos. of Canals, 20 nos. of Nalaha falling along the alignment. There shall be no major impact on the drainage system as 147 numbers of structures (such as culverts, minor bridges, major bridges etc.) will be constructed. The road will have 3 Major Bridges, 44 no's of Minor Bridges, 4 no's of Vehicular underpass, 03 no's of LVUP, 02 no's of SVUP, 2 nos. of Interchanges/Flyover, 1 nos. ROB and 88 nos. of Box Culverts.

3.1.6 The total requirement of water for construction is estimated to 12,777.59 KL. Water will be extracted from surface sources. The ground water will be abstracted for camp site after obtaining permission from the competent authority.

3.1.7 A total of 1100 nos. of trees falls in proposed ROW. However, bare minimum no. of trees shall be felled for construction of four lane road. Detailed tree inventories will be provided after joint enumeration with the appropriate authority in EIA. Avenue plantation shall be carried out as per IRC SP: 21:2009 on available ROW apart from statutory requirements.

3.1.8 A total number of 25 structures will be affected due to proposed Road. The NHAI shall compensate the entire affected title holder as per NHAI Act, 1956 and Right to fair compensation and transparency in land acquisition, rehabilitation and Resettlement Act, 2013.

3.1.9 All safety measures will be provided as per NHAI Safety Manual and IRC: SP 88 and Expressway Manual IRC: SP 99). Safety Measures, as provided in NHAI Safety Manual i.e. Unit-3 (pertaining to Traffic Safety, such as traffic control zone, advance warning zones, traffic control devices, regulatory & warning signs cylindrical cones, drums, flagman, Barricades, Pedestrian

Safety , speed control etc.) and other safety guidelines & measures suggested in Unit-4 (Construction Zone Safety), Unit 5 (Temporary Structures Safety), Unit-6 (Workers & Work Zone Safety), Unit-7 (Electrical & Mechanical Safety) will be strictly implemented. All required illustrative plans for safety at construction sites keeping in view all situations highlighted IRC: SP: 55 and in NHAI Safety Manual will be prepared and strictly implemented.

3.1.10 Benefits of the Project: The main objective of the proposed project is to reduce the distance and travel time from North-Bihar to South Bihar and to give connectivity to remote areas and major cities. The project will enhance economic development in the area through industrial areas, Agriculture (Market access), commercial development and consequent employment. The junctions with existing road will be planned in the form of interchanges and flyover to ensure uninterrupted flow of traffic. The proposed road would act as the prime artery for the economic flow to this region. It will enhance opportunities to locals, strengthen tourist development, ensure road safety, and provide better transportation facilities and other facilities such as way side amenities. Vehicle operating cost will also be reduced due to improved road quality. The compensatory plantation and road side plantation shall further improve the air quality of the region. About 1000 persons will be employed temporarily during the construction phase for a period of 3 years. During operation phase about 50 persons will be employed.

3.1.11 Details of Court cases: No court case is pending against the proposed project.

3.1.12 The EAC noted that the NHAI has submitted 5 proposals from Package-I to Package-V which can be seen in the MOM from agenda item 3.1 to 3.5. All the packages are in the same alignment however divided into 5 packages for convenience. The Kacchi Dargah–Bidupur Bridge currently under construction will span the river Ganges, connecting Kacchi Dargah in Patna and Bidupur in Hajipur in the state of Bihar. The proposed completion date is Nov 2021. This bridge will provide an easy roadway link between the northern and southern parts of Bihar and will connect two major national highways, linking NH 30 (Patna-Bakhtiyarpur Road) to NH 333 (Hajipur Samastipur Road). The bridge will reduce the load on Mahatma Gandhi Setu and will also reduce the traffic in the capital city of Patna. The bridge will be a major connecting bridge between North and South Bihar.

3.1.13 The concrete laying in well foundations started on 19 July 2017 on the Raghopur side. Total 67 foundations to be constructed (65 DD type well foundations and 2 Circular Well foundations). The length of main bridge is 9.750 Km (75+65x150+75) and the length of both side approach roads is 1.5 Km (South/Kachhi Dargah side) and 8.5 Km (North/Bidupur/Kalyanpur Side). Total length of the project is 19.750 Km.

3.1.14 The project is being implemented by L&T Construction, JV with Daewoo E&C from Korea. The estimated project cost is Rs. 3115 Cr. The proposed bridge is one of the longest bridges on river Ganga. The project authority is Road Construction Department, Bihar.

3.1.15 In case construction of Kacchi Dargah–Bidupur Bridge could not be completed, the existing bridge (Gandhi Setu) can be used as alternative alignment/connectivity from Kacchi Dargah (End point of Package-3) to Kalyanpur (Starting point of Package-IV) through existing NH- 30 (Patna-Bakhtiyarpur Road) and NH-103 (Hajipur Samastipur Road). The existing Gandhi Setu is located approximate 10 Km away from end point of Pakage-3 and Starting point of Package-4.

3.1.16 The EAC, taking into account the submission made by the project proponent had a detailed deliberation in its 260th meeting during 5th - 6th April, 2021 and **recommended the proposal for grant of Terms of Reference (ToR)** with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects:

- i. Apart from land compensation, the loss for crop has also to be compensated.
- ii. The proponent shall carry out a detailed traffic flow study to assess inflow of traffic from adjoining areas like airport/urban cities. The detailed traffic planning studies shall include complete design, drawings and traffic circulation plans (taking into consideration integration with proposed alignment and other state roads etc.). Wherever required adequate connectivity in terms of VUP (vehicle underpass)/ PUP (Pedestrian underpass) needs to be included.
- iii. Cumulative impact assessment study to be carried out along the entire stretch including the other packages in the current stretch under consideration.
- iv. The alignment of road should be such that the cutting of trees is kept at bare minimum and for this the proponent shall obtain permission from the competent authorities. Alignment also should be such that it will avoid cutting old and large and heritage trees if any. All such trees to be geotagged.
- v. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent, based on the commitments made during the public hearing, shall include all the activities required to be taken to fulfil these commitments in the Environment Management Plan along with cost estimates of these activities, in addition to the activities proposed as per recommendations of EIA Studies and the same shall be submitted to the ministry as part of the EIA Report. The EMP shall be implemented at the project cost or any other funding source available with the project proponent.
- vi. In pursuance of Ministry's OM no stated above the project proponent shall add one annexure in the EIA Report indicating all the commitments made by the PP to the public during public hearing and submit it to the Ministry and the EAC.
- vii. The proponent shall carry out a comprehensive socio-economic assessment and also impact on biodiversity with emphasis on impact of ongoing land acquisition on the local people living around the proposed alignment. The Social Impact Assessment should have social indicators which can reflect on impact of acquisition on fertile land. The Social Impact Assessment shall take into consideration of key parameters like people's dependency on fertile agricultural land, socio-economic spectrum, impact of the project at local and regional levels.

- viii. The Action Plan on the compliance of the recommendations of the CAG as per Ministry's Circular No. J-11013/71/2016-IA.I (M), dated 25th October, 2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.

Agenda No. 3.2

Development of 4 lane inter corridor (Greenfield alignment) from Amas (Old NH-2/New NH-19) (Ch. 00+000) to Shiwrampur (Ch. 55+002) under Bharatmala Pariyojna(Lot-5/Package-7) in state of Bihar (Package-I Length -55.002 km) by M/s National Highways Authority of India – Terms of Reference (Proposal No. IA/BR/NCP/204598/2021 and File No. 10/19/2021-IA.III)

“The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

The project proponent along with the EIA consultant M/s P & M Solution, Uttar Pradesh has made a presentation through Video Conferencing and provided the following information-

3.2.1. The proposed project is for Development of 4 lane inter corridor (Green field alignment) starts from existing National Highway 2 (New NH-19) from Amas (Ch.00+000) to Shiwrampur (Ch. 55+002) under Bharatmala Pariyojna (Lot-5/Package-7) in the state of Bihar (Package-I). The proposed road passes through Gaya District in the state of Bihar and passes through approx. 60 villages such as Amas, Guraru, Paraiya, Itawa, Koiri Bigha, Manda, Deal Chak, Salaipura, Parsohad, Anantpur, Burma Tilor road, Kormath, Shekhipur, Mungara, Nepa Chak, Fatehpur, Tekari, Bela Ganj, etc. The total length of the proposed alignment is approx. 55.002 km.

3.2.2. The proposed project falls under 7(f), Category-A, Highway as per EIA notification 2006. Total investment/cost of the project is Rs 1207.91 Crores.

3.2.3. The alignment is mainly passing through agriculture land. The Proposed Right of Way (RoW) is 60 m. The terrain of the alignment area is mainly flat to undulating in nature. The project alignment involves acquisition of 376.50 ha of land which includes 310.18 ha of private land, 60.82 ha Government land and 5.5 ha forest land. The land will be acquired as per NH Act 1956 and compensation will be given as per RFCT LARR Act, 2013. As the proposed project falls in notified protected forest areas at some locations (crossings point of roads/railway/canals), declared for management purposes, the forest proposal shall be prepared after consultation with concerned forest officer if it attracts FC under section 2, 1980.

3.2.4. The proposed alignment does not pass through any National Parks, Wildlife Sanctuary, and Tiger Reserve or any other Eco-Sensitive Zone (ESZ) or Eco-Sensitive Area (ESA) notified by the MoEF&CC within 10 Km radius of the project site.

3.2.5. There are 04 nos. of Rivers, 7 nos. of Canals, 20 nos. of Nalahs, falling along the alignment. There shall be no major impact on the drainage system as 151 numbers of structures (such as culverts, minor bridges, major bridges etc.) will be constructed. The Proposed road will have 4 Major Bridges, 27 no.s of Minor Bridges, 2 nos. of Vehicular underpass, 05 no.s of LVUP, 12 no.s of SVUP, 3 nos. of Interchanges/Flyover, 2 nos. ROB and 96 nos. of Box Culverts.

3.2.6. The total water requirement during construction is estimated to 12956 KL. Water will be extracted from surface sources. The ground water will be abstracted for camp site after obtaining permission from the competent authority.

3.2.7. The proposed alignment will require cutting of approximately 1300 nos. of trees. However, bare minimum no. of trees shall be felled for construction of four lane road. Detailed tree inventories will be provided after joint enumeration with the appropriate authority in EIA. Avenue plantation shall be carried out as per IRC SP: 21:2009 on available ROW apart from statutory requirements.

3.2.8. A total number of 50 structures will be affected due to proposed Road alignment. The NHAI shall compensate the entire affected title holder as per NHAI Act, 1956 and Right to fair compensation and transparency in land acquisition, rehabilitation and Resettlement Act, 2013.

3.2.9. All safety measures will be provided as per NHAI Safety Manual and IRC: SP 88 and Expressway Manual IRC: SP 99). Safety Measures, as provided in NHAI Safety Manual i.e. Unit-3 (pertaining to Traffic Safety , such as traffic control zone , advance warning zones, traffic control devices, regulatory & warning signs cylindrical cones, drums, flagman, Barricades, Pedestrian Safety , speed control etc.) and other safety guidelines & measures suggested in Unit-4 (Construction Zone Safety), Unit 5 (Temporary Structures Safety), Unit-6 (Workers & Work Zone Safety), Unit-7 (Electrical & Mechanical Safety) will be strictly implemented. All required illustrative plans for safety at construction sites keeping in view all situations highlighted IRC: SP: 55 and in NHAI Safety Manual will be prepared and strictly implemented.

3.2.10. Benefits of the Project: The main objective of the proposed project is to reduce the distance and travel time from NH- 2 to NH-57 and North-Bihar to South Bihar and to give connectivity to remote areas and major cities. The project will enhance economic development in the area through industrial areas, Agriculture (Market access), commercial development and consequent employment. The junctions with existing road will be planned in the form of interchanges and flyover to ensure uninterrupted flow of traffic. The proposed road would act as the prime artery for the economic flow to this region. It will enhance opportunities to locals, strengthen tourist development, ensure road safety, and provide better transportation facilities and other facilities such as way side amenities. Vehicle operating cost will also be reduced due to improved road quality. The compensatory plantation and road side plantation shall further improve the air quality of the region. About 1000 persons will be employed temporarily during the construction phase for a period of 3 years. During operation phase about 50 persons will be employed.

3.2.11. Details of Court cases: No court case is pending against the proposed project.

3.2.12. The EAC noted that the NHAI has posed 5 proposals from Package-I to Package-V which can be seen in the MOM from agenda item 3.1 to 3.5. All the packages are in the same alignment however divided into 5 packages for convenience. The Kacchi Dargah–Bidupur Bridge currently under construction will span the river Ganges, connecting Kacchi Dargah in Patna and Bidupur in Hajipur in the state of Bihar. The proposed completion date is Nov 2021. This bridge will provide an easy roadway link between the northern and southern parts of Bihar and will connect two major national highways, linking NH 30 (Patna-Bakhtiyarpur Road) to NH 333 (Hajipur Samastipur Road). The bridge will reduce the load on Mahatma Gandhi Setu and will also reduce the traffic in the capital city of Patna. The bridge will be a major connecting bridge between North and South Bihar.

3.2.13. The concrete laying in well foundations started on 19 July 2017 on the Raghopur side. Total 67 foundations to be constructed (65 DD type well foundations and 2 Circular Well foundations). The length of main bridge is 9.750 Km (75+65x150+75) and the length of both side approach roads is 1.5 Km (South/Kachhi Dargah side) and 8.5 Km (North/Bidupur/Kalyanpur Side). Total length of the project is 19.750 Km.

3.2.14. The project is being implemented by L&T Construction, JV with Daewoo E&C from Korea. The estimated project cost is Rs. 3115 Cr. The proposed bridge is one of the longest bridges on river Ganga. The project authority is Road Construction Department, Bihar.

3.2.15. In case construction of Kacchi Dargah–Bidupur Bridge could not be completed, the existing bridge (Gandhi Setu) can be used as alternative alignment/connectivity from Kacchi Dargah (End point of Package-3) to Kalyanpur (Starting point of Package-IV) through existing NH- 30 (Patna-Bakhtiyarpur Road) and NH-103 (Hajipur Samastipur Road). The existing Gandhi Setu is located approximate 10 Km away from end point of Package-3 and Starting point of Package-4.

3.2.16. The EAC, taking into account the submission made by the project proponent had a detailed deliberation in its 260th meeting during 5th - 6th April, 2021 and **recommended the proposal for grant of Terms of Reference (ToR)** with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects:

- i. Apart from land compensation, the loss for crop has also to be compensated.
- ii. The proponent shall carry out a detailed traffic flow study to assess inflow of traffic from adjoining areas like airport/urban cities. The detailed traffic planning studies shall include complete design, drawings and traffic circulation plans (taking into consideration integration with proposed alignment and other state roads etc.). Wherever required adequate connectivity in terms of VUP (vehicle underpass)/ PUP (Pedestrian underpass) needs to be included.

- iii. Cumulative impact assessment study to be carried out along the entire stretch including the other packages in the current stretch under consideration.
- iv. The alignment of road should be such that the cutting of trees is kept at bare minimum and for this the proponent shall obtain permission from the competent authorities. Alignment also should be such that it will avoid cutting old and large and heritage trees if any. All such trees to be geotagged.
- v. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent, based on the commitments made during the public hearing, shall include all the activities required to be taken to fulfil these commitments in the Environment Management Plan along with cost estimates of these activities, in addition to the activities proposed as per recommendations of EIA Studies and the same shall be submitted to the ministry as part of the EIA Report. The EMP shall be implemented at the project cost or any other funding source available with the project proponent.
- vi. In pursuance of Ministry's OM no stated above the project proponent shall add one annexure in the EIA Report indicating all the commitments made by the PP to the public during public hearing and submit it to the Ministry and the EAC.
- vii. The proponent shall carry out a comprehensive socio-economic assessment and also impact on biodiversity with emphasis on impact of ongoing land acquisition on the local people living around the proposed alignment. The Social Impact Assessment should have social indicators which can reflect on impact of acquisition on fertile land. The Social Impact Assessment shall take into consideration of key parameters like people's dependency on fertile agricultural land, socio-economic spectrum, impact of the project at local and regional levels.
- viii. The Action Plan on the compliance of the recommendations of the CAG as per Ministry's Circular No. J-11013/71/2016-IA.I (M), dated 25th October, 2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.

Agenda No. 3.3

Development of 4 lane inter corridor (Greenfield alignment) from Kalyanpur (Ch. 0+000) to Tal Dasraha (Ch. 47+000) (Package-IV, Length - 47.0 km) under Bharatmala Pariyojana (Lot-5, Package-7) in state of Bihar by M/s National Highways Authority of India - Terms of Reference (Proposal No. IA/BR/NCP/205952/2021 and File No. 10/20/2021-IA.III)

“The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

The project proponent along with the EIA consultant M/s P & M Solution, Uttar Pradesh has made a presentation through Video Conferencing and provided the following information-

3.3.1. The proposed project is for Development of 4 lane inter corridor (Green field alignment) starts from Kalyanpur (new NH 19: Ch. 0+000 Km) to Tal Dasraha (Ch. 47+000 Km) under Bharatmala Pariyojna (Lot-5/Package-7) in the state of Bihar (Package-IV). The proposed road passes through 2 districts viz. Vaishali and Samastipur district in the state of Bihar and passes through approx. 57 villages. The major settlements along the alignment are Raja Pakad, Jandaha, Patepur, Hazipur, Mahua in Vaishali district and Samastipur, Kalyanpur and Varishnagar in Samastipur district. The total length of the proposed alignment is approx. 47.000 km.

3.3.2. The proposed project falls under 7(f), Category-A, Highway as per EIA notification 2006. Total investment/cost of the project is Rs 1165.54 Crores.

3.3.3. The alignment is mainly passing through agriculture land. The Proposed Right of Way (RoW) is 60 m. The terrain of the alignment area is mainly flat to undulating in nature. The project alignment involves acquisition of 304.54 ha of land which includes 294.03 ha of private land, 8.87 ha Government land and 1.5 ha forest land. The land will be acquired as per NH Act 1956 and compensation will be given as per RFCT LARR Act, 2013. As the proposed project falls in notified protected forest areas at some locations (crossings point of roads/railway/canals), declared for management purposes, the forest proposal shall be prepared after consultation with concerned forest officer if it attracts FC under section 2, 1980.

3.3.4. The proposed alignment does not pass through any National Parks, Wildlife Sanctuary, and Tiger Reserve or any other Eco-Sensitive Zone (ESZ) or Eco-Sensitive Area (ESA) notified by the MoEF&CC within 10 Km radius of the project site.

3.3.5. There are 02 nos. of rivers, 23 Nos. of Canals, 04 Nos. of Nalaha, falling along the alignment. There shall be no major impact on the drainage system as 113 numbers of structures (such as culverts, minor bridges, major bridges etc.) will be constructed. The Proposed road will have 2 Major Bridges, 6 no.s of Minor Bridges, 4 nos. of Trumpet/Flyover, 5 no.s of VUP, 5 no.s of LVUP, 15 nos. of SVUP, 1 nos. ROB and 75 nos. of Box Culverts.

3.3.6. The total water requirement during construction is estimated to 13329 KL. Water will be extracted from surface sources. The ground water will be abstracted for camp site after obtaining permission from the competent authority.

3.3.7. The proposed alignment will require cutting of approximately 1750 nos. of trees. However, bare minimum no. of trees shall be felled for construction of four lane road. Detailed tree inventories will be provided after joint enumeration with the appropriate authority in EIA. Avenue plantation shall be carried out as per IRC SP: 21:2009 on available ROW apart from statutory requirements.

3.3.8. A total number of 30 structures will be affected due to proposed Road alignment. The NHAI shall compensate the entire affected title holder as per NHAI Act, 1956 and Right to fair compensation and transparency in land acquisition, rehabilitation and Resettlement Act, 2013.

3.3.9. All safety measures will be provided as per NHA Safety Manual and IRC: SP 88 and Expressway Manual IRC: SP 99). Safety Measures, as provided in NHA Safety Manual i.e. Unit-3 (pertaining to Traffic Safety , such as traffic control zone , advance warning zones, traffic control devices, regulatory & warning signs cylindrical cones, drums, flagman, Barricades, Pedestrian Safety , speed control etc.) and other safety guidelines & measures suggested in Unit-4 (Construction Zone Safety), Unit 5 (Temporary Structures Safety), Unit-6 (Workers & Work Zone Safety), Unit-7 (Electrical & Mechanical Safety) will be strictly implemented. All required illustrative plans for safety at construction sites keeping in view all situations highlighted IRC: SP: 55 and in NHA Safety Manual will be prepared and strictly implemented.

3.3.10. Benefits of the Project: The proposed road would act as the prime artery for the economic flow to this region. It will enhance economic development, provide employment opportunities to locals, strengthen tourist development, ensure road safety, and provide better transportation facilities and other facilities such as way side amenities. Vehicle operating cost will also be reduced due to improved road quality. The compensatory plantation and road side plantation shall further improve the air quality of the region. The total manpower required for the project is 1050. About 1000 persons will be employed temporarily during the construction phase for a period of 3 years. During operation phase about 50 persons will be employed.

3.3.11. Details of Court cases: No court case is pending against the proposed project.

3.3.12. The EAC noted that the NHA has posed 5 proposals from Package-I to Package-V which can be seen in the MOM from agenda item 3.1 to 3.5. All the packages are in the same alignment however divided into 5 packages for convenience. The Kacchi Dargah–Bidupur Bridge currently under construction will span the river Ganges, connecting Kacchi Dargah in Patna and Bidupur in Hajipur in the state of Bihar. The proposed completion date is Nov 2021. This bridge will provide an easy roadway link between the northern and southern parts of Bihar and will connect two major national highways, linking NH 30 (Patna-Bakhtiyarpur Road) to NH 333 (Hajipur Samastipur Road). The bridge will reduce the load on Mahatma Gandhi Setu and will also reduce the traffic in the capital city of Patna. The bridge will be a major connecting bridge between North and South Bihar.

3.3.13. The concrete laying in well foundations started on 19 July 2017 on the Raghapur side. Total 67 foundations to be constructed (65 DD type well foundations and 2 Circular Well foundations). The length of main bridge is 9.750 Km (75+65x150+75) and the length of both side approach roads is 1.5 Km (South/Kachhi Dargah side) and 8.5 Km (North/Bidupur/Kalyanpur Side). Total length of the project is 19.750 Km.

3.3.14. The project is being implemented by L&T Construction, JV with Daewoo E&C from Korea. The estimated project cost is Rs. 3115 Cr. The proposed bridge is one of the longest bridges on river Ganga. The project authority is Road Construction Department, Bihar.

3.3.15. In case construction of Kacchi Dargah–Bidupur Bridge could not be completed, the existing bridge (Gandhi Setu) can be used as alternative alignment/connectivity from Kacchi Dargah (End point of Package-3) to Kalyanpur (Starting point of Package-IV) through existing NH- 30 (Patna-Bakhtiyarpur Road) and NH-103 (Hajipur Samastipur Road). The existing Gandhi Setu is located approximate 10 Km away from end point of Package-3 and Starting point of Package-4.

3.3.16. The EAC, taking into account the submission made by the project proponent had a detailed deliberation in its 260th meeting during 5th - 6th April, 2021 and **recommended the proposal for grant of Terms of Reference (ToR)** with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects:

- i. Apart from land compensation, the loss for crop has also to be compensated.
- ii. The proponent shall carry out a detailed traffic flow study to assess inflow of traffic from adjoining areas like airport/urban cities. The detailed traffic planning studies shall include complete design, drawings and traffic circulation plans (taking into consideration integration with proposed alignment and other state roads etc.). Wherever required adequate connectivity in terms of VUP (vehicle underpass)/ PUP (Pedestrian underpass) needs to be included.
- iii. Cumulative impact assessment study to be carried out along the entire stretch including the other packages in the current stretch under consideration.
- iv. The alignment of road should be such that the cutting of trees is kept at bare minimum and for this the proponent shall obtain permission from the competent authorities. Alignment also should be such that it will avoid cutting old and large and heritage trees if any. All such trees to be geotagged.
- v. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent, based on the commitments made during the public hearing, shall include all the activities required to be taken to fulfil these commitments in the Environment Management Plan along with cost estimates of these activities, in addition to the activities proposed as per recommendations of EIA Studies and the same shall be submitted to the ministry as part of the EIA Report. The EMP shall be implemented at the project cost or any other funding source available with the project proponent.
- vi. In pursuance of Ministry's OM no stated above the project proponent shall add one annexure in the EIA Report indicating all the commitments made by the PP to the public during public hearing and submit it to the Ministry and the EAC.
- vii. The proponent shall carry out a comprehensive socio-economic assessment and also impact on biodiversity with emphasis on impact of ongoing land acquisition on the local people living around the proposed alignment. The Social Impact Assessment should have social indicators which can reflect on impact of acquisition on fertile land. The Social Impact Assessment shall take into consideration of key parameters like people's dependency on fertile agricultural land, socio-economic spectrum, impact of the project at local and regional levels.

- viii. The Action Plan on the compliance of the recommendations of the CAG as per Ministry's Circular No. J-11013/71/2016-IA.I (M), dated 25th October, 2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.

Agenda No. 3.4

Development of 4 lane inter corridor (Greenfield alignment) from Tal-Dasraha (Ch. 47+000) to Bela Nawada (NH 57) (Ch. 89+100) (Package-5, Length - 42.100 km) under Bharatmala Pariyojana (Lot-5, Package-7) in the state of Bihar by M/s National Highways Authority of India - Terms of Reference (Proposal No. IA/BR/NCP/205963/2021 and File No. 10/21/2021-IA.III)

“The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

The project proponent along with the EIA consultant M/s P & M Solution, Uttar Pradesh has made a presentation through Video Conferencing and provided the following information-

3.4.1. The proposed project is for Development of 4 lane inter corridor (Green field alignment) starts from Tal Dasraha (Ch. 47+000) to Bela Nawada (NH 57; Ch. 89+100) under Bharatmala Pariyojna (Lot-5/Package-7) in the state of Bihar (Package-V). The proposed road passes through 2 districts viz. Samastipur and Darbhanga district in the state of Bihar and passes through approx. 60 villages. The major settlements along the alignment are Kalyanpur, Hayaghat, Bahadurpur and Darbhanga. The total length of the proposed alignment is approx. 42.100 km.

3.4.2. The proposed project falls under 7(f), Category-A, Highway as per EIA notification 2006. Total investment/cost of the project is Rs 1133.34 Crores.

3.4.3. The alignment is mainly passing through agriculture land. The Proposed Right of Way (RoW) is 60 m. The terrain of the alignment area is mainly flat to undulating in nature. The project alignment involves acquisition of 265.33 ha of land which includes 236.83 ha of private land, 25.5 ha Government land and 3.2 ha forest land. The land will be acquired as per NH Act 1956 and compensation will be given as per RFCT LARR Act, 2013. As the proposed project falls in notified protected forest areas at some locations (crossings point of roads/railway/canals), declared for management purposes, the forest proposal shall be prepared after consultation with concerned forest officer if it attracts FC under section 2, 1980.

3.4.4. The proposed alignment does not pass through any National Parks, Wildlife Sanctuary, and Tiger Reserve or any other Eco-Sensitive Zone (ESZ) or Eco-Sensitive Area (ESA) notified by the MoEF&CC within 10 Km radius of the project site.

3.4.5. There are 04 nos. of rivers, 7 Nos. of Canals, 81 Nos. of Nalahs, falling along the alignment. There shall be no major impact on the drainage system as 121 no.s numbers of structures (such as culverts, minor bridges, major bridges etc.) will be constructed. The Proposed road will have 5 Major Bridges, 7 no.s of Minor Bridges, 2 nos. of Fly over, 04 no.s of Vehicular underpass, 5 no.s LVUP, 14 no.s of SVUP, 2 nos. ROB and 81 nos. of Box Culverts.

3.4.6. The total water requirement during construction is estimated to 11673 KL. Water will be extracted from surface sources. The ground water will be abstracted for camp site after obtaining permission from the competent authority.

3.4.7. The proposed alignment will require cutting of approximately 1700 nos. of trees. However, bare minimum no. of trees shall be felled for construction of four lane road. Detailed tree inventories will be provided after joint enumeration with the appropriate authority in EIA. Avenue plantation shall be carried out as per IRC SP: 21:2009 on available ROW apart from statutory requirements.

3.4.8. A total number of 75 structures will be affected due to proposed Road alignment. The NHAI shall compensate the entire affected title holder as per NHAI Act, 1956 and Right to fair compensation and transparency in land acquisition, rehabilitation and Resettlement Act, 2013.

3.4.9. All safety measures will be provided as per NHAI Safety Manual and IRC: SP 88 and Expressway Manual IRC: SP 99). Safety Measures, as provided in NHAI Safety Manual i.e. Unit-3 (pertaining to Traffic Safety , such as traffic control zone , advance warning zones, traffic control devices, regulatory & warning signs cylindrical cones, drums, flagman, Barricades, Pedestrian Safety , speed control etc.) and other safety guidelines & measures suggested in Unit-4 (Construction Zone Safety), Unit 5 (Temporary Structures Safety), Unit-6 (Workers & Work Zone Safety), Unit-7 (Electrical & Mechanical Safety) will be strictly implemented. All required illustrative plans for safety at construction sites keeping in view all situations highlighted IRC: SP: 55 and in NHAI Safety Manual will be prepared and strictly implemented.

3.4.10. Benefits of the Project: The proposed access controlled project with new alignment has been envisaged through an area which shall have the advantage of simultaneous development as well as shall result in a shorter distance to travel. The proposed road would act as the prime artery for the economic flow to this region. It will enhance economic development, provide employment opportunities to locals, strengthen tourist development, ensure road safety, and provide better transportation facilities and other facilities such as way side amenities. Vehicle operating cost will also be reduced due to improved road quality. The compensatory plantation and road side plantation shall further improve the air quality of the region. The total manpower required for the project is 1050. About 1000 persons will be employed temporarily during the construction phase for a period of 3 years. During operation phase about 50 persons will be employed on permanent basis.

3.4.11. Details of Court cases: No court case is pending against the proposed project.

3.4.12. The EAC noted that the NHAI has posed 5 proposals from Package-I to Package-V which can be seen in the MOM from agenda item 3.1 to 3.5. All the packages are in the same alignment however divided into 5 packages for convenience. The Kacchi Dargah–Bidupur Bridge currently under construction will span the river Ganges, connecting Kacchi Dargah in Patna and Bidupur in Hajipur in the state of Bihar. The proposed completion date is Nov 2021. This bridge will provide an easy roadway link between the northern and southern parts of Bihar and will connect two major national highways, linking NH 30 (Patna-Bakhtiyarpur Road) to NH 333 (Hajipur Samastipur Road). The bridge will reduce the load on Mahatma Gandhi Setu and will also reduce the traffic in the capital city of Patna. The bridge will be a major connecting bridge between North and South Bihar.

3.4.13. The concrete laying in well foundations started on 19 July 2017 on the Raghopur side. Total 67 foundations to be constructed (65 DD type well foundations and 2 Circular Well foundations). The length of main bridge is 9.750 Km (75+65x150+75) and the length of both side approach roads is 1.5 Km (South/Kachhi Dargah side) and 8.5 Km (North/Bidupur/Kalyanpur Side). Total length of the project is 19.750 Km.

3.4.14. The project is being implemented by L&T Construction, JV with Daewoo E&C from Korea. The estimated project cost is Rs. 3115 Cr. The proposed bridge is one of the longest bridges on river Ganga. The project authority is Road Construction Department, Bihar.

3.4.15. In case construction of Kacchi Dargah–Bidupur Bridge could not be completed, the existing bridge (Gandhi Setu) can be used as alternative alignment/connectivity from Kacchi Dargah (End point of Package-3) to Kalyanpur (Starting point of Package-IV) through existing NH- 30 (Patna-Bakhtiyarpur Road) and NH-103 (Hajipur Samastipur Road). The existing Gandhi Setu is located approximate 10 Km away from end point of Package-3 and Starting point of Package-4.

3.4.16. The EAC, taking into account the submission made by the project proponent had a detailed deliberation in its 260th meeting during 5th - 6th April, 2021 and **recommended the proposal for grant of Terms of Reference (ToR)** with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects:

- i. Apart from land compensation, the loss for crop has also to be compensated.
- ii. The proponent shall carry out a detailed traffic flow study to assess inflow of traffic from adjoining areas like airport/urban cities. The detailed traffic planning studies shall include complete design, drawings and traffic circulation plans (taking into consideration integration with proposed alignment and other state roads etc.). Wherever required adequate connectivity in terms of VUP (vehicle underpass)/ PUP (Pedestrian underpass) needs to be included.

- iii. Cumulative impact assessment study to be carried out along the entire stretch including the other packages in the current stretch under consideration.
- iv. The alignment of road should be such that the cutting of trees is kept at bare minimum and for this the proponent shall obtain permission from the competent authorities. Alignment also should be such that it will avoid cutting old and large and heritage trees if any. All such trees to be geotagged.
- v. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent, based on the commitments made during the public hearing, shall include all the activities required to be taken to fulfil these commitments in the Environment Management Plan along with cost estimates of these activities, in addition to the activities proposed as per recommendations of EIA Studies and the same shall be submitted to the ministry as part of the EIA Report. The EMP shall be implemented at the project cost or any other funding source available with the project proponent.
- vi. In pursuance of Ministry's OM no stated above the project proponent shall add one annexure in the EIA Report indicating all the commitments made by the PP to the public during public hearing and submit it to the Ministry and the EAC.
- vii. The proponent shall carry out a comprehensive socio-economic assessment and also impact on biodiversity with emphasis on impact of ongoing land acquisition on the local people living around the proposed alignment. The Social Impact Assessment should have social indicators which can reflect on impact of acquisition on fertile land. The Social Impact Assessment shall take into consideration of key parameters like people's dependency on fertile agricultural land, socio-economic spectrum, impact of the project at local and regional levels.
- viii. The Action Plan on the compliance of the recommendations of the CAG as per Ministry's Circular No. J-11013/71/2016-IA.I (M), dated 25th October, 2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.

Agenda No. 3.5

Development of 4 lane inter corridor (Greenfield alignment) from Amas (Old NH-2/New NH-19) to Shiwrampur under Bharatmala Pariyojana (Lot-5, Package-7) in the state of Bihar - Package-III from Ramnagar (Ch. 00+000 to Kachchi Dargah (Ch.14+257) - Length 14.257 km by M/s National Highways Authority of India - Terms of Reference (Proposal No. IA/BR/NCP/206000/2021 and File No. 10/22/2021-IA.III).

[Note: The PP/Consultant has provided erroneous project title as the correct project name is "Development of 4 lanes inter corridor (Green field alignment) from Ramnagar to Kachchi Dargah under Bharatmala Pariyojna in state of Bihar (Lot-5/Package-7). Package-III (Km chainage from 00+000 to 14+257)". Further, in the proposed project there is diversion of 1 ha Forest land; however, in form-I, the PP has incorrectly mentioned that 0 ha of Forest land is Involved. It may be mentioned that the NHAI has been asked several times to submit the technically correct information. Despite several verbal requests, the NHAI/consultant is submitting their proposal with several mistakes.]

“The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

The project proponent along with the EIA consultant M/s P & M Solution, Uttar Pradesh has made a presentation through Video Conferencing and provided the following information-

3.5.1. The proposed project is for Development of 4 lane inter corridor (Green field alignment) starts from Ramnagar (Ch. 0+000) to Kachchi Dargah (Ch. 14+257) under Bharatmala Pariyojna (Lot-5/Package-7) in the state of Bihar (Package-III). The proposed road passes through Patna district in the state of Bihar and passes through 20 villages. The major settlements along the alignment are Patna City and Fathua. The total length of the proposed alignment is approx. 14.257 km.

3.5.2. The proposed project falls under 7(f), Category-A, Highway as per EIA notification 2006. Total investment/cost of the project is Rs 1082.4 Crores.

3.5.3. The alignment is mainly passing through agriculture land. The Proposed Right of Way (RoW) is 60 m. The terrain of the alignment area is mainly plain and rolling area. The project alignment involves acquisition of 99.00 ha of land which includes 85.20 ha of private land, 12.80 ha Government land and 1 ha forest land. The land will be acquired as per NH Act 1956 and compensation will be given as per RFCT LARR Act, 2013. As the proposed project falls in notified protected forest areas at some locations (crossings point of roads/railway/canals), declared for management purposes, the forest proposal shall be prepared after consultation with concerned forest officer if it attracts FC under section 2, 1980.

3.5.4. The proposed alignment does not pass through any National Parks, Wildlife Sanctuary, and Tiger Reserve or any other Eco-Sensitive Zone (ESZ) or Eco-Sensitive Area (ESA) notified by the MoEF&CC within 10 Km radius of the project site.

3.5.5. There are 01 nos. of rivers, 07 Nos. of Canals, 20 Nos. of Nalahs, falling along the alignment. There shall be no major impact on the drainage system as 65 numbers of structures (such as culverts, minor bridges, major bridges etc.) will be constructed. The Proposed road will have 1 Major Bridges, 07 no.s of Minor Bridges, 02 nos. of Vehicular underpass, 12 no.s of SVUP, 1 nos. of Interchanges/Flyover, and 42 nos. of Box Culverts.

3.5.6. The total water requirement during construction is estimated to 5687 KL. Water will be extracted from surface sources. The ground water will be abstracted for camp site after obtaining permission from the competent authority.

3.5.7. The proposed alignment will require cutting of approximately 1000 nos. of trees. However, bare minimum no. of trees shall be felled for construction of four lane road. Detailed tree inventories will be provided after joint enumeration with the appropriate authority in EIA. Avenue plantation shall be carried out as per IRC SP: 21:2009 on available ROW apart from statutory requirements.

3.5.8. A total number of 20 structures will be affected due to proposed Road alignment. The NHAI shall compensate the entire affected title holder as per NHAI Act, 1956 and Right to fair compensation and transparency in land acquisition, rehabilitation and Resettlement Act, 2013.

3.5.9. All safety measures will be provided as per NHAI Safety Manual and IRC: SP 88 and Expressway Manual IRC: SP 99). Safety Measures, as provided in NHAI Safety Manual i.e. Unit-3 (pertaining to Traffic Safety , such as traffic control zone , advance warning zones, traffic control devices, regulatory & warning signs cylindrical cones, drums, flagman, Barricades, Pedestrian Safety , speed control etc.) and other safety guidelines & measures suggested in Unit-4 (Construction Zone Safety), Unit 5 (Temporary Structures Safety), Unit-6 (Workers & Work Zone Safety), Unit-7 (Electrical & Mechanical Safety) will be strictly implemented. All required illustrative plans for safety at construction sites keeping in view all situations highlighted IRC: SP: 55 and in NHAI Safety Manual will be prepared and strictly implemented.

3.5.10. Benefits of the Project: The main objective of the proposed project is to reduce the distance and travel time from North-Bihar to South Bihar and to give connectivity to remote areas and major cities. The project will enhance economic development in the area through industrial areas, Agriculture (Market access), commercial development and consequent employment. The junctions with existing road will be planned in the form of interchanges and flyover to ensure uninterrupted flow of traffic. The proposed road would act as the prime artery for the economic flow to this region. It will enhance opportunities to locals, strengthen tourist development, ensure road safety, and provide better transportation facilities and other facilities such as way side amenities. Vehicle operating cost will also be reduced due to improved road quality. The compensatory plantation and road side plantation shall further improve the air quality of the region. The total manpower required for the project is 1050. About 1000 persons will be employed temporarily during the construction phase for a period of 3 years. During operation phase about 50 persons will be employed on permanent basis.

3.5.11. Details of Court cases: No court case is pending against the proposed project.

3.5.12. The EAC noted that the NHAI has posed 5 proposals from Package-I to Package-V which can be seen in the MOM from agenda item 3.1 to 3.5. All the packages are in the same alignment however divided into 5 packages for convenience. The Kacchi Dargah–Bidupur Bridge currently under construction will span the river Ganges, connecting Kacchi Dargah in Patna and Bidupur in Hajipur in the state of Bihar. The proposed completion date is Nov 2021.

This bridge will provide an easy roadway link between the northern and southern parts of Bihar and will connect two major national highways, linking NH 30 (Patna-Bakhtiyarpur Road) to NH 333 (Hajipur Samastipur Road). The bridge will reduce the load on Mahatma Gandhi Setu and will also reduce the traffic in the capital city of Patna. The bridge will be a major connecting bridge between North and South Bihar.

3.5.13. The concrete laying in well foundations started on 19 July 2017 on the Raghopur side. Total 67 foundations to be constructed (65 DD type well foundations and 2 Circular Well foundations). The length of main bridge is 9.750 Km (75+65x150+75) and the length of both side approach roads is 1.5 Km (South/Kachhi Dargah side) and 8.5 Km (North/Bidupur/Kalyanpur Side). Total length of the project is 19.750 Km.

3.5.14. The project is being implemented by L&T Construction, JV with Daewoo E&C from Korea. The estimated project cost is Rs. 3115 Cr. The proposed bridge is one of the longest bridges on river Ganga. The project authority is Road Construction Department, Bihar.

3.5.15. In case construction of Kacchi Dargah–Bidupur Bridge could not be completed, the existing bridge (Gandhi Setu) can be used as alternative alignment/connectivity from Kacchi Dargah (End point of Package-3) to Kalyanpur (Starting point of Package-IV) through existing NH- 30 (Patna-Bakhtiyarpur Road) and NH-103 (Hajipur Samastipur Road). The existing Gandhi Setu is located approximate 10 Km away from end point of Package-3 and Starting point of Package-4.

3.5.16. The EAC, taking into account the submission made by the project proponent had a detailed deliberation in its 260th meeting during 5th - 6th April, 2021 and **recommended the proposal for grant of Terms of Reference (ToR)** with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects:

- i. Apart from land compensation, the loss for crop has also to be compensated.
- ii. The proponent shall carry out a detailed traffic flow study to assess inflow of traffic from adjoining areas like airport/urban cities. The detailed traffic planning studies shall include complete design, drawings and traffic circulation plans (taking into consideration integration with proposed alignment and other state roads etc.). Wherever required adequate connectivity in terms of VUP (vehicle underpass)/ PUP (Pedestrian underpass) needs to be included.
- iii. Cumulative impact assessment study to be carried out along the entire stretch including the other packages in the current stretch under consideration.
- iv. The alignment of road should be such that the cutting of trees is kept at bare minimum and for this the proponent shall obtain permission from the competent authorities. Alignment also should be such that it will avoid cutting old and large and heritage trees if any. All such trees to be geotagged.

- v. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent, based on the commitments made during the public hearing, shall include all the activities required to be taken to fulfil these commitments in the Environment Management Plan along with cost estimates of these activities, in addition to the activities proposed as per recommendations of EIA Studies and the same shall be submitted to the ministry as part of the EIA Report. The EMP shall be implemented at the project cost or any other funding source available with the project proponent.
- vi. In pursuance of Ministry's OM no stated above the project proponent shall add one annexure in the EIA Report indicating all the commitments made by the PP to the public during public hearing and submit it to the Ministry and the EAC.
- vii. The proponent shall carry out a comprehensive socio-economic assessment and also impact on biodiversity with emphasis on impact of ongoing land acquisition on the local people living around the proposed alignment. The Social Impact Assessment should have social indicators which can reflect on impact of acquisition on fertile land. The Social Impact Assessment shall take into consideration of key parameters like people's dependency on fertile agricultural land, socio-economic spectrum, impact of the project at local and regional levels.
- viii. The Action Plan on the compliance of the recommendations of the CAG as per Ministry's Circular No. J-11013/71/2016-IA.I (M), dated 25th October, 2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.

Agenda No. 3.6

Developmental expansion of Industrial park over an area of 1415.25 ha in addition to existing Developed area of 290.37 ha within total permitted area of 1705.62 ha in respect of Khed City Multi-product Industrial Park at Khed Taluka, District Pune, Maharashtra by M/s Khed Economic Infrastructure Pvt. Ltd - Environmental Clearance (Proposal No IA/MH/NCP/203636/2008 and File No 21-944/2007-IA.III)

“The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

3.6.1 The Environmental clearance subsequent to Public hearing of the above proposal was earlier granted *vide* letter No. 21-944/2007-IA.III, dated 20th May 2010 for 4500 Ha of land (2000 Ha of processing area + 2000 Ha of non-processing area + 500 Ha of domestic tariff area). The validity of this EC was further extended for two years i.e., up to 19th May 2017 *vide* letter No. of even number dated 19th February 2016 and then for further three years. i.e., up to up to 19th May, 2020 *vide* letter No. of even number dated 11th August 2017. **Further, MOEF&CC *vide* its**

notification dated 27th September 2020 extended the validity of the EC's expiring in the year 2020-2021 upto 31st March 2021.

3.6.2 As stated above, initially, the project was planned to be spread over an area of 4,500 Ha falling in jurisdiction of Gram Panchayats of Khed and Shirur Talukas, but MIDC was able to acquire only 1705.62 Ha of land therefore only 1705.62 Ha was leased out by MIDC to KEIPL vide two lease deeds for the period of 95 years for Phase I in four villages viz. Dawdi, Kanerhsar, Nimgaon in Khed Taluka and Kendur of Shirur Taluka. Further, MPCB has granted Consent to Operate for Processing Area (PA) and Domestic Tariff Area on plot area of 192.67 Ha, out of total plot area of 1705.62 Ha for a period upto 31st March, 2021. Subsequently, MPCB has also granted Consent to Operate for Domestic Tariff Area-II on plot area of 97.7 Ha, out of total area of 1705.62 Ha for period up to 31st October, 2024. [Remaining/Balance Area: 1705.62 Ha - 192.67 Ha - 97.7 Ha = **1415.25 Ha**]

3.6.3 In order to regularize the validity of EC and development of Industrial park over balance area of 1415.25 Ha out of total acquired area of 1705.62 Ha, it was necessary to obtain a fresh EC with this expansion proposal.

3.6.4 For the want of fresh Terms of Reference (TOR) followed by EC, the above mentioned proposal was earlier considered by Expert Appraisal Committee (EAC) in its 235th and 237th EAC meetings held on 26th May, 2020 and 29th June 2020, respectively. The MOEF & CC vide letter no. 21-944/2007/-IA-III, dated 20th July 2020 issued the TOR to KEIPL, with a mandate to conduct Public Consultation/ Hearing.

3.6.5 Further, The PP vide letter No. KEIPL/EC/Public Hearing/56/20-21, dated 17th December, 2020 had submitted on-line application on dated 26th Dec 2020, requesting for amendment/modification of ToR letter No. 21-944/2007/-IA-III, dated 20th July 2020 “*exemption of Public Hearing*”. The EAC, taking into account the submission made by the project proponent and the detailed deliberation during its 253rd meeting on 18th – 19th January, 2021, recommended the proposal for amendment/modification (i.e., exemption of Public Hearing) in Terms of Reference, which was issued vide letter No. 21-944/2007/-IA-III, dated 20th July 2020. *Subsequently, a revised ToR was accorded by the Ministry with “exemption of Public Hearing” vide a ToR letter of even no., dated 25th February, 2021.*

3.6.6 At this instant, the PP vide Proposal No. IA/MH/NCP/203636/2008 has submitted application on-line on dated 16th Mar 2021, requesting for fresh Environmental clearance under the project type “Expansion” of the aforementioned project. The proposal was placed before the EAC in its 260th meeting during 5th - 6th April, 2021, in favor of Environmental clearance. The project proponent alongwith EIA consultant M/s Ardra Consulting Services Pvt. Ltd.

Bhubaneswar, Odisha, has made a presentation through Video Conferencing and provided the following information-

3.6.7 The proposed project is for developmental expansion of Industrial park over an area of 1415.25 ha in addition to existing Developed area of 290.37 ha within total permitted area of 1705.62 ha in respect of Khed City Multi-product Industrial Park at Khed, Pune, Maharashtra by M/s Khed Economic Infrastructure Pvt. Ltd.

3.6.8 The proposed project falls under 7(c)-Industrial estates/ parks/ complexes/ areas, export processing Zones: Industrial Park, Category-A, as per EIA notification 2006.

3.6.9 ToR for the proposed project was issued *vide* Proposal no. IA/MH/NCP/152981/2020, dated 20th July, 2020 and subsequently, ToR amendment letter was issued *vide* Proposal no. IA/MH/NCP/190021/2020, dated 25th February, 2021.

3.6.10 Total investment/cost of the project is Rs 327431 Lakh. The Capital cost to be invested over development in next 10 year is Rs159715 Lakh. The EMP cost is Rs 48421 Lakh (capital cost) & Rs 28940 Lakh (recurring cost).

3.6.11 Public hearing (PH) was conducted during previous Environmental Clearance *vide* letter No.21- 944/2007-I-A-III dated 20th May 2010. For the proposed expansion project, PH was exempted *vide* ToR amendment letter dated 25th February, 2021.

3.6.12 Total Area of the proposed Project is 1705.62 ha, out of which 290.37 ha has already been developed and balance 1415.25 ha need to be developed. The topography in and around the site is mostly undulated with steep slopes on edges of the plateau. The Landuse/Landcover of project site is as following:

Sr No	Land Use/Land Cover	Existing Land Use	Proposed Land Use	Total land use
		Area (ha)	Additional Area (ha)	Area (ha)
1	Industrial	175.83	697.22	873.05
2	Amenities/ Utilities	17.57	75.52	93.09
3	Roads	37.53	44.39	81.92
4	Supporting activities for residential and commercial	17.77	315.68	333.45
5	Open Spaces/ greenbelt	41.67	133.44	175.11
6	Authorized area under Khed City Development Limited (KDL)*	-----	149.00	149.00
Total		290.37	1415.25	1705.62

3.6.13 The industries related to Health care, FMCG, Renewable and non-renewable energy, Auto and engineering. Heavy Industries, Light Industries, Electronics and Electrical products, Automobiles, Biotechnology, Pharmaceutical, IT/ITES/Food Processing, Textile and apparel, Gems, Jewellery, Plastics, aviation and logistics shall be housed with the proposed project. No water polluting and chemical industries are proposed under Pharmaceutical category.

3.6.14 No water bodies are present in the project site, and no natural drainage is getting disturbed. However, Vel River and Bhima River is present at a distance of 1.0 Km at East side and 2.0 km at western side, respectively. There is one pond namely Thitewadi tank at a distance of 1.7 km East.

3.6.15 The water requirement for the project is 75.40 MLD that will be drawn from Bhima River and Chaskaman dam. Necessary permission is in place. Ground water will not be abstracted during construction & operation phase of the project. Surface water from Chaskman dam of 50 MLD and Watekarwadi K.T. weir on Bhima River of 1.73 MLD will be transfer to proposed Industrial Park. As per the estimation, the average water requirement for the proposed project will be 0.2 MLD during the construction phase and 75.20 MLD during the operation phase. KEIPL provides water to the units through the exclusive arrangement with Irrigation department of Govt. of Maharashtra from the Bhima River and Chaskaman Dam.

3.6.16 No further land acquisition is proposed in the present developmental expansion project application for fresh EC. A certified compliance report has been issued by the Nagpur regional office of MoEF&CC. No forest land diversion is involved in the project.

3.6.17 There are no protected areas under international conventions, national or local legislation for their ecological, landscape, cultural or other related value within 15 km radius. No new Rehabilitation of communities/villages is required. Land acquisition and rehabilitation of communities are implemented.

3.6.18 Waste Management: Solid waste management System has been planned and will be in place as per the provisions of the MSW (M&H) rules 2016.

3.6.19 Common effluent treatment plant of 1.0 MLD capacity and STP of 35 KLD capacity based on MBBR technology is proposed.

3.6.20 Total 22,148 trees are reported from Khed City Project area. The current cumulative status of tree felling is shown below.

S. No	No. of Trees Felled within Project Area	Total
1	1027*	1027
2	Total No. of Trees Transplanted	45
3	Total No. of Trees Impacted (No.s) (1+2)	1072

* Majority with girth around 10 cms, mainly non scheduled species

Note: KEIPL has planted 111314 numbers of local tree saplings and 50735 numbers of shrubs.

3.6.21 Greenbelt development is recommended for implementation, in area of 177.71 Ha. KEIPL will consider maintaining 50 m green belt between industrial units and residential areas and the all possibilities while the plots are handed over to customers. Green belt to a width of 15 meters, thick vegetation along boundaries, Roads and plots setbacks is provided. To ensure a permanent green shield around the periphery planting is considered in two phases:

3.6.22 Rainwater harvesting structures are developed in the project site. KEIPL has constructed 11 surface rain water harvesting structures to catch 189.23 TCM of rain water, out of which 9 structures are Earthen Nala Bunds and 2 are Cement Nala Bunds. The Total capacity for rain water harvesting in the project area has been enhanced to 340.367 ML from 304.23 ML by further strengthening of 7 Earthen Nala Bunds.

3.6.23 Socio-economic condition of local people: Local villagers which are nearby to Khed City are having agriculture as main occupation. Some people from these villages are having their own business like cement agencies, kirana and essentials supply shops, dairy, package water supply. Some people are associated with Khed City in terms of contract works like earth works, road construction, manpower supply to the industries located in the Khed City, and some are even doing regular jobs in these industries.

3.6.24 Benefits of the project: *Employment Generation*: The project will provide employment to a large number of local people. Skilled, semi-skilled and unskilled man power will be utilized during construction and operation phase. This will positively impact the economic condition of the study area. *Microclimate improvement of the surrounding*: Due to increase/enhancement of the forests and greenery, the project area will possess an enriched ecological profile with significant improvement in micro-climate. *Improvement in the health and educational profile of the area*: The development of planned residential and industrial growth shall necessitate the erection of education and health infrastructure. The project will undertake their creation with quality. *Improvement in infrastructure facility*: In order to facilitate the industries in the Integrated Industrial area and in order to enhance their productivity, it is proposed to improve existing connectivity and add green-field connectivity projects. *Economy improvement*: After implementation of the Project, a host and variety of industries will be established in the area. This will give rise to employment to the local people. The industrial development will also promote allied businesses and facilities in the area. This will result in considerable improvement in the economic condition of the study area.

3.6.25 Details of Court cases: Earlier, there were two legal aspects with regards to KEIPL projects. Land owners had approached Hon'ble High Court and further before Hon'ble Supreme Court. In

the year 2013 Honourable Supreme Court dismissed the allegations made by the land owners. KEIPL's EC was also challenged before the Honourable National Green Tribunal, New Delhi and further before Hon'ble Supreme Court, which was also dismissed and the EC was confirmed.

3.6.26 The Committee notes that the PP during ToR stage submitted that they are continuing the "sectors" approved in the earlier EC granted by the Ministry vide letter dated 20th May, 2010. No new sectors has been included in the expansion application. No chemical industries are proposed under Pharmaceutical category. Only formulation unit is proposed as per continuation with prior EC.

3.6.27 The sectors approved in the earlier EC are heavy industry, light industries, electronics and electrical products, automobiles, biotechnology, pharmaceutical, IT/ITES/Food Processing, textiles and apparels, gems, jewellery, plastics, aviation and logistic. However, at the time of appraisal PP submitted a layout map showing maximum red category industry. Further there is no legend on the map to know the sectoral division of the industries.

3.6.28 The EAC, taking into account the submission made by the project proponent had a detailed deliberation in its 260th meeting during 5th - 6th April, 2021 and **deferred the proposal** for want of following documents/ information:

- i. Layout map showing the existing industrial development vis-à-vis proposed industries with sectors specified on the layout map.
- ii. Detailed list of industries as envisaged in the original EC and revised ToR issued on 20th July, 2020 and subsequently, ToR amendment dated 25th February, 2021.
- iii. The infrastructure which is already in place and the proposed infrastructure should be clearly highlighted on the layout map with legend. The existing green belt and the proposed green belt should be clearly highlighted.
- iv. The map should be clear in all perspective including legend, scale, North mark etc.

Agenda No. 3.7

Developmental of Greenfield Bhavanapadu Port, District Srikakulam, Andhra Pradesh by M/s Andhra Pradesh Maritime Board – Terms of Reference (Proposal No IA/AP/MIS/173542/2020 and File No 10-56/2020-IA.III)

“The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

Note- It may be mentioned this proposal was considered in 243rd EAC meeting during 28th -30th September, 2020 and was deferred for want of some requisite information. Further, the proposal was reconsidered in 256th EAC meeting held on 3rd – 4th March, 2021 and it was observed that the land for the site selected for project has been already allotted by the State Government to Singareni Collieries Company Limited (SCCL) as a part of compensatory afforestation. EAC observed that the same site cannot be allotted by the State Government to another project and therefore, the proposal was deferred till the availability of land for the proposed port is ascertained by the competent authority of the state government. ***However, the PP/consultant has given false/misleading information at point 3 of the Annexure III (Required for ToR: New/Expansion/Amendment Proposals) as shown below-***

3	Whether the proposal was considered in earlier meetings of EAC: If yes, provide date of EAC meeting and reasons for deferment, if any	No
---	---	----

The project proponent along with the EIA consultant M/s P & M Solution, Uttar Pradesh has made a presentation through Video Conferencing and provided the following information-

3.7.1. The proposed project is for development of Greenfield Bhavanapadu Port at Srikakulam, Andhra Pradesh by M/s Andhra Pradesh Maritime Board.

3.7.2. The proposed project falls under 7(e) - Ports & Harbors, Category-A (cargo handling capacity > 5 million TPA), as per EIA notification 2006. Total investment/cost of the project is Rs 309190 Lakhs.

3.7.3. Total area for Port development for Phase-I is about 1010 Acres i.e., 408.73 Ha (Port Development 660 acres i.e., 267.093 ha and area for external infrastructure like road and rail connectivity is 350 Acres i.e., 141.64 Ha). The Land use/land cover of project site is as following-

S. No.	Land use category	Area (in Ha)	Area in %
1	Agriculture Land	12	2.87
2	Settlement	00	0.03
3	Waterbody	169	41.44
4	Forest	141	34.55
5	Wetland	1	0.27
6	Open scrub	85	20.84
Total		408	100.00

3.7.4. The total Land required for Phase I is 660 acres (267.093 ha) out of which government land and forest is 379 acres (153.376 Ha) and 281 acres (113.717 Ha), respectively. The Total Forest Land Area Identified is 471.35 Acres (190.74 Ha) (for master plan).

3.7.5. Total Water Requirement for the proposed project is 111295 litres (31455 litres for administrative building + 9240 litres for Workshop Building + 70600 litres for Miscellaneous Facilities). The water demand shall be met from the nearby reservoir. No ground water shall be abstracted or used for any commercial purposes of Port Operations.

3.7.6. Bushes and scrubs with Trees will be cut due to Development of proposed Bhavanapadu Port. Care will be taken to relocate the trees and necessary permission will be sought from the competent authority. The details will be provided in the EIA report.

3.7.7. The project site is in CRZ III area & part of the area will fall under harbor, berth, north & south break water & turning circle will fall under CRZ 1B. Bhavanapadu Port Area falls under rural area & hence categorized as CRZ III. Average Density of Population of Srikakulam district is 462 / Sqkm (Census 2011), hence Bhavanapadu being a part of it will fall under CRZ-III B. Demarcation of coastal regulation zone, High Tide Line/Low Tide Line & Land Use map will be prepared through MoEFCC authorized / accredited institute & the same will be presented in Environmental Impact Assessment Report.

3.7.8. Total Domestic Effluent Generation will be 69.04 KLD. STP of 70 KLD will be provided for domestic Effluent.

3.7.9. The details on the shoreline change will be studied by doing modelling and littoral drift studies as required & the same will be submitted during Environmental Impact Assessment Study (Report) in detail.

3.7.10. The estimated capital dredging quantity & dredging areas for the proposed port is as follows:

- a. Entrance / Approach Channel /Turning Circle/ Sand trap – 10.88 Mm³
- b. Berthing Area/ Port Basin – 10.377 Mm³
- c. Providing Navigational aids and shore marks – Lump Sum (LS)
- d. Mobilisation and Demobilisation of dredgers and other ancillary equipment's – (LS)
- e. Total estimated dredging quantity for Phase I development is 21.177 Million cum (Mm³).

3.7.11. Cargo stacking and storage facilities will be developed for handling cargos with commodities like –

- a. Raw cashew, Lime stone, Edible oil, other commodities, containers, Mineral sands, cashew, soya meal, Granite, Ferro products, Jute products, Iron & Steel scrap, Iron ore, Iron & steel products, Fertilizers. Thermal coal/ Coking coal
- b. There is deposition of dust in to the air at the time of construction and cargo handling.
- c. Dust suppression systems (e.g. water Sprinkling/misting at the bulk storage).

3.7.12. There are no fishing boats, no fish landing centres observed within the project site boundary. There is one Fishery Harbour near to the port. However, the Fishery Harbour is outside the port boundary. Hence, development of Bhavanapadu port shall not disturb the fishery Harbour operations.

3.7.13. R & R issues: Land Compensation and R & R is planned per the land acquisition plan for Project Affected Family's (PAF's) and budget is established as per the District Collector Letter RC no. 806/2015 G.1 dated .23/8/2018. Rehabilitation and Resettlement (R & R) will be taken up

adhering to The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation & Resettlement Act, 2013 (No. 30 of 2013) – Andhra Pradesh Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Rules, 2014. Notification – Orders Issued GO. MS. No. 389 dated 20/11/2014.

3.7.14. Benefits of the project: The project has considerable benefits from the social perspective. The proposed project will have positive impact on social and economic improvement of the region by overall improvement in living standard through creation of new direct and Indirect Jobs, increase in volume of general trade, general improvement in infrastructural facility with better transport and communication network. It is estimated that, this project will generate 10,000 No. of Direct and indirect Employment. As per the Feasibility Assessment, the project is found to be viable from all aspects such as technical, economic, environmental and social aspects.

3.7.15. Details of Court cases: No court case is pending against the proposed project.

3.7.16. The EAC, taking into account the submission made by the project proponent had a detailed deliberation in its 260th meeting during 5th - 6th April, 2021 and **deferred the proposal** with following comments:

It was observed by the committee in the earlier meeting that the land for the site selected for project has been already allotted by the State Government to Singareni Collieries Company Limited (SCCL) as a part of compensatory afforestation. EAC observed that the same site cannot be allotted by the State Government to another project and therefore, the proposal was deferred till the availability of land for the proposed port is ascertained by the competent authority of the state government.

PP further submitted the letter No. INI0-01-PORTS-I/129/2020-PORTS, dated 20.03.2021 that the Special Chief Secretary has given confirmation for land being allotted for the proposed port including forest and revenue land and assured that the Go AP & AP Maritime Board will follow the due process involved in obtaining Forest Clearance from the Central Government and comply the conditions stipulated while granting Stage-I & Stage-II clearances by MoEF&CC.

The EAC observed that the land was accorded to Singareni collieries in the year 2001, however the Notification (reserve or protected forest) for the same has not been issues till date. Money has been deposited for the compensatory afforestation to CAMPA. Further, the compensatory afforestation work has also been completed. However, the forest land has not been de-notified; in fact the Notification work itself is pending. PP informed that an alternative site for afforestation has been identified in YSR district of AP.

The Committee decided that the ToR for the project cannot be accorded to a piece of land for which the land records are not clear and land is not in possession of the PP. The EAC, taking into account the above fact **deferred the proposal**.

Agenda No. 3.8

Integrated development of International Container Transshipment Terminal (ICTT)-14.2 Million TEU along with Greenfield International Airport (4000 Peak Hour Passengers-PHP), Township & Area development and 450 MVA Gas and Solar based power plant in 16610 ha. Great Nicobar Islands, Nicobar District by M/s Andaman and Nicobar Islands Integrated Development Corporation Ltd. - Further consideration for Terms of Reference (Proposal No. IA/AN/NCP/201159/2021 and File No 10/17/2021-IA.III)

“The EAC noted that the Project Proponent has given undertaking that the data and information given in the application and enclosures are true to the best of his knowledge and belief and no information has been suppressed in the EIA/EMP report. If any part of data/information submitted is found to be false/ misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

3.8.1 The proposal was considered in the 258th meeting of Expert Appraisal Committee held on 17th -18th March, 2021. The proposal was deferred by the EAC for want of additional information from the proponent.

3.8.2 PP submitted the requisite information and the proposal was further considered in the EAC in its 260th meeting held on 5th - 6th April, 2021. The DPR consultant engaged for the project is M/s AECOM India Pvt Ltd.

3.8.3 It has been mentioned that total township area is 149.60 Sq.km. Revenue land is 28.27 Sq.km, Revenue land (deemed forest) is 8.37 Sq.km, and forest land is 112.96 Sq.km. Regarding Site grading, all details related to port and airport are included in the PEFR. For township related site grading, same shall be conducted during the detailed engineering studies. Regarding water requirement, it has been mentioned that the total Water Demand for the project area is estimated at 160 MLD (Fresh Water Demand 90 MLD and Recycled Water Demand 70 MLD).

LANDUSE AREA CHART- GNI		
Land Use Category	Area (sq.km.)	Percentage (%)
RESIDENTIAL	36.66	22.07
Residential Mixed-Use (Medium density)	29.1	
Residential (Medium Density)	2.98	
Residential Low Density	4.58	
COMMERCIAL	6.44	3.88
Commercial Mixed-Use	4.33	
Commercial Office	0.41	
Tourism and Hospitality	1.70	

INSTITUTIONAL	15.14	9.11
Institutional Campus	15.14	
INDUSTRIAL	0.31	0.19
Industrial	0.31	
TRANSPORT	24.01	14.46
Ports and Marine	7.66	
Aviation	8.45	
Logistics	7.90	
UTILITIES	1.2025	0.72
Power Plant	0.39	
Other Utilities (includes Solid Waste disposal)	0.81	
OPEN SPACE	73.0575	43.98
Greens	9.61	
Eco-Tourism	40.81	
Coastal tourism	22.64	
DEFENCE AREA	9.28	5.59
TOTAL PROJECT AREA	166.10	100.00
TOWNSHIP AREA	149.60	90.01

3.8.4 In order to have minimal dependency on surface water from Galathea River, it is being proposed to create rainwater harvesting reservoirs within the project area. Approximate 2.5 Sq.km of area is being identified for creation of water reservoirs which will store rainwater from surface runoff. Detail watershed studies and mathematical modelling will be carried out at the detail design stage and will be included in the EIA report. A LIDAR survey for the island was conducted for detailed terrain mapping. The data is classified as restricted by Ministry of Defence. Necessary approvals are being obtained for doing detail analysis on the LIDAR data collected. Final water sourcing will be included in the EIA report to be submitted. In case of inadequacy of water from these sources, alternate sources will be explored and presented at the time of EIA submission.

3.8.5 Regarding impact on Leatherback Turtle and other geo-seismological view it has been mentioned that the most technically and financially feasible location is Galathea Bay. All emphasis will be given to avoid any impact on the turtle nesting sites and detail mitigation strategies shall be covered in the EIA report including but not limiting to offshore break water provision to have unhindered turtle movement to nesting grounds. Further, comparative analysis of all location viz Galathea Bay, Casuarina Bay, Anderson Bay, Pemayya Bay, Campbell Bay was presented.

3.8.6 Regarding Geographical Meteorological study and Seismology status, it has been mentioned that there is no IMD station in Great Nicobar Island. The data from INS Baaz station in Great Nicobar Island (Navy facility) has been procured and shall be used for all modelling

studies. All relevant reports available with National Centre for Seismology will also be procured and analyzed during the EIA study.

3.8.7 Regarding conformity of proposed integrated development in relation to latest CZMP at 1:4000 scale and Island Development plan for Great Nicobar it has been mentioned that approvals as per ICRZ notification 2019 shall be obtained for undertaking proposed development. The CRZ maps at 1:4000 scale as mandated in the notification shall be submitted along with application for CRZ clearance. However, PP has to submit all documents at the time EC+CRZ (combined clearance) as mentioned in the procedure for CRZ clearance for permissible and regulated activities at item 8 of CRZ Notification 2019 alongwith recommendation of the A&N CZMA for all activities proposed under aforesaid integrated development project.

Following break-up for Area statement is provided.

S. No.	Description	Area in Sqkm
1	Total Area of Great Nicobar Island	910.04
2	Forest Area	865.84
3	Campbell National Park*	391.75
4	Campbell National Park Eco sensitive Zone	65.81
5	Galatea National Park*	107.10
6	Galatea National Park Eco sensitive Zone	14.93
7	Tribal Reserve Area	751.41
8	Revenue Area	44.20
9	Developable area (Project area)	166.10

* (The notified areas of Galathea National Park, Campbell Bay National Park and Biosphere Reserve are 110 sq. km, 426.23 sq. km and 885 sq. km respectively. However, on account of reconciliation of area of Great Nicobar Island by Survey of India vide letter dated 01.09.2020, there is revision in the area of Galathea National Park, Campbell Bay National Park and Biosphere Reserve).

Of the total 166.1 sq.km project area,

- i. Revenue land 44.2 sq.km,
 - a. Revenue land (allotted) = 23.53 sq.km.
 - b. Revenue land (vacant)= 6.62 sq.km
 - c. Revenue land (encroached) = 2.0 sq.km.
 - d. Others (roads and water bodies) = 3.16 sq.km.
 - e. Revenue land (Deemed Forest) = 8.88 sq.km.
- ii. Forest area - 121.87 sq.km

3.8.8 The Committee notes that the site selection for the port component has been done keeping primarily the technical and financial viability in place. The environmental aspects were not given much weightage while selecting the site. The Island has large number of endangered species including Leatherback Turtle at the Galathea Bay. It would be ideal to involve an independent organisation/institution with specialized skills such as IIT, NIOT, NCCR, NIO etc for technical aspect while research institutes such as Zoological Survey of India (ZSI), SACON and Wildlife Institute of India (WII) for ecological assessment with expertise on Island ecosystems, its terrestrial and marine flora and fauna. An independent study/evaluation for the suitability of the proposed port site with specific focus on Leatherback Turtle, Nicobar Magapod and Dugong should be carried out and submitted its recommendations. The report shall become the part of EIA/EMP report and the recommended selection of the site could be further considered in the EAC for the merits of site in terms of environmental sensitivity.

3.8.9 Committee also of the view that the consultant agency for conducting the EIA study shall be independent of the agency involved in preparation of DPR and should involve the experts from the organisations which were involved in assessing the impact of Tsunami on and its mitigation in the A&N islands. Consultant agency should also involve senior scientists from WII or ZSI or IISc or SACON in ecological and biodiversity studies.

3.8.10 Committee further opined that since the project is appraised by single Committee (Infra-1) with involvement of Member Secretaries of concerned sector, it is advisable to take comments from all sectors so that specific ToRs for each sector can be provided for EIA studies.

3.8.11 The EAC, taking into account the submission made by the project proponent had a detailed deliberation in its 260th meeting during 5th - 6th April, 2021 and **recommended the proposal for grant of Terms of Reference (ToR)**. The sector specific ToRs are obtained from the respective sector. The EIA/EMP studies shall be conducted based on the sector specific ToRs as mentioned below, in addition to all standard ToRs applicable for such projects.

A. International Container Transshipment Terminal (ICTT)

- i. The Island has large number of endangered species such as Leatherback Turtle at the Galathea Bay. The area also has a presence of Nicobar Megapod, an endemic species and possibility of other endangered species such as Dugong and Saltwater Crocodiles. An independent evaluation of impact of proposed port site at Galathea Bay including its backend support infrastructure on the ecology and biodiversity shall be carried out by engaging a nationally recognized institutes such as Zoological Survey of India or SACON or Wildlife Institute of India or consortium of these three institutes and submit detailed study including findings, recommendations and comprehensive mitigation plan to the Ministry. The report shall specifically include key components such as impact of dredging and reclamation, port operations, ship movement, illumination, habitat alteration, breakwater, underwater noise, oil pollution etc on the movement and nesting beaches of Leatherback as well as shore

morphology and sand grain profile at the nesting sites. The report shall become the part of EIA/EMP report and the selection of the site shall be based on the recommendations and environment management plan prescribed in the report. The study also should examine other alternate sites suggested in the presentation such as Casuarina Bay, Anderson Bay, Pemayya Bay and Campbell Bay based on environmental, ecological and economic considerations, and choose one appropriate site having minimum impacts on ecology and environment with specific focus on Leatherback Turtle and other endangered species (both terrestrial and marine). A detailed comparison of the sites in this regard shall be submitted. The study should emphasize impact on Leatherback Turtles and Nicobar Magapod and its past and present distribution including nesting of these species.

- ii. An independent study for assessment of biodiversity and Wildlife value of all the alternative sites for ICTT port shall be conducted by engaging a nationally recognized institutes such as WII or ZSI or IISc or SACON or consortium of these institutes. Diversity and wildlife value so assessed by these organisations or a team of these organisations shall form one of the criteria for cost benefit analysis of all the alternative sites. The report along with Cost Benefit Analysis shall be incorporated in EIA/EMP report
- iii. The alternate sites than proposed Galathea Bay for International Container Transhipment Terminal should be explored through detailed studies with more focus on environmental and ecological impact of ICTT during construction and its operation, specially movements of vessels on turtles.
- iv. The ecologically fragile area including CRZ 1A area etc shall be demarcated in conformity with latest approved CZMP as per notification of 2019 and superimposed on the layout plan at 1: 4000 scale and submitted. Submit a copy of layout superimposed on the HTL/LTL map demarcated by an authorized agency on 1:4000 scale.
- v. Risk analysis for handling different types of cargos shall be conducted and submitted. Focus also should be given on how such a cargo will affect Leatherback nesting areas.
- vi. Detailed study well supported by strong historical data through simulation studies, whether the selected site can withstand the cyclone/storm surge and Tsunami.
- vii. Erosion and accretion study at the mouth of the Galathea Bay and entire island with reputed national institute to be submitted through predictive modelling for port area reclamation, construction and breakwaters. The study should highlight impact of these on Leatherback nesting sites.
- viii. Recommendation of the A&N CZMA shall be obtained and submitted. Submit superimposing of latest CZMP as per CRZ (2011) on the CRZ map. Submit a complete set of documents required as per para 4.2 (i) of CRZ Notification, 2011.

- ix. Comprehensive study of the impact of dredging and reclamation and port operations including oil spills on marine ecology and marine biodiversity with specific focus on corals, mangroves, sandy shores and mud flat should be done by engaging a nationally recognized institutes such as Zoological Survey of India or SACON or Wildlife Institute of India or consortium of these three institutes and draw up a management and mitigation plan. Being sensitive area, proposed plan of online monitoring of water quality during dredging and disposal should be submitted.
- x. A specific study to be undertaken to ascertain the impact of proposed development on the migratory birds by engaging a nationally recognized institutes such as Zoological Survey of India or SACON or Wildlife Institute of India covering both inward and return migration period. The studies should specially focus on migratory bird species composition, impact due to habitat destruction, impact due to oil spillage and risk of all the hazards that has potential to damage the fragile environment. A comprehensive mitigation plan also to be developed.
- xi. A detailed and comprehensive study for assessment of requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract) shall be conducted and submitted.
- xii. A detailed study for assessing the carrying capacity of the areas proposed for development shall be conducted and incorporated in EIA/EMP Report
- xiii. An assessment of the cumulative impact of all development and increased inhabitation being carried out or proposed to be carried out by the project or other agencies in the core area, shall be made for traffic densities and parking capabilities in a 05 kms radius from the site.
- xiv. A detailed traffic management and a traffic decongestion plan drawn up through an organization of repute and specializing in Transport Planning shall be submitted with the EIA.
- xv. Disaster Management Plan for the project shall be prepared and submitted.
- xvi. Oil spill management plan should be drawn as per NOS DCP and submitted
- xvii. The details about number of labourers, number of labour camps and its construction, their basic requirements such as transport, fuel for cooking, freshwater, sanitation, health and emergency evacuation etc to be provided in detail.
- xviii. Public hearing to be conducted and issues raised and commitments made by the project proponent on the same should be included in EIA/EMP Report in the form of tabular chart with financial budget for complying with the commitments made. It should be ensured that tribes such as Shompen and Nicobarese and anthropological organisations well versed in

communication with and involved in welfare of Shompen and Nicobarese are adequately represented in the Public Hearing.

B. Greenfield International Airport (4000 Peak Hour Passengers-PHP)

- i. The E.I.A. will give a justification for land requirements along with a comparison to the guidelines established by the Airport Authority of India/Ministry of Civil Aviation in this regard.
- ii. An assessment of the cumulative impact of all development and increased inhabitation being carried out or proposed to be carried out by the project or other agencies in the core area, on the flora and fauna of the region shall be made.
- iii. Detailed studies on Bird Hazzard to the proposed airport and flight operations and its mitigation measures should be carried out (both migratory and resident birds) by engaging a nationally recognized institutes such as SACON or Wildlife Institute of India.
- iv. Impact of proposed Port on the Flight Safety and operations and Airport security should be examined in detailed
- v. Layout maps of proposed project indicating runway, Aerodrome building, parking, greenbelt area, utilities etc.
- vi. The ecologically fragile area including CRZ 1A area etc shall be demarcated and superimposed on the layout plan and submitted.
- vii. An independent study for assessment of biodiversity and Wildlife value of all the alternative sites for ICTT port shall be conducted by the organisations in this field like WII, ZSI, IIS and SACON. Diversity and wildlife value so assessed by these organisations or a team of these organisations shall form one of the criteria for cost benefit analysis of all the alternative sites. The report along with Cost Benefit Analysis shall be incorporated in EIA/EMP report
- viii. An assessment of the cumulative impact of all development and increased inhabitation being carried out or proposed to be carried out by the project or other agencies in the core area, shall be made for traffic densities and parking capabilities in a 05 kms radius from the site. A detailed traffic management and a traffic decongestion plan drawn up through an organization of repute and specializing in Transport Planning shall be submitted with the EIA. The Plan to be implemented to the satisfaction of the State Urban Development and Transport Departments shall also include the consent of all the concerned implementing agencies.
- ix. The E.I.A. should specifically address to vehicular traffic management as well as estimation of vehicular parking area inside the Airport premises.
- x. An onsite disaster management plan shall be drawn up to account for risks and accidents. This onsite plan shall be dovetailed with the onsite management plan for the district.
- xi. A note on appropriate process and materials to be used to encourage reduction in carbon foot print. Optimize use of energy systems in buildings that should maintain a specified indoor environment conducive to the functional requirements of the building by following mandatory compliance measures (for all applicable buildings) as recommended in the Energy Conservation Building Code (ECBC) 2017 of the Bureau of Energy Efficiency, Government of India. The energy system includes air conditioning systems, indoor lighting systems, water heaters, air heaters and air circulation devices.
- xii. Details of emission, effluents, solid waste and hazardous waste generation and their management. Air quality modelling and noise modelling shall be carried out for the

emissions from various types of aircraft. Detail plan for impact of noise on the sensitive environment specially the wildlife sanctuaries and national parks.

- xiii. The impact of aircraft emissions in different scenarios of idling, taxiing, take off and touchdown shall be examined and a management plan suggested.
- xiv. The impact of air emissions from speed controlled and other vehicles plying within the Airport shall be examined and management plan drawn up.
- xv. A detailed management plan, drawn up in consultation with the competent District Authorities, shall be submitted for the regulation of unauthorized development and encroachments within a 05 Km radius of the Aerodrome.
- xvi. The details about number of labourers, number of labour camps and its construction, their basic requirements such as transport, fuel for cooking, freshwater, sanitation, health and emergency evacuation etc to be provided in detail.
- xvii. Noise monitoring and impact assessment shall be done for each representative area (as per the Noise Rules of MoEF&CC). A noise management plan shall be submitted to conform to the guidelines of the MoEF&CC and the DGCA. Noise monitoring shall also be carried out in the funnel area of flight path.
- xviii. A detailed and comprehensive study for assessment of requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract) shall be conducted and submitted.
- xix. A detailed study for assessing the carrying capacity of the areas proposed for development shall be conducted and incorporated in EIA/EMP Report
- xx. Public hearing to be conducted and issues raised and commitments made by the project proponent on the same should be included in EIA/EMP Report in the form of tabular chart with financial budget for complying with the commitments made. It should be ensured that tribes such as Shompen and Nicobarese and anthropological organisations well versed in communication with and involved in welfare of Shompen and Nicobarese are adequately represented in the Public Hearing.
- xxi. Recommendation of the A&N CZMA shall be obtained and submitted.
- xxii. Details of fuel tank farm and its risk assessment.
- xxiii. The report should give a detailed impact analysis and management plan for handling of the following wastes for the existing and proposed scenarios. The management plan will include compliance to the provisions of the MSW Rules, 2016.
 - (a) Trash collected in flight and disposed at the Aerodrome including the segregation mechanism.
 - (b) Toilet wastes and sewage collected from aircrafts and disposed at the Aerodrome.
 - (c) Maintenance and workshop wastes.
 - (d) Wastes arising out of eateries and shops situated within the Aerodrome.

C. Township & Area development

- i. The ecologically fragile area including CRZ 1A area etc shall be demarcated and superimposed on the layout plan and submitted.
- ii. Seismic and Tsunami hazard map on entire island and its relation to each component of the integrated project should be detailed. All the facilities should be analysed for these hazards, with emphasis on future possible events

- iii. An assessment of the cumulative impact of all development and increased inhabitation being carried out or proposed to be carried out by the project or other agencies in the core area, shall be made for traffic densities and parking capabilities in a 05 kms radius from the site. A detailed traffic management and a traffic decongestion plan drawn up through an organization of repute and specializing in Transport Planning shall be submitted with the EIA. The Plan to be implemented to the satisfaction of the State Urban Development and Transport Departments shall also include the consent of all the concerned implementing agencies.
- iv. The details about number of labourers, number of labour camps and its construction, their basic requirements such as transport, fuel for cooking, freshwater, sanitation, health and emergency evacuation etc to be provided in detail.
- v. A note on appropriate process and materials to be used to encourage reduction in carbon foot print. Optimize use of energy systems in buildings that should maintain a specified indoor environment conducive to the functional requirements of the building by following mandatory compliance measures (for all applicable buildings) as recommended in the Energy Conservation Building Code (ECBC-R) 2018 of the Bureau of Energy Efficiency, Government of India. The energy system includes air conditioning systems, indoor lighting systems, water heaters, air heaters and air circulation devices.
- vi. A detailed and comprehensive study for assessment of requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract) shall be conducted and submitted.
- vii. A specific study should be conducted to enumerate the anticipated impact and mitigation of increased illumination and noise on nocturnal bird and mammal fauna.
- viii. A detailed study for assessing the carrying capacity of the areas proposed for development shall be conducted and incorporated in EIA/EMP Report.
- ix. Details of emission, effluents, solid waste and hazardous waste generation and their management.
- x. Specify plan of Administration of A & N to prevent further encroachment on the forest land with the proposed increased population considering that already 2 sq km revenue land has been encroached by existing population as envisaged in the ToR presentation
- xi. Public hearing to be conducted and issues raised and commitments made by the project proponent on the same should be included in EIA/EMP Report in the form of tabular chart with financial budget for complying with the commitments made. It should be ensured that tribes such as Shompen and Nicobarese and anthropological organisations well versed in communication with and involved in welfare of Shompen and Nicobarese are adequately represented in the Public Hearing.
- xii. Recommendation of the A&N CZMA shall be obtained and submitted.

D. 450 MVA Gas and Solar based power plant

- i) The proposed project shall be given a unique name in consonance with the name submitted to other Government Departments etc. for its better identification and reference.
- ii) Vision document specifying prospective long term plan of the project shall be formulated and submitted.
- iii) The project proponent needs to identify minimum three potential sites based on environmental, ecological and economic considerations, and choose one appropriate site

- having minimum impacts on ecology and environment. A detailed comparison of the sites in this regard shall be submitted.
- iv) Executive summary of the project indicating relevant details along with recent photographs of the proposed site (s) shall be provided. Response to the issues raised during Public Hearing and the written representations (if any), along with a time bound Action Plan and budgetary allocations to address the same, shall be provided in a tabular form, against each action proposed.
 - v) Harnessing solar power within the premises of the plant particularly at available roof tops and other available areas shall be formulated and for expansion projects, status of implementation shall also be submitted.
 - vi) The geographical coordinates (WGS 84) of the proposed site (plant boundary), including location of ash pond along with topo sheet (1:50,000 scale) and IRS satellite map of the area, shall be submitted. Elevation of plant site and ash pond with respect to HFL of water body/nallah/River and high tide level from the sea shall be specified, if the site is located in proximity to them.
 - vii) Layout plan indicating break-up of plant area, ash pond, green belt, infrastructure, roads etc. shall be provided.
 - viii) Land requirement for the project shall be optimized and in any case not more than what has been specified by CEA from time to time. Item wise break up of land requirement shall be provided.
 - ix) Present land use (including land class/kism) as per the revenue records and State Govt. records of the proposed site shall be furnished. Information on land to be acquired including coal transportation system, laying of pipeline, ROW, transmission lines etc. shall be specifically submitted. Status of land acquisition and litigation, if any, should be provided.
 - x) Impact of transmission lines on migratory birds and large raptors by engaging a nationally recognized institutes such as Zoological Survey of India or SACON or Wildlife Institute of India.
 - xi) If the project involves forest land, details of application, including date of application, area applied for, and application registration number, for diversion under FCA and its status should be provided along with copies of relevant documents.
 - xii) The land acquisition and R&R scheme with a time bound Action Plan should be formulated and addressed in the EIA report.
 - xiii) Satellite imagery and authenticated topo sheet indicating drainage, cropping pattern, water bodies (wetland, river system, stream, nallahs, ponds etc.), location of nearest habitations (villages), creeks, mangroves, rivers, reservoirs etc. in the study area shall be provided.
 - xiv) Location of any National Park, Sanctuary, Elephant/Tiger Reserve (existing as well as proposed), migratory routes / wildlife corridor, if any, within 10 km of the project site shall be specified and marked on the map duly authenticated by the Chief Wildlife Warden of the State or an officer authorized by him.
 - xv) Topography of the study area supported by toposheet on 1:50,000 scale of Survey of India, along with a large scale map preferably of 1:25,000 scale and the specific information whether the site requires any filling shall be provided. In that case, details of filling, quantity of required fill material; its source, transportation etc. shall be submitted.
 - xvi) A detailed study on land use pattern in the study area shall be carried out including identification of common property resources (such as grazing and community land, water resources etc.) available and Action Plan for its protection and management shall be

- formulated. If acquisition of grazing land is involved, it shall be ensured that an equal area of grazing land be acquired and developed and detailed plan submitted.
- xvii) A mineralogical map of the proposed site (including soil type) and information (if available) that the site is not located on potentially mineable mineral deposit shall be submitted.
 - xviii) Details of fly ash utilization plan as per the latest fly ash Utilization Notification of GOI along with firm agreements / MoU with contracting parties including other usages etc. shall be submitted. The plan shall also include disposal method / mechanism of bottom ash.
 - xix) The water requirement shall be optimized (by adopting measures such as dry fly ash and dry bottom ash disposal system, air cooled condenser, concept of zero discharge) and in any case not more than that stipulated by CEA from time to time, to be submitted along with details of source of water and water balance diagram. Details of water balance calculated shall take into account reuse and re-circulation of effluents.
 - xx) Water body/Nallah (if any) passing across the site should not be disturbed as far as possible. In case any Nallah / drain is proposed to be diverted, it shall be ensured that the diversion does not disturb the natural drainage pattern of the area. Details of proposed diversion shall be furnished duly approved by the concerned Department of the State.
 - xxi) It shall also be ensured that a minimum of 500 m distance of plant boundary is kept from the HFL of river system / streams etc. and the boundary of site should also be located 500 m away from railway track and National Highways.
 - xxii) Hydro-geological study of the area shall be carried out through an institute/ organization of repute to assess the impact on ground and surface water regimes. Specific mitigation measures shall be spelt out and time bound Action Plan for its implementation shall be submitted.
 - xxiii) Detailed Studies on the impacts of the ecology including fisheries of the River/Estuary/Sea due to the proposed withdrawal of water / discharge of treated wastewater into the River/Sea etc shall be carried out and submitted along with the EIA Report. In case of requirement of marine impact assessment study, the location of intake and outfall shall be clearly specified along with depth of water drawl and discharge into open sea.
 - xxiv) Source of water and its sustainability even in lean season shall be provided along with details of ecological impacts arising out of withdrawal of water and taking into account inter-state shares (if any). Information on other competing sources downstream of the proposed project and commitment regarding availability of requisite quantity of water from the Competent Authority shall be provided along with letter / document stating firm allocation of water.
 - xxv) Detailed plan for rainwater harvesting and its proposed utilization in the plant shall be furnished.
 - xxvi) Feasibility of near zero discharge concept shall be critically examined and its details submitted.
 - xxvii) Optimization of Cycles of Concentration (COC) along with other water conservation measures in the project shall be specified.
 - xxviii) Plan for recirculation of ash pond water and its implementation shall be submitted.
 - xxix) Detailed plan for conducting monitoring of water quality regularly with proper maintenance of records shall be formulated. Detail of methodology and identification of monitoring points (between the plant and drainage in the direction of flow of surface / ground water) shall be submitted. It shall be ensured that parameter to be monitored also include heavy metals. A provision for long-term monitoring of ground water table using Piezometer shall be incorporated in EIA, particularly from the study area.

- xxx) Socio-economic study of the study area comprising of 10 km from the plant site shall be carried out through a reputed institute / agency which shall consist of detail assessment of the impact on livelihood of the local communities.
- xxxii) Action Plan for identification of local employable youth for training in skills, relevant to the project, for eventual employment in the project itself shall be formulated and numbers specified during construction & operation phases of the Project.
- xxxiii) If the area has tribal population it shall be ensured that the rights of tribals are well protected. The project proponent shall accordingly identify tribal issues under various provisions of the law of the land.
- xxxiiii) Public hearing to be conducted and issues raised and commitments made by the project proponent on the same should be included in EIA/EMP Report in the form of tabular chart with financial budget for complying with the commitments made. It should be ensured that tribes such as Shompen and Nicobarese and anthropological organisations well versed in communication with and involved in welfare of Shompen and Nicobarese are adequately represented in the Public Hearing.
- xxxv) While formulating CER schemes it shall be ensured that an in-built monitoring mechanism for the schemes identified are in place and mechanism for conducting annual social audit from the nearest government institute of repute in the region shall be prepared. The project proponent shall also provide Action Plan for the status of implementation of the scheme from time to time and dovetail the same with any Govt. scheme(s). CER details done in the past should be clearly spelt out in case of expansion projects.
- xxxvi) R&R plan, as applicable, shall be formulated wherein mechanism for protecting the rights and livelihood of the people in the region who are likely to be impacted, is taken into consideration. R&R plan shall be formulated after a detailed census of population based on socio economic surveys who were dependant on land falling in the project, as well as, population who were dependant on land not owned by them.
- xxxvii) Assessment of occupational health and endemic diseases of environmental origin in the study area shall be carried out and Action Plan to mitigate the same shall be prepared.
- xxxviii) Occupational health and safety measures for the workers including identification of work related health hazards shall be formulated. The company shall engage full time qualified doctors who are trained in occupational health. Health monitoring of the workers shall be conducted at periodic intervals and health records maintained. Awareness programme for workers due to likely adverse impact on their health due to working in non-conductive environment shall be carried out and precautionary measures like use of personal equipment etc. shall be provided. Review of impact of various health measures undertaken at intervals of two to three years shall be conducted with an excellent follow up plan of action wherever required.
- xxxix) One complete season site specific meteorological and AAQ data (except monsoon season) as per latest MoEFCC Notification shall be collected and the dates of monitoring shall be recorded. The parameters to be covered for AAQ shall include PM₁₀, PM_{2.5}, SO₂, NO_x, CO and Hg. The location of the monitoring stations should be so decided so as to take into consideration of the upwind direction, pre-dominant downwind direction, other dominant directions, habitation and sensitive receptors. There should be at least one monitoring station each in the upwind and in the pre-dominant downwind direction at a location where maximum ground level concentration is likely to occur.

- xxxix) In case of expansion project, air quality monitoring data of 104 observations a year for relevant parameters at air quality monitoring stations as identified/stipulated shall be submitted to assess for compliance of AAQ Standards (annual average as well as 24 hrs).
- xl) A list of industries existing and proposed in the study area shall be furnished.
- xli) Cumulative impacts of all sources of emissions including handling and transportation of existing and proposed projects on the environment of the area shall be assessed in detail. Details of the Model used and the input data used for modelling shall also be provided. The air quality contours should be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any. The windrose and isopleths should also be shown on the location map. The cumulative study should also include impacts on water, soil and socio-economics.
- xl ii) Radio activity and heavy metal contents of coal to be sourced shall be examined and submitted along with laboratory reports.
- xl iii) Fuel analysis shall be provided. Details of auxiliary fuel, if any, including its quantity, quality, storage etc should also be furnished.
- xl iv) Quantity of fuel required, its source and characteristics and documentary evidence to substantiate confirmed fuel linkage shall be furnished. The Ministry's Notification dated 02.01.2014 regarding ash content in coal shall be complied. For the expansion projects, the compliance of the existing units to the said Notification shall also be submitted
- xl v) Details of transportation of fuel from the source (including port handling) to the proposed plant and its impact on ambient AAQ shall be suitably assessed and submitted. If transportation entails a long distance it shall be ensured that rail transportation to the site shall be first assessed. Wagon loading at source shall preferably be through silo/conveyor belt.
- xl vi) For proposals based on imported coal, inland transportation and port handling and rail movement shall be examined and details furnished. The approval of the Port and Rail Authorities shall be submitted.
- xl vii) Details regarding infrastructure facilities such as sanitation, fuel, restrooms, medical facilities, safety during construction phase etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase should be adequately catered for and details furnished.
- xl viii) EMP to mitigate the adverse impacts due to the project along with item - wise cost of its implementation in a time bound manner shall be specified.
- xl ix) A Disaster Management Plan (DMP) along with risk assessment study including fire and explosion issues due to storage and use of fuel should be carried out. It should take into account the maximum inventory of storage at site at any point of time. The risk contours should be plotted on the plant layout map clearly showing which of the proposed activities would be affected in case of an accident taking place. Based on the same, proposed safeguard measures should be provided. Measures to guard against fire hazards should also be invariably provided. Mock drills shall be suitably carried out from time to time to check the efficiency of the plans drawn.
- l) The DMP so formulated shall include measures against likely Fires/Tsunami/Cyclones/Storm Surges/Earthquakes etc, as applicable. It shall be ensured that DMP consists of both On-site and Off-site plans, complete with details of containing likely disaster and shall specifically mention personnel identified for the task. Smaller

version of the plan for different possible disasters shall be prepared both in English and local languages and circulated widely.

- li) Detailed scheme for raising green belt of native species of appropriate width (50 to 100 m) and consisting of at least 3 tiers around plant boundary with tree density of 2000 to 2500 trees per ha with a good survival rate of around 80% shall be submitted. Photographic evidence must be created and submitted periodically including NRSA reports in case of expansion projects. A shrub layer beneath tree layer would serve as an effective sieve for dust and sink for CO₂ and other gaseous pollutants and hence a stratified green belt should be developed.
- lii) Over and above the green belt, as carbon sink, plan for additional plantation shall be drawn by identifying blocks of degraded forests, in close consultation with the District Forests Department. In pursuance to this the project proponent shall formulate time bound Action Plans along with financial allocation and shall submit status of implementation to the Ministry every six months.
- liii) The details about number of labourers, number of labour camps and its construction, their basic requirements such as transport, fuel for cooking, freshwater, sanitation, health and emergency evacuation etc to be provided in detail.
- liv) Corporate Environment Policy
 - a. Does the company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.
 - b. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.
 - c. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions. Details of this system may be given.
 - d. Does the company has compliance management system in place wherein compliance status along with compliances / violations of environmental norms are reported to the CMD and the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism should be detailed in the EIA report.

All the above details should be adequately brought out in the EIA report and in the presentation to the Committee.

- liv) Details of litigation pending or otherwise with respect to project in any Court, Tribunal etc. shall invariably be furnished.

Special Conditions

- 1) Cumulative Impact Assessment of all above proposed four sectors (ICTT, Greenfield International Airport, Township and Area Development and 450 MVA Gas and Solar based power plant) to be undertaken keeping in focus ecological and environmental impacts on Great Nicobar Island

- 2) Detailed freshwater requirement and augmentation plan, its impact and mitigation plan on native, endangered and endemic freshwater flora and fauna to be developed for all above four sectors.
- 3) Public hearing: It should be ensured that tribes such as Shompen and Nicobarese and anthropological organisations well versed in communication with and involved in welfare of Shompen and Nicobarese are adequately represented in the Public Hearing. Details of the same to be provided in EIA-EMP of all above four sectors.

Annexure-A

Following members were present during the 260th EAC (Infra-1) meeting held on 5th – 6th April, 2021

S. No.	Name	Designation	Remarks	
			Day 1	Day 2
1.	Dr. Deepak ArunApte	Chairman	Present	Present
2.	Sh. S. Jeyakrishnan	Member	Present	Present
3.	Sh. Manmohan Singh Negi	Member	Present	Present
4.	Sh. Sham Wagh	Member	Present	Present
5.	Dr. MukeshKhare	Member	Absent	Absent
6.	Dr. Ashok Kumar Pachauri	Member	Absent	Present
7.	Dr. V.K Jain	Member	Absent	Absent
8.	Dr. Manoranjan Hota	Member	Present	Present
9.	Sh. R Debroy	Member	Absent	Absent
10.	Dr. Rajesh Chandra	Member	Absent	Absent
11.	Dr. M.V Ramana Murthy	Member	Present	Present
12.	Smt.Bindu Manghat	Member	Absent	Absent
13.	Dr. Niraj Sharma	Member	Present	Present
14.	Sh. Amardeep Raju,	Scientist 'E' & Member Secretary, MoEF&CC	Present	Present
15.	Dr. H. Kharkwal	Scientist 'E' & Member Secretary (CRZ), MoEF&CC	-	Present
16.	Sh. Lalit Bokoloya	Scientist 'F' & Member Secretary (Infra-II), MoEF&CC	-	Present
17.	Dr. Rajesh P Rastogi	Scientist 'C', MoEF&CC	Present	Present

ANNEXURE 23



Holistic Development of Great Nicobar Island at Andaman & Nicobar Islands

Pre-Feasibility Report

March 2021

Quality information

Prepared by

Alexa Heidrich
Virender Kattarya
Saurabh Sharma
Dinesh Arora
Umesh Kathpalia
Sharvari Sadadekar

Checked by

Abhishek Malhotra
Somnath Mukherjee

Approved by

John Bachmann

Revision History

<i>Revision</i>	<i>Revision date</i>	<i>Details</i>	<i>Authorized</i>	<i>Name</i>	<i>Position</i>

Distribution List

<i># Hard Copies</i>	<i>PDF Required</i>	<i>Association / Company Name</i>

Prepared for:



Sansad Marg, Sansad Marg Area, New Delhi, Delhi 110001

Prepared by:



AECOM India Private Ltd.

9th Floor, Tower C, Building
No. 9, DLF Cyber City, DLF
Phase II Gurgaon 122002,
Haryana
India

T: +91 124 4830100

© 2021 AECOM India Private Limited. All Rights Reserved.

This document has been prepared by AECOM India Private Limited (“AECOM”) for sole use of our client (the “Client”) in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between AECOM and the Client. Any information provided by third parties and referred to herein has not been checked or verified by AECOM, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of AECOM.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	12
1 INTRODUCTION TO THE PROJECT	14
1.1 IDENTIFICATION OF PROJECT AREA	14
1.2 NATURE OF THE PROJECT	15
1.3 NEED FOR THE PROJECT AND ITS IMPORTANCE	15
1.3.1 International Container Transshipment Terminal	16
1.3.2 Greenfield International Airport	18
1.3.3 Township and Area Development	18
1.3.4 Power Plant	18
1.4 EXISTING POPULATION AND OCCUPATION	19
1.5 ENVIRONMENTAL CONDITIONS	20
2 PROJECT DESCRIPTION	23
2.1 TYPE OF PROJECT, INCLUDING INTERLINKED AND INTERDEPENDENT PROJECTS	23
2.2 LOCATION- REGIONAL CONTEXT	24
2.3 SITE AND PROJECT DESCRIPTION	25
2.3.1 International Container Transshipment Terminal	25
2.3.2 Greenfield International Airport	30
2.3.3 Township and Area Development	31
2.3.4 Power Plant	32
3 SITE ANALYSIS	34
3.1 CONNECTIVITY	34
3.2 LAND USE AND OWNERSHIP	34
3.3 TOPOGRAPHY AND HYDROLOGY	37
3.4 EXISTING PHYSICAL AND SOCIAL INFRASTRUCTURE	38
3.4.1 Physical Infrastructure	38
3.4.2 Social and Commercial Infrastructure	38
3.5 SOIL CLASSIFICATION	40
3.6 CLIMATE	40
3.7 ICTT SITE ANALYSIS	40
3.8 AIRPORT SITE ANALYSIS	48
3.9 TOWNSHIP SITE ANALYSIS	58
3.10 POWER PLAN SITE ANALYSIS	58
4 PLANNING BRIEF	61
4.1 PLANNING CONCEPT	61
4.2 EMPLOYMENT AND POPULATION PROJECTION	61
4.3 AMENITIES	65
4.4 INTERNATIONAL CONTAINER TRANSSHIPMENT TERMINAL	65
4.4.1 Planning Criteria	65
4.5 GREENFIELD INTERNATIONAL AIRPORT	67
4.5.1 Planning Criteria	67
4.5.2 Planning Concept	67
4.6 AREA DEVELOPMENT AND TOWNSHIP PROJECT	76
4.7 POWER PLANT	80
4.7.1 Identification of Power Source	85
4.7.2 Substations and Distribution Network	86
5 PROPOSED INFRASTRUCTURE	87

5.1	INTERNATIONAL CONTAINER TRANSSHIPMENT TERMINAL.....	87
5.1.1	Facilities Requirements for the Purpose of Layout Development.....	87
5.1.2	Recommended Transshipment Port Layout.....	91
5.1.3	Phasing of the Port Development.....	92
5.1.4	Project Schedule & Cost Estimates.....	92
5.1.5	Resource Optimisation.....	93
5.1.6	Material Sourcing.....	93
5.2	INTERNATIONAL GREENFIELD AIRPORT.....	93
5.2.1	Summarized Project Facilities & Area Details.....	100
5.2.2	Project Schedule & Cost Estimates.....	101
5.2.3	Resource Optimization.....	104
5.2.4	Material Sourcing.....	110
5.3	POWER PLANT.....	111
5.4	OTHER PHYSICAL INFRASTRUCTURE.....	112
5.4.1	Water Supply, Recycled Water and Sewerage.....	112
5.4.2	Drainage.....	117
5.4.3	Solid Waste.....	118
5.4.4	Power and ICT Systems.....	118
5.5	INDUSTRIAL AREA.....	120
5.6	RESIDENTIAL AREA.....	120
5.7	GREENBELT.....	121
5.8	SOCIAL INFRASTRUCTURE.....	121
5.9	CONNECTIVITY.....	121
6	REHABILITATION AND RESETTLEMENT.....	122
6.1	INTERNATIONAL CONTAINER TRANSSHIPMENT TERMINAL.....	122
6.2	INTERNATIONAL GREENFIELD AIRPORT.....	122
6.3	TOWNSHIP AND AREA DEVELOPMENT.....	122
6.4	POWER PLANT.....	122
7	ANALYSIS OF PROPOSAL.....	123
7.1	INTERNATIONAL CONTAINER TRANSSHIPMENT TERMINAL.....	123
7.2	INTERNATIONAL GREENFIELD AIRPORT.....	123
7.3	TOWNSHIP AND AREA DEVELOPMENT.....	124
7.4	POWER PLANT.....	124

Annexure-I Draft Notification of Eco-Sensitive Zone around Galathea National Park

Annexure-II De-notification of Galathea Bay Wildlife Sanctuary

Annexure-III Draft Notification of Eco-Sensitive Zone around Campbell Bay National Park

LIST OF FIGURES

Figure 1: Great Nicobar Island showing the Project Area	14
Figure 2: Locational Advantage of Great Nicobar	16
Figure 3: Locational setting of Great Nicobar Island with respect to major Indian ports	17
Figure 4: Transshipment Dynamics in Great Nicobar Catchment Area	17
Figure 5: Location of Four Interlinked Projects	24
Figure 6: Location of Great Nicobar Island in India	25
Figure 7: Map showing the proposed ICTT Port	27
Figure 8: Seismic Zoning Map of India as per IS-1893 Part 1-2002	29
Figure 9: Location of National Parks, Forest Reserve and Revenue Land	36
Figure 10: Project Area Overlaid on Topographic Map	37
Figure 11: Alternative Site Locations for Port	41
Figure 12: Galathea Bay Location – Proposed Layout (Site 1)	42
Figure 13: Casuarina Bay Location – Proposed Layout (Site 2)	43
Figure 14: Anderson Bay Location – Proposed Layout (Site 3)	44
Figure 15: Pemayya Bay Location – Proposed Layout (Site 4)	45
Figure 16: Campbell Bay Location – Proposed Layout (Site 5)	46
Figure 17: 5 Alternative Sites for Airport	49
Figure 18: 3 Alternative Sites for Airport	50
Figure 19: OLS for Airport North Site	51
Figure 20: OLS for Airport Central Site	52
Figure 21: OLS for Airport South Site	53
Figure 22: Preferred airport site location	57
Figure 23: Aerial Perspective of alternate Concept Plan option	58
Figure 24: Alternate sites for Power Plant	59
Figure 25: Employment and Population Projection Methodology	62
Figure 26: Range of common aircraft types in service worldwide	70

Figure 27: Benchmarking with the other airfields in the region such as 1) Campbell Bay in the island of Great Nicobar, 2) Car Nicobar and 3) Port Blair; all these runways are oriented in the first and third quadrant.	72
Figure 28: Windrose Diagrams	73
Figure 29: Concept Land use Plan	77
Figure 30: Factor contributing to Sustainable Development within GNI's Carrying Capacity.....	81
Figure 31: Galathea Bay Location – Recommended Master Plan Layout.....	91
Figure 32: Galathea Bay Location – Google image showing Port Area	91
Figure 33: Map showing preferred Airport site	94
Figure 34: Master Plan of recommended Airport site	95
Figure 35: Layout Plan of Power Plant (Recommended site).....	111
Figure 36: Water Balance Diagram.....	114
Figure 37: Location of WTP and STPs	117

LIST OF TABLES

Table 1: Great Nicobar Island Population	20
Table 2: Population of Revenue Villages	20
Table 3: Occupational Structure of Great Nicobar Island (2016-17)	20
Table 4: Site Specific Surveys	27
Table 5: Landside General Soil Profile	28
Table 6: Marine Side General Soil Profile	28
Table 7: Land Requirement of Proposed Projects	32
Table 8: Power Generation Sources	33
Table 9: Comparative Analysis for Alternate Sites	46
Table 10: Analysis of Alternative Sites	54
Table 11: Analysis of Alternative Sites	60
Table 12: Assumptions for Employment Estimation	63
Table 13: Projection of Total No. of Employees	64
Table 14: Projection of Total Population	64
Table 15: Preliminary Projections of Transshipment Port Traffic (million TEUs) -Excluding FTWZ.....	65
Table 16: Dimensions of the Smallest and Largest Ship	66
Table 17: Dredged Depth Summary.....	66
Table 18: Aerodrome reference code by ICAO	68
Table 19: Fleet Mix	69
Table 20 Summarisings the Stretches	70
Table 21: Critical design aircraft envelopes	71
Table 22: Wind Direction	72
Table 23: Take-off Climb Surface Dimensions and Slopes	74
Table 24: Approach Surface Dimensions and Slopes	74
Table 25: Runway Dimensions.....	75
Table 26: Permissible Values of Slopes As per ICAO	76

Table 27: Land Use Categories.....	78
Table 28: Land Use Area Breakdown.....	80
Table 29: Key Performance Indicators for Managing Tourism & Urban Development.....	83
Table 30: CEA Recommendation	85
Table 31: Electricity supply code Recommendation	85
Table 32: List of Equipment for ICTT	89
Table 33: Phase-wise Port Development over Master Plan Horizon	92
Table 34: Block Cost Estimates	92
Table 35: Main Parallel Taxiway Dimension.....	95
Table 36: Apron Dimension	95
Table 37: Summarized facilities at proposed Airport.....	100
Table 38: Preliminary cost estimate	104
Table 39: Tentative area for the main components of gas-based power plant.	111
Table 40: Water Demand details	114
Table 41: Waste Water/Sewage Generation Details	115
Table 42: Raw & Treated Sewage.....	115
Table 43: Details of the households in revenue villages	122

LIST OF ABBREVIATIONS

ICTT- Integrated Container Transshipment Terminal
ICAO-International Civil Aviation Organisation
CEA- Central Electricity Authority
GDP-Gross Domestic Product
IOR- Indian Ocean Region
MOEF&CC- Ministry of Environment Forest & Climate Change
MSL- Mean sea level
BRO- Border Road Organisation
BRT-Bus Rapid Transit
TOD-Transit Oriented Development
ITV- Inter Transfer Vehicles
RMQC- Rail Mounted Quay Crane
RTG- Rubber Tyred Gantry
WAPCOS- Water and Power Consultancy Services (India) Limited
VTMS-Vessel Traffic Management Systems
STP-Sewage Treatment Plant
ETP- Effluent Treatment
MLD- Million litres per day
KLD- Kio litres per day
WC-Water Closet
UV-Ultra violet
MW-Megawatt
MVA- Megavolt amperes
TEU- Twenty-foot equivalent units
ECBC- Energy Conservation Building Code
CD- Chart Datum
TGS- Twenty Feet Ground Slots
ICRZ-Island Coastal Regulation Zone
PIZ- Project Influence Zone
GNIIA-Great Nicobar Island International Airport
ATC-Air Traffic Control
IFR-Instrument Flight Rules
RESA-Runway End Safety Area
DG – Diesel Generator
APFC- Automatic Power Factor Control
CNS-Communication, Navigation & Surveillance
CCTV- Closed Circuit Television
DFMDs- Door Frame Metal Detector
HHMD-Hand Held Metal Detector
ILS- Instrument Landing System
DVOE-DME - Doppler Very High Frequency Omni Range Distance Measuring Instrument
CCR- Central Control Room
FID- Flight Information Display System
lpm- litres per minute
CCTV - Close Circuit Surveillance System
ppm- parts per million
lpcd- litres per capita per day

CPWD- Central Public Works Department
CFT- Crash Fire Tender
SAR- Synthetic Aperture Radar
AFI-Air Force Station
ARFF-Aircraft Rescue and Fire Fighting
CP- Controlled Percolating
RRL-Reinforced Rubber Line
ATM- Air Traffic Management
AAI-Airports Authority of India
OLS- Obstacle Limitation Surface
DGCA-Director General of Civil Aviation
IATA- International Air Transport Association
NBC-National Building Code
VHF Channels:
ADC-Arrival Departure Control
SMC-Surface Movement Control
ATN-Aeronautical Telecommunication Network
AMSS- Automatic Message Switching System
AFTN-Aeronautical Fixed Telecommunication Network
ATIS-Airport Terminal Information System
MLC-Military Liaison Cell
ADC-Air Defence Clearance
NPA-Non-Precision Approach
LPDME - Low Power Distance Measuring Equipment
ASR-Airport Surveillance Radar
VFR-Visual Flight Rules
PAPI-Precision Approach Path Indicator
CCR-Constant Current Regulators
RVR-Runway Visual Range
RWY-Runway
GSE-Ground Support Equipment
MSSR-Monopulse Secondary Surveillance Radar
ASSR- Airport Surface Surveillance Radar
AGL-Air field Ground lighting
FAA- Federal Aviation Agency
ORAT-Operational Readiness and Transition
NOC-No Objection Certificate
SOS- Security of Supply
EDAN Islands - Electricity Department of Andaman and Nicobar Islands
LNG-liquefied Natural Gas
NTPC-National Thermal Power Corporation Limited
GIS-Gas Insulated Sub Station

EXECUTIVE SUMMARY

The goal of the project 'Preparation of Master Plan for Holistic Development of Great Nicobar Island in Andaman & Nicobar Islands' is to provide a framework for development of a new 'greenfield city' with a diverse and robust economy based on maritime services and tourism, amongst other drivers. The development of the new economic base will depend heavily on investment in catalytic infrastructure facilities, including an International Container Transshipment Terminal (ICTT), Greenfield International Airport, and Power Plant. A new Township will link the infrastructure facilities into complete the physical framework of the new city. These four interlinked projects (Port, Airport, Power Plant, and Township) form the core of the new city and the main components of the holistic master plan. From an environmental assessment perspective, the ICTT is considered the primary project.

The proposed port will allow Great Nicobar to participate in the regional and global maritime economy by becoming a major player in cargo transshipment. The proposed airport will support the growth of maritime services and enable Great Nicobar Island to attract international and national visitors to experience the outstanding natural environment and participate in sustainable tourism activity.

Mixed-use urban development in the vicinity of these major infrastructure works will also be necessary to support quality of life for the residents and visitors alike. Urbanisation will require the development of primary and secondary urban infrastructure networks and services, including roads, public transport, and energy, water, wastewater, and storm water. The proposed power plant will ensure the production of sufficient electrical power to run the new city. These physical infrastructure networks will form the backbone of the township master plan. Developable areas have been identified along the south-western and especially south-eastern coasts of the island.

The vision for the development of Great Nicobar Island is formulated as: 'To leverage the locational advantage of being on International sea route and develop Great Nicobar as a sustainable, green, global destination for business, trade, and leisure'.

The scope of services of this commission is to analyse the site and development potential, plan the city and its key infrastructure facilities, and identify the modalities for financing and implementation. The scope also includes preparation of an Environmental Impact Assessment for securing environmental clearance of the project. This Pre-Feasibility Report has been structured as per the MoEF&CC Guidelines to cover all the essential required aspects, described in detail under respective sections of: Introduction, Project Description, Site Analysis, Planning Brief, Proposed infrastructure, Rehabilitation and Resettlement, and Analysis of Proposal.

Siting studies were carried out for each of the interlinked projects. Alternatives were identified and evaluated against predetermined criteria, including environmental impact, operational performance, and economic viability. Sub-criteria included coastal morphology, density and diversity of the terrestrial ecosystem, density and diversity of coral, compliance with ICRZ notifications, and impact on the Tribal people. The basic aim for site selection was to ensure that the natural habitat and its attributes are preserved and the impact of the construction and operation of the project is at minimum and to an acceptable level.

Galathea Bay was recommended as the preferred site for the ICTT and the power plant. This site includes no human habitation. The back port area will have to be developed by reclamation, which will extend up to the intertidal zone. No cutting of hills is required. Minimal dredging is envisaged. The area falls partly under ICRZ Zone 1B. A small portion of the west breakwater and backup area falls in tribal reserve. Turtle nesting sites are observed at the western beach of Galathea.

It is proposed to locate the airport at Gandhi Nagar and Shastri Nagar (South site), the only site within the project area flat enough to facilitate bidirectional take-off and landing. The flight path of the aircrafts will run over sea and there will be minimal disturbance to local population and the tribal areas due to over flying of aircrafts at low altitude. Some of the existing households in those villages will be affected by the project. The site includes a large area of revenue land, and minimal forest land will be affected.

As the western and the northern parts of the island have never been the permanently settled or occupied by mainlanders, these pristine areas were excluded from development alternatives. Moreover, several Shompen habitats along the western and north-eastern coastline were deliberately avoided. The coastal stretches on the western coast are used both by Shompens and Nicobarese for fishing purposes. The area around the Casuarina Bay and Pemayya Bay which was initially considered for Port was finally excluded due to Environmental and other technical considerations.

An alternate concept master plan was considered. It includes 75 sq.km of urbanised area, including 33 sq.km of residential area and 42 sq.km of commercial development. The combined urbanised area is significantly higher than the preferred option, which includes approximately 45 sq.km of urbanised area. Since under the alternate plan the 75 sq.km area does not fit within the current revenue land (approximately 44 sq.km), it was distributed to the forested areas between the revenue villages and to the west of the villages. The alternate layout results in considerably more deforestation and more redevelopment of hilly, forested land to urban uses. The lower environmental costs associated with the more compact layout led to its selection as the preferred concept master plan for Great Nicobar Island.

Supporting urban infrastructure systems have been planned and identified for development of the city. As concerns water supply, 40 MLD of fresh water demand can be met from surface water of Galathea River and Alexandria River. Approximately 40% of the water demand will be met through water re-use. Distributed waste water treatment plants at selected locations along the south-east coast will result in lower energy usage and more economically viable waste water service delivery.

The ICTT can be developed at a cost of INR 35,959 Crore. The international airport can be developed over a 5-year period, including one year for procurement. The cost of the project is estimated at INR 10,359 Crore.

On final analysis, the set of four interlinked projects will add considerable socio-economic value at a relatively low social and environmental cost. The ICTT and Power Plant project sites are uninhabited. Only the airport project requires resettlement, and the number of affected persons is low. The large majority of the existing corals have been avoided through careful siting. The urban development will be kept on a small footprint along the edges of the island that are least frequented by the Shompen and the Nicobarese. Compact development will result in higher environmental sustainability and diversion of less forest land to non-forest uses. Low-intensity and low-impact ecotourism uses are deployed in forested areas within the project area and along the south-eastern coastline. More than 1 lakh new direct jobs and 1.5 lakh indirect jobs can be created on the island during the next 30 years. The local business community is aware that the public sector mindset has changed, and that development on GNI can grow in harmony with the natural environment and aboriginal peoples.

1 INTRODUCTION TO THE PROJECT

1.1 Identification of Project Area

The project is located on Great Nicobar Island, the southernmost last mass of the Andaman and Nicobar Islands. The regional context is given in Section 2.2 of this report. Great Nicobar Island has a total area of 910.074 sq.km. The island includes two national parks, a biosphere, and is home to the Shompen and Nicobarese tribes. With a view to preserving the valuable ecological and anthropological assets on Great Nicobar Island, the development area has been limited to a 166.1 sq.km area along the south-eastern and southern coastlines. It extends from the north of Campbell Bay to Indira Point and further up to the Pemayya Bay area in the south. While the east and South of the site are edged by the Indian Ocean, the west and north are flanked by mountainous terrain and forests of the Galathea National Park. The development area does not include any area within the national parks, though a small portion falls within the Biosphere reserve. The project area has been carefully delineated after considering the parameters of topography, drainage pattern, preservation of rich ecological central core of the island, national parks and its eco-sensitive buffers, mangroves and other ecological assets, presence of existing habitation on the western coast and considering all the natural features.

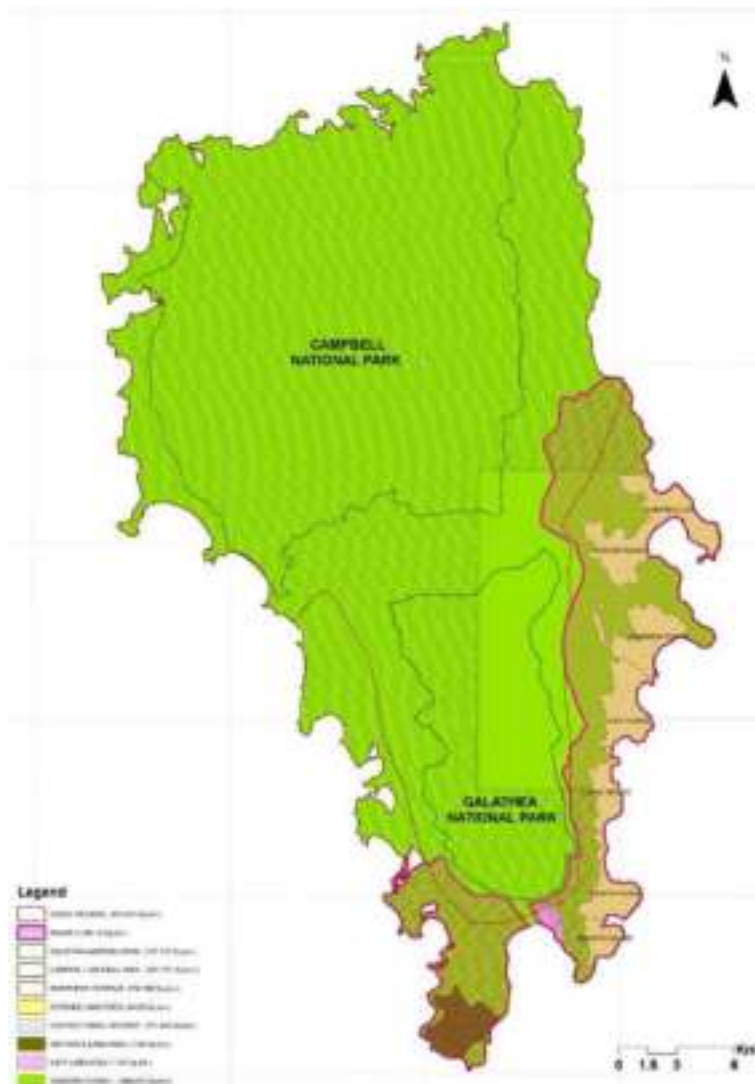


Figure 1: Great Nicobar Island showing the Project Area

1.2 Nature of the Project

Great Nicobar is an integrated urban development project planned on a pristine tropical island with exceptional natural and cultural assets and distinct economic advantages. The project will (1) strengthen India's presence in the Andaman Sea and the Southeast Asian region and (2) create an economic hub in the Andaman & Nicobar Islands that functions simultaneously as a major cargo transshipment centre and a global tourism destination.

This project is in fact four 'interlinked' projects that together constitute the new Greenfield city at Great Nicobar. The four projects are the port, airport, power plant, and township. Each of these four projects is considered separately — and together, as an integrated whole — in each section of this pre-feasibility report. From an environmental assessment perspective, the port is considered the primary project.

For several reasons, successful development of Great Nicobar Island requires a sensitive, holistic approach. First, the island is home to a dwindling number of indigenous people whose traditional culture is considered an international resource. Development plans must not only consider the impact of growth on these people, but also be formulated in order to generate benefits for them as well as for future in-migrants and investors. Second, the world-class ecological resources must be conserved and enhanced during the proposed integrated development at Great Nicobar Island.

While it is clear that development on Great Nicobar will have environmental impacts, the holistic master plan must enable environmentally and socio-culturally sustainable development and identify effective mitigating measures for any anticipated negative impacts. A systematic and thorough method for evaluating the socio-cultural and environmental impacts of different planning infrastructure project proposals has been employed. Trade-offs are identified and quantified, and alternatives that perform better from a socio-cultural and environmental perspective are prioritised. The preferred alternatives will be those that strike the appropriate balance between the environmental, social, and economic goals of the project.

1.3 Need for the Project and Its Importance

Great Nicobar Island is a jewel of an island, the development of which can address several pressing concerns related to maritime security, economic growth, and quality of life for the local population.

The development of Great Nicobar Island is significant from the point of view of national security. This is in light of the ongoing consolidation of the Indian Ocean region and the military and economic impact of this consideration. The Indian Ocean Region (IOR) in general and the Indian Ocean in particular has turned into a strategic hotspot in recent years. In response to the increasing strategic value of this IOR, a critical mass of development in the Andaman & Nicobar Islands is necessary for strengthening India's regional presence.

In addition, Great Nicobar Island represents a significant economic development opportunity. The main east-west shipping route that links East Asian exports with the Indian Ocean, Suez Canal and Europe runs just to the south of Great Nicobar Island, the southernmost landmass in India. By building a container port in this location, India can participate more fully in the global shipping trade, creating employment opportunities for its citizens and improving quality of life for current and future residents of Great Nicobar Island.

In addition to this overarching rationale for undertaking the project, each of the four interlinked projects has its own rationale, as described below.

1.3.1 International Container Transshipment Terminal

The development of a new cargo Transshipment terminal and associated industrial facilities will allow India to leverage its excellent access to major shipping routes between East Asia and South Asia in order to capture a significant share of the regional maritime economy.

Due to geographical and logistic constraints, deep water berths in the ports along the East & West Coasts of India have not been developed for berthing large inter-continental vessels of drafts over 15 m. The present major Transshipment hubs in South Asia at Colombo and Singapore provide deep water ports for main line vessels carrying cargoes for smaller ports in the region. Feeder vessels presently call Singapore and Colombo for loading cargoes bound for smaller ports in the Bay of Bengal, Andaman and the Arabian Sea. The result is that India is losing substantial revenue in terms of facilities and higher rate of landings.

It has also been observed that other countries like Myanmar, China and Sri Lanka are gearing up to develop deep water facilities for taking major share of trade by developing suitable harbour facilities. From the foregoing, it is quite evident that India should move towards setting up dedicated deep-water berths for primarily Transshipment activities in its waters thereby generating revenue.

Great Nicobar Island is strategically located equidistant from Colombo, Port Klang and Singapore and is also very close to the East-West international shipping corridor.

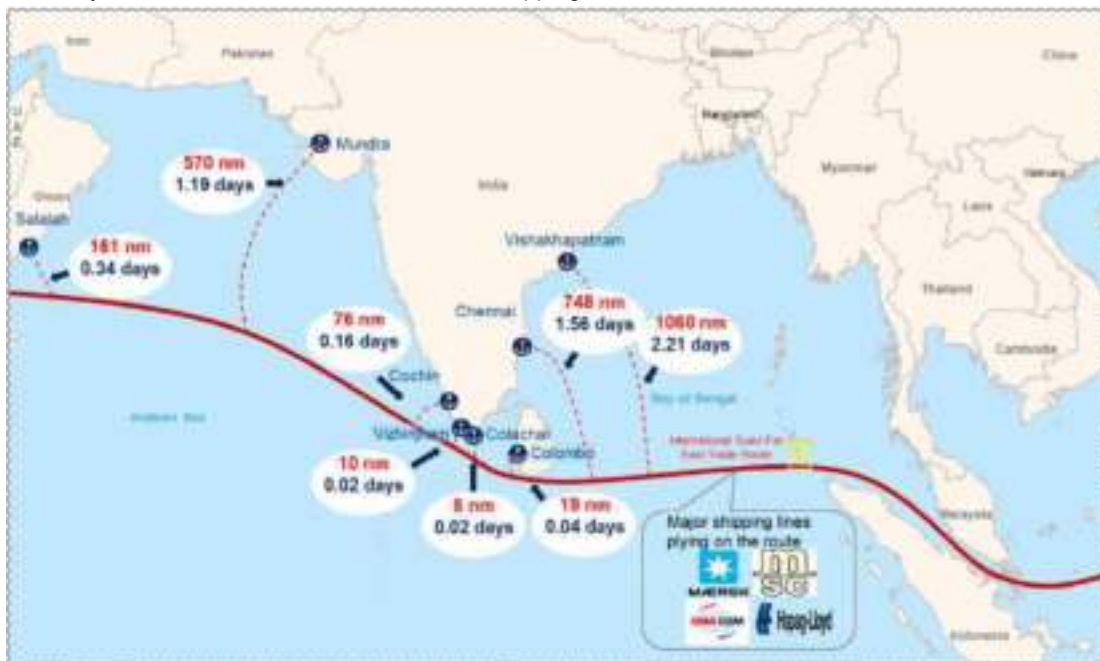


Figure 2: Locational Advantage of Great Nicobar

Development of Transshipment terminal at South Bay would attract existing traffic of ports along East Coast of India, Bangladesh and Myanmar as they form primary catchment for Transshipment terminal for the following reasons

- Proposed Terminal is strategically located on the East West container trade route.
- Strategic location advantage leads to overall cost savings for containers shipping costs.

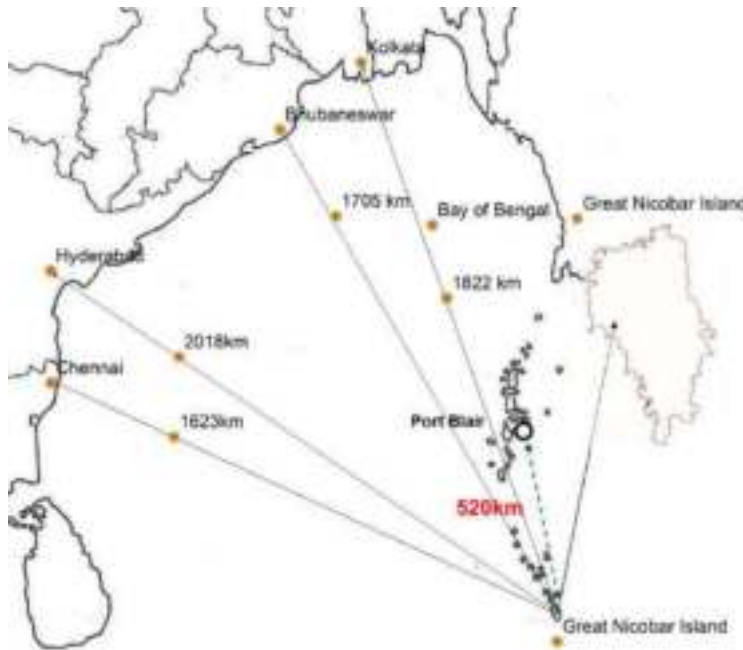


Figure 3: Locational setting of Great Nicobar Island with respect to major Indian ports

The proposed site is endowed with natural depth of 20 m as close as one Nautical Mile from the sea coast. As may be appreciated, due to natural depth availability, the site needs minimal capital dredging requirements and thus low costs (as compared to the any other port in India within a reasonable distance from the East-West Shipping axis). The proposed site has minimal Littoral drift and as such would hardly require any maintenance dredging during the years of operation. This will result in low O&M Costs. The proposed site is away from mainland / urban / city limits, and thus can be master planned and shaped by the professional and experienced developers as per their own efficient designs and needs.

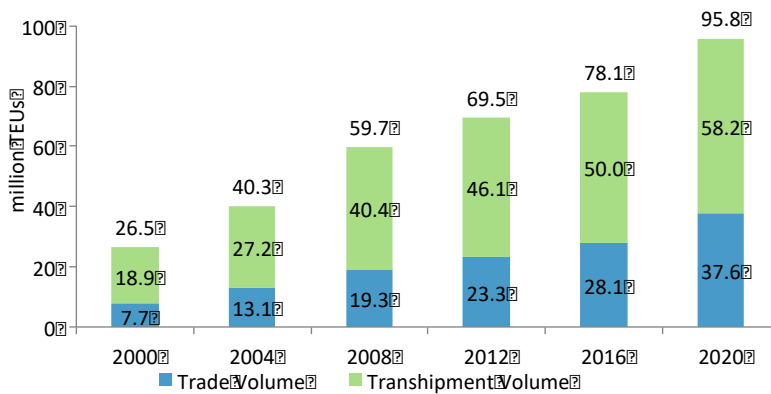


Figure 4: Transshipment Dynamics in Great Nicobar Catchment Area

Great Nicobar Container transshipment terminal would have business prospects from following 2 avenues:

- Transshipment of Containers for feeder ports in the region
- Development of Storage and Re-processing zones

The majority of Transshipment terminals in Asia have developed large warehouses behind Transshipment terminals. This includes Singapore, Jebel Ali, etc. The free trade zones in these regions act as storage

and distribution centre of the region. Some of the Free Trade zones also allow minimal packaging and processing for re-export. Singapore is the nearest competitor of proposed Great Nicobar Transshipment terminal. Following 3 factors determine the dynamics of Free trade zones beside Transshipment terminal

- Large economy of Scale
- Availability of large parcel of lands at economical rates
- Availability of low-cost manpower to work in Free Trade Zones

The Project can provide direct and indirect employment to over 4200 people. During construction an estimate 2000 people are expected to be employed. It would increase the employability of the local population on the island.

1.3.2 Greenfield International Airport

The island and the archipelago feature world class ecological resources that, with the right level of infrastructure development, can attract international and Indian tourists. An international airport is necessary to improve connectivity to Great Nicobar and open up the island to tourism.

Given its geographical context, an airport at Great Nicobar can serve not only the island but also adjoining areas. Locational advantage of the islands is their close proximity to international tourist island destinations like the upcoming Senang City, the Phuket Island and Langkawi Island. Thus, the islands present a great opportunity for a tourism-oriented island development that would put Andaman and Nicobar on the global tourist destinations map.

Econometric modelling using various parameters individually and in combination (as input independent variables) are in the process of being undertaken to find the most correlated factor(s). The projections will also be informed by inputs from key stakeholders. In the absence of any concrete data and very minimal economic & tourist activity, it has been assessed that the projections would be akin to what prevails at Port Blair. Currently, Port Blair Airport handles approx. 2000-2500 passengers per day bringing to an annual figure of approx. 1.8 million passengers in 2019. It can be reasonably assumed that by the time the airport opens, this international airport will also have an identical influx of passengers. Hence, it is being assumed that the airport should be capable of handling at least 1million passengers at the instance of opening and thereafter be adequate to sustain a figure of approx. 10MPPA wherein after it would require further enhancement.

1.3.3 Township and Area Development

Mixed-use urban development is a necessary component of future development on Great Nicobar Island. The people who manage and operate the transshipment terminal need a place to live. Development of hotels and associated commercial land uses are essential for growth of the tourism industry. The ancillary economic sectors, including professional services, education, research others yet to be identified, also need real estate and public services in order to grow. While the main drivers of the economic growth and robust national presence on Great Nicobar Island are the transshipment terminal and the tourism industry, the city fabric is necessary to grow an urban agglomeration substantial enough to support and facilitate these economic initiatives.

1.3.4 Power Plant

Electric power is necessary for operation of the port, airport, and township. Without power, there will be no Greenfield city at Great Nicobar Island. While the port and airport are catalytical infrastructure facilities

to the extent that they will generate and economic growth, the power plant is an enabling and supporting infrastructure facility that the city and the economy need in order to grow and prosper.

Power or electricity is the most convenient and versatile form of energy. All forms of economic activity, whether it be agriculture, industry or services rely upon the uninterrupted power supply, as well as it is the most crucial source of supplying domestic energy requirement. Diesel Generating (DG) sets are the major source of energy in this Union Territory of A&NI.

The primary objective of the power infrastructure design is to provide good quality, reliable electrical energy without interruptions. System design ensures the continuity of power supply in the event of outage of any one primary component of the system. Design of network is in tune with the phasing strategies of the overall master plan.

For the proposed development at GNI such as industrial, residential and commercial buildings, mobility, public built spaces and other urban arrangements, the network of energy provision is basic requirement of these development. Thus, higher level electricity is pre-requisite for better quality of living, and it is better to plan additional generation from renewable sources for GNI.

An uninterrupted energy supply will be a key component in increasing the GDP of any cities or island. Handling this urban evolution is a challenge and we need to address the energy and climate implications it will entail.

With power infrastructure being vastly complex and intense as the channelling of supply goes through various cities, island, towns and villages it now has become paramount to have technology interference to conventional system.

Business and the economy in digital era depend upon reliable and quality power supply. So far, the focus of the sector was limited to providing uninterrupted power supply to consumers. This was understandable at the time of deficit when the limited supply of power was available to meet peak demand and the expectation of end consumers was availability of power supply.

1.4 Existing Population and Occupation

The population of Great Nicobar Island combines aboriginal tribes that have inhabited this island for thousands of years with ex-servicemen that were settled here by the Government of India during the 1970s. The new residents came from Punjab, Maharashtra and Andhra Pradesh. Thus, a 'Mini-India' exists in Great Nicobar Island, with Indians from all parts of the country harmoniously residing here.

Great Nicobar Island is inhabited by aboriginal mongoloid Shompen. The Shompens are hunter-gatherers and depend on the forest and marine resources for sustenance. They live where natural water source is available and use the surface water for drinking. Another Mongoloid Tribe, the Nicobarese, used to live in settlements along the west coast. After the tsunami in 2004, which devastated their settlement on the western coast, they were relocated to Afra Bay on the north coast and to Campbell Bay. They survive on fish caught from the sea. There are about 237 Shompen and 1,094 Nicobarese individuals.

The areas where the tribal dwell have been declared as Tribal Reserve. The Shompens move between the Core and Buffer Zones, while the settlers and Nicobarese live in settlements spread along the coast in the Transition zone. The area of the tribal reserve is 751.070 sq.km. Of this 84.10 sq.km falling under tribal reserve, is proposed to be denotified. Andaman & Nicobar Administration proposes to renotify 45.23 sq.km of land in Campbell Bay and Galathea National Parks and 31.73 sq.km land outside the National parks. Therefore effectively 7.11 sq.km will be required for de-notification for the project.

The settlers and mainlanders, which number over 8,000, live along the southeast coast of the island, practising agriculture, horticulture and fishing. The settled area includes seven revenue villages, namely: Campbell Bay, Govind Nagar, Joginder Nagar, Vijay Nagar, Laxmi Nagar, Gandhi Nagar, and Shastri Nagar. The remaining villages in Great Nicobar Island are not identified as revenue villages.

Table 1: Great Nicobar Island Population

Male	Female	Total
5025	3342	8,367

Source: Census of India 2011

Table 2: Population of Revenue Villages

Sr. No.	Village	Population
1	Campbell bay	5736
2	Govind Nagar	676
3	Joginder Nagar	693
4	Vijay Nagar	100
5	Laxmi Nagar	230
6	Gandhi Nagar	69
7	Shastri Nagar	15

Source: Census of India 2011

According to census data and local officials and residents, the primary economic activities of people on the island are agriculture, horticulture and fishing. Prior to Tsunami 2004, Great Nicobar had extensive paddy cultivation and coconut plantations. The paddy fields were severely impacted by the tsunami and the cropping pattern has now shifted away from paddy to coconut, fruits, and vegetables. In terms of fisheries, the site has huge potential for oceanic tuna, which is virtually unexploited, and offers ample scope for deep sea fishing. But the main bottleneck is lack of connectivity for export of fish from the island.

Table 3: Occupational Structure of Great Nicobar Island (2016-17)

Sr. No.	Category	Population
1	Main Workers	3350
2	Cultivators	118
3	Agricultural Labour	80
4	Marginal Workers	491
5	Other Workers	3152
6	Non-Workers	4526
7	Total	11717

1.5 Environmental Conditions

Great Nicobar Island harbours a range of ecosystems, including tropical wet evergreen forests, mountain ranges reaching a height of nearly 650 m (Mt. Thullier) above sea level, and coastal plains. The island is noted for its rich biodiversity. It houses 650 species of angiosperms, ferns, gymnosperms, bryophytes and lichens among others. The tract is rich in plant diversity and fosters a number of rare and endemic species,

including *Cyathea alboretacea* (tree fern) and *Phalaenopsis speciosa* (orchid). A total of 14 species of mammals, 71 species of birds, 26 species of reptiles, 10 species of amphibians, and 113 species of fish have been reported. The region also harbours a large number of endemic and endangered species of fauna. To date, 11 species of mammals, 32 species of birds, 7 species of reptiles and 4 species of amphibians have been found to be endemic. Of these, the well-known Crab-eating Macaque, Nicobar Tree Shrew, Dugong, Nicobar Megapode, Serpent Eagle, salt water crocodile, marine turtles and Reticulated Python are endemic and/or endangered.

The area harbours coral reefs. These reefs are present around the island with varied thickness and diversity. The corals were severely affected due to 2004 tsunami. In 2008, due to rise in sea water temperature, significant number of corals were bleached all over the world; the corals of Nicobar Island also experienced bleaching. However, the exact quantity of coral bleaching has not been estimated. The corals generally exist along the rocky coastal stretches with varied thicknesses. The island has plates of dead and live corals. In few areas, new coral recruits were also observed. As a part of the EIA study for this development, Zoological Survey of India (ZSI) has surveyed the area. The data collection is underway, and the report is awaited.

Along the coastal beaches of the Nicobar Island, Leatherback and Olive Ridley turtles are known to nest. The tsunami of 2004 modified the coastal morphology significantly and the turtles stopped visiting the beaches for nesting. However, with the passage of time, some turtles have returned for nesting. Each Leatherback turtle lays about 100 eggs, and the survival rate of the hatchlings is around 2-5%. Various reports suggest that one out of one thousand turtles reach adulthood.

Megapode nesting sites can be seen in various places around the island. Megapodes are mainly solitary birds that do not incubate their eggs with their body heat as other birds do, but bury them in mound consisting of decaying vegetation. ZSI is studying the megapode nesting sites as a part of the EIA. The report is awaited.

The island is known for salt water crocodiles. There has been an increase of man-crocodile conflict and the attacks on human have increased significantly over the years. There have been petitions by locals for culling of crocodiles.

The GNI suffered severely during the 2004 tsunami. The Sumatra earthquake (Mw 9.3) of 26 December 2004 was one of the most important earthquakes from the point of view of plate tectonics. This event occurred along the plate boundary marked by the subduction zone between the Indian Plate and the Burmese Plate (a part of the Eurasian Plate). The southern portion of the Great Nicobar Island seems to have subsided by about 3 m, as supported by changes in the natural water levels. The entire Megapode Wildlife Sanctuary was submerged due to the submergence and does not exist anymore. On the eastern coast also, the sea has advanced to the coast by about 200-500 m, depending on the topography.

This sudden 'land drowning' (due to tectonic subsidence), coupled with the tsunami, altered the structure of mangrove forests. As per the study by WII, the mangrove cover in the Nicobar Islands declined by around 97 percent, which is higher than the earlier estimation. The researchers from Centre for Ornithology and Natural History (SACON) documented 20 mangrove species from 34 sites across the Nicobar Islands, of which eight species were recorded for the first time from the island group. There could be two major reasons for the new reports of eight mangrove species. These islands are often underexplored, so the species could have been there but not reported. The second factor could be that the tsunami may have carried the seed material of the unreported species from nearby sources (such as

Malaysia, Indonesia and Singapore) along with the huge pile of debris that it dumped on the Nicobar coasts.

2 PROJECT DESCRIPTION

2.1 Type of Project, Including Interlinked and Interdependent Projects

The proposed development at Great Nicobar Island includes four interlinked projects¹:

1. International Container Transshipment Terminal (ICTT) under Category 7 (e), Port, Harbours. This is the primary project.
2. Greenfield International Airport under Category 7(a)
3. Township and Area Development under category 8(b)
4. Power Plant under category 1(d)

The EIA process will be undertaken in line with the OM dated 24th December 2010 for interlinked projects. Thus, an integrated TOR for interlinked projects will be obtained from MOEF&CC. Further a common EIA will be prepared covering all sectors and one public hearing on the EIA report so prepared will be held. The ICTT is considered the primary project.

¹as per the EIA Notification of 14th September 2006



1. International Container Transshipment Terminal
2. International Airport
3. Township and Area Development
4. Power Plant

Figure 5: Location of Four Interlinked Projects

2.2 Location- Regional Context

The Andaman and Nicobar Islands are a cluster of about 836 offshore islands of India located to the east of the Bay of Bengal and west of the Andaman Sea. The clusters comprise of two island groups, the Andaman Islands and the Nicobar Islands, separated by the 150 km wide Ten Degree Channel, with the Andaman Islands to the north and the Nicobar Islands to the south. The Union Territory's capital city is Port Blair which is the current focal point of all development and connectivity in the Islands.

The Great Nicobar Island is located in the Nicobar district to the south of the Andaman Islands. It is the largest of the cluster of islands with an area of about 910.074 sq. km and the southernmost of the group

of Nicobar Islands located at a distance of approximately 520 km from Port Blair. Indira Point, earlier known as Pygmalion Point, lies at the tip of the Great Nicobar Island and is the southernmost point of the country. It is at an approximate distance of 144 km from the Sumatra Island of Indonesia.

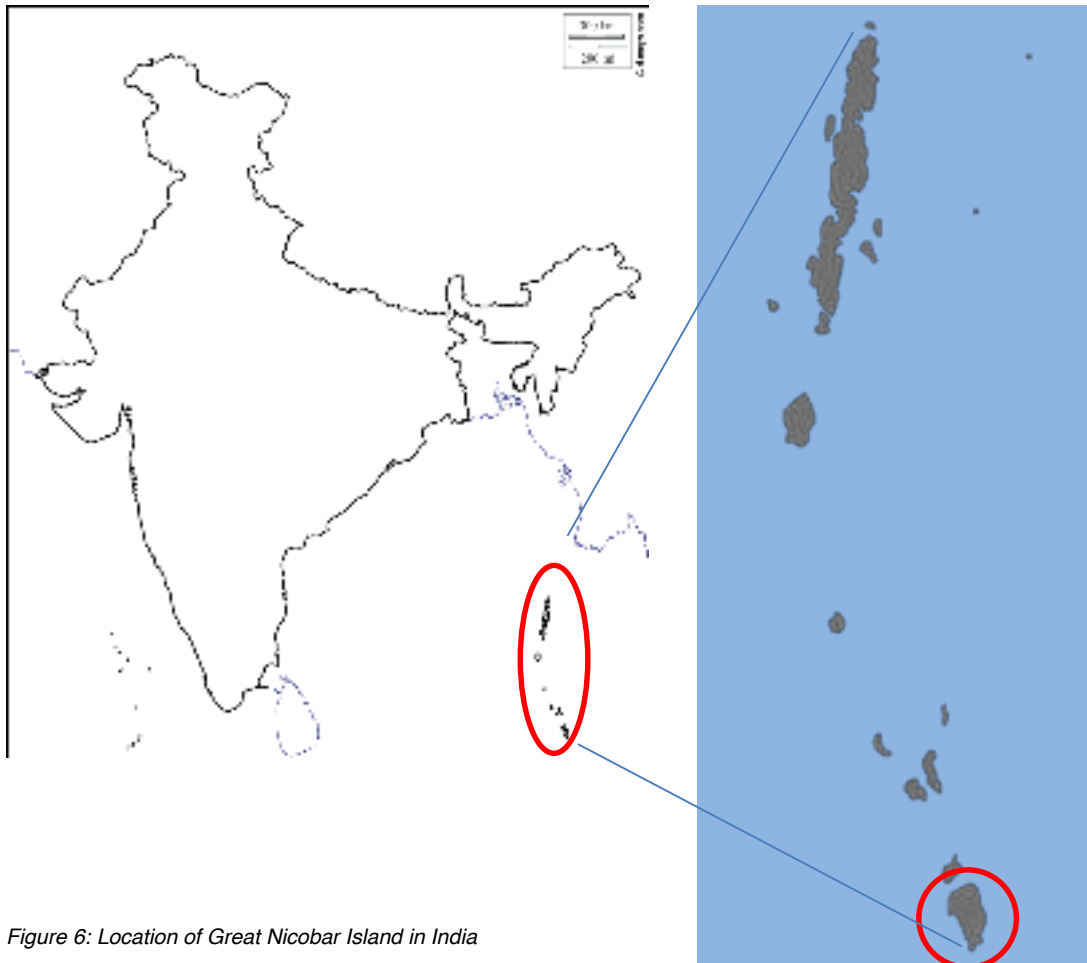


Figure 6: Location of Great Nicobar Island in India

As described in Section 1.3, this strategic location of the island to International Shipping route, ferry terminals, airports, major ports and tourist destinations presents immense opportunities to further strengthen India's trading position in the world.

2.3 Site and Project Description

This integrated urban development project is composed of four interlinked projects: the Port, Airport, Township, and Power Plant. Taken together, these four projects constitute development of Great Nicobar City- a new port city and tourism destination at the southernmost tip of India. Each of the four projects, and its corresponding site, is described below. The Site Analysis is presented in Section 3.

2.3.1 International Container Transshipment Terminal

The proposed project is to develop an International Container Transshipment Terminal (ICTT) Port facility, including for establishing the container Transshipment port at Great Nicobar Island. The total project area for port is 993 ha (out of which 766 ha is on land and 227 ha shall be created through reclamation). The port land will be used for developing port infrastructure, Port & Utility buildings and facilities, Workshops, Container stacking yards, Reefer Areas, Vehicles and ITV parking and movement areas, Port roads, Pavements and green areas.

The site selection process is described in Section 3 below. The selection of Galathea Bay as the proposed site was done with a view to minimising negative environmental impacts and complying with the requirements of the environmental regulatory framework, including the provisions related to Island Coastal Regulation Zones.

The Galathea Bay site includes no human habitation. The Backup area will have to be developed by reclamation, which will extend up to the intertidal zone. No cutting of hills is required. Minimum Dredging is envisaged. The area falls partly under ICRZ Zone 1B. A small portion of the west breakwater and backup area falls in tribal reserve. Turtle nesting sites are observed at the western beach of Galathea.

- **Site Conditions**

General-

The proposed Project land does not have permanent habitation by people, show cultivation, pasture grazing or water reservoirs (ponds). The proposed site comprises an intertidal zone and forest.

Site Specific Surveys & Studies-

Following site specific surveys & investigations have been conducted forming base for this Pre-Feasibility Study for the proposed container Transshipment port at Great Nicobar Island.

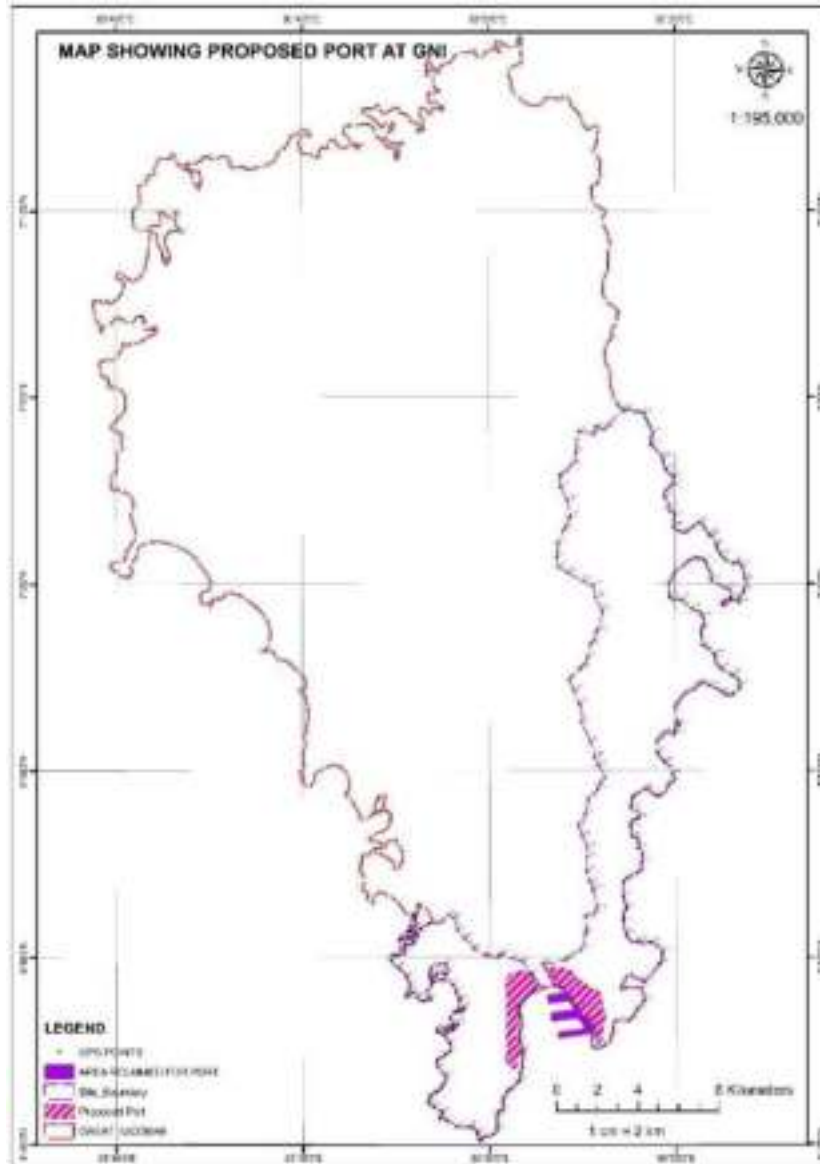


Figure 7: Map showing the proposed ICTT Port

The site-specific surveys details are summarised in **Table 4**.

Table 4: Site Specific Surveys

Sr.No	Survey	Agency	Survey Extent
1	Bathymetric surveys	WAPCOS	Covering an area of about 21.5 sq. km encompassing the proposed site
2	Topographic Survey	WAPCOS	Covering an area of 12 sq. km
3	Land borehole investigations	WAPCOS	04 land borehole
4	Maine geotechnical investigations	WAPCOS	06 marine borehole
5	Sea-bed Samples, Water Samples, Current meter observations	WAPCOS	Tide and Current measurements for 1 lunar cycle of 30 days at 1 location. Sea-bed and Water samples collected at 7 locations.

Topography-

Most of Great Nicobar Island is hilly and undulating, with average of +15m to +20m height is observed on land, and somewhere +100 heights are also observed. +2m, +3m, +4m contours are very near to seashore. +19m, +17m, +15m, +13m, +11m, +9m, and +7m contours are at a distance 0.82 km, 0.78 km, 0.75 km, 0.69 km, 0.59 km, 0.56 km and 0.50 km respectively from the high-water line.

Bathymetry-

The shortest distance of -20m, -10m and -5m contour are at a distance about 700 m, 400m and 250m respectively from the high-water line. It is observed that 10m and 20m contour come closest to coast at this site near Indira Point and thereafter they become parallel to the coast.

- **Geotechnical Condition**

Landside-

The landside ground investigations in the region comprised 04 boreholes drilled to depths of between 25 m and 27 m. The sequence of strata anticipated on the site, in terms of superposition is estimated to comprise as presented in Table-5.

Table 5: Landside General Soil Profile

Strata	Description	Thickness of Strata
1	Silty Sand	1.5m - 2.0m
2	Sandy Silt	2.0m - 3.0m
3	Silty sand	3.0m - 6.0m
4	Sandy Clay	6.0m - 10.5m
5	Clay	10.5m -16.5m
6	Cemented Land	16.5m – 21.0m
7	Soft Rock	12.0m – 27.0 m

The marine ground investigation in the region comprised 06 boreholes drilled to depths of between 21 m and 28.8 m. The sequence of strata anticipated on the site, in terms of superposition is likely to comprise the following strata. The marine side general soil profile is presented in Table-6.

Table 6: Marine Side General Soil Profile

Strata	Description	Thickness of Strata
1	Silty Sand	0 m varying Depth
2	Silty Sandy Clay	10.5 m-15.0 m
3	Cemented Sand	15 m-21 m
4	Soft Rock	21 m-21.8 m

The region lies in Seismic Zone V designated by the IS-1893 Part 1-2002 as shown in Figure 8. It is also cyclone prone. All structures will be designed to make them earthquake and cyclone resistant.

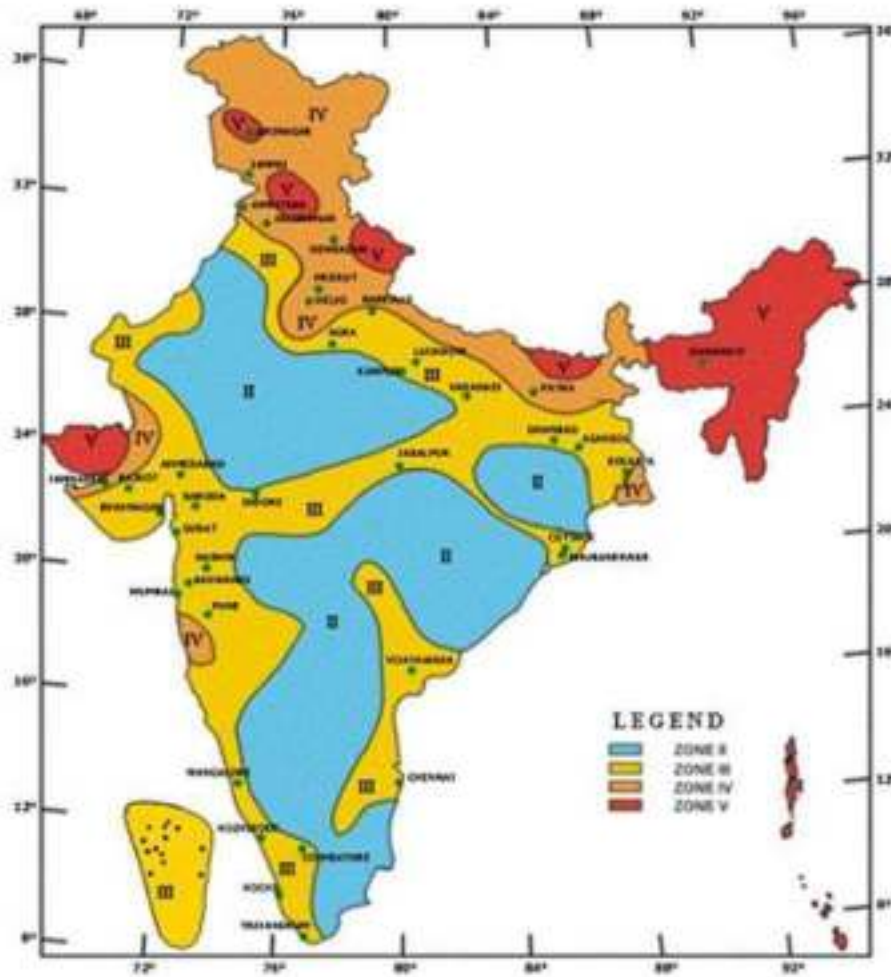


Figure 8: Seismic Zoning Map of India as per IS-1893 Part 1-2002

• Marine Conditions

The tidal levels observed at the South Bay (Galatea) with respect to Chart Datum of admiralty chart are given below:

- MHWS + 1.6 m
- MHWN + 1.1 m
- MSL + 0.9 m
- MLWN + 0.7 m
- MLWS + 0.2 m

The maximum tidal range in the region is about 1.4 m.

• Meteorological Conditions

The mean wind speed prevailing in the area is around 7.2 km/hr. The direction of wind in different seasons are as indicated below

- i. Monsoon – mostly south easterly and east
- ii. Summer – mostly north easterly and east

May and November are transition months when direction of wind changes. The climate of the region is Tropical, and the area is situated in the Hot or Torrid Zone. The atmosphere is damp and warm all the year round though when the sun is soothing the nights may be cool. The mean maximum temperature is 29.1°C and mean minimum temperature is 24.3°C. Mean highest air temperature is 32.4°C.

The project site receives greater part of annual rainfall from South West (May to December) monsoon accounting for nearly 86% of annual rainfall and the remaining 14% of the rainfall is recorded during the rest of the year. The rainfall is heavy due to annual monsoon and its anything between 2700 and 4000 mm annually and the number of wet days per annum vary from 150 to 220. The area receives an average annual rainfall of 3157.5 mm. The heaviest rainfall occurred in 24 hours on 18th August 1969 which was about 350.4 mm.

Relative humidity varies from month to month, being maximum during the month of October i.e., during monsoon and minimum during the month of February and March. The mean average humidity in the month of October is 90% and that in February and March is 82% with an average humidity of 86%.

- **Site Connectivity / Access**

The proposed Project site is in not connected through any road. Currently the access is through sea route only. Approach road shall be developed.

- **Existing Infrastructure**

Water-

There is currently no reliable water source or water supply system near the site for intended development.

Power-

At present, there is no power supply to the project site.

Social Infrastructure-

The proposed project site vicinity has no social infrastructure.

2.3.2 Greenfield International Airport

Great Nicobar Island International Airport (GNIIA) has been decided to be developed as an International Airport in Great Nicobar, Nicobar Islands of India. The airstrip will be developed to cater for operation of Airbus A-380 type of aircraft in all weather conditions having peak hour passenger's capacity of 4000 PHP. This will involve construction of new runway with all allied facilities like terminal building, Apron, Taxi Track, Shoulder boundary wall, perimeter roads, parking facilities, ATC, Fire Station, Technical block, electric substation etc.

The airport will occupy a 1039 Ha site (for air side, Land Side, approach road & a defence apron). The proposed project falls in Category 7(a) of the Schedule vide EIA notification 2006 amended to date involving preparation of Environment Impact Assessment study and Environment Management Plan.

Development of Great Nicobar Island airport shall be developed for IFR operation of Airbus A-380 for all weather conditions.

The site of the airport has been recommended after consideration of five alternative sites, as described in Section 3. The

The Gandhi Nagar site (South Site) includes a large area of revenue land, and minimal forest land will be affected. In order to achieve the required length of the runway, reclamation of the sea coast in North and South will be required; however, reclamation can be optimally reduced with erecting the approach lights over pedestals. The approach takes off and flight path of the aircrafts will run over sea and there will be minimal disturbance to local population and the tribal areas due to over flying of aircrafts at low altitude.

The airport will include the following components:

A. Civil Works: The airside civil works are-

- Runway having 4000x75m length, Basic Strip 280m, RESA 2x240x150, Runway Overrun 2x60x60.
- Taxiway having 4800x45m, (including shoulders)
- An apron to accommodate 4 no. wide body aircrafts (like Airbus A-380/ Boeing 747) and 28 narrow body aircrafts (like Airbus-320 etc.) having an area 2,52,800 sq.m has been proposed to be constructed
- Category 9 level of protection, minimum 3 No. of Crash Fire Tender is required to be provided.
- RCC framed with filler bricks, boundary wall of height 3m (with 0.60m concertina wire on top) is proposed.
- Chain link fencing is proposed to be erected to segregate operational area with non-operational area and the length of the fencing shall be approximately 4,800 m.

B. Terminal Building- The peak hour traffic for medium horizon period of 16 years (Year 2037) is 2000 Peak Hour Passengers (arrival + departure) considering 24 sq.m /passenger a terminal building of 48,000 Sq. m is planned to be constructed in. The building shall be extended later on to handle 4000 Peak Hour Passengers (arrival + departure) in year 2047 for long term horizon period of 25 years. Car parking for adequate peak hour traffic shall also be developed.

C. Miscellaneous Facilities- Information and mandatory signage, canopies on city as well as on air side, new sub-station and AC plant room, landscaping and horticulture work, provision of hooter system for access points, provision of explosive detection system.

D. Electrical Works & Other Equipment/Services- Electric substation building of 6,300 Sqm is proposed to be constructed on city side to house HT and LT panels, DG set, Transformers, APFC Panel, Bus duct cabling etc. with control office. Pump house and UG sump shall also be developed alongside of the substation for water supplies to the airport.

E. Communication, Navigation & Surveillance (CNS) Planning Works- Provision of security system surveillance CCTV, Baggage Scanner, DFMDs, HHMDs, ILS, DVOR-DME, Flight Information Display, Intelligent building management, energy efficient internal / external lighting, LED TVs etc.

2.3.3 Township and Area Development

The Township and Area Development project consists of a mixed-use development area that will form the heart of Great Nicobar city, while also connecting and engaging the key infrastructure facilities and making

them part of a complete urban system. In addition to the port, airport, and power plant, the urban infrastructure that underpins the development of the Township includes the systems for water supply, waste water, storm water, electrical transmission and distribution, other energy systems as required (e.g., district cooling), roads, public transit, and solid waste.

Within the township area, the Concept Master Plan calls for the development along the coast of a series of compact, walkable, mixed-use urban centres separated by natural features such as forested hills and stream buffers. Set against the backdrop of the steep forested hills towards the interior and set back from the coastline to build resiliency to natural shocks, this will be a 'city in the forest' that brings the 'forest into the city'. Compact development is not only more liveable and attractive; it will also reduce Great Nicobar's future carbon footprint, promote conservation of resources, and limit the overall development area, thereby preserving more of the existing forest and other natural resources. The largest urban centre will be at Campbell Bay.

The large majority of the land on Great Nicobar is forest land; there is little non-forest land available for development. It is therefore unavoidable that some of the existing forest land is identified for future urban development. However, the approach is to minimise the impact of non-forest uses on forest land by:

- Using compact settlement patterns that require less land; in this way, much of the proposed development can be accommodated on the existing revenue land;
- Using forest land for low-impact development such as institutional campus development (compact school, research or other institutional campuses surrounded by forest) and very low residential development (with minimum plot sizes for single family housing of 5-10 ha. and restrictions on the amount of forest that can be cleared on those plots).

The land requirement of proposed project sites is given in **Table-7**.

Table 7: Land Requirement of Proposed Projects

Proposed Projects	Area in Hectares
ICTT	766
Airport	845
Township & Area Development	14960
Power plant	39
Total	16610*

*This area excludes the reclamation areas for port and airport which are as under:

Port= 227 ha of reclamation area

Airport= 194 ha of reclamation area

The urban layout, land uses, and coastal management strategies are described in more detail under Section 4, Planning Brief.

2.3.4 Power Plant

It is proposed to develop a power plant near the ICTT facility with capacity to accommodate a city-wide demand of 450 MVA.

The power generation plan for the project envisages the solar plants, Gas based plant and some Diesel generating stations in initial days. For generation capacity addition and power procurement plans is proposed for energy requirement and power demand. To meet the power demand requirement of Great Nicobar Island, some broad level sourcing points have been identified for and stated below:

- Diesel Generating power plant.
- Gas Power Plant
- Solar Power plant.

'Clean and Green Energy Initiatives' have been taken up in both Andaman & Nicobar Islands. In addition, LNG-based power plant for 50 MW is being established by NTPC.

To reduce the dependency on diesel for power generation, priority shall be accorded to improvement in energy efficiency. It is proposed to use of solar power and other non-conventional energy sources (de-dieselization) for maintaining a clean, green and healthy environment in the islands.

Diesel Gensets shall be used in initial phase of development and shall be about 15% of the total Demand of 450 MVA. About 10% is planned through solar panels. Balance shall be gas based. Details are as shown in the table below.

Table 8: Power Generation Sources

Type and %	Capacity	Area
LNG based (75%) -	337 MVA	39 ha
DG Set Power (15%)	68 MVA	
Solar Power (10%)	45 MVA	

Natural gas is a relatively clean energy source, which produces much less pollution than coal or oil. During liquefaction process the natural gas volume is reduced by the ratio of 1/600. Through this volume reduction liquefied natural gas can be transported by ships and stored in storage tanks. In the next step the LNG is pumped to required pressure and transformed into vapour phase. Vaporized natural gas is transferred into pipeline system. A high efficiency, natural gas-fired combined-cycle power plant might consume about 7000 BTUS of gas to produce one kilowatt-hour of electricity. Therefore, it would therefore take about 7000 cubic feet of gas to produce one megawatt-hour

An area of 39 hectares is earmarked including space for Diesel Generating units to be at single location. The space allocation also shall have space for switching station, to a Step up the voltage level. The plant shall be set-up two parallel trains in a phase manner. To start with the power plant in its initial phase of implementation would be further augmented, integrated and optimized in the final phase of the project with the installation of the second train.

Smart grid connected with distributed power generation that significantly generates reliable security of supply (SOS) and quality of electric energy shall be presented. This concept is practical and reliable as numerous types of energy sources become available, such as diesel, solar, wind, biomass, and hydropower as a hybrid case.

3 SITE ANALYSIS

This section contains the study of the current conditions within the Great Nicobar project development area (166.1 sq.km.) following a review of available secondary data, existing reports, and a field visit. Numerous elements have been considered in the site context analysis, including a review of surrounding and site-specific conditions with regards to transport, development, environment, and infrastructure. This examination of the existing site conditions provides key insights that will help shape future development decisions.

3.1 Connectivity

Presently there is limited connectivity to Great Nicobar Island from the mainland. The island can only be accessed by air and sea routes from within the Nicobar Islands. For air routes, it takes approximately 2.5 hours from the nearest airports in cities like Kolkata, Chennai, Vishakhapatnam and Bengaluru to reach the Veer Savarkar International Airport, located at Port Blair in Andaman. From there a helicopter can be taken to reach INS BAAZ at Campbell Bay in Great Nicobar Island. This INS BAAZ air landing facility, located in Campbell Bay, is the first naval air station in the Nicobar group of islands. For sea routes it takes approximately 3 days from the nearest ports in cities like Kolkata, Chennai and Vishakhapatnam to sail to the Port located at Port Blair in Andaman. Further, from Port Blair jetty it takes about 1 day to reach Great Nicobar Island. Ferries arrive at, or depart from, either the Campbell Bay Jetty or the Breakwater Jetty in Great Nicobar. There is a 106 m length wharf that is capable of handling medium size ship vessels and has been proposed to be extended by another 45 meters to handle large size ship vessels.

The south-eastern coast is only area on the island with permanent settlements. (The Shompen move seasonally from one part of the island to another in search of food.) In the south-east, there is a modest network of paved and unpaved roads. A single main north-south spine connects the seven revenue villages from Campbell Bay area in the north to Shastri Nagar in the south. An extension of this road across the Galathea River and down to Indira Point is under construction by the Border Roads Organization (BRO). The Campbell Bay has a local road hierarchy that serves the local population. Informal and unpaved roads serve communities that are located along the coastal villages.

Primary mobility on the project area is by bus, car, bike, or on foot. Buses are run by state transportation services and provide transportation between the villages.

3.2 Land Use and Ownership

The Great Nicobar Island is rich with the presence of dense forests, abundant flora and fauna, and two national parks (Campbell Bay National Park in north and Galathea National park in South). The project area (166.1 sq.km) is outside of the national parks and the area frequented by the Shompen. It includes the revenue villages, the only developed portion of the island. This project area includes low density residential and small-scale commercial development, as well as community facilities and services.

Of the total 166.1 sq.km project area, the revenue land area is 44.2 sq.km, which comprises of the following

- Revenue land (allotted) = 23.53 sq.km.
- Revenue land (vacant)= 6.62 sq.km
- Revenue land (encroached) = 2.0 sq.km.
- Others (roads and water bodies) = 3.16 sq.km.

- Revenue land (Deemed Forest) = 8.88 sq.km.

This revenue land was allotted to settlers on the island as tenants. They have occupancy rights but not ownership of the land. There is no lease and no time limit. Households can sell/transfer their rights of land in lieu of payment. They cannot change land use without permission. At present, tenants can only make improvements, but it requires approval by Deputy Commissioner.

1.65 sq.km of Defense land is falling under the proposed Port at Galathea bay; 7.849 sq.km. of Defense area is near Indira Point in the south and 1.43 sq.km. is at Campbell bay. The forest land in the project is 121.87 sq.km, alongwith Deemed forest of 8.88sq.km. These are Tropical Evergreen and Tropical Semi-Evergreen forests. There is agricultural land in the villages and few grasslands as well. The map showing land ownership is shown in **Figure-9**.

Eco-Sensitive Zone

It is to be noted that the proposed project site is falling outside the eco-sensitive zones of Campbell Bay and Galathea National Parks.

Galathea National park is spread over an area of 107.103 sq.km and is located in the south of Great Nicobar Island in Nicobar district of Andaman and Nicobar Islands. MoEF&CC has issued a draft notification on 28th October 2020 mentioning boundary description of Eco-sensitive zone around the Galathea National park. The copy of the Gazette S.O 3874 (E) is given in **Annexure-1**.

Further Department of Environment & Forests, Andaman and Nicobar has de-notified the Galathea Bay Wildlife Sanctuary (11.44 sq.km) at Great Nicobar Island, vide notification dated 25th January 2021. The copy of the notification is given in **Annexure-2**.

For Campbell Bay National Park, a draft notification was issued by MoEF&CC on 28th October 2020, with regard to boundary description of Eco sensitive zone (ESZ) around the Campbell Bay National Park. The copy of the Gazette S.O 3873(E) is given in **Annexure-3**.

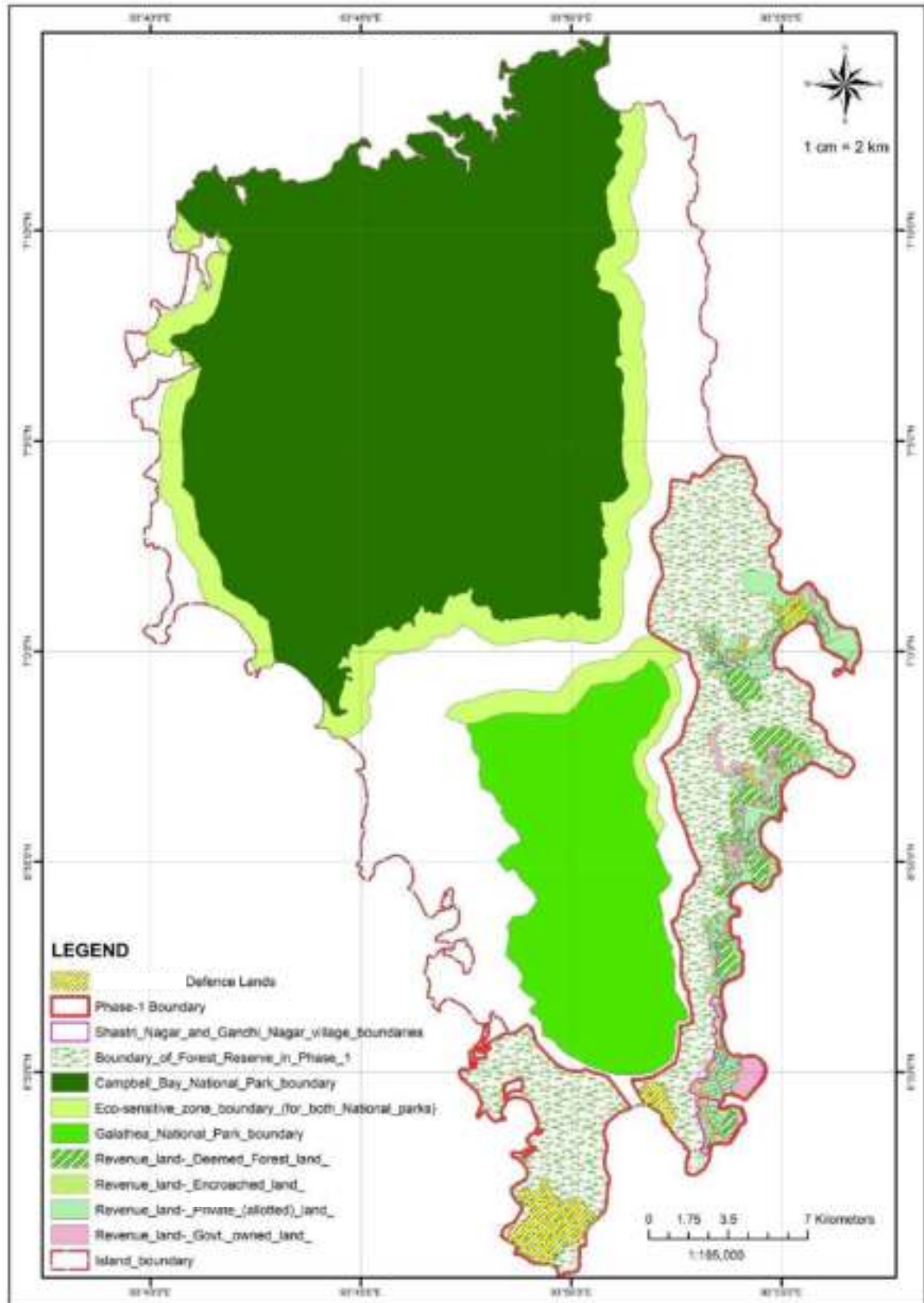


Figure 9: Location of National Parks, Forest Reserve and Revenue Land

3.3 Topography and Hydrology

Great Nicobar Island's topography is characterized by relatively flat areas near the coasts and steep hills and mountains in the interior, especially in the northern half. Great Nicobar Island has complex topography and terrain with higher peaks and deeper valleys and ridges that cross the Island. Mount Thullier is the highest peak on the island, with an elevation of 642 m above mean sea level (msl). The project area includes flat land sloping towards the coast on the east and south of the island. Here there is habitation and plantations of coconut, spice, vegetables, etc. The western edge of the project area is a hilly terrain of undulating landform covered with dense forest.

Great Nicobar Island has three rivers that flow west including Alexandria, Dogmar and Amritkaur; one that flows north, which is Jubilee; one that flows south, which is the river Galathea and is the largest of the five rivers and its mouth opens at Galathea bay falling in our area of interest. There are several streams many of which are perennial in nature, making water available throughout the year. There is, however, a need for engineering interventions to utilize the available water for long term sustainability. The mountains on the west have these numerous streams flowing from there into the sea towards the east and south. The map showing topography of project area is shown in **Figure-10**.

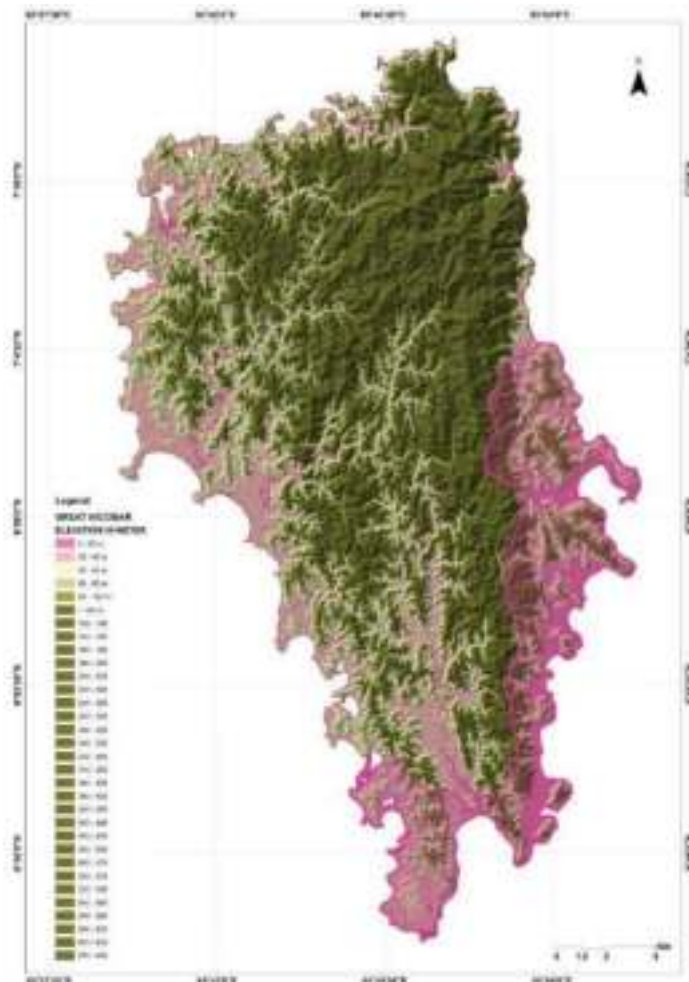


Figure 10: Project Area Overlaid on Topographic Map

3.4 Existing Physical and Social infrastructure

An inventory of the existing infrastructure on the project area/site which can be classified into physical infrastructure and social infrastructure is presented below:

3.4.1 Physical Infrastructure

Physical infrastructure comprising roads, jetties, wharf, air landing facilities etc. are as follows:

- **Road Infrastructure**

There are two major roads in the Great Nicobar Island: the North South Road and the East-West Road. The North South Road, 51 km long before the Tsunami, is now reconstructed only up to 35 km. The East West Road is 43 km long but is blocked beyond 13 km and needs major repairs.

- **Campbell Bay Jetty**

Travelling by ship still remains the lifeline for the local population, which transports people and business commodities. The MV Campbell Bay transports around 500 passengers from Port Blair to Campbell Bay en route to the Nan Cowry group of Islands in Nicobar District and is the most popular means of transport amongst the masses. The passengers of the ship are debarked at the Campbell Bay jetty where a passenger hall or waiting hall is set up for their convenience.

- **Breakwater Jetty**

Adjoining the Campbell Bay Jetty is the Breakwater Jetty where a large number of passenger and transport ship's deck. It is among one of the most attractive places for people who love the calmness of the sea, the soothing sea breeze, the splash of water and darkness of night. The cold storage for fish is near the Fisheries Jetty for the convenience of fishermen to load and unload their daily catch and to store them too.

- **Air Landing Facilities**

The INS BAAZ, commissioned on 31 July 2012 is the first naval air station in the Nicobar group of islands. One of the primary functions of INS BAAZ is to provide information based on airborne maritime surveillance with the help of aircrafts and UAVs. It is located in Campbell Bay HQ.

3.4.2 Social and Commercial Infrastructure

- **Administration**

The overall administration of the Great Nicobar Island is monitored by the Assistant Commissioner / SDM, Campbell Bay who is assisted by all other heads of the departments. The AC (Assistant Commissioner's) office remains the hub of government activities at Campbell Bay. The residence of AC Campbell Bay is also close by for effective and prompt administration and management. A Station House Officer (SHO) is posted with adequate staff for timely and prompt enforcement of law. To redress the grievances of people, a court of the Judicial Magistrate is also situated there on the island. A jail with sufficient manpower is also built on the island, for execution of penal punishment. Three government guest houses at Campbell Bay cater to tourists and provide lodging and boarding facilities.

- **Banks**

Banks along with ATM facilities are available for financial services. Two such banks are the Syndicate Bank and the Cooperative Bank. There is a post office on the island for postal communication with the outside world.

- **Anganwadi Centre**

An Anganwadi centre is also present under the Integrated Child and Development Scheme.

- **Schools**

There are primary, secondary and senior secondary schools run by the Education Department, Andaman and Nicobar Administration. There is also a Coast Guard Public School and a Zonal Library, which stock all necessary and latest books.

- **Sports**

A badminton court and a well-equipped gym at the Mini Stadium at Campbell Bay are source of recreation for the local population. The Mini Stadium is not only a hub for sports activities, such as cricket, football, volleyball and Kho—Kho matches, but is also the venue for hoisting the national flag on Independence Day and the Republic Day. It also hosts state functions, cultural programmes and inter-school sports meet.

- **Transport**

The latest addition to the island is the southernmost petrol pump of the nation which is run by the Andaman and Nicobar Islands Integrated Development Corporation; it supplies petrol and diesel to the local population and was inaugurated on 4 January 2018. Buses run by the state transport service are the lifelines for transport of the local population in the village.

- **Recreation**

There is a Children's Park at the village for the entertainment of children and adults. Children can be seen playing in the park after school hours. There is a small Recreation Hall, which is generally used to celebrate social functions, marriages, parties, etc.

- **Lifestyle**

Despite being geographically isolated, the youth and people of Campbell Bay keep pace with fashion and with the latest trends. Popular hairstyles are displayed by saloons; these are then followed by the local crowd.

- **Markets**

There is a local market and a fish market at Campbell Bay to cater to residents' daily needs.

- **Religion**

One can find various places of worship, belonging to every religion across the island. Some examples are the Mariyappan Temple, the Krishna Temple, the Ayyapa Temple, the Ram Temple, the Shakti Vinayaka Temple, the Shri Guru Singh Sabha Gurudwara (Dashmesh Nagar, Campbell Bay), St Joseph Church, Redemption Church and the Juma Masjid.

- **Health**

Also present is a primary health centre to cater to the needs of the local population round the clock with a stationed medical team consisting of medical officers.

- **Orchidarium**

The orchidarium has a collection of a variety of orchids that are bred there. This is managed by the forest department of the Andaman and Nicobar Islands and is one of its kind.

- **Emergency Operation Centre**

An emergency operation centre functions 24x7 at Campbell Bay. It is there to respond to emergency situations and to coordinate rescue operations on the island. It is directly linked to the State Disaster Management authority and was set up after the devastating tsunami of 2004.

3.5 Soil Classification

Based on observations made during the field visit, the top layer of soil appears clayey followed by hard clay layer and very soft rock. This rock is very fragile to the extent that it can be easily broken by hand and disintegrates into pieces when thrown from a height of approximately 2m. The beaches are white sandy with rocky formations along with few beaches formed due to dead corals. At Galathea Bay beach, the Western side has more flat land and wide beach as compared to Eastern side.

3.6 Climate

The island's climate is categorized as tropical rainforest, with a temperature range typically between 18° C and 36° C. Relative humidity is typically between 70-90%. The island experiences a monsoon season in two phases: May to September and November to December. North-easterly winds blow from November to December, and southwesterly from May to October. The calmest weather can be experienced between January to April.

Average annual rainfall of Andaman and Nicobar Islands is 2300 mm. Rough weather prevails during the monsoon season in Andaman and Nicobar Islands. The Island experiences more than 130 numbers of rainy days, during the monsoon period May to December which is the monsoon period and dry period extends for 3 to 4 months from January to April. The predominant wind directions are SW and NE with the recorded maximum wind speed is being 26.5 km/h.

Located on the southeastern coast of the Island, the project site is most exposed to sea breezes.

3.7 ICTT Site Analysis

Following Five alternative sites were examined for the development of the Project. Facilities for selection of the most suitable site based on the multicriteria analysis.

- Alternative Site 1 – Galathea Bay
- Alternative Site 2 – Casuarina Bay
- Alternative Site 3 – Anderson Bay
- Alternative Site 4 – Pemayya Bay
- Alternative Site 5 – Campbell Bay

The location of the five alternative sites in the Great Nicobar Island is shown in Figure 11.



Figure 11: Alternative Site Locations for Port

The harbour layouts at each of the above alternative sites have been developed considering the direction of waves, water depths to minimize dredging and also ensuring at the same time that the breakwater does not extend to deeper waters that would increase the cost of development.

Alternative Site 1 – Galathea Bay

This site is located near the southernmost tip of the Great Nicobar Island and is approximately 40 km away from the mainline shipping route. The sea-bed contours are steep, and the water depths of 20 m and 30 m are available within a distance of 2.3 km and 3.6 km from the shoreline respectively. The site offers the water area of about 517.60 hectares between shoreline and the 20 m contour which could be optimally utilised for the development of the harbour facilities. It could be observed that about 6.07 km of total berth length is possible to be developed on the western side of the bay. Two breakwaters of length 2.53 km and 1.37 km respectively provide round the year wave tranquillity. The port would be developed in phased manner and the berths would be added as per the traffic growth. However, the breakwaters would need to be fully constructed at the initial phase only.

Environmental Sensitivity: The site is away from any habitation. The Backup area will have to be developed by reclamation which will extend up to the intertidal zone. No cutting of hills is required. Minimum Dredging is envisaged. Area falls partly under ICRZ Zone 1B. A small portion of the West Breakwater and backup area falls in tribal reserve. Turtle nesting sites are observed at the mouth and west of Galathea river.

The indicative layout of the container Transshipment port is presented in Figure 12

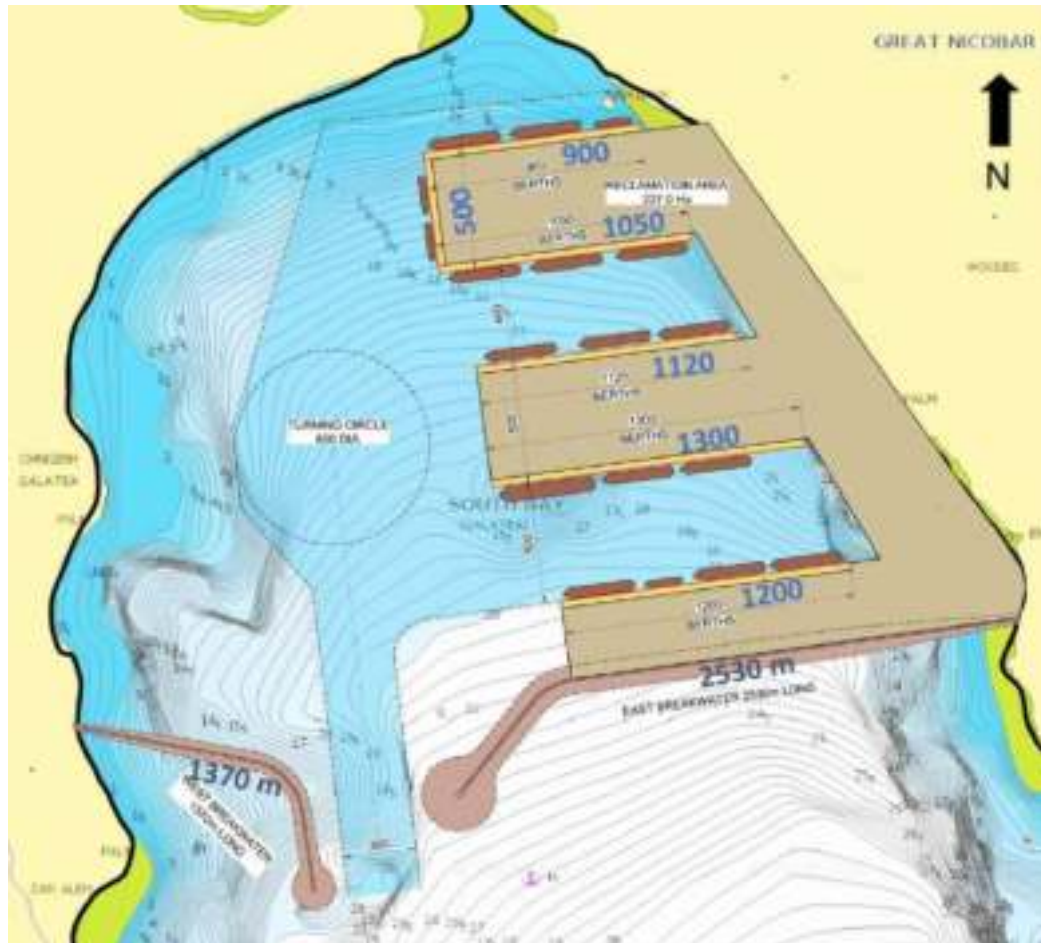


Figure 12: Galathea Bay Location – Proposed Layout (Site 1)

Alternative Site 2 – Casuarina Bay

This area falls outside project boundary and is away from the overall development plan of the Nicobar Island. The site can offer adequate Harbour area, but it would involve slightly higher dredging as compared to site 1 which eventually leads to higher risk of involving rock dredging. Two breakwaters of length 4.150 km and 0.88 km respectively provide round the year wave tranquillity. The port would be developed in phased manner and the berths would be added as per the traffic growth.

Environmental sensitivity: The site is away from any habitation. The Backup area will have to be developed through reclamation which extends into the intertidal zone and slightly into tribal reserve, protected forest and biosphere reserve areas. Berths and Breakwaters extend into the coral reefs. Dredging anticipated is more than Galathea bay. No hill cutting is envisaged. Location falls partly under ICRZ Zone 1A.

The indicative layout of the container Transshipment port is presented in Figure 13.

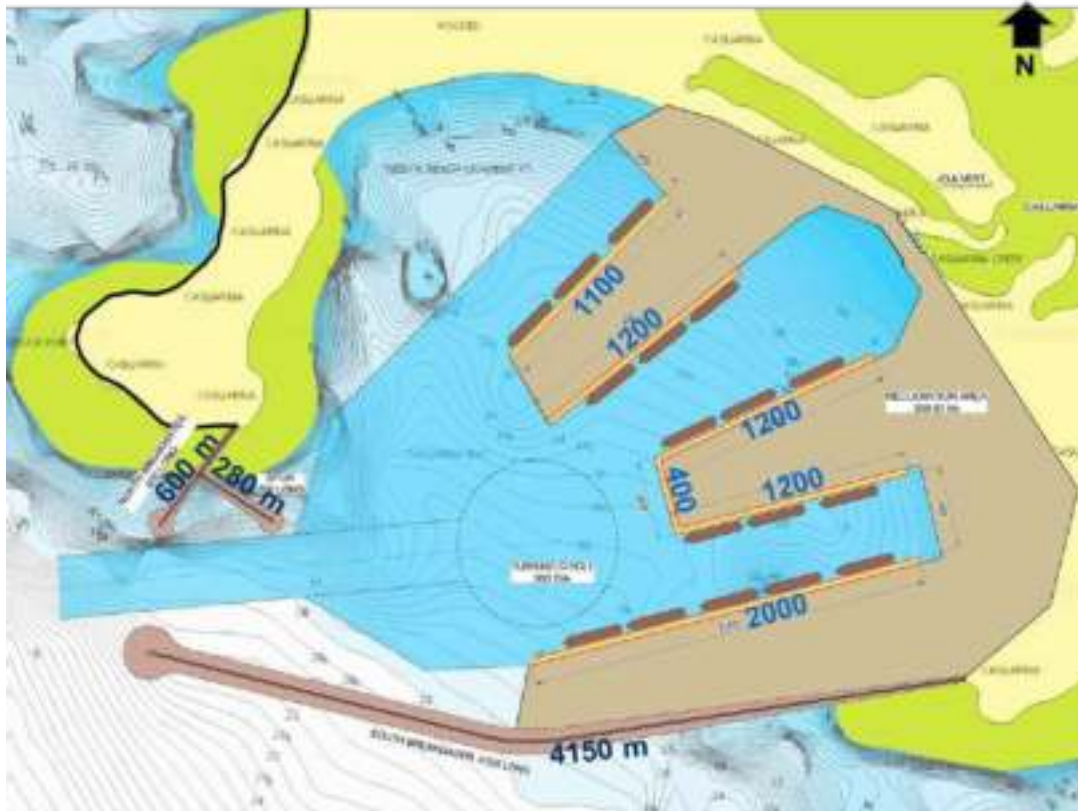


Figure 13: Casuarina Bay Location – Proposed Layout (Site 2)

Alternative Site 3 – Anderson Bay

The site is located in a creek just south of Campbell Bay. Further the entire site is relatively exposed to the sea and thus would require longer breakwaters. The site is close to the habitation near Campbell bay. Two breakwaters of length 4.00 km and 1.660 km respectively provide round the year wave tranquillity. The port would be developed in phased manner and the berths would be added as per the traffic growth.

Environmental sensitivity: The berths and breakwaters extend into coral reefs. Significant dredging is required including coral reef areas. The backup area extends well beyond the intertidal zone into the creek, agricultural land and hilly areas. The area of the creek is very much limited and therefore lot of hill cutting would be needed to create the required harbour area. Dredging required is more than Galathea and Casuarina bay. Turtle nesting grounds are present in the area. Area falls partly under ICRZ Zone 1A.

The indicative layout of the container Transshipment port is presented in Figure 14.



Figure 14: Anderson Bay Location – Proposed Layout (Site 3)

Alternative Site 4 – Pemayya Bay

The entire site is relatively exposed to the sea and thus would require longer breakwaters. Two breakwaters of length 4.20 km and 1.55 km respectively provide round the year wave tranquillity. The port would be developed in phased manner and the berths would be added as per the traffic growth. This area may conflict with the proposed naval facilities planned near the Indira Point.

Environmental Sensitivity: The site is away from any habitation. The reclamation area extends into intertidal zone, creek, Tribal reserve and protected forests. The area of the creek is very much limited and therefore lot of hill cutting would be needed to create the required harbour area. Breakwaters and berths extend into coral reefs. Turtle nesting grounds are present in the area. Area falls partly under ICRZ Zone 1A.

The indicative layout of the container Transshipment port is presented in Figure 15.



Figure 15: Pemayya Bay Location – Proposed Layout (Site 4)

Alternative Site 5 – Campbell Bay

Campbell bay has existing three jetties and a small breakwater. The site is in the vicinity of an INS BAAZ airstrip, permanent settlements and habitation. The location has defence land and is a highly restricted zone.

One additional breakwater of length 1.20 km shall be provided for round the year wave tranquillity. The port would be developed in phased manner and the berths would be added as per the traffic growth. The port development would require the existing airport to be shifted to some other location as not only the container cranes would be under direct flight path but also the airport land would be required to create the backup land for the container terminal.

Environmental Sensitivity: The overall area of the bay is small and extensive dredging would be needed to create the harbour facilities for the proposed container transshipment terminal. Significant hills also will be required to be cut to create the harbour facilities. The backup area extends into the Govindnagar creek having mangroves because of which the area falls partially under ICRZ Zone 1A.

The indicative layout of the container Transshipment port is presented in Figure 16.



Figure 16: Campbell Bay Location – Proposed Layout (Site 5)

The alternative sites were evaluated using Multicriteria Analysis as presented in Table 9.

The comparison and site evaluation were carried out considering the various factors and the outcome of the evaluation is given in.

Table 9: Comparative Analysis for Alternate Sites

Sr No.	Factor Description	Galathea Bay	Casuarina Bay	Anderson Bay	Pemayya Bay	Campbell Bay
1	Proximity to shipping routes	Closest to the International Shipping line (only 40 km away)	Additional distance of 35 km from Site 1	Additional distance of 25 km from Site 1	Additional distance of 15 km from Site 1	Additional distance of 30 km from Site 1
2	Cost Risks	Minimal	Risk of rock dredging higher as compared to site 1	Significant as hills have to be cut for creating the Harbour basin. Presence of rock would make dredging very expensive	Significant as hills have to be cut for creating the Harbour basin. Presence of rock would make dredging very expensive	Risk of rock dredging higher as compared to site 1
3	Land Development	Requires Reclamation of Land to develop Onshore Storage Facilities.	Reclamation Required is slightly more as compared to Galathea Bay.	Reclamation required is less than in Galathea bay.	Reclamation required is slightly more than in Galathea Bay.	Reclamation required is less than in Galathea Bay.

Sr No.	Factor Description	Galathea Bay	Casuarina Bay	Anderson Bay	Pemayya Bay	Campbell Bay
4	Breakwaters	Small length of breakwaters required.	Length of breakwater is more than Galathea bay but less than Anderson bay and Pemayya bay	Length of breakwaters is significantly more than the length required for Galathea bay	Length of breakwaters required is maximum of all locations	Small length of breakwaters required as compared to all other locations
5	Environmental sensitivity	ICRZ-Zone				
		Area falls partly under ICRZ Zone 1B.	Area falls partly under ICRZ Zone 1A. Area within biosphere reserve and partly within Campbell National Park	Area falls partly under ICRZ Zone 1A	Area falls partly under ICRZ Zone 1A	Area falls partly under ICRZ Zone 1A
		Turtle Nests				
		Turtle nesting sites are present at the mouth of Galathea river. These sites will be avoided while planning the development.	Turtle nests present at site	Turtle nests present at site	Turtle nests present at site	NO Turtle nests at site
		Megapode Nest				
		No Megapode Nests at site	No Megapode Nests at site	No Megapode Nests at site	No Megapode Nests at site	No Megapode Nests at site
		Crocodile Nests				
		NO crocodile nests at site	NO crocodile nests at site	NO crocodile nests at site	NO crocodile nests at site	NO crocodile nests at site
		Hill Cutting				
		No hill cutting envisaged	No hill cutting envisaged	Significant Hill cutting required	Hill cutting required is maximum	Significant Hill cutting required
Habitation						
Site away from any habitation	Site close to Shompen habitation	Site close to habitation at Campbell bay	Site close to proposed Naval facilities at Indira point and to Nicobarese habitation	Site close to habitation and INS BAZZ facilities.		
Dredging						

Sr No.	Factor Description	Galathea Bay	Casuarina Bay	Anderson Bay	Pemayya Bay	Campbell Bay
		Sufficient water depth is available close to shore. Minimal dredging is required	Shallower water depths near to shore. Dredging volume required is slightly more than Galathea bay but less than Anderson and Pemayya bay	Shallower water depths near to shore. Significant volume of dredging required. Dredging required is max among all locations	Shallower water depths near to shore. Significant Dredging required. It is more than Galathea bay and Casuarina bay	Shallower water depths near to shore. Dredging volume Required is significantly more than Galathea bay.
Disturbance to Shompen Tribes						
		No disturbance	No disturbance	No disturbance	No disturbance	No disturbance
6	Compatibility with Overall development plan	The location gels well with the overall development plan .However its proximity with the proposed air strip needs to be confirmed as the 125m high cranes falls within the runway funnel zone	Location falls outside Project boundary and is very far from proposed township at Campbell bay.	Rehabilitation issues. Site more suitable for township development	Development is restricted. It may overlap with the defence land	Does not gel well with the overall development plan as residential, commercial office and mixed-use development have been planned at the location. Backup area fouls with the INS BAZZ Airstrip and its facilities which will have to be relocated. Area falls under highly restricted zone and CTT will have to be co-located with naval facilities.

It could be observed from above that Transshipment Port site at Galathea appears to be the best in terms of attracting transshipment container traffic, minimal capital investment risk and on overall considerations for technical, environmental and financial parameters- all site conditions have been considered. Therefore, this site is recommended for further detailed evaluation.

3.8 Airport Site Analysis

The site selection criteria are as follows:

1. Open, Longitudinal, fairly level and well drained site.
2. Prevailing wind to be facilitating operations.
3. Obstructions to Air Navigation.

4. Environmental concerns, Avi-fauna safety/concerns, National Parks, Tribal areas etc.
5. Earthwork Economics
6. Connectivity / access to population centres; existing roads vis a vis new developments/ alignment

Based on above broad parameters, five sites were identified on the island which were partially meeting the first iteration. Three of these sites were located on the East Coast, one the West Coast and one located near mid of the island. These sites are as marked in Figure below.



Figure 17: 5 Alternative Sites for Airport

Detailed analysis and examination revealed that the Site No 2 & 4 were deficient on two important factors, namely: -

- Length of Runway availability was restricted
- Wind direction was across the runway orientation and hence was not conducive to air operations for considerable amount of time in a year.

Moreover, other major disadvantages of the West site was its proximity to depicted Shompen Tribe areas; secondly, no connectivity either by land/ road or by sea to connect the site and would entails cutting a new

road through virgin forest zone for development abinitio; and lastly the proposed habitation would be on the East coast and the airport would be diagonally across the island on the West coast. Hence, the West coast site was rejected. Hence, out of five, three sites were shortlisted which partially met the requirements and were further analysed in detail. They are shown in fig below as per;

- North Site – Ranganatha Bay
- Central Site – Existing Runway of INS BAAZ
- Southern Site- Shastri Nagar



Figure 18: 3 Alternative Sites for Airport

- **North Site**

Topography: The site is approx. 4200 m long, running along the length of a seasonal stream which runs south to North and discharges in sea at its North end. The site lies in the catchment area of the Ridge line on the West and few high isolated knolls on the East. Number of spurs jets out from mother ridge into the valley from both the side which need to be erased in the event of selecting this site.

Wind Direction: The site is oriented in North South direction approximately and hence suitable for preferred Runway orientation.

Obstruction to Air Navigation: The site is towered by ridge line running North- South, which is over 100 m high, and thus penetrating into the obstacle limiting surface of Inner Horizontal Surface, Conical Surface and Outer Horizontal Surface.



Figure 19: OLS for Airport North Site

Air Approaches to the Site:

- a. Approach from North. The approach is over Sea and mostly clear except for some obstructions on the coastline.
- b. Approach from South. The approach from South is obstructed and hampered by hill features which lie right in the Approach surface. These hills are serious obstructions to approaching aircraft and will endanger safe flying operations.

Airport Availability: Due to the restrictions of approach from South, the Airport could be approached from Single direction only; hence, the airport will be available for operations only when the Wind is from third quadrant or is in calm realm. Thus, the availability of airport would be about 50% of the time.

Environment Sensitivity: The site lies in the catchment area of two hill slopes and is covered with dense forest growth. This will entail clearing of the forest cover and levelling the catchment area. The access to habitation and Campbell bay is non-existent and fresh roads will need to be constructed. The

approach takes off and flight path of the aircrafts will run over the island and there will be need to put in noise reduction procedures for aircraft operations.

- **Central Site**

Topography: The site is the existing Runway of Indian Navy. The runway is about 1000 m long and has to be extended to about 4000 m to make wide body aircraft operations possible. The site is dominated by a hill feature in the North and the southern edge is the shore of Campbell Bay. The site has very limited scope for future expansion and will not be able to accommodate the required infrastructure for an International Airport. This site if extended, would run through the existing habitation and split the settlement into two parts.

Wind Direction: The site is oriented in North- East to South- West direction and hence suitable for preferred Runway orientation.

Obstruction to Air Navigation: The site is dominated by a hill feature on the North which is over 80 m high thus penetrating the Inner Horizontal obstacle limiting Surface & Conical Surface. Similarly, the approach and take off surfaces are also hindered.

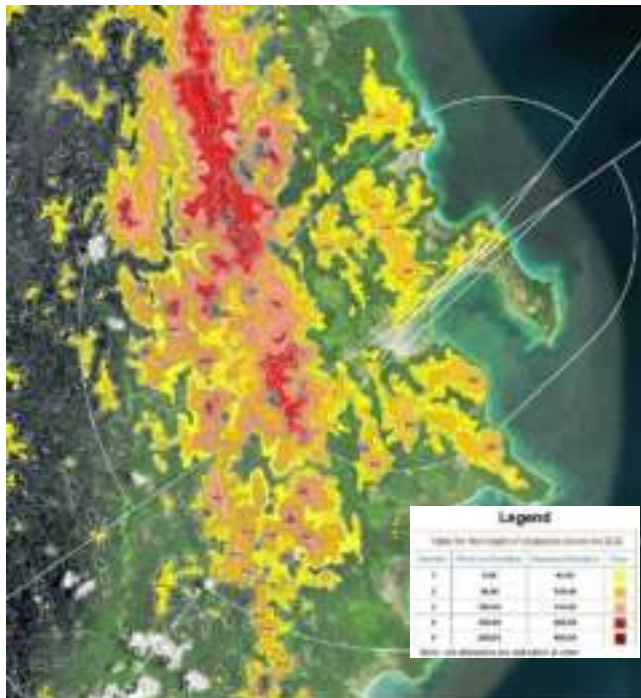


Figure 20: OLS for Airport Central Site

Air Approaches to the Site:

- Approach from North- East. The approach is over Sea and is mostly clear.
- Approach from South. The approach from South is obstructed and hampered by hill features which lie right in the Approach surface. These hills are serious obstructions to approaching aircraft and will endanger safe flying operations.
- Airport Availability:** Due to the restrictions of approach from South, the Airport could be approached from Single direction only; hence, the airport would be available for operations only when the Wind is from third quadrant or calm realm. Thus, the availability of airport would be about 50% of the time.

Environment Sensitivity: The site lies on the existing airstrip at Campbell bay and will require approx. 75 % further extension to facilitate operations of the type of aircrafts envisaged. This site on extension will split the existing town in two parts as the extension will run through the build-up area and farm land. In order to achieve the required width of airport, reclamation of the sea coast will be required along the length of runway. The approach take off and flight path of the aircrafts will run over the width of the island, forest zones, habitation and over the tribal nominated areas.

- **South Site**

Topography: The site is approx. 4000 m long, running along a flat open patch. The site is dominated by a 100 m high ridge line on the West and has two isolated knolls on the East. A few of spurs jets out from either direction which can be levelled in the event of selecting this site. The site has tidal area jetting inside which would need to be filled and levelled. A part of the tidal area could be developed into a Sea Jetty for High speed boats connecting the Airport with the Port and Campbell bay. Establishing of approach lights, ILS etc. for the first runway and providing full length second runway (if required in future) will require some reclamation of land on North and South.

Wind Direction: The site is oriented in North South direction approximately and hence suitable for preferred Runway orientation.

Obstruction to Air Navigation: There exists a dominating ridge line on West of the site running North-South with some heights over 100 m thus penetrating the obstacle limiting surface of Inner Horizontal Surface and Conical Surface. However, this ridge line also separates the Airport and the proposed port site and provides a buffer zone between the two. The site proposed as a major Sea Port across the ridge line at Galathea Bay will have tower cranes installed for loading and unloading of ships; these cranes will also be an obstacle, however, their potential as an obstacle needs to be assessed by Airport Authority of India as these will lie in the shadow of the separating ridge line. Suitable and appropriate ATM procedures need to be established by AAI for safe navigation if this site is recommended.



Figure 21: OLS for Airport South Site

Air Approaches to the Site:

- a. Approach from North: The approach is over Sea and is mostly clear.
- b. Approach from South: The approach is over Sea and mostly clear except for some levelling on the Coastline and reclamation of land. Obstacle Limitation Surface (OLS) Airport Availability: The airport is available from both the approaches and hence is assessed that it will be available for over 95 % of time which is a requirement of International Civil Aviation Organisation (ICAO).

Environment Sensitivity: The site has fairly large portion on revenue land and minimal forest land will be affected. There is existing road connectivity to main island habitation and will facilitate movement of men and materials from Campbell Jetty to the airport site. In order to achieve the required length of the runway, reclamation of the sea coast in North and South will be required; however, reclamation can be optimally reduced with erecting the approach lights over pedestals. The approach takes off and flight path of the aircrafts will run over sea and there will be minimal disturbance to local population and the tribal areas due to over flying of aircrafts at low altitude.

All the proposed alternative sites were evaluated using Multicriteria Analysis as presented in Table-10.

Table 10: Analysis of Alternative Sites

S No	Description	Site Characteristics		
		Site N	Site C	Site S
1	Approx. Length of Land available	4200 m	3900 m	4000 m
2	Approaches	Only North	Only NE	Both
3	Obstructions to Air Navigation	High Ridge Lines Venturi effect	Small Hill on North	Hills on W Port Cranes
4	Favourable Wind Direction	Partial availability of Airport	Partial availability of Airport	Airport available most time in year
5	Earth work Economics	Expensive	Intermediate	Intermediate
6	Environmental Sensitivity	a. Most Sensitive;	a. Fairly Sensitive;	a. Fairly Sensitive;
		b. Virgin Forest area;	b. Large part is Revenue Land	b. Large part is Revenue Land Minimal forest Land affected
		c. No Habitation on Site	c. Existing Town will Split in two parts:	c. Existing Town of Shastri Nagar will need to be shifted

S No	Description	Site Characteristics		
		Site N	Site C	Site S
		d. Needs new green field Highway for Connectivity to Airport Site	d. Existing Road Connectivity	d. Existing Road Connectivity
		e. Needs reclamation of large shore line for Runway systems	e. Needs reclamation of large shore line;	e. Needs reclamation of large shore line for Runway systems
		f. Flight path over entire length of island and habitation	f. Flight path over entire width if island, tribal areas and over all habitation	f. Flight path over Sea; Minimal disturbance to population
		g. Likely Disturbance to Tribal areas	g. Likely Disturbance to Tribal areas	g. Unlikely Disturbance to Tribal areas
7	Concerns on Avifauna	a. Flight path might interfere with avifauna flight paths & habitat	a. Flight path might interfere with avifauna flight paths & habitat	a. Flight path over Sea; Minimal disturbance to Avi fauna and population
		b. Active and Passive measures need to be instituted at the Airport to safeguard Flight operations and Avifauna	b. Active and Passive measures need to be instituted at the Airport to safeguard Flight operations and Avifauna	b. Active and Passive measures need to be instituted at the Airport to safeguard Flight operations and Avifauna
8	Turtle Nesting Areas	Not affected	Not affected	Not affected
9	Crocodile infested areas	Affected	Affected	Affected
10	Megapode	Not affected	Not affected	Not affected

S No	Description	Site Characteristics		
		Site N	Site C	Site S
11	ICRZ	Effects on North End and Centre of Runway : Mangroves and falls in ICRZ Zone IV B	Minimal Effects on South side of Runway; Part in ICRZ Zone IV B	Minimal Effects on North and South Ends of Runway Part in ICRZ Zone 1 A & IV B
12	Access by			
a	Road	Yes	Yes	Yes
b	Speed Boats	No	Yes	Yes
c	Sea Aerodrome	No	No	Yes

The map showing the site location is shown in Figure-22.



Figure 22: Preferred airport site location

3.9 Township Site Analysis

The concept master planning process included the consideration of alternative layouts. The primary alternate was a layout that called for lower density development spread over a larger land area. While the total project area (166 sq.km) was the same, the *urbanised* area was larger because the net density of the residential, commercial and institutional areas was lower.

The alternate concept master plan is shown in the figure below. It includes 75 sq.km of urbanised area, including 33 sq.km of residential area and 42 sq.km of commercial development, in the form of an Office and Technology District. The combined area is significantly higher than in the concept master plan described in the previous section, which includes approximately 45 sq.km of urbanised area. Since under the alternate plan the 75 sq.km area does not fit within the current revenue land (approximately 44 sq.km), it was distributed to the forested areas between the revenue villages and to the west of the villages. The alternate layout results in considerably more deforestation and more redevelopment of hilly, forested land to urban uses.



Figure 23: Aerial Perspective of alternate Concept Plan option

The lower environmental costs associated with the more compact layout led to its selection as the preferred concept master plan for Great Nicobar Island. The project area, 166 sq.km, is the same in both alternatives. The land uses in the preferred land use plan are defined in Section 4.6.

3.10 Power Plant Site Analysis

Three alternative sites were examined for the proposed LNG power plant. The alternative sites are Option 1-Near Campbell bay, Option 2-Near Shastri Nagar and Option 3-Near port. The alternate sites for Power Plant are shown in Figure-24.

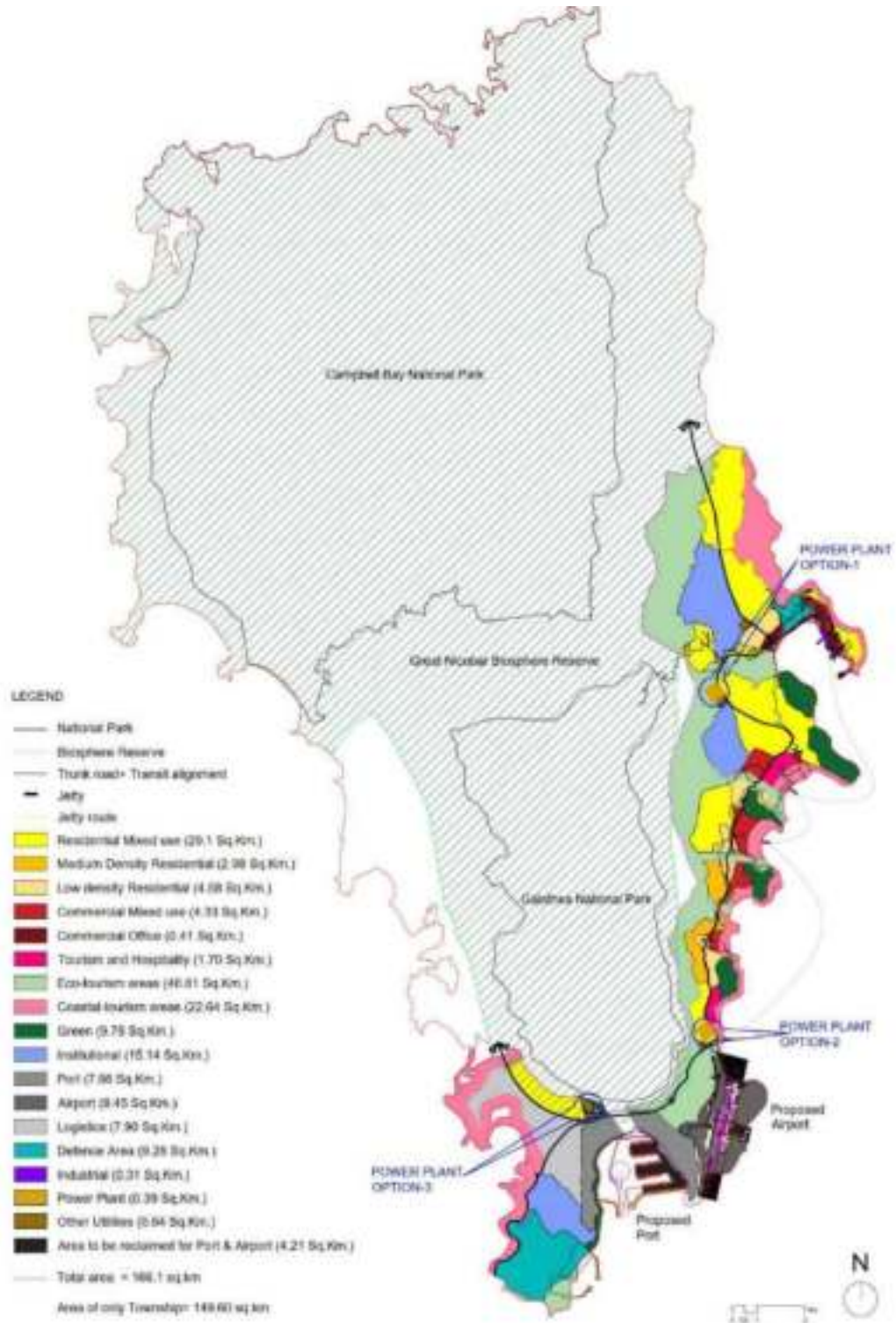


Figure 24: Alternate sites for Power Plant

The alternative sites were evaluated using Multicriteria Analysis as presented in Table-11.

Table 11: Analysis of Alternative Sites

S. No.	Description	Option-1 (Near Campbell bay)	Option-2 (Near Shastri Nagar)	Option-3 (Near Port)
1	Approx. Area of Land available	96 Acres	96 Acres	96 Acres
2	Earth work Economics	Expensive	Intermediate	Intermediate
3	Environmental Sensitivity	Most Sensitive: Site comes near densely populated territory.	Fairly Sensitive: Site comes densely populated territory.	Less Sensitive: Site comes near less populated territory.
a)	Turtle Nesting Areas	Not affected	Not affected	Not affected
b)	Crocodile infested areas	Not affected	Not affected	Not affected
c)	Megapode	Not affected	Not affected	Not affected
d)	ICRZ	Not affected	Not affected	Must avoid intertidal areas
4	Equitable Growth of Different Areas	Long distance from the major upcoming load centre	Long distance from the major upcoming load centre	Near Load centre
5	Transportation	Expensive Transportation cost of Fuel	Intermediate Transportation cost of Fuel	Less Transportation cost of fuel
6	Generation Expenses	High	Intermediate	Less

The preferred site is option 3, which is near to the ICTT facility.

4 PLANNING BRIEF

4.1 Planning Concept

The Master Plan has been prepared with a view to charting a balanced path forward that can achieve Great Nicobar Island's ambitious economic development goals, while conserving the natural environment and improving the quality of life of local residents. With that perspective in mind, an Island-wide settlement pattern has been set forth, that preserves the ecological core of the Island and concentrates development along the eastern coast.

With respect to the project area, the development extends from Ranganatha Bay on the east coast southwards to Galathea Bay and around the corner of Indira Point to Pemayya Bay. All development is contained within the 166.1 sq. km. area along this coastal strip of land between 2 and 4 km width.

In keeping with the Great Nicobar development potential highlighted earlier, four principal anchors have been identified for holistic development of Great Nicobar: The International Container Transshipment Terminal (ICTT), International Airport, Township and Power plant focussing on overall development of Nicobar Islands. Alternative sites for the port and the airport were examined and Galathea Bay and Gandhi Nagar/ Shastri Nagar villages were selected respectively. The large majority of the township area extends north-eastward from this multimodal hub north to Campbell Bay and to Ranganatha Bay. It also includes a small logistics development area west of the port.

Within the township area, the Concept Master Plan calls for the development along the coast of a series of compact, walkable, mixed-use urban centres separated by natural features such as forested hills and stream buffers. Set against the backdrop of the steep forested hills towards the interior and set back from the coastline to build resiliency to natural shocks, this will be a 'city in the forest' that brings the 'forest into the city'. Compact development is not only more liveable and attractive; it will also reduce Great Nicobar's future carbon footprint, promote conservation of resources, and limit the overall development area, thereby preserving more of the existing forest and other natural resources. The largest urban centre will be at Campbell Bay.

4.2 Employment and Population Projection

A number of different economic sectors will contribute to future growth on Great Nicobar Island. Each sector will in turn be driven by specific infrastructure investments and development zones like International Container Transshipment Terminal (ICTT) and associated logistics facilities, Airport, Tourism, Commercial, Light Industrial, etc.

These key facilities and development zones are anticipated to spur the development of ancillary industries, further cementing the economic growth trend. A preliminary analysis has been carried out to identify potential direct employment growth in each of the key economic sectors as well as indirect employment in the ancillary industries. This section presents preliminary employment and population forecasts based on market conditions, the size of the facilities, and industry norms. The projections will be refined in future stages of the master planning assignment.

The establishment of robust estimates of population and generated employment is of critical importance to the planning of the city, since they underpin all the land use proposals for the region. The population and employment estimates for Greater Nicobar Island have been derived from a model that includes

number of variables and assumptions. The model forecasts jobs in the primary economic drivers (anchor sectors), leading to the forecast of secondary employment (ancillary sectors). The population is forecasted, on the basis of total primary and secondary employment generated. The employment and Population Projection Methodology is shown in **Figure-25**. The population model developed for the region is illustrated in the **Table 12**.

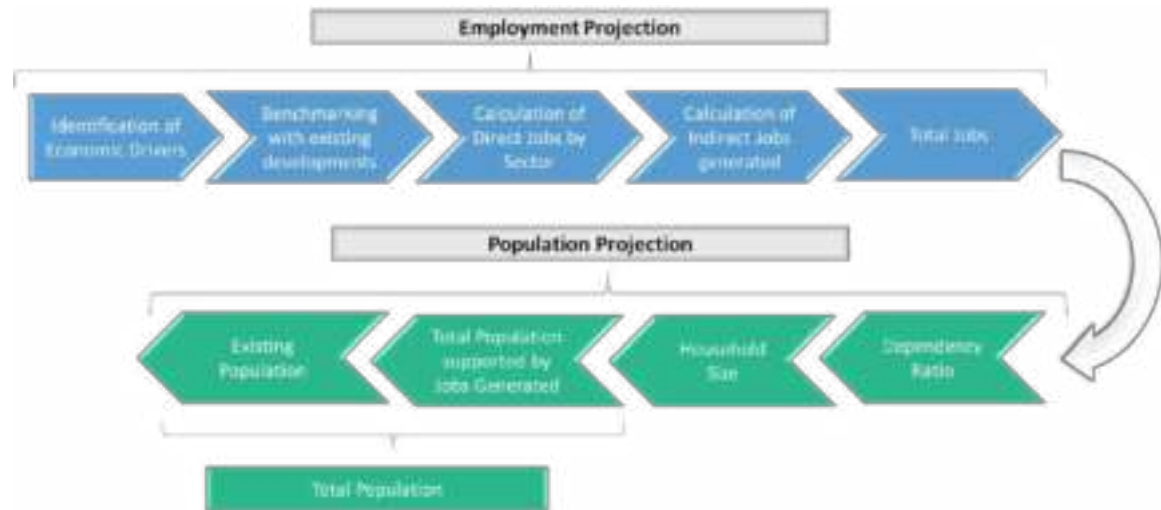


Figure 25: Employment and Population Projection Methodology

To benchmark the development, a number of actual case study locations have been analysed. The case studies have informed the assumptions, shown in Table 12, that are used in the model.

Table 12: Assumptions for Employment Estimation

Particulars	Value	Notes
ICTT and Logistics and Power Plant / Export Processing Zone		
Processing Area	1,373 Ha	30% of total area allocated to economic sector
Employee per Ha.	35	Industry norms
* Other Amenities include worker housing, primary healthcare and education centres, Internal infrastructure like roads, STP etc.		
Industrial Processing Zone		
Processing Area	360 Ha	30% of total area allocated to economic sector
Employee per Ha.	35	Industry norms
* Other Amenities include worker housing, primary healthcare and education centres, Internal infrastructure like roads, STP etc.		
Tourism / Airport		
No. of Visitors	9.80 Lakh PA	Benchmarked with the total visitors in the developed Islands in vicinity of Project Site with well-developed tourist infrastructure
Business Travellers	0.44 Lakh PA	Benchmarked with the total employment
Employment in Tourism	4.3% of annual tourist	Industry Norms
Employment at Airport	19% of annual passengers	Industry Norms
Macro-economic Assumption		
Multiplier Effect	1.5	
Dependency Ratio	1.5	
Household Size	4	

On basis of above-mentioned assumptions, total employment in economic anchors is forecasted. It is anticipated that these core economic drivers will generate and sustain additional jobs in the ancillary industries, such as commercial, administrative, institutional, residential and recreational sectors. These jobs will enable the island to develop into a self-sustaining and economically diverse city. The number of employees generated by direct and indirect employment is shown in the **Table 13**.

Table 13: Projection of Total No. of Employees

Sectors	No. of Direct Employees	No. of Indirect Employees	Total Employees
ICTT & Logistics & Power Plant	27,573*	41,360	68,933
Export Processing Zone	20,475	30,712	51,187
Food Processing Zone	12,600	18,900	31,500
Tourism	43,863	65,794	109,656
Airport	530	796	1,326
Power plant	100	150	250
Total	105141	157711	262852

*Includes employment at port, estimated as 4,200

The demand for workers from the economic drivers would translate into the residing population for the region. The population would be composed of all employees (direct and indirect employment) and their dependents. With the migration of both skilled and unskilled labour to the project site, dependents are also expected to migrate eventually. The dependent population would contain those in 0-14 yrs. and 65+ age groups as well as those individuals in the employable age group who are unemployed (by choice or by force). The dependency ratio is estimated to be 1.5. The population projections made are given as in below Table. With the below mentioned population, the density of the region would be approximately 27 person per hectare. The projection of total population is given in **Table-14**.

Table 14: Projection of Total Population

Particulars	Population (lakh)
Working population	2.6
Dependent Population	3.9
Total Population	6.5

Thus, as discussed above, it is anticipated that investment in the Transshipment hub, tourism facilities and the airport, among other economic activities, will generate approximately 105,141 jobs by 2050. This direct employment will have multiplier effects in service and support industries that will generate another 157,711 jobs. The total number of employees is anticipated to be approximately 2.6 lakh thirty years from now. Associated with that employed population is a dependent population estimated at about 3.9 lakh. The total population in 2050 is estimated at approximately 6.5 lakh.

In terms of the phasing of the investment, employment generation, and urban growth, it is anticipated that approximately 2.5 lakh of the anticipated population growth will take place during Phase 1 (2021-2036), while the balance growth of 4 lakh population will take place over the 15 year period after that (Phase 2 = 2037-2051). The population growth for Phase I is derived considering the following factors:

- The growth in population is a function of growth in employment. Typically there is a lag between generation indirect employments after the direct employment is generated for the Greenfield projects. Thus, total most of the indirect employment potential will be generated in Phase II only
- Initially, the workforce moves without families because there is a lack of social infrastructure, security etc. Therefore, the Work Force Participation Rate is high, thereby the population will not grow to its full potential (from economic perspective).

4.3 Amenities

The new amenities at Great Nicobar Island will cater to the resident population and the tourists and other visitors. The distinctive amenities, which separate Great Nicobar from other destinations, include the ecological amenities, such as access to the beach, sea, as well as to the rich and lush tropical forest. These amenities will consist of access facilities (roads, paths, marine transit) and vertical facilities (welcome centres, cultural centres, marinas, dive shacks, etc.) The urban centres of this proposed city will also include standard commercial amenities associated with a culturally and socially vibrant lifestyle, including restaurants, cafés, theatres, museums and other cultural and entertainment amenities. The urban centres will also include recreation amenities such as parks and sports fields.

4.4 International Container Transshipment Terminal

The planning framework for the ICTT starts with demand projects, as shown below.

Table 15: Preliminary Projections of Transshipment Port Traffic (million TEUs) -Excluding FTWZ

	2025	2030	2035	2040	2045	2050	2055
India (East Coast)	0.9	1.4	1.9	3.7	4.7	5.9	7.4
Bangladesh	1.2	1.7	2.0	2.2	3.0	3.3	3.6
Myanmar	0.5	0.8	1.0	1.2	1.8	2.0	2.3
Sri Lanka (Repositioning)	0.0	0.0	0.0	0.1	0.1	0.1	0.1
Malaysia (Smaller Ports & Repositioning)	0.2	0.5	0.5	0.6	0.6	0.6	0.6
Singapore (Repositioning)	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Total	3.0	4.5	5.6	7.8	10.2	12.0	14.2

The container volume of a Transshipment terminal is counted twice the trade volume. A container brought to Transshipment terminal large container carrier (mother vessels) is unloading in terminal. Unloaded container is again re-loaded into feeder vessels for final delivery. Hence, every container gets counted twice for single trade. The tariff of Transshipment terminal (THC – Terminal Handling Charges) is charged once. The projections for Great Nicobar Transshipment terminal in above table would have to be halved while calculating THC revenue from Transshipment terminal.

4.4.1 Planning Criteria

- **Land Use**

Land use has been worked out to get the most out of the planned Transshipment terminal. As per the estimated traffic of 14.2 Million TEU's during Final Phase, the total reclaimed land (227 Ha) has been redistributed between berths (13%), container storage (70%), building & utilities (1%), road & pavements (9%) & Green areas (6%). Green zone has been assigned keeping in view of the diverse flora & fauna of the Nicobar region.

- **Harbour Planning Criteria**

Ship Sizes

Based on the market assessment detailed earlier in section above, the target cargo volumes and ship size adopted for planning of the container Transshipment port is presented in this section. Economy of scale effects in container shipping have led to a rapid increase in size for all types of vessels, from feeders to

the large inter-continental carriers. The trend towards larger ships has accelerated in recent years. The facilities planning shall be based on the maximum size of the container ship that would be visiting the port. For coal will be governing the harbour / channel depth for the proposed Project. Container ships are classified into six broad categories viz. Feeder, Feeder Max, Handy, Sub-Panamax, Panamax and Post-Panamax. The following table, which has been compiled through data from the Shipping Register of Lloyds Fair play database, gives a broad outline of the principal dimensions of the ships under the different categories. The Table 16 gives the dimensions of the smallest and the largest ship in each category. This will help in planning the layout of the container Transshipment port and the other facilities.

Table 16: Dimensions of the Smallest and Largest Ship

Category	Capacity (TEUs)	Dimensions(m)		
		LOA	Beam	Loaded Draft
Feeder	1,000	175	27	10.0
Feeder Max	2,000	210	32	12.0
Handy to Sub-Panamax	6,000	285	40	14.5
>Panamax	8,000	335	42	14.5
Post-Panamax	12,500	397	56	16.0
Super Post-Panamax	18,000	400	59	16.0
	19,650	398	61.5	16.6

[Source: Lloyds Fair play Database]

- **Positioning of Facilities**

This section examines the layout of facilities for the proposed Project. Since the Coastline is exposed to open sea, breakwater(s) will be required to shelter the manoeuvring area and the berths. The orientation of the breakwater shall be such as to provide tranquillity at the berths (wave heights limited to 0.5 m) for round the year operations. The harbour should be sized adequately so as to provide adequate stopping distance and manoeuvring space for the largest ship to be handled at the port. The berths have to be planned and designed so that they can handle the largest and smallest ships visiting the port. Also, the berths should be located where the significant wave heights under operational conditions do not exceed 0.5 m.

- **Dredged Depths**

The dredged depths required in various parts of the harbour area are based on the design vessel sizes provided in the earlier section & are calculated as below adopting standard norms as shown in Table 17 below.

Table 17: Dredged Depth Summary

Sr.No.	Location	Depth	Remarks
1	Approach Channel	-19.8 m CD	20% additional over the Loaded Draft of 16.5 m of the largest container vessel.
2	Turning Basin	-19.0 m CD	15% additional over the Loaded Draft of 16.5 m of the largest container vessel. Similarly, the diameter of turning circle adopted is 800 m which is 2 times the LOA of largest vessel

Sr.No.	Location	Depth	Remarks
3	Berth Pockets	-18.2 m CD	10% additional over the Loaded Draft of 16.5 m of the largest container vessel.

It needs to be ensured that the harbour area is located so that the capital dredging required to create the above water depths is optimal by way of eliminating the rock dredging to the extent possible as that can seriously impact project financials. On the other hand, adequate plans must be made for disposal of the dredged material, which will be salty and therefore cannot be disposed of on land.

- **Reclamation**

In view of the container handling practices the backup area should ideally be located immediately behind the berths for operational efficiency. Based on the project annual throughput of the terminal the requirement of the backup area has been arrived at. Based on the layout of the harbour and arrangement of the berths, the backup space shall be created either through site grading or through reclamation. The limit for land reclamation shall be determined through an initial economic assessment of the cut and fills balance of material, ease of dredging and environmental considerations rather than a requirement to provide additional site area.

4.5 Greenfield International Airport

4.5.1 Planning Criteria

The purpose of this section is to present the Planning Concepts for the proposed Great Nicobar Island Airport, in terms of both their vision and reasoning. Therefore, several basic assumptions have been established, which are intended to direct the future planning of the Airport. These assumptions are supported by the aviation activity forecasts and include a commitment for continued airport operation, which supports local and regional needs.

Airport planning and design primarily depends upon availability of land, its topography, orientation, accessibility, etc. Traffic is the other major factor that decides the size of runway, terminal building and other related infrastructure required for the proposed airport. Based on the site and traffic studies the planning and conceptual design of the proposed airport is discussed in this chapter.

4.5.2 Planning Concept

Because all airport functions relate to and revolve around the basic runway/ taxiway layout, airside planning recommendations must first be carefully examined and evaluated. It is essential that the initial development of the Airport be commensurate with the anticipated needs and requirements of the airport users; however, the long-term expansion capabilities of the facility must also be considered and planned for to ensure the future success of the project. The main objective of the proposed project is to ensure design requirement to cater to the passenger demand.

As discussed, peak hour traffic of 4000 passengers both ways are considered for planning of airport. Accordingly, it is proposed that the airport shall be planned for the operations of Code F type of aircraft. After the commencement of operations from this airport, continual monitoring of the traffic shall be done to observe the actual traffic scenario after the opening of Great Nicobar Island Airport. Important planning parameters considered for planning of various facilities for the proposed Airport are discussed.

The recommended planning parameters are presented and discussed in this section. Where gaps exist, these recommended planning parameters are supplemented by other assumptions based on existing data/experience as well as other information/opinion that we have gathered.

The proposed site is for a Greenfield airport project. The following are design criteria for the proposed project air-side activities.

Key design and development reference standards that need to be complied with are as follows:

- Director General of Civil Aviation (DGCA) Aeronautical Information Circular No.22/1992 provides standards that must be complied with in order that an aerodrome shall receive an aerodrome licence.
- International Civil Aviation Organisation (ICAO) – International Standards and Recommended Practices, Aerodromes, Annex 14 to the Convention on International Civil Aviation. Volume 1 Aerodrome Design and Operations – Eighth Edition, 2018.
- ICAO Aerodrome Design Manual (Doc 9157).
- Airport Services Manual (Doc 9137).
- Conform to US National Fire Protection Association (NFPA) standard on Airport Terminal Buildings, Fuelling Ramp drainage and loading Walkways.
- Conform to best practice as set out in International Air Transport Association (IATA) Airport Development Reference Manual, 11th Edition.
- Conform to the National Building Code (NBC), which sets out safety and durability aspects to be incorporated into building structure.
- Conform to the relevant code for the specific aspect of development. The Indian Standard Codes are a comprehensive range of Standards and practices as per Bureau of Indian Standards, to be adopted in all aspects of design and construction in India.
- Meet all requirements of the statutory agencies, including Directorate General of Civil Aviation (DGCA), Bureau of Civil Aviation Security, Ministry of Défense, Customs and Immigration authorities, Ministry of Environment & Forests, Pollution Control Board.
- Adhere to all conditions, regulations, measures and all requirements of whatever kind imposed by local byelaws and other applicable Central, State and Local Government laws.

• **Airside Planning**

The aerodrome reference code based on ICAO Criteria remains 4F. Aerodrome Reference Code is defined by the characteristics of the aircraft intended to use the airport. The parameters to categorize the Aerodrome reference code by ICAO are mentioned in Table 18.

Table 18: Aerodrome reference code by ICAO

Code No	Aero plane reference field	Code	Wingspan
1	Less than 800m	A	Up to and not including 15m
2	800m up to 1200m but not including 1200m	B	15m up to and not including 24m
3	1200m up to 18000m but not including 1800m	C	24m up to and not including 36m
4	Over 1800m	D	36m up to and not including 52m
5	-	E	52m up to and not including 65m
6	-	F	65m up to and not including 80m

Source: ICAO Annex 14 (Eighth Edition July 2018)

The anticipated fleet is tabulated in Table-19.

Table 19: Fleet Mix

Aircraft Type	ICAO CODE	Wingspan (m)	Overall Length (m)	Tail height(m)	Forecast Fleet mix (%)
A380-800	F	79.75	72.73	24.10	2%
B747-400	E	64.94	70.67	19.51	
B777-F	E	64.80	63.73	18.85	
B787-800	E	60.12	56.72	16.92	
A330-200	E	60.30	58.37	18.23	
B 767	D	51.9	61.4	16.8	5%
A 310	D	43.9	46.66	15.8	
B737-800	C	35.79	39.47	12.55	90%
B737-900ER	C	34.32	42.11	12.55	
A321	C	34.15	44.50	12.10	
A320	C	34.10	37.57	11.76	
Bombardier 400	C	28.40	32.81	8.34	
Rotary wing aircraft & sea planes					3%

- **Aircraft Wingspan**

As described above, ICAO Annex 14 groups aircraft by wingspan and outer main wheel span. In practice, the aircraft manufacturers design aircraft within these groupings. Airport aprons have typically been planned for a maximum aircraft wingspan based on these groups rather than being based on a particular aircraft with its defined wingspan.

In the 1990's, prior to adoption by ICAO of a Code F group, the largest group was Code E. Prior to development of the B747-400, Code E was for an aircraft with maximum wingspan up to but not including 60m. Annex 14 was subsequently amended to provide Code E with up to but not including 65m wingspan aircraft. Many airports around the world were obliged to create greater spacing between Code E stands to accommodate these larger wingspan aircraft and runway to taxiway and taxiway to taxiway/taxi lane separations were also increased. However, since the adoption of Code F group, it is expected that there will be no further amendment to the current Code E group requirements as aircraft with larger wingspans will be classified as Code F.

- **Aircraft Length**

The Annex 14 Code Letter provides aircraft classification with reference to wingspan and wheel track width only. The other key dimension required for planning apron areas is aircraft length. The aircraft length to be adopted for planning purposes is based on the lengths of current and proposed aircraft types and a judgement as to what may be the longest aircraft length in the future. Most aircraft types have been stretched during their life from the initial version introduced into service to later higher capacity versions of the same aircraft.

Figure-26 illustrates stretches that have been designed for a range of common aircraft types in service worldwide.



Figure 26: Range of common aircraft types in service worldwide

Table-20 summarizes the stretches and indicates that, on average, the length of aircraft has been stretched by some 19.5% throughout their life, within a range of 7.8% to 27.3%.

Table 20 Summarisings the Stretches

ICAO Code Letter	Initial Aircraft	Overall Length(m)	Derivative Aircraft	Overall Length	Increase in length (m)	% increase in length
C	A320	37.57	A321	44.50	6.94	18.5
C	B737-200	32.92	B737-900	41.91	8.99	27.3
Average Code C - 22.9						
D	B757-200	47.33	B757-300	54.08	6.75	14.3
D	B767-200	48.51	B767-400	61.37	12.86	26.5
Average Code D – 20.4m						
E	A340-200	53.61	A340-600	74.90	15.48	26.1
E	777-200	63.73	B777-300	73.90	10.17	16.0
E	B747-100	70.66	B747-8	76.30	5.64	7.8
Average Code E – 16.6						

It can, therefore, be expected that in the future, when airlines require aircraft with greater capacity than current types, aircraft that are significantly longer than current types will be introduced into service. Based on the above analysis, for Code C aircraft approaching 46m and Code E aircraft approaching 80m in length could reasonably be expected.

Currently, no aircraft in operation and in development has an overall length larger than 80m. Aircraft models in development with an overall length larger than 80m are very likely to be classified as Code F aircraft.

• **Recommended Design Aircraft Envelopes**

Based on industry trends and the above analysis, the following recommendations are made with respect to the critical aircraft to be adopted for apron and taxiway / taxi lane separation planning as shown in Table 21.

Table 21: Critical design aircraft envelopes

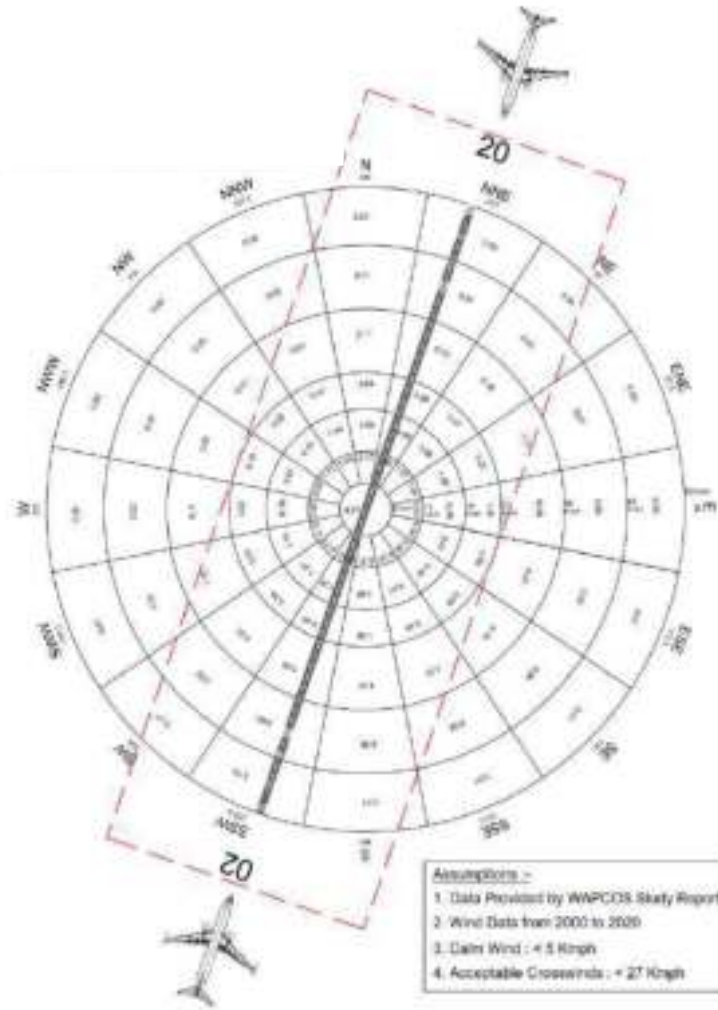
ICAO Code Letter	Wingspan (m)		Length (m)	
	Recommended	Critical Aircraft	Recommended	Critical Aircraft
E	65	B747-400 ¹ (64.9m)	80	A340-600 ² (75.4m)
C	36	B737-800w (35.8m)	50	A321 ³ (44.5m)

Remarks:

- B747-400 has the largest wingspan among all Code E aircraft, which approaches the maximum limit as required for ICAO Code E group.
- A340-600 has the longest overall length among all Code E aircraft. Recommended wingspan has made reservation for future Code E aircraft with longer overall length.
- B727-200 is the longest Code C aircraft that was manufactured, with an overall length of 46.68m. It has already been discontinued and retired from operation. Recommended wingspan has made reservation for future Code C aircraft with longer overall length.

• **Runway Orientation**

Based on analysis of wind data as provided in the WAPCOS report which has considered 20 years of wind data, the predominant wind direction is such that the runway must be oriented in first and third quadrant for 95% availability. As per analysis of the wind data, the runway availability for this orientation is 98.4%. The Benchmarking with the other airfields in the region such as 1) Campbell Bay in the island of Great Nicobar, 2) Car Nicobar and 3) Port Blair; all these runways are oriented in the first and third quadrant is shown in Figure-27.



1) Campbell Bay - RWY 05-23 2) Car Nicobar – RWY 02-20 3) Port Blair – RWY 04-22

Figure 27: Benchmarking with the other airfields in the region such as 1) Campbell Bay in the island of Great Nicobar, 2) Car Nicobar and 3) Port Blair; all these runways are oriented in the first and third quadrant.

The wind data noted from the WAPCOS report, Sep 2020 is reproduced in Table-22.

Table 22: Wind Direction

SPEED (kmph)	Percentage Number of Days Wind from							
	N	NE	E	SE	S	SW	W	NW
0	0.01	0.03	0.00	0.03	0.05	0.02	0.02	0.02
0-5	0.54	0.99	0.14	0.47	0.29	0.62	0.39	0.96

SPEED (kmph)	Percentage Number of Days Wind from							
	N	NE	E	SE	S	SW	W	NW
6-12	2.17	4.23	0.52	1.16	0.51	1.97	0.92	3.51
13-19	4.06	10.04	0.76	1.40	0.86	3.58	0.78	2.86
20-25	3.89	12.28	1.04	1.40	1.36	10.01	0.63	0.66
26-38	0.11	1.71	0.40	0.72	1.38	13.59	0.11	0.05
39-50	0.01	0.10	0.05	0.18	0.38	5.61	0.02	0.00
51-61	0.00	0.00	0.00	0.03	0.01	0.33	0.00	0.00
> 61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Adapted from WAPCOS Report dated Sep 2020

It can be observed from the Table above that the wind is predominantly from South-West, North-East direction.

The wind rose diagrams from the nearest observatory is presented in Figure 28.

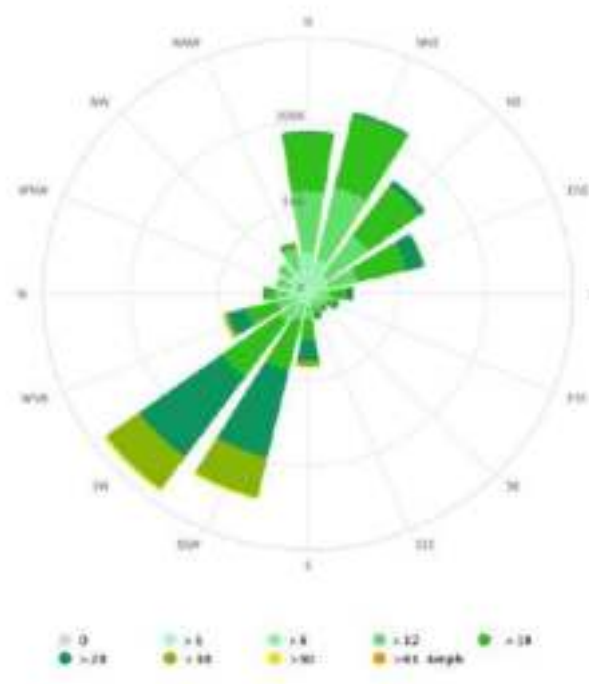


Figure 28: Windrose

Diagrams

• Obstacle Limitation Study

Obstacle Limitation Surfaces

Guidance on the characteristics of the different obstacle limitation surfaces is provided in ICAO Annex 14 as well as the Gazette of India G.S.R. 751 (E).

The Take-off Climb and Approach Surfaces utilize the dimensions and slopes shown in Table-23. As can be seen from these tables both ICAO and G.S.R. 751 (E) requirements are identical. The approach surface dimensions and slopes is given in Table-24.

Table 23: Take-off Climb Surface Dimensions and Slopes

Measurement	ICAO Annex 14 Table 4-2	GSR 751 (E) Table 2.1
Length of inner edge	180m	180m
Distance from runway end	60m	60m
Divergence each side	12.5%	12.5%
Final Width	1,200m	1,200m
	1,800m	1,800m
Length	15,000m	15,000m
Slope	2%	2%

Table 24: Approach Surface Dimensions and Slopes

Surface	Measurement	ICAO ANNEX 14 TABLE 4-1	GSR 751 (E)	
Conical	Slope	5%	5%	
Inner Horizontal	Locus from strip edge	4,000m	4,000m	
Approach	Length of inner edge	300m	300m	
	Distance from threshold	60m	60m	
	Divergence each side	15%	15%	
	Slope	First Section (3,000m)	2%	2%
		Second Section (3,800m)	2.5%	2.5%
Total Length	15,000m	15,000m		
Transitional	Slope	14.3% (1:7)	14.3% (1:7)	

For a precision approach runway, the obstacle limitation surfaces as listed in the table below are established according to Annex 14. Fixed objects shall not be permitted above the inner approach, inner transitional and balked landing surfaces. Annex 14 further recommends that obstacles penetrating other surfaces should, as far as practical, be removed, except when after an aeronautical study it is determined that the object would not affect the safety or the regularity of aircraft operations. The system of obstacle limitation surfaces for the proposed runway has been established. The layout of the composite inner horizontal surface is designed according to ICAO, Airport Services Manual, and Part 6 - Control of Obstacles. The total area of land to be acquired for the airport is 1039 Ha. (Includes reclamation area of 194 ha) A hill of elevation varying from 200-225m is penetrating the Inner Horizontal Surface (IHS). This challenge can be mitigated by designing suitable flight procedures and bringing in changes to the profile of the hill features.

Study of Obstacles:

As per Annexure 14 of ICAO, the following obstacle limitation surfaces shall be established for a non-precision approach runway:

- Conical surface;
- Inner horizontal surface;
- Approach surface;
- Take-off Surfaces and;
- Transitional surfaces.

The above obstacle limitation surfaces are proposed to be studied as per requirements of Code 4F aircraft which is proposed to be operated from this airport accordingly an obstacle limitation plan will be prepared in detailed design stage. The runway alignment 02/20 was found most suitable from wind direction, obstruction management, land economics and safety standpoint.

Runway Length

The development of Great Nicobar Island Airport will include a single Code 4F runway. The runway length requirement is basically dependent on the critical/design aircraft likely to operate at the airport. After a range of aircraft were analysed for their landing and take-off performance requirements, based on the assumed temperature and elevation characteristics of the proposed new airport at Great Nicobar Island, a runway length of 4000 m is recommended. The details of runway dimensions are presented in Table-25.

Table 25: Runway Dimensions

Item	Dimension
Length	4000m
Width	45m
Isolation Bay	112m x90 m
Runway End Safety Area (RESA)	240m x 150m
Runway overrun	60m x 60m

Runway Strips & Safety Areas

Runway End Safety Areas (RESA) is provided at each end of the runway strips. The area extends 240m from the strip and has a width of 150m on each side of the extended centreline of the runway.

Runway overrun are along-with the strips at both ends in between strips & RESA, with length of 60m & width of 60m meter.

Runway Geometry

The runway is planned for Code F type aircrafts. The proposed width of the runway is 45 m and length of 4000 m leaving a space of approximately 900 m on both runways ends for the approach lighting. The

orientation of the runway for airport is 02-20. The permissible values of slopes as per ICAO are given in Table -26:

Table 26: Permissible Values of Slopes As per ICAO

Name	Slope	Permissible
Runway	Longitudinal	1.25% (Max.) with Max. slope of 0.8% in the last quarters on both ends and overall slope not to exceed 1.00%
	Transverse	1.50% (Max.) 1.00% (Min.)
Runway Strip	Longitudinal	1.50% (Max.)
	Transverse	2.50% (Max.)
Taxiway	Longitudinal	1.50% (Max.)
	Transverse	1.50% (Max.)
Taxiway Strip	Transverse	2.50% (Max. Downward)
		0.50% (Max. Upward)
Apron	Longitudinal	1.00% (Max.)
	Transverse	1.00% (Max.)

Source: ICAO Annex 14

4.6 Area Development and Township Project

4.6.1 Land Use Planning

The land uses have been defined by 'land use categories' that each combine multiple uses. The objective is to create vibrant neighbourhoods and destinations that combine commercial, residential, institutional, and other uses in compact clusters of development that are accessible by foot and offer a broad range of amenities to residents and tourists alike.

Ecotourism is a future pillar of the Great Nicobar economy. Tourism land and facilities are not geographically isolated — as seen in many beach resorts where resorts are developed with specialized tourism zones. Rather, tourism facilities (hotels, resorts, dining, shopping, and entertainment) are to be developed within the urban centres up and down the coast. Often, they will be located on the seaside, to facilitate access to the beach. Ecotourism resources are marine and terrestrial; they include the beaches, the sea, on one hand, and the interior tropical forest on the other. These two very distinct areas will be opened up to tourists and residents in an environmentally sensitive manner that will help conserve the integrity of these world class resources.

Concept Land Use Plan

The major urban centre is located at Campbell Bay. Starting at Anderson Bay, secondary urban centres are proposed at each of the five largest bays along the coast to Gandhi Nagar. The urban centres are linked together by a major arterial road that integrates a mass transit solution (either light rail or Bus Rapid Transit (BRT), to be determined at a later date. The urban centres are anchored by the transit stations and laid out using Transit Oriented Development (TOD) principles and layouts. There are mixed use commercial areas around many of the stations. Beyond those and moving towards the shoreline, there are residential mixed-use areas and tourism and hospitality areas that include hotels, food and beverage establishments, housing entertainment, and social infrastructure, as well as general public open space.

To the west of the main road in the mountainous, forested areas, the plan calls for Ecotourism uses (described above), extremely low-density residential development (minimum plot size 10 ha.), and the occasional institutional campus (higher education establishment, research facility, etc.) which can be built on some of the rare relatively flat areas found within the mountains.

The multimodal transport hub, including the port and the airport, is centred at Galathea Bay and Shastri Nagar respectively. All mixed use and tourism development are on the east of this bay. To the west, is a logistics zone and some land zoned for institutional campuses also part of the development area of proposed Township.

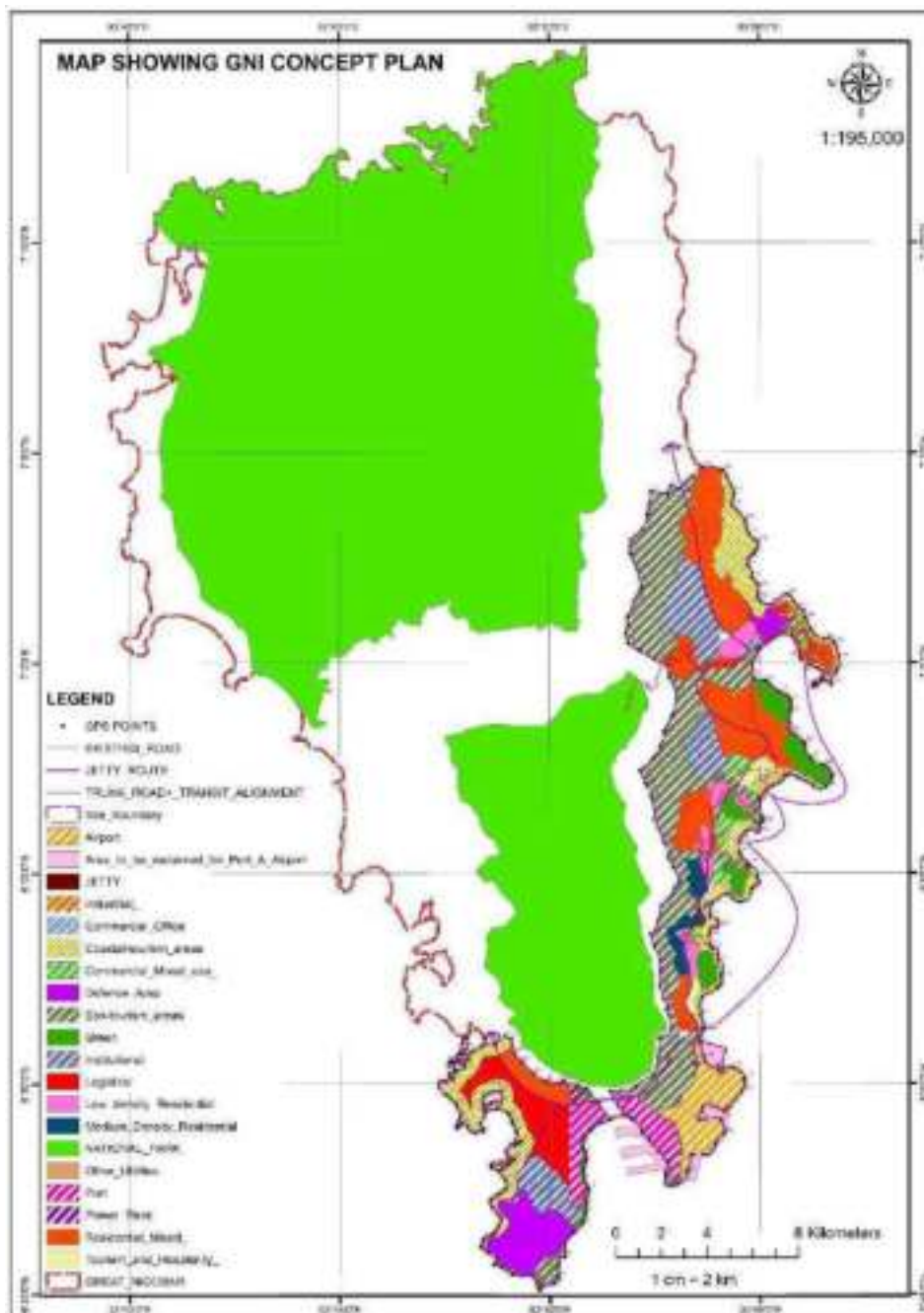


Figure 29: Concept Land use Plan

The approach to management of the coastal areas is based on the Island Coastal Regulation Zone provisions. Settlement areas and infrastructure facilities have been located away from the most ecologically sensitive areas. (The environmental sensitivity of different siting proposals for the port and airport are discussed in detail in Section 3 of this report.) Setbacks and use restrictions will be defined in the master plan for inhabited coastal areas. In keeping with the requirements of ICRZ IIIA land, the first 150 meters of land above the high tide line will be a No Development Zone. These areas will be preserved as natural areas such as beaches, mangroves, and or coconut plantations. These areas will also serve public open space needs of residents and tourists. In the next 250 meter wide area, which includes ICRZ IIIB land and some additional inland areas, the 'Coastal Tourism' land use category encompasses a number of low impact uses and activities that can take place along the shoreline, while avoiding major construction along the beach.

Similarly, the 'Ecotourism' land use category in the forested, hilly areas to the west of the main settlement areas will allow tourists to enter the tropical forest, learn about the natural environment and the indigenous people that inhabit it, and experience the forest by walking through it. Major construction projects will not be permitted in these forested areas.

The land use categories are defined in **Table-27**.

Table 27: Land Use Categories

Land Use Category	Permitted Land Uses	Description
COMMERCIAL		
Commercial Mixed-Use	Office Retail Hotel Food & beverage Entertainment Institutional Multifamily residential	Compact, walkable, medium-density mixed-use development located in city centre or near transit stations. Long list of by-right uses; some conditional uses can also be identified. High quality public realm
Commercial-Office	Office	-
Tourism and Hospitality	Hotel Food & beverage Entertainment Retail Mice (Convention Centres, etc.)	Walkable medium- to low-density development at the edge of town centres, with access to the sea and the forest.
RESIDENTIAL		
Residential Mixed-Use (Medium Density)	Multifamily residential Row housing Duplexes/Triplexes Retail Hotel Food & Beverage Institutional	Compact, walkable, medium-density residential development located near transit stations or adjacent to Commercial Mixed-Use districts. Multiple housing types permitted. Neighbourhood-serving commercial development also permitted. High quality public realm
Residential (Medium Density)	Multifamily residential Row housing Duplexes/Triplexes	Compact, walkable, medium-density residential development located near transit stations or adjacent to Commercial Mixed-

Land Category	Use	Permitted Land Uses	Description
			Use districts. Multiple housing types permitted.
Residential (Low Density)		Single-family housing	Single-family houses on large plots (>10 ha) in forested areas. Light touch, minimal impact on forest. No clearing allowed, except at residence. Serves as buffer between urbanized areas (mostly on revenue land) and forest outside Project boundary.
INSTITUTIONAL			
Urban Infrastructure	Social	School Health facility Religious	Integrated into new urban communities.
Institutional-Campus		College Research centre Health facility	Stand-alone campus built on relatively flat land within forested areas. Light touch, minimal impact on forest. No clearing allowed, except at campus site. Ceiling on % of total area allowed to be developed as campus
INDUSTRIAL			
Industrial		Light manufacturing	Industrial estates and warehouses with ready access to power, port and airport. No residential or commercial development.
TRANSPORT			
Ports and Marine		Port Transshipment hub Container storage Administration Jetty Marina	Marine facilities for Transshipment and passenger traffic and leisure.
Aviation		Airport– Aeronautical Airport– Non-Aeronautical Cargo Air catering Fuel farm	Airport and associated facilities.
Transit Station		Landside transit station Seaside transit station	Does not include right-of-way; only facilities (stations).
Logistics		Port allied activities, light industrial, go down, etc.	
Roads		Road Bus Rapid Transit	-
Railway		Light rail Heavy rail	-
UTILITIES			
Water Supply		Water treatment plant Pump station	Facilities required for water supply treatment and distribution system.
Wastewater		Wastewater treatment plant Pump station	Facilities required for wastewater collection and treatment system.
Energy		Electrical power plant District cooling station Pump station	Facilities required for electrical power and district cooling systems.
OPEN SPACE			
Park		Regional park	Natural parks at all scales.

Land Category	Use	Permitted Land Uses	Description
		Nature reserves Local park Playground	
Plaza		Plaza Square	Hardscape public open space.
Sports and Recreational Greens		Sports fields / facilities	Recreational facilities.
Ecotourism		Museum Cultural Centre Camping	Vertical development limited to Welcome Centre, museum or other facility. Vehicular access to facility. Walking paths in forest.
Coastal tourism		Sports Recreation Low-impact hotel Marina	-

Table 28: Land Use Area Breakdown

LANDUSE AREA CHART- GNI		
Land Use Category	Area (sq.km.)	Percentage (%)
RESIDENTIAL	36.66	22.07
Residential Mixed-Use (Medium density)	29.1	
Residential (Medium Density)	2.98	
Residential Low Density	4.58	
COMMERCIAL	6.44	3.88
Commercial Mixed-Use	4.33	
Commercial Office	0.41	
Tourism and Hospitality	1.70	
INSTITUTIONAL	15.14	9.11
Institutional Campus	15.14	
INDUSTRIAL	0.31	0.19
Industrial	0.31	
TRANSPORT	24.01	14.46
Ports and Marine	7.66	
Aviation	8.45	
Logistics	7.90	
UTILITIES	1.2025	0.72
Power Plant	0.39	
Other Utilities (includes Solid Waste disposal)	0.81	
OPEN SPACE	73.0575	43.98
Greens	9.61	
Eco-Tourism	40.81	
Coastal tourism	22.64	
DEFENCE AREA	9.28	5.59

TOTAL	166.10	100.00
ONLY TOWNSHIP AREA	149.60	
RECLAMATION AREA	4.21	
Reclamation for Airport	1.94	
Reclamation for Port	2.27	

4.6.2 Environmental Carrying Capacity

This carrying capacity framework has been developed to assess the impact of future development and tourism on Great Nicobar on the island's valuable natural and human assets.² This framework is meant to provide a structure to determine maximum carrying capacity on GNI in order to avoid degradation of the assets resulting from excessive urban development or tourism. The framework is based on three primary considerations: environmental conservation, socio-cultural preservation, and the legal and policy considerations for development and tourism. Several Key Performance Indicators (KPIs) have been developed to guide development and tourism and are meant to help arrive at a maximum carrying capacity for population (year-round) and tourism (seasonal).

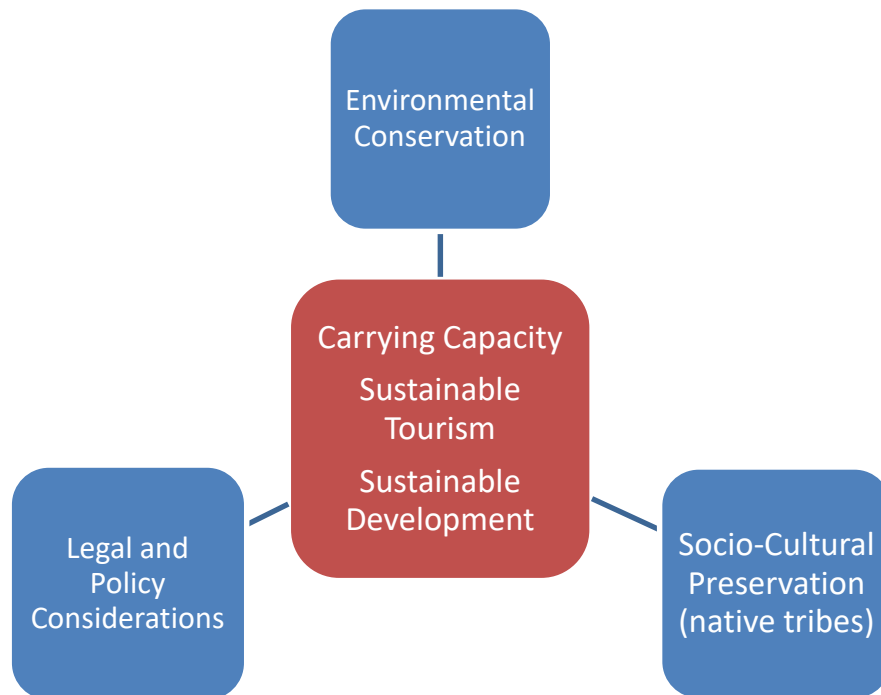


Figure 30: Factor contributing to Sustainable Development within GNI's Carrying Capacity

Environmental Conservation — Great Nicobar Island is infused with natural beauty and home to a variety of animal species that all contribute to its unique ecosystem (see Section 2). Some areas will remain off-limits to development and tourism, while other areas will be utilized as building blocks for development and tourism. The development of these areas and the influx of residents and visitors as a result of urban development and tourism should not generate undue negative environmental impacts.

Socio-Cultural Preservation — The Shompen and Nicobarese tribes are native to Great Nicobar Island. GNI has a tribal reserve with both core and buffer areas. The aboriginal tribes will have to option to

² All built and natural resources have a carrying capacity. When that capacity is exceeded, the resource fails to function or thrive as intended or hoped. Once their carrying capacity is exceeded, it may be impossible to restore.

maintain their separate existence in their natural habitat, as is their current preference. Furthermore, tourism and development should not generate undue negative impacts on the existing tribes, nor should interaction initiated unilaterally by tourists or residents be permitted. The tribal reserves, including their core and buffer areas, will remain largely for the exclusive use of the native tribes.

Legal and Policy Considerations — As a Union Territory, Andaman & Nicobar Islands has created a legal framework to regulate urban development, coastal zone management, tourism and infrastructure. Robust laws regulate the island's natural environment and restrict development in most areas of the island. GNI has several protected areas, including the GNI Biosphere Reserve (GNBR), which covers a majority of the Island and includes two national parks, Campbell Bay National Park and Galathea National Park, as well as two wildlife sanctuaries. Native tribal laws and polices like the Shompen Policy (2015) and PAT Regulation 1956 seek to preserve and protect the lifestyle and cultural heritage of the tribals.

Outcomes to Be Avoided

Managing development and tourism on the island in a way that is consistent with Great Nicobar Island's environment carrying capacity is about avoid long-term impacts that would erode the value of the ecological and socio-cultural assets on the island. An illustrative list of environmental and socio-economic impacts that should be avoided is presented below with a view to facilitating evaluation of the carrying capacity framework and methodology, including the definition of Key Performance Indicators in the following sub-section.

- Depletion of water resources—Surface water will be harvested and treated for distribution to residents and visitors. The amount of water generated, re-used and reintroduced into the environment should be consistent with the ability of the hydrological system to generate more surface water.
- Loss of tropical forest—while some development of urban uses in currently forested areas is probably necessary for urban development, the proportion of that development should not be so high as to compromise the quality of the remaining forest or the ability of the forest (and more generally, the Biosphere Reserve) to generate positive environmental impacts for the planet.
- Contamination of surface or ground water — Ground water supplies are limited. Most of the rivers are rain-fed. Nevertheless, waste water and solid waste must be managed so that naturally occurring water supplies are not unduly damaged.
- Degradation of the natural habitat in the Tribal Reserve Areas —This could make it harder from the aboriginal peoples to gather and hunt food the forest and the sea.
- Intrusion of outsiders into Shompen and Nicobarese areas — such intrusions, which are known to be unwanted by the Shompen, could cause harm to the aboriginals and exacerbate their quality of life.

Key Performance Indicators of Carrying Capacity

Given the unique biodiversity and ecological fragility of GNI, the major objective of forest and ecosystem management should be biodiversity conservation and protection of the habitat of the native tribal people living in the forests. The carrying capacity for GNI shall be determined using a threshold approach. Development scenarios and tourism projections should be measured against the KPIs found in the table below. Development and tourism are encouraged up until the point where they no longer meet environmental conservation KPIs, cultural preservation KPIs, and/or comply with applicable laws and policies. Monitoring measures and enforcement of KPIs are included in the table below.

Table 29: Key Performance Indicators for Managing Tourism & Urban Development

Dimension / Objective	Key Performance Indicator	Measurement / Calculation
OVERARCHING*		
Economic impact of tourism	Tourism output Tourism employment	Island-wide cumulative GDP of tourism activity Tourism GDP as % total island-wide GDP
NATURAL ENVIRONMENT		
Development does not generate undue negative environmental or socio-cultural impacts	Development containment	% of new (re)development land within area zoned for development, including coastal tourism and ecotourism zones
	Development sustainability	% of new development land area compliant with sustainable development standards
	Surface water quality	% change in contaminants in untreated drinking water supplies (river water)
Tourism does not generate undue negative environmental or socio-cultural impacts	Health of coral reefs	Average rating of reef quality along east coast Change in average rating of reef quality along east coast
	Endangered species	Number of endangered species Average annual % change in population of endangered species
	Surface water level	% change in surface water level of Galathea River % change in surface water level of Galathea River
SOCIO-CULTURAL		
Protect native tribes (Shompen and Nicobarese) from excessive exposure to mainlanders / tourists	Incursions into Tribal Reserve land	# of unauthorized incursions/year % change in unauthorized incursions/year
	Incidence of infectious disease	# of Shompens that contracted infectious diseases due to interaction with outsiders % change in # of Shompens that contracted infectious diseases due to interaction with outsiders
	Access to food	% change within Tribal Reserves of quantity of animals and plants that are routinely gathered/hunted by Shompens
LEGAL / POLICY		
Comply with land development relevant laws and policies	Use of land and development complies with section 40 of the Andaman and Nicobar Islands Land Revenue and Land Reforms Regulations, 1966	Ha of conforming land divided by Ha of total urbanized land
Comply with environmental protection laws and policies	Development and tourism compliance with Forest (Conservation) Act 1980; Environment (Protection) Act of 1986	Use standard monitoring data collected by MoEF

Dimension / Objective	Key Performance Indicator	Measurement / Calculation
Comply with native peoples protection laws and policies	Development and tourism compliance with Shompen Policy 2015	Number of uncompliant projects per year (including interactions, preservation, and use of protected land)

*Measuring the economic value of these sectors is important for evaluating any negative socio cultural and environmental impacts.

4.7 Power Plant

The electrical load demand is the basic requirement for Design and Planning of an Electrical Network. As it has direct bearing on the system. Under assessed load demand results into an inadequate Electrical System, leading to poor Voltages to the consumers and more losses of energy in the Electrical Network. Over assessed load demand will require more capital returns, as the network will be large for load demand considerations. More overload and underload running of electrical equipment has bearing on losses / efficiency / financial viability. On the other hand, it is also difficult to have exact load demand for mixed type of development at planning stage.

- **Load Norms**

For Power demand calculation and selection of voltage level for proposed development, following references are considered.

- Utility norms / standards / Guidelines
- Past Project Reference
- ECBC (Light Power Method) etc.
- CEA guideline for Manual on Transmission Planning Criteria

- **Broad Power Demand**

Power demand has been assumed for all types of industries, non-industrial buildings (residential, commercial & Institutional building), industrial amenities and common utilities (water supply, STP, CETP, street lighting, ICT). Diversity factor (demand factor) has been applied by considering the type of industry, commercial & residential buildings, operating hours and group of end users.

The broad design basis for the demand factors considered, kVA/Acre value for each type of land use. Since, the total loads shall not be occurring at the same time, a diversity factor is to be considered for different voltage levels.

Based on upon load norms and as per our past projects' references, the proposed broad level power demand is approx. 450 MVA.

- **Selection of Voltage Level**

In order to handle this huge power, different types of voltage will be the required which is also in line with the "CEA guideline for Manual on Transmission Planning Criteria" recommendations. Also establishing the infrastructure with different voltage level can facilitate in integrating with the future upcoming and planned substations. A CEA guideline recommendation is shown in Table-30 for reference:

Table 30: CEA Recommendation

Voltage Level (A)	Transformer Capacity	
	Existing capacity (B)	Maximum Capacity (C)
765 kV	6000 MVA	9000 MVA
400 kV	1260 MVA	2000 MVA
220 kV	320 MVA	500 MVA
132 kV	150 MVA	250 MVA

For other voltage levels following capacities shall be considered in designing. The electricity supply code recommendation is given in Table-31.

Table 31: Electricity supply code Recommendation

Connected Load	Nominal Voltage level
80kW / 100kVA	415Volt
101kVA to 4000kVA	11kV
4001kVA to 20000kVA	33kV
20001kVA to 150 MVA	132kV
Above 150 MVA	220kV

Final voltage level selection shall be depending upon as per power generation, transmission and distribution of power and it shall be finalized after detailed design.

4.7.1 Identification of Power Source

Because the entire load is not concentrated in one sector and is distributed over a large area, it is prudent to identify multiple source points. Existing Generation and power houses are also considered.

Due to the geographical and topographical peculiarities of these islands, including separation by sea over great distances, there is no single power grid for all the electrified islands and instead, separate power houses cater independently to the power requirements of separate Islands.

Electricity Department of Andaman and Nicobar (EDA&N) Islands is responsible for managing the generation sector. Since the islands are isolated from the mainland of India and are not connected with each other, the generation in the individual island is managed by standalone generating systems with associated distribution system. Due to the large distances from mainland, the islands are expected to depend on these isolated systems.

The Electricity Department is operating power generation, transmission and distribution systems & networks in these islands for providing electric power supply to the general public and various categories of consumers in different part of these islands. The Electricity Department also functions as a Nodal Agency for implementing Renewable Energy Programmes and schemes and Integrated Rural Energy Programmes of the Ministry of Non-Conventional Energy Sources in these islands.

The power generation in A&N Islands is through 53 Power Plants in 25 PHs in Nicobar District. Great Nicobar Island has an installed capacity of approx. 3 MW from 11 DG sets of capacity ranging from 12 kW to 800 kW. Most of the generation is from Diesel Generation units owned by the EDA&N. Petronet

LNG has proposed to install a 30 MW (expandable to 50 MW) LNG based generation plant in south Andaman Island in recent future to reduce the consumption of diesel in the island.

Some DG sets installed in the islands have either aged beyond rated life or have high specific fuel consumption. The units at Campbell bay have aged beyond 30 years.

4.7.2 Substations and Distribution Network

• Proposed Power Distribution Network

HV distribution system shall be designed as an economical and technically viable distribution system. Since the present HV system existing of project is overhead bare conductor, the same voltage level lines shall be maintained and shifted to underground cables. For each location, HV & LV cables shall be underground with HDPE duct with spare HV cables as radial feeders. In case of fault in any one feeder, the spare cable shall be able to take the full load of those locations.

11kV supply from 33/11kV Substations shall be distributed in the following way:

- The proposed Spare feeder concept is a significant betterment over the outdated and inefficient distribution concept. The spare feeder concept will provide improved reliability and redundancy to the entire site distribution network.
- All HV power distribution up to distribution transformer and LT distribution system shall be directly buried underground system with HDPE duct.

Main receiving substation (MRSS) shall comprise of 400kV / 220kV / 132kV/110 kV substation. Based on load demand of various clusters and distribution network length. The voltage shall be stepped down to 66kV or 33kV or 11 KV by using power transformers.

Further distribution to project site shall be through various Zonal (clustered) substations which may be of 66/11kV or 33/11kV. With project advancement the distribution shall be underground. Switching station, ring main units (RMU), package substations shall be proposed wherever required. The Substation shall be Gas Insulated Sub Station (GIS) to optimize the land requirement land requirement and to have efficient O&M. As required may for smaller loads concentrated at one end/location to mitigate voltage drops in cables, Compact Substation may be proposed to optimize both the cost and technical constraints.

5 PROPOSED INFRASTRUCTURE

5.1 International Container Transshipment Terminal

5.1.1 Facilities Requirements for the Purpose of Layout Development

The following facilities are envisaged for the proposed container Transshipment port:

- **Breakwaters**

Breakwaters of suitable length and orientation would be required to provide round the year tranquillity in the harbour with significant wave heights not exceeding 0.5 m under normal wave conditions.

Breakwaters 3.90 Km (2.53 km east breakwater & 1.37 km west breakwater).

The east and west breakwater extends till the 20 m & 25 m contour respectively. Both the breakwaters are envisaged to be rubble mound and shall be constructed using marine mode.

- **Capital Dredging**

To create the required water depths in navigational channel and harbour area capital dredging would be needed Capital dredging of approximately 17.7 million cum in Final phase & 6.4 million cum in initial Phase will be required.

Based on assessment of the site investigation information, the material to be dredged will be mainly silty sand and silty sandy clay. From the available boreholes data, soft rock is observed in the deeper layers and therefore the involvement of rock dredging would be minimal in the chosen layout. It is estimated that only part of the dredged material shall be suitable for reclamation (only 50%). The unsuitable material shall be disposed at an identified offshore location in about 40 m contour as per dredging guidelines.

- **Berths**

The number of berths to be provided depends upon the Berth capacity (measured in twenty-foot equivalent units or TEU) which is dependent upon many factors as give below:

- Design Vessel Sizes – Mainline vessels as well as Feeder vessels
- TEUs exchange per Vessel Call – Higher TEUs exchange per vessel increases the berth capacity
- Dock Cranes Assigned per Vessel – 5 to 6 in case of mainline vessels Vs 3 to 4 in case of feeder vessels
- Productivity per Dock Crane - Depends on the crane capacity of moving Boxes per hour. It also increases in case more 40' units are to be handled and ability of twin lifting (moving two containers at a time)
- Maximum Practical Berth Utilization – Ideally 50% for up to 3 berths but can go up to for 60% to 65% in case of higher number of berths
- Operational Time - Modern terminals operate 24 hours per day
- Unproductive Time at Berth – Shall be limited to 2 hours per day

In view of the above the berth capacity to handle the mainline vessels would be different than that in the case of feeder vessels. In case of the proposed container Transshipment terminal envisaged the share of containers to be handled by mainline and feeder vessels will be 50% each.

For operational reasons it is preferable to have the berth contiguous to the backup area. Depending upon the construction methodology of the reclamation, time frame and costs, the berths shall be built using piles or sheet pile walls or block work. The berths shall be provided with the fixtures like fenders, bollards, crane rails, storm anchors, safety ladders, mooring hooks, utility ducts etc.

The berths are proposed in such a manner so as to enable getting higher berthing length within the limited area. The ships shall be berthed in respective basins. The area created between the respective basins shall be used for transit storage of containers.

Total berth length of about 6.07 km in Final phase & 2.42 km in initial Phase for handling container vessels. One Material offloading Berth with provision for fuel handling and one harbour crafts jetty will be required though in the initial stages they would be handled at container berths.

- **Approach Channel**

An approach channel in natural water depths and a turning circle of 800 m Diameter is provided. The approach channel is proposed to be 300 m wide to cater to the design ship size with beam of 61.5 m. As the 20 m contour is very close to the shoreline, the channel length is in natural water depths to cater for vessels proposed. The channel is oriented NNE.

- **Reclamation and Site Grading**

To develop the backup area container parking yard, port buildings, workshops, utility buildings etc., reclamation as well as site grading would be needed. The source and quantity of reclamation material will be specified in the Preliminary Engineering Design Report.

- **Back Area Development**

It is estimated that about 32.2 million cum (227 hectare) in Final phase & 13.7 million cum (102 hectare) in initial Phase respectively is required develop the backup area. Part of it shall be obtained from the dredged material and the balance requirement shall be met through the borrowed fill, either through hill cutting nearby or brought from distant locations through the barges/ships. The ground improvement would be carried out by suitable means to enable the back area to take the loads of containers and yard equipment.

Back up area development consisting of container yard and other allied infrastructure facilities like administration building, operations building, workshops, substation, fuel depot, ancillary buildings will be developed. Water supply, fire fighting system, drainage, sewerage system including STP, Power Supply and distribution system including diesel generators shall also be developed.

- **Container Yard**

The size of the container yard dependent on following factors:

- Mean Dwell Time: The number of days a container sits inside the container
- terminal (dwell), which significantly varies for Transshipment (usually 2 to 3
- days) vs. the gateway traffic (varies from 3 to 7 days). In the present case a value of 3 have been considered on conservative side.

- TGS Capacity: Represents the static storage capacity in terms of total number of twenty feet ground slots (TGS) or net acres available to store those containers inside the container yard per hectare.
- Mean Storage Height: A mean storage height is calculated which considers the peak stacking height of the machine and various utilization factors than can be applied. It is proposed to stack containers 5 high for planning purposes.
- Seasonal Peaking Factor: It is assumed that a peak demand of container yard
- Will be 25% higher than the average demand.
- Capacity of the Handling Equipment (RTGs): Depends on the crane capacity of moving Boxes per hour.

Basis above it is estimated that container yard area of 42.8 Ha in initial phase and 160 Ha in final phase would be required.

• **Equipment**

The equipment required for the proposed container Transshipment port is estimated in Table 32.

Table 32: List of Equipment for ICTT

Sr.No	Equipment	Initial Phase	Final Phase	Incremental over Initial Phase
1	Equipment For Containers			
1.1	RMQCs - Mainline	12	40	28
1.2	RMQCs - Feeder	5	18	13
1.3	Reach Stacker	6	19	14
1.4	ITVs	102	348	246
1.5	Forklift	6	18	12
1.6	RTGs	51	174	123
2	Equipment for Material Offloading Facility			
2.1	Crane	1	3	2
2.2	Hoses	1	3	2
2.3	Pipeline	1000m	3000m	2000m
3	Weigh Bridge			
3.1	Weigh Bridge	2	6	4

• **Aids to Navigation**

The port shall be equipped with navigational aids as below:

- 5 Tugs of 50 T bollard pull capacity, including 1 standby in initial phase & 15 Tugs of 50 T bollard pull capacity, including 2 standbys in final phase
- 2 Pilot cum Survey Launches in initial phase & 6 Pilot cum Survey Launches in final phase
- 2 Mooring Launches initial phase and 6 Mooring Launches in final phase
- Channel marking buoys
- Manoeuvring area buoys

- Leading & transit lights
 - Breakwater Beacon Lights
 - Berth lights
 - Racon
 - VTMS
- **Power Requirement and Source**

The estimated power requirements for the port in initial phase and Final phase is about 13 MW & is about 45 MW respectively. The same would be sourced from either single or combination of gas/solar/hydro power plant.

Initially it is proposed to source the power through diesel Gensets and subsequently a gas based captive power plant shall be built as part of the overall development plan of the Nicobar Island.

- **Water Requirement and Source**

A water demand of 0.4 MLD & 1.7 MLD is estimated in initial phase and final phase respectively. The same will be sourced from the surface water and sea water. A desalination plant will be provided if in case water is sourced from sea at a later stage.

- **Waste Management**

Wastewater from WC, urinals, etc. will be collected separately through soil pipes, and discharged directly into the sewerage pipeline system, while wastes from wash basins, showers, kitchens will be collected separately to the nearest manhole, through gully trap / grease trap. Sewage will flow by gravity through external sewer lines up to the last manhole and sump, from where it will be pumped to the Sewage Treatment Plant (STP) of capacity 70 KLD during initial Phase and 240 KLD during final phase, for treatment and recycling. The treated water from STP will be used for green belt. ETP is envisaged for treatment of solid waste generated during the washing of equipment. The capacity & detailed assessment of the ETP shall be studied in detail at the later stage of project study.

- **Fire Safety**

A zonal fire detection and alarm system for all buildings covering substations, control rooms, workshops, etc., are planned to be installed. The type of fire detectors planned would include smoke detectors, UV detectors, rate of heat rise detectors, etc. The system shall be complete with manual call points, break glass stations, sirens and zonal and central fire alarm panels. Fire extinguishers appropriate to the location are also planned.

- **Other Requirements**

- Adequate Security arrangements
- Communication system.
- Greenbelt / green area

5.1.2 Recommended Transshipment Port Layout

Location of cranes is marked on the recommended layout. A fuel Jetty can be accommodated near the tip of the East breakwater as shown in Figure 31.



Figure 31: Galathea Bay Location – Recommended Master Plan Layout

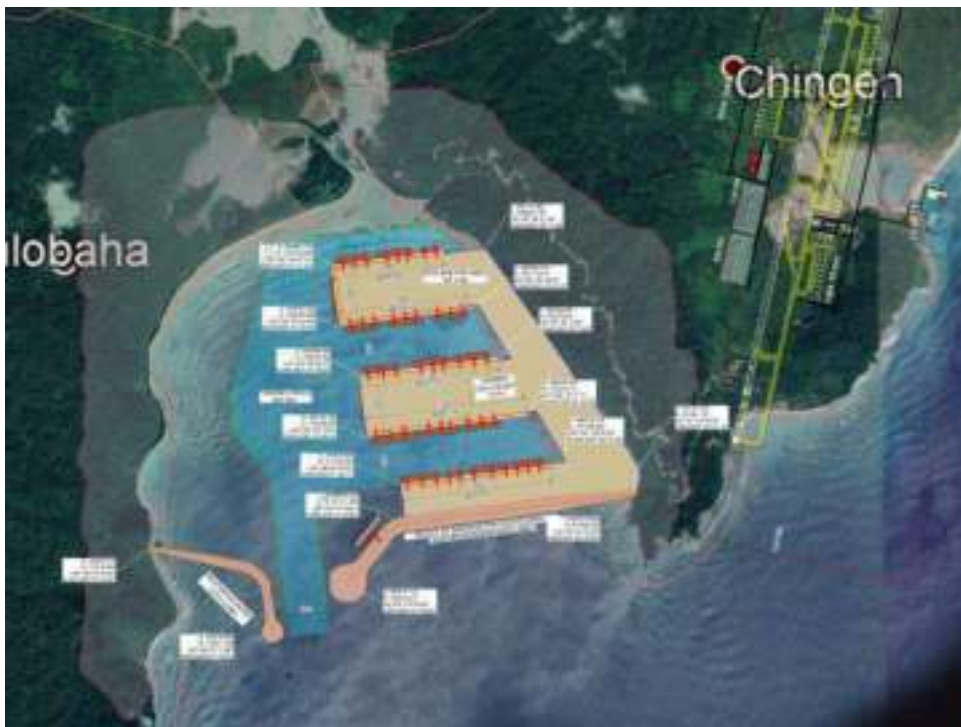


Figure 32: Galathea Bay Location – Google image showing Port Area

5.1.3 Phasing of the Port Development

The development of Transshipment Port shall be taken up in phases i.e. Initial Phase (Year 2025) & Final Phase (Year 2055). The key port facilities that shall be developed in the phased manner over the Final Phase are indicated in Table 33.

Table 33: Phase-wise Port Development over Master Plan Horizon

Parameter	Initial Phase	Final Phase	Incremental Over Initial phase
Turning Circle Diameter (m)	800	800	0.0
Length of Breakwaters (km)	3.90	3.90	0.0
Length of Quay (km)	2.42	6.07	3.65
Dredging Quantity (Mcum)	6.40	17.69	11.29
Reclamation Filling Qty (Mcum)	13.71	32.22	18.51
Cutting Quantity (Mcum)	0.0	0.0	0.0

5.1.4 Project Schedule & Cost Estimates

- Project Schedule**

The project development activities are proposed to commence at the site in the year 2022 -23 and the port is expected to be commissioned by the year 2027 - 28. This includes the time required for statutory approvals and financial closure. Construction of breakwaters would be a major time-consuming activity as the quarry material will have to be brought from the mainland through one or more ports along the east coast of India. Similarly, other construction material would also need to be brought to site through marine mode.

- Cost Estimates**

The capital cost estimated for the initial phase & final phase of the project is as presented in Table 34:

Table 34: Block Cost Estimates

Sr. No.	Item	Initial Phase Cost (INR in Crore)	Final Phase Cost (INR in Crore)	Incremental Cost (INR in Crore)
1	Project Preliminaries and Site Development	35	100	65
2	Dredging and Reclamation	4,594	10,994	6,401
3	Breakwaters & Shore Protection	7,641	7,866	225
4	Berths	2,178	5,607	3,429
5	Storage Areas	432	1,606	1,174
6	Equipment	1,826	6,195	4,369
7	Buildings	83	184	101
8	Roads & Pavements	31	61	31
9	External Power, Water & Telecommunication	22	43	22
10	Utilities and Others	156	468	312
11	Port Crafts and Aids to Navigation	274	799	525

Sr. No.	Item	Initial Phase Cost (INR in Crore)	Final Phase Cost (INR in Crore)	Incremental Cost (INR in Crore)
12	Total	17,271	33,780	16,653
13	Contingencies @3%	518	1,103	500
14	Detailed Engineering & Project Management Services @3%	518	1,103	500
15	Cost of Land Acquisition	0	0	0
16	GRAND TOTAL COST (Rs. in Crores)	18,308	35,959	17,652

*** (Note: The capital cost estimates exclude cost of land acquisition if any & Financing and Interest Costs)*

5.1.5 Resource Optimisation

Water-

The wastewater shall be treated and reused for green belt maintenance and toilet flushing.

Solar Powered Lighting

At least 25% of the installed external lighting in the Marine facility is recommended to be solar powered for Green Marine facility development.

Common Amenity Building-

All the buildings within marine terminal development are planned to be energy efficient as per the Energy Conservation Building Code (ECBC).

Social Infrastructure-

Social infrastructure which includes the educational, medical facilities is proposed in the overall development plan of Great Nicobar. These facilities will include schools, clinics, recreational facilities & other allied infrastructure required for people residing during construction & operation phases as well.

5.1.6 Material Sourcing

No construction material is available at site. All the construction material like rock, cement, sand, aggregates & steel will have to be brought to site by sea route from one or more of the Indian ports on the east coast.

5.2 International Greenfield Airport

The concept master plan for the proposed international airport is shown in the figures below.



Figure 33: Map showing preferred Airport site

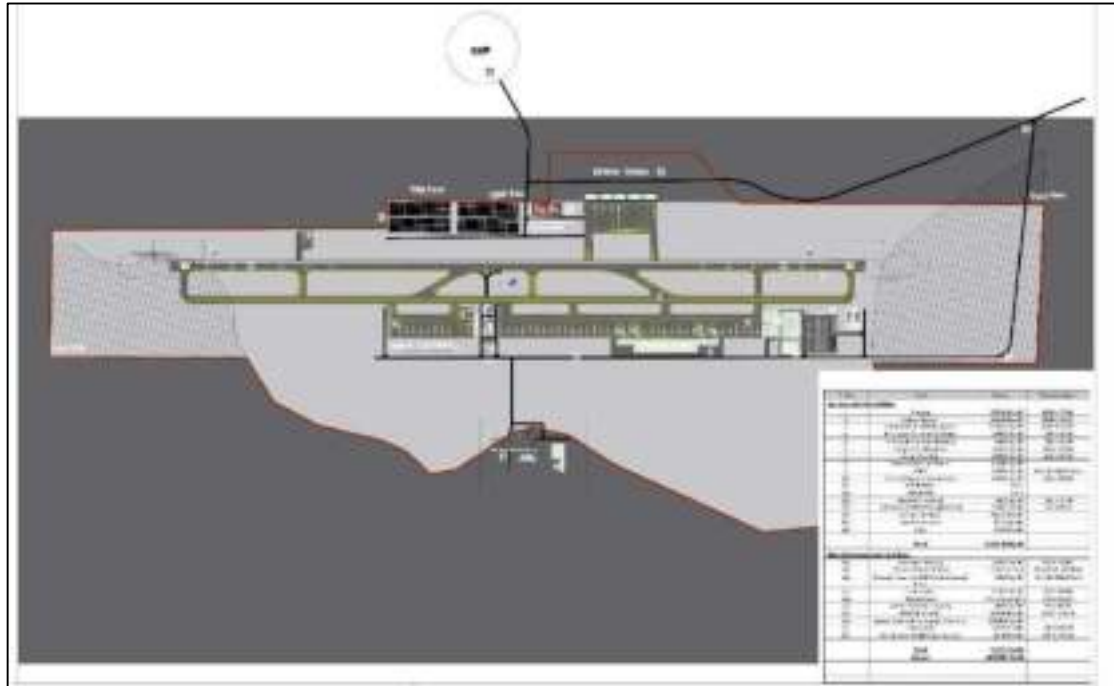


Figure 34: Master Plan of recommended Airport site

Taxiways & Apron

One parallel taxiway is planned along the runway which will connect to the main apron. The runway is connected to main parallel taxiway by 5 runway exits.

Details of dimension of Taxiway given in Table-35.

Table 35: Main Parallel Taxiway Dimension

Item	Dimension
Length	4800 m
Width	45m

An apron to accommodate 04 Code F Aircraft (MARS Stands) & 14 Code C aircraft (252,800 sqm) has been proposed to be constructed. Sufficient space has been kept for future extension. The apron dimension is presented in Table-36.

Table 36: Apron Dimension

Sizing	Area (Sqm)
Commercial aircraft apron	252,800
Cargo aircraft apron	56,700
General Aviation Apron	15,640
GSE Area	12,400

- **Isolation Bay**

An isolation bay of 10,080 sqm has been proposed to be constructed as per requirements.

Pavement

Runways shall be constructed as flexible pavements in order to secure optimal runway surface evenness for aircraft landing and taking off. Only the runway ends shall be constructed as a rigid pavement so that aircraft can perform a 180° turn on the runway without damaging the flexible pavement.

Aprons and aircraft stands shall be constructed as rigid pavement. Concrete pavements are necessary on aprons since fuel spillage during re-fuelling is likely to occur. Flexible pavements are not able to withstand fuel spillage or high temperatures of summer in combination with static loads from aircraft without being damaged.

Taxiways can be constructed both as rigid and flexible pavements. Both pavement types have advantages and disadvantages but none of the disadvantages are of such a character that one type is preferred over other. It should therefore be left to the detailed design to find the most economically beneficial pavement type.

Air Traffic Control Tower

A fully functional low activity ATC Tower with a tower cab floor area of about 50 sqm is required. To meet the minimum line of sight and grade intersection angle of 0.80, the height of the tower is recommended as 35m above GL with an eye level of more than 3m above the average runway level, which will facilitate un-obstructed view of operational areas as well as surrounding air space. The Tower will provide Aerodrome Control and Flight Information Services. On the ground and first floor tower will have administrative block of 6,000 sqm area.

Height of control tower

Besides the general requirements mentioned above, Federal Aviation Agency (FAA) recommends that the line of sight from the control tower to the runway ends should not be less than 0.80 when measured against the ground line between the runway end and tower ground level. Tentatively, a height of 30m is required to achieve an angle of 0.80 to the runway end 02 & 20. However, a detailed study will be carried out during the design phase.

Airside Roads

The airside service road system is planned to connect the different apron and service areas with each other. The road system has been laid out with as few intersections with taxiways as possible. And a crash road system leading from the aircraft rescue and fire-fighting stations to the runways is established.

- **Communication Navigation Surveillance & Air Traffic Management**

Proposed facilities:

- **Land Side**

Sub Station equipment along with HT & LT distribution network.

- Area Lighting.

- Building Electrification.
- X-Ray Baggage Scanner.
- Baggage Conveyor.
- Non-illuminated Retro Reflective Sign Boards inside the building.
- Door Fitted Metal Detectors and Handheld Metal Detectors.
- Sliding doors.
- Water Coolers Hand Driers.
- Flight Information Display System (FID)
- Close Circuit Surveillance System (CCTV) (IP based)
- Public Address System (IP based)
- Fire Alarm Type (Addressable Type)
- Flight Information Display
- Intelligent building management system
- Escalators / travellers
- **Air Side**
 - ATC communication equipment
 - Meteorological equipment
 - Revolving Beacon
 - Landing T / H indicator
 - Runway / taxiway / apron edge lighting (CAT-1)
 - Cat-1 approach lights on both ends of main runway
 - Runway -end / threshold lights
 - PAPI
 - DVOR-DME
 - ILS Cat-1
 - ASSR
- **Communication**

Communication facilities associated with Air Traffic Services will be as follows:

- VHF Channels: Arrival Departure Control (ADC), Approach Control (APP), Surface Movement Control (SMC), Apron Control and Search & Rescue (SAR) channels to aircraft, channel to the SAR Jeep & Channel to Crash/Fire Fighting Vehicles.
- Aeronautical Telecommunication Network (ATN) Compatible Router/ Automatic Message Switching System (AMSS) for Flight Plan through-put and other Aeronautical Fixed Telecommunication Network (AFTN) related messages.
- VHF Broadcast Airport Terminal Information System (ATIS).
- Direct Speech Circuits (DSS) to Diabolism (Approach Control) and Mumbai (Area Control).
- Data and Speech lines or wireless network to cover all NAVAID and Surveillance Locations (VOR/DME, Localizers, Glide Slopes and Airport Surveillance Radar sites) with remote control facility from Maintenance Control and Remote Display at ATC.
- Speech Circuit to Military Liaison Cell (MLC) for Air Defence Clearance (ADC).
- Speech-cum-Data Satellite Communication Node on Airport Authority of India's countrywide network.

- **Navigation**

Navigational Aids for both, Non-Precision Approach (NPA) and Precision / Instrument Approach & Landing (IAL), will be as follows:

- Doppler Very High Frequency Omni Range (DVOR) and High-Power Distance Measuring Equipment (DME).
- Dual Frequency Capture Effect Instrument Landing System (ILS) with Low Power DME (LPDME) collocated with the Glide Slope. For Runway 02 and runway 20.

- **Surveillance**

Surveillance Aids required will be as follows and shall be installed:

- An S-Band Airport Surveillance Radar (ASR) with a range of 60 NM.
- An ADS-B Node.
- Visual Aids
- Visual Aids required for Day & Night operation in good visibility under Visual Flight Rules (VFR) will be as follows:
- Precision Approach Path Indicator (PAPI) for both approaches (02 & 20).

- **Airfield Lighting**

The need for a High Intensity Runway Lighting System along with Constant Current Regulators (CCR) and Remote Digital Control from the ATC will be studied. The light segments to be covered are as under:

- Precision Approach Category III lighting system extending to 900 meters from the runway thresholds for approach RWY 02 & CAT I for RWY 20.
- Runway Threshold Lights for both thresholds (02 & 20)
- Runway Edge Lights.
- Runway End Lights (at both ends)
- Taxiway edge lights
- Apron Lights (Including Isolation Bay)

- **Meteorological Systems**

Following Meteorological Sensors/Instruments are required to provide vital weather inputs to pilots and air traffic controllers to enable flight operations without jeopardizing air safety:

- Standard Anemometer or an Ultrasonic Sensor: To measure Wind Speed & Direction.
- Dry & Wet Thermometers: To measure Temperature and Humidity
- Mercury or Aneroid Barometer: To measure ambient pressure
- Transmission meter at each Runway end: To measure Runway Visual Range (RVR)

Laser-based Ceilometers on the extended centre line of runway: To measure and record Cloud Base. As a low-cost alternative, a Binocular Laser Ranger can be provided which enables measurement, without automatic recording

- **Assessment of Infrastructure Demand**

Water Requirement & Supply

The total requirement of water will be approx. 1MLD. Out of this, part will be met from fresh water & balance will be met from recycled water.

Wastewater Management

Treated wastewater shall be mainly used for landscaping and flushing. Efforts will be made to fully utilize the wastewater to eliminate the risk of land or water contamination. The main source of drainage generation will be the discharges from toilets (water closet), urinals, sinks, pantry's, kitchen and other similar utilities.

Solid Waste Management

During construction phase solid waste will be collected and disposed as per established laws and Procedures. The Organic waste will be treated at site.

During the operation phase, twin bin waste collection system– green bins for bio-degradable wastes and blue bins for non-biodegradable wastes shall be provided. Waste collection shall be done on a door to door basis, and temporarily stored at identified locations before disposing as per established laws and procedures at the waste disposal site.

Hazardous waste shall be treated in accordance with Hazardous Waste Management Rules 2016, Batteries waste shall be handled in accordance with Batteries Management Rules, 2020 and E waste as per E-waste Guidelines, 2016 and subsequent amendments.

Car Parking

Parking space to handle a peak hour passenger traffic of 4000 and airport staff will be planned for the proposed project. The project parking area will be utilized during the arrival and departure of the flight.

- **Support Amenities**

The following facilities will be available in the proposed airport

- Baggage handling system
- Passenger boarding bridges
- Flight information and displays
- Sewage treatment facility
- Firefighting system
- Security equipment
- Restaurants
- Medical facilities
- Quarantine facilities

5.2.1 Summarized Project Facilities & Area Details

Project facilities & area details are summarized in Table-37.

Table 37: Summarized facilities at proposed Airport

S. No.	Description	Specifications
1	Aerodrome Reference Code	4F
2	Design Aircraft	Code F
3	Flights per hour	20 flights in peak hour
5	Passenger Terminal Capacity (million per annum)	4000 PHP
6	Runway	4000m x 45m
7	Turning Pads	Not Provided
8	Taxiway	4800x25 m
9	Apron	252,800 sqm
10	RESA	2X240X150 m
11	Isolation Bay	10,080 sqm
12	Taxiway to Isolation Bay	Link Provided
14	Overruns	2 x 60m
15	GSE area	9,185 sqm
16	Peripheral Road	√
17	Terminal Building sqm	48,000 sqm

S. No.	Description	Specifications
19	Fire station Building	10,800 sqm
20	ATC Tower – sqm	6,000 sqm
21	STP	√
22	Internal Roads	√
23	Car Park	√
24	Boundary Wall - 3.0m high with 0.6 m concertina coil on top	√
25	Operational Chain Link Fencing - 2.0m high	√
26	Gates	√
27	Estimated Electrical Load	√
28	Transformer rating	10 MVA
29	DG set rating	10 MVA
30	Sub Station equipment along with HT & LT distribution network	√
31	Building Electrification and Area Lighting	√
32	Central Air conditioning of terminal building	√
37	Close Circuit Surveillance System (CCTV) (IP based)	√
38	Public Address System (IP based)	√
39	Flight Information Display System	√
40	ATC communication equipment	√
41	Automated Weather observation system	√
42	Revolving Beacon	√
43	Landing T / H indicator	√
44	Airfield Ground Lighting (AGL) in interleaved circuit.	√
45	Simple & CAT – I approaches	√
46	Apron High Mast lighting	√
47	Navigation equipment / system	√
48	ASSR / MSSR	√

The number of people to be displaced is being worked out.

5.2.2 Project Schedule & Cost Estimates

• Quantities

Quantities of the runway pavements, buildings, electrical works, navigational equipment's and other associated works for development of the airport are calculated based on preliminary high-level analysis, assessment of requirements based on codes and specifications. Detail designs not done at this stage.

• Facilities Included

The various facilities considered in the Capital Expenditure of the proposed development are as follows

Site Preparation & Earthwork (Cut & Fill Works)

- Clearing & Grubbing
- Cutting/Filling and levelling
- Aeronautical Facilities
- Runway System

- Taxiway System
- Apron Works (Commercial Apron, Cargo Aircraft Apron, General Aviation Apron, Ground Support
- Equipment Apron, Defence Enclave, Isolated Aircraft Parking, etc.).
- Passenger Terminal Building
- ATC And Technical Building
- Cargo Building
- ARFF
- DVOR/DME
- ASR/MSSR
- GSE Maintenance Building
- Runway Approach System
- Meteorological Equipment

Non-Aeronautical Facilities

- Vehicular Parking
- ESS and Power Station
- Space for Solar Panel
- Sewage Treatment Plant & Waste Disposal Plant
- Fuel Farm
- Access Road
- Airline Services Catering
- Peripheral Road
- Space Reserved for Support Activity
- Solar Farm
- **Utilities**
 - Storm water drainage
 - Sewage and water supply systems
 - Solid waste management

- **Basis of Estimate**

Unit Cost

Site Preparation & Earthworks (Cut & Fill Works), Runways, Taxiways, aprons, at grade parking, road works

- It is assumed that the site comprises of hilly terrain requiring balancing of cutting and filling.
 - For preliminary estimates, it is assumed that hills are soil, clay or may be very soft rock. Cutting of hills will be required to be undertaken for safe air operations.
 - An average lead of 5kms is considered for estimating cost
 - The rates are adopted based on CPWD DSR 2018 rates plus 192 % escalation
 - Pavement Works (Runway, Taxiway, Taxi lanes/Apron, Peripheral Roads and Access Roads)
 - The Proposed Pavement Sections will be designed as per FAA practice of pavement design.
 - The unit cost has been worked out using CPWD DSR Rates 2018, duly enhanced with 192 % escalation till Jan 2021
- **Terminal Buildings, other Support Services - Buildings & Utility Buildings / Structures**

For the scheduled items, the rates have been taken as per CPWD PAR-2020, duly enhance with 192 % escalation per year till Jan 2021. For non- scheduled items, rate has been adopted based on similar works carried out at other airports and inputs obtained from the vendors / specialized agencies during 2020, duly enhanced with 192 % escalation till Jan 2021.

For E&M elements the unit cost has been worked out using Plinth Area Rates (PAR) 2020 for Specialized E&M Works of CPWD, duly enhanced with 192 % escalation till Jan 2021.

For Specialized Items the unit Price worked out based on benchmarking of recently completed airport projects of similar nature and magnitude and also rates obtained from specialized agencies during 2020, duly enhanced with 192 % escalation till Jan 2021

• **Contingency**

As the project is at Concept stage, a certain amount of cost contingency is required to be added to the base estimates to account for the cost variations due to uncertainty as to the precise content of all items / work elements in the estimate, any other project requirements and challenging site conditions, which may occur but are not identifiable at this stage of estimate. The quantum of the contingency is influenced by the project size, complexity, associated level of risks and level of information available during different stages of the project development.

The traditional approach of providing cost contingency is through a fixed percentage of the base cost estimate based on the experience on the past projects and such percentage is usually @ 10 percent.

In view of above, the provision of contingencies has been considered in the current cost estimate on the basis of current concept stage.

• **Preliminaries**

The cost of office establishment for project team (Project office), temporary site office at site, Establishing permanent survey pillars, fixing boundary stones, initial survey / geotechnical investigation, Topographical Site Survey, Obstruction Survey works for initial engineering, temporary road, temporary gates, Monsoon protection works, fencing, construction power, Operational Readiness and Transition (ORAT) and various other miscellaneous activities which are not covered anywhere under any cost heads is required to be accounted as part of Preliminaries cost. In the current cost estimate @ 3% cost has been considered towards Preliminaries.

- **Insurance & Permits**

Cost for Insurance, CAR policy, and Government Authorities / Local bodies approvals / NOC such as Building Layout Approval from Development Authority/Municipality, DGCA NOC/Approval / Permit, Temporary & Permanent Water & Power connection Approval / NOC, Consent to Establish & Operate from Pollution Control Board, Height clearance NOC/Approval of Buildings / Structures/ Masts from the Directorate of Air Traffic Management, Airport Authority of India (AAI), Fire clearance NOC, Permission for Excavation / Royalty payment from Collector, Other Common Facilities e.g. telecom, gas, Oil Company etc., approval / NOC (Internal Infrastructure services), Lift Escalator Installation Approval/NOC from (PWD / CPWD), Electric substation, Transformers, DG Set NOC, etc. In the current cost estimate @1% cost has been considered towards Insurance & Permits. The preliminary cost estimate for is given in Table-38.

Table 38: Preliminary cost estimate

SUMMARY OF THE COST ESTIMATE								
Cost (INR Crore)								
Sr. No	Capital Expenditure Item	Timeline and Expenditure						
		2021-24	2023(3%)	2023(15%)	2023(20%)	2024(20%)	2025(20%)	2026(20%)
1	Site Preparation & Earthworks (Cut & Fill Works)	2561	128	384	513	513	513	513
2	Air side Pavement Works(Runway, Taxiway, Parallel taxiway, Apron) including earthwork	1634	82	245	327	327	327	327
3	Terminal Building and other building works	7366	318	355	473	473	473	473
4	City side pavement works (internal road & car park)	595	30	89	119	119	119	119
5	ATC/ATM/CNS equipment	25	1	4	5	5	5	5
6	Utilities	1077	54	162	215	215	215	215
	SUB TOTAL (A)	8,260	413	1,239	1,652	1,652	1,652	1,652
7	Design & PMC @ 10 % on "A"	826	41	124	165	165	165	165
8	Preliminaries @ 3% On "A"	248	12	37	50	50	50	50
9	Insurance & Permits @1% On "A"	83	4	12	17	17	17	17
	SUB TOTAL (B)	9,417	471	1,413	1,883	1,883	1,883	1,883
10	Contingency @ 10 % on " B"	942	47	141	188	188	188	188
	TOTAL (C) - HARD COST	10,359	518	1,554	2,072	2,072	2,072	2,072

5.2.3 Resource Optimization

The resource optimization is always prerequisite for any development project and saving the precious. This requires a new approach to viewing, evaluating, understanding, and communicating, which ultimately requires new approaches to science, engineering, and economics. In quest towards resource optimization in proposed project the tradition practices are substituted by modern practices involving water reduction, rainwater harvesting, energy conservation etc.

- **Water Saving Practices and Reduction**

In India, the average domestic water consumption is 4.1% of the total water use. As per the Bureau of Indian Standards, the per capita water requirement varies with building type. As per BIS, for residential buildings with a population of 20,000 - 1,00,000, the per capita consumption is 100-150 LPCD and for those with population above 1,00,000, the consumption is 150-200 LPCD. Out of the 150 to 200 litres per

head per day, 45 litres per head per day may be taken for flushing requirements and the remaining quantity for other domestic purposes. For the other types of buildings, the water requirement varies between 30 to 340 LPCD. Water usage for applications such as flushing, bathing and washing is as high as 93% of water demand in any building. However, measures can be adopted to reduce this demand through use of water efficient practices and devices (efficient plumbing fixtures). These would result in significant saving of water and contribute towards protection of the environment. Some of the common practices and devices that can save water are covered below:

Monitoring Water Use

Use of water meter conforming to ISO standards should be installed at the inlet point of water uptake and at the discharge point to monitor the daily water consumption. This would also enable the user to identify if there are any points of leakages.

- **Use of Water Saving devices/ Fixtures**

About 40% of all water used indoors is in the bathroom and toilets and more than 10% of that used is in the kitchen. The conventional fixtures used in toilets use water at the rate of 12-15 litres per flush. In normal scenario, the taps and showerheads in buildings consume water at the rate of 20 litres of water per minute. The flow rates of these fixtures depend on the pressure at which these are operated. However, there exists the opportunity to lower the consumption through the use of following efficient fixtures:

Low Flow Flushing Systems

Water consumption is more for flushing applications in any building. Use of more efficient water saving toilets having dual flush system can result in a saving of at least 50% of water. Dual flush systems can be installed in order to allow different volume of water for flushing liquids and solids. To facilitate efficient cleaning at low volume, it is possible to install suitable water closets. Sensor based fixtures: Sensors based fixtures functions only in the presence of user. Various types of sensor-based technologies are magic eye sensor for urinals, solenoid self-operating valves etc. Infrared and ultrasonic sensors discharge a set amount of water only when the taps are being used thus resulting in water saving as compared to manually operated valves. In addition to its advantage in reducing water consumption, sensor operated taps also result in better hygiene particularly in a public place.

Urinals

By using automated flushing urinals usage of water is very high. By replacing these with sensor-based urinals such as magic eye sensor, the water use is reduced to 0.4 litres per flush. In place of conventional urinals, if the low flow urinals are used, water saving amounts to 3 litres per flush.

Waterless Urinals

Waterless urinals are an efficient technique to save water. The system works without any water but with the use of biodegradable liquid in the cartridge fitted at the bottom of the urinal. Each cartridge is adequate for 7000 uses.

Water Taps

A normal tap works at a flow rate as high as 20 lpm. Use of low flow faucets along with other water saving devices such as auto control valves, pressure reducing devices, aerators and pressure inhibitors for constant flow, magic eye solenoid valve, self-operating valves can result in 25 – 50% of water savings.

Tap Aerators

Tap aerators can be effective by facilitating cleaning through increasing the pressure at which the water is delivered even at low flow rates. Installation of flow regulators can be done where the aerators cannot be installed.

Auto Control Valves

Automatic shut-off valves can be used to control the flow of water for a present time limit and with use, which is linked to the release of the lever or handle.

Pressure Reducing Device

The reducers can be used to control the pressure in the water line, which will affect the discharge rate and to maintain uniform flow at different levels. A pressure reduction device can be installed when the pressure in the line exceeds 50-60 psi. It is observed that a reduction of pressure from 80 to 65 and 50 psi can result in a reduction of water flow of 10% and 25%, respectively.

Dual Plumbing System

Introduction of dual pipe in the buildings for use of water with different water quality namely ground water with high hardness, municipal supply water, treated soft water and recycled water can result in optimal use of water for different applications thus saving on the high-quality water. Installation of dual pipe plumbing for using recycled water / rainwater can save the potable water from municipal supply or ground water. There can be two lines, one supplying fresh water for drinking, cooking and bathing etc. and other for supply of recycled water for flushing, landscape irrigation, car washing, thermal conditioning etc. This result in saving of more than one-third of fresh water demand and life of existing sewerage can be improved and promotes decentralized treatment system. This system needs space for establishment and initial investment and retrofitting.

Water Quality: In addition to providing adequate water supply for building occupants, quality of water is also a key concern. Bureau of Indian Standards has recommended a set of parameters which should be complied with as per IS 10500:2012.

Water use Reduction

To estimate the reduction in water use achieved by the building by following the mitigation measures, use following steps: (i) Step 1: Estimate total water demand based on the occupancy and type of building; (ii) Step 2: List various efficient fixtures and other measures and (iii) Step 3: Calculate demand reduction as compared to the BIS per capita water consumption.

Domestic use for 24 hrs.

Under normal conditions, water consumption per person for flushing is 45 litres (9 litre/flush with 5 number of uses). With efficient fixture (3 and 6 litre/flush), water use is 21 litres (3 litre/flush with 3 uses and 6 litre /flush with 2 uses). Water use per person for washing with normal fixture with a flow rate of 20 litres per minute is 40 litre (assuming use for 2 minutes), while with efficient fixture (flow rate of 7.5 lpm) is 15 litres.

Water Use during Construction

Water used shall be clean and reasonably free from injurious quantities of deleterious materials such as oils, acids, alkalis, salts and microbial growth. Generally, potable water shall be used. Where water can be shown to contain any sugar or an excess of acid, alkali or salt, that water should not be used. As a

guide, the following concentrations may be taken to represent the maximum permissible limits of deleterious materials in water.

Limits of Acidity: To neutralize 200 ml sample of water, it should not require more than 2 ml of 0.1 N caustic soda solutions.

Limits of Alkalinities: To neutralize 200 ml sample of water it should not acquire more than 0.1 ml of 0.1 N hydrochloric acid.

Percentage of Solids should not exceed:

Organic 200 ppm (0.02%)

Inorganic 3000 ppm (0.30%)

Sulphates 500 ppm (0.05%)

Alkali Chlorides 1000 ppm (0.1%)

- **Water Requirement & Supply**

Water Source & Demand

The project will utilize the ground water and water supply from the catchment dams that will be constructed over Galathea River. The daily consumption of water during operation phase will be about 387.33 KLD of which 201 KLD will be fresh water and 170.5 KLD will be recycled water.

Water Storage

Since the hours of supply may not be continuous, it is recommended to go for 3 days bulk storage at the main receiving tanks, wherein the domestic water will receive the desired level of treatment. Further to bulk storage, individual Buildings / Utility will have their own storage tanks catering to a day's requirement

Water Distribution

Treated water will be pumped into the main header pipe to distribute water to the storage tanks located in the individual building / utilities i.e. Terminal Building, Maintenance Building, ATC Tower, Commercial Building, Shopping Area and Admin Office Building.

The pump system at the receiving tank will be hydro-pneumatic type with pressurized diaphragm tank for starting & stopping pumps.

Storage tanks in individual buildings will have solenoid controls to regulate & control the inflow. From these storage tanks water will be pumped into the internal plumbing system of respective buildings through variable speed hydro-pneumatic pumps.

The Terminal building, especially, will witness periodic peak flow surge along with relatively very low demand periods. It is recommended for optimization of energy to go for multiple pump configurations to offset such variance in demand. It is proposed to integrate the water system with Building Management controls.

- **Waste-Water Generation and Treatment**

The main source of drainage generation will be the discharges from toilets (water closet), urinals, sinks, pantry's, kitchen and other similar utilities. The total wastewater generation in operation phase will be 323 KLD and that during construction phase is 350 KLD. The wastewater will be treated in 400 KLD STP.

- **Storm Water Drainage**

Storm drainage will be designed using the rational formula

$$Q = C ia$$

Where,

C = Coefficient of Run off

i = Intensity of rainfall in m/sec

a = Contributing area in m²

Runoff coefficients to be assumed are as below:

- Paved area = 0.9
- Building Roofs = 0.85
- Soil / Grass = 0.30
- Gravelled Area = 0.50

Since the airport is in a rain belt having annual rainfall exceeding 3000mm, it is recommended to design the storm drainage system for suitable intensity.

- **Power Requirement & Supply**

Total load estimation for Great Nicobar Island International Airport works out to 10,000 KVA (approx.) or 10 MVA. The bulk power supply will be from DG sets. In addition, a solar farm of area 133,200 sqm is being planned which is likely to generate 0.8 KW/sqm. All the electrical HT & LT cables shall be laid as per the stipulations of CPWD specifications.

- **Solid Waste Management**

Construction Phase

About 2% of construction materials generally end up as construction waste. During construction phase, solid waste will be refilled for levelling etc. What cannot be disposed of on site will enter the municipal solid waste disposal system. Organic waste will be treated at site.

Operation Phase

Twin bin waste collection system– Green bins for bio-degradable wastes and blue bins for non-biodegradable wastes shall be provided. Waste collection shall be done on regular basis, and temporarily stored at identified locations before disposing as per established laws and procedures. Hazardous waste shall be treated in accordance with Hazardous Waste Management Rules 2016, Batteries waste shall be

handled in accordance with Batteries Management Rules, 2020 and E waste as per E-waste Guidelines, 2016 and according to their subsequent amendments.

- **Fire Safety**

Fire Suppressions

This section only deals with the fire protection services related to Hydrants, Sprinklers and Extinguisher. Fire protection in the context of this project is required for the following:

- Protection of occupied buildings like Terminal Building, ATC Tower, AFI, Commercial Development.
- Protection of ancillary buildings like Maintenance buildings, Workshop & utilities etc.
- Protection of amenity centres like Shopping & Kiosks.
- Protection of Fuel Farm.
- Protection of Apron & Runways
- Electric substation, Plant rooms
- Aircraft related fires

Fire Reserves

The type of fire within an aircraft complex may range from those caused in the human occupied structures like Terminal Building, ATC Tower, Offices, Shopping & Commercial, where human safety is of prime consideration to the workshop and hanger where equipment protection is primary objective. Besides this is the additional task of aircraft fire rescue. Considering the diverse requirement of air and land side fire service multiple underground fire reserve with pumping stations are proposed.

Category 9 level of protection is required to be provided to meet the of design aircraft. For category 9 level of protection, minimum 3 No. of Crash Fire Tender are required to be provided. A fully equipped

Ambulance shall also support the Crash Fire Rescue Services. Two fire stations of 5400 sqm each is proposed to house the CFTs, Ambulance and an SAR vehicle.

Airside hydrants are also proposed to supplement the water requirements for fire fighting vehicles. Thus, the following is proposed:

Pilot Fire Reserve tank with pumping arrangement and ring main, serving air and land side.

For Air side - Fire Water Reserve of adequate capacity for ARFF station.

For Land side - Static Fire Water Reserve of adequate capacity for both Hydrant & Sprinklers system located in Terminal Building.

Pumping Agreement

Pump house and UG sump shall also be developed alongside of the substation for water supplies & fire emergency for the airport.

Fire Fighting Fitments

External yard Hydrant shall be provided on the land side accompanied by a Hose cabinet, weatherproof type, housing branch pipe, nozzles, two 15m long CP Fire Hoses and one coupling for Foam Systems. Pressure more than 7.0 kg /cm² will be controlled with provision of orifice plates in the Hydrant.

All landside buildings/structures shall be provided with Landing Valve, each valve serving a design influence area of 1,000 sqm. The landing valves are tapped from the hydrant risers or the external ring main in case of Ground structures. In addition to the Landing valve, swing type Hose Reels with 20mm rubber tubing along with 63 mm RRL Hoses Nozzles, Branch Pipe and fireman axe all housed in a Fire Hose cabinet will be provided.

- **Air Conditioning System**

The cooling requirements for the proposed project have been estimated based on the following design assumptions.

Outside Ambient Conditions

Peak temperatures are:

Summer: 34.35 oC

Monsoon: 32.83 oC

Inside Design Condition

Room Temperature: 23o C +/- 1.1o C

Relative Humidity: 55% +/- 5%

5.2.4 **Material Sourcing**

The construction material used in proposed project will be sourced from the mainland (Chennai, Vizag, Tuticorin) through the contractor and the specification will be as per the conditions laid in contract. The contractors work will be monitored, approved and certified by the Engineering-In Charge.

5.3 Power Plant

The proposed layout and association land area breakdown for the power plant are shown below.



Figure 35: Layout Plan of Power Plant (Recommended site)

The proposed land use of proposed Project contains development of different sizes. The target segment proposed will be mainly food and export processing, industrial units. In addition to industries, there is also provision for residential, commercial, Institutions, airport, port & utility areas as per vision document. Further zones are divided in different blocks. In addition to these blocks, some of the common services area are also provided such as commercial, Community, Governance, Utility service Area etc.

Table 39: Tentative area for the main components of gas-based power plant.

S. No.	Description	Area in Acre
--------	-------------	--------------

1	Fuel Tank & Unloading Area	20.0 Acre
2	Pump & Stack	5.0 Acre
3	Generation Area	30 .0 Acre
4	Substation/Switchyard (400kVA)	20.0 Acre
5	Other Areas i.e. Road, Green, parking, I/C, O/G cables, control room, SCADA room, Admin Building, Storage , diesel gensets etc.	21.0 Acre

5.4 Other Physical Infrastructure

The assumptions for development of trunk urban infrastructure systems, above and beyond the major interlinked projects discussed above, are as follows:

- Based on the limitations of surface water availability, about 40-50% of the water demand shall be met by surface water resources and balance by sea water desalination plant, at a later stage.
- Sewage Treatment Plant shall be established with Tertiary Treatment for reuse for non-potable usages. No disposal into sea.
- The runoff shall be collected through check dams on the existing rivers and lakes/ponds planned as per Master Plan.
- The solid waste shall be segregated at source, so for the degradable can be bio methanation can be done, recycle part recycle can be done and only non-degradable /non-recyclable shall be to landfill.

5.4.1 Water Supply, Recycled Water and Sewerage

The main Objectives for the Water, Recycle Water and Sewerage/wastewater services in the proposed project area are:

- To make available water and sewerage/wastewater services as per global standards to the consumers in the project area, at an affordable price and sustainable basis;
- To design fully automated water supply system with online measuring devices and centralized control as per standards.
- To design fully automated sewerage/wastewater supply system with online measuring devices and centralized control standards.
- Use recycled/treated wastewater to achieve zero discharge and minimize the dependence on fresh water.
- To collect and dispose the storm water in an efficient manner to prevent water logging.

Our understanding of the project is to arrive at a careful balance between technical sophistication and optimum costs which should be adapted to the specific requirements of the proposed development.

Water Supply:

The assessment and design of the new water supply system are, but not limited to the following broad design parameters: - Estimate water demand for next 30 years. Demand of potable water in initial days of development can be meet through surface water, however as the development proceeds the demand will be met in combination with Sea Water. The Water Demand shall be based as per below:

- Land Use prototype/area map/existing area Master Plan.
- Domestic water demand – by population projection and a litres per capita consumption rate as per Manual on Water Supply by Government of India.

- Institutional and commercial water demand as per NBC/ Manual on Water Supply by Government of India. Industrial Demand as per Type of industry with optimization of use for Recycled Water.
- Provision for Unaccounted for Water in distribution limited to 15%.
- The total fire demand is estimated as 1% of the total water demand. Fire Hydrants shall be proposed on potable water network along with dedicated fire tanks and pumping machinery as required.

Since Great Nicobar Island is an island, the source of water for this shall be a combination of Sea Water and surface water. Sea Water shall be treated at Desalination Plant (at a later stage) and Surface Water shall be treated through different process. The Great Nicobar Island is the land of five rivers, namely, the Galathea, Alexandria, Amritkaur, Dogmar and Jubilee. The rivers Alexandria, Dogmar and Amritkaur flow towards the West, Jubilee towards the North and the largest river Galathea flows towards the south of the island at South beach (41 km from Campbell Bay).

The major source shall be Galathea River, which is rain fed and provisions shall be made to store water for the proposed project.

The project shall have dedicated continuous pressurized water supply and a Dedicated Sewerage Collection System to convey generated Sewerage from the source/s to the Treatment Plant, including the Treatment Plant is planned.

The sewerage shall be treated in dedicated sewage treatment plants to remove impurities, to re-use the treated sewage for non-potable usages.

The sewage after treatment shall be used for non-potable usages such as irrigation water/landscaping water requirement, washing at port etc., thus reducing the ever-increasing burden on the fresh water source and creating a sustainable system. The sludge generated shall be utilized as manure for Landscaping within the city. This will be a perfect case of reduce-recycle and reuse in line with principle of the central government.

Traditionally sewage treatment plants were used to be planned on centralised approach where large flows are brought to a single location generally at the outer area of the island/zone. Evidently this involves higher investments in sewage collection & transportation through network, including multiple pumping stations. It also involves relatively higher electricity /operating costs towards pumping of sewage and deeper excavations.

On the other hand, decentralised approach of sewage treatment at habitation/zonal level/Load centres involves STPs of lower capacities. Further, the decentralised wastewater treatment systems are characterised by maximum utilization of the natural slopes, lesser pumping, lower electricity consumption and thus relatively lower capital costs. The operation and maintenance of such systems is also perceived to be less complex and hence involve comparatively lower OPEX. However, strategic planning of the number and locations of the STPs as well as pumping stations and treatment technology selection will play vital roles in deciding the long-term sustainability and operation of the treatment plants.

A dedicated sewerage system including sewage treatment plants will bring tangible benefits such as better health with abridged water borne & Vector borne diseases. A better health leads to better life, as it is said Better health is vital to human happiness and economic wellbeing.

The sewage treatment plant shall be based on membrane based treatment to utilize for non-potable usages. The Plant shall be sustainable with environment on optimized foot print and optimized sludge generation, as the bacteria shall be under endogenous phase.

The use of recycled water shall be adopted to meet the non-potable water demand, and a recycled water network will be designed. Therefore, a dual piping system for the building, wherein the recycled (treated waste water) shall be supplied for non-potable usages like flushing of toilets etc. Due care needs to take in the event of wrong plumbing leading to serious health hazards. In other cases, to meet the demand for washing, landscaping and other non-potable usages recycled water shall be used to the best possible extent and a separate network shall be designed, to deliver the treated waste water for non-potable usages within the proposed township.

The total Water Demand for the project area is estimated at 160 MLD (Fresh Water Demand 90 MLD and Recycled Water Demand 70 MLD). 40 MLD of the Fresh Water demand shall be met from surface water of River Galathea and part from Alexandria during Phase 1 of the development of the city (2021-2036); and balance 50 MLD shall be met through Desalination Plant (RO based) at a later stage during Phase 2 (2037-2051).

Taking into consideration the fresh water availability, the same shall suffice to a resident population of approximately 1.8-2 lakh, along with fresh /potable water requirements for other developments. So this is about 30% of the total resident population. According to the assessment, this should suffice for first 10-12 yrs. approximately. On storage arrangements: the area for raw water storage is accounted in the Water Works area, for the fresh water availability for a day's demand. Check dam details will be worked out during EIA stage.

Sewage generation for the proposed developments is 110 MLD, depending upon final type of industries to be selected. The Demand for Non-potable water of 70 MLD shall be met by recycling the Sewage within the Project Area. The Water Balance Diagram is given below-

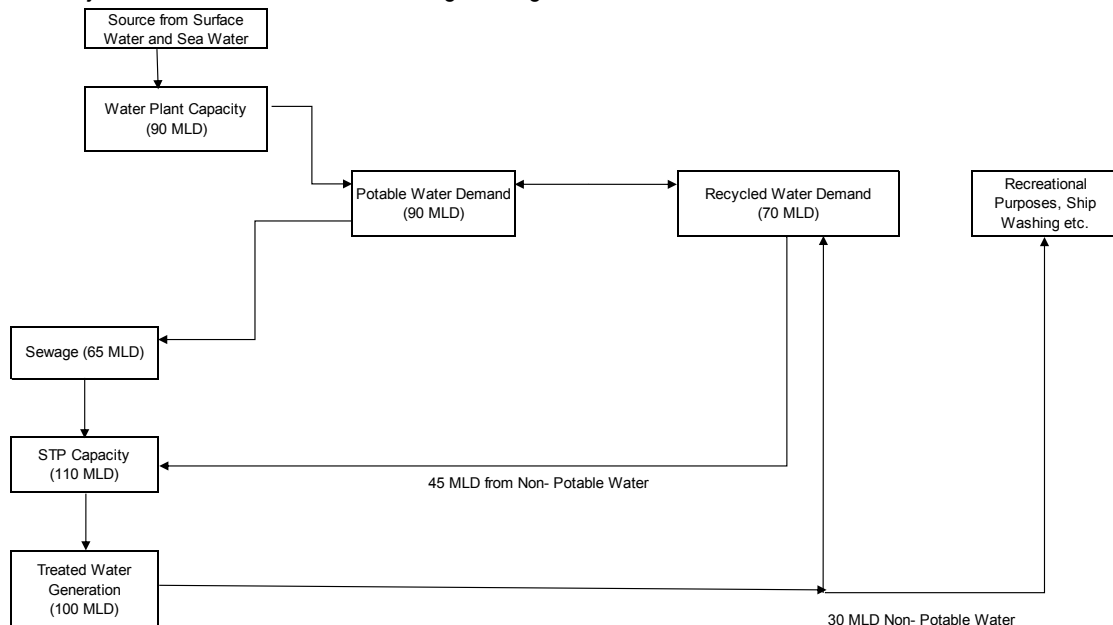


Figure 36: Water Balance Diagram

Water Demand break up is mentioned as below:

Table 40: Water Demand details

S. No.	Description	Water Demand in MLD
1	For Resident Population @ 150 LPCD + 15% unaccounted water as per CPHEEO for Mega Cities	113
2	For Floating Population @ 60 LPCD + 15% unaccounted water	15
3	Proposed Industries	5
4	Green area/Open area/Road Gutter Washing etc.	10
5	Port, Airport etc.	3
6	Hospitals/Medical Care etc.	5
7	Defence Area, Euro Tourism, Utilities etc.	7
8	Fire Demand 1% of Total (Round Off to nearest whole number)	2
	Total	160 MLD

S. No.	Purposes	Quantity (MLD)
1	Domestic water and other potable water requirement:	90
2	Flushing and other non-potable requirement:	70
	Total water requirement	160

The breakup of Waste-water/sewage generation are mentioned as below: -

Table 41: Waste Water/Sewage Generation Details

S. No.	Purposes	Quantity (MLD)
1	Waste Water/Sewage Generation from Potable water Demand	65
2	Waste Water/Sewage Generation from Non-Potable water Demand	45
	Total wastewater generation	110

The parameters of raw & treated sewage are as below: -

Table 42: Raw & Treated Sewage

Sr.no	Parameters of Raw Sewage	Values	Unit
1	BODs	200-300	mg/l
2	COD	500-600	mg /l
3	Suspended Solids	300-350	mg /l
4	pH	6.5-8.5	
5	Total Alkalinity as CaCO ₃	300-400	mg /l
6	Chlorides	250-300	mg /l
7	Sulphate	100-150	mg /l
8	Total Kjeldahi nitrogen	40-50	mg /l
9	Ammonical Nitrogen	35-40	mg /l
10	Total Phosphorous	5-7	mg /l
11	Temperature	15-35	°C

S. No.	Parameters of treated sewage	Values	Unit
1	BODs	<5	mg /l
2	COD	<30	mg /l
3	TSS	<1	mg /l

4	TKN	<5	mg /l
5	Ammonical Nitrogen	<2	mg /l
6	Total Nitrogen	<10	mg /l
7	Total Phosphorus	<1	mg /l
8	pH	6.5-8.5	mg /l
9	Turbidity	<1	NTU
10	Bacteria Removal	5 Logs	
11	Virus Removal	6 Logs	

Location of 01 No. WTP cum Desal plant/ Water Works and 03 Nos. STPs is worked out and is shown as below: -

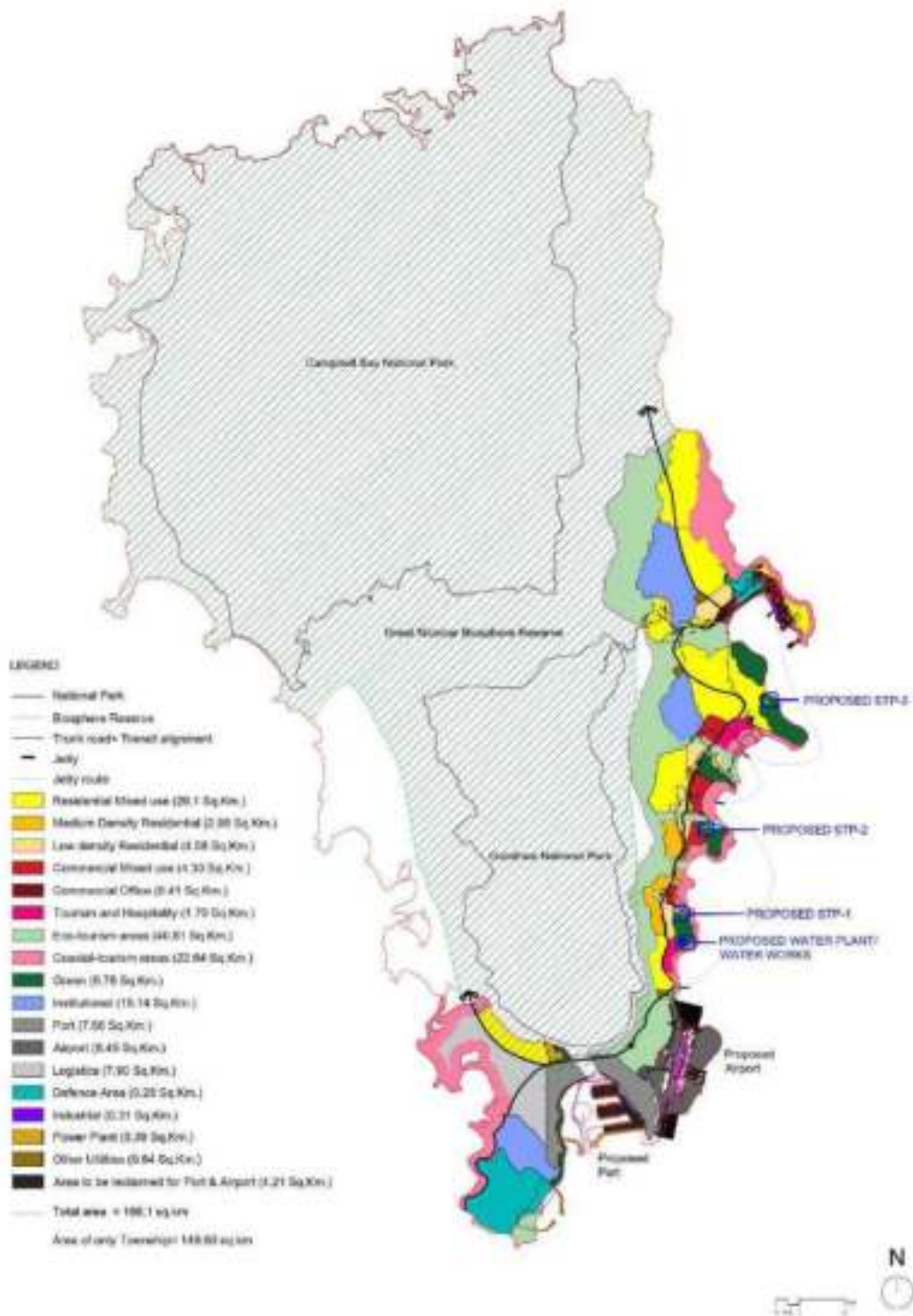


Figure 37: Location of WTP and STPs

5.4.2 Drainage

The primary objective of flood control /drainage design is to protect the area during the design storm events. The drainage system is designed to collect storm water run-off from roadway surface, right-of-way and entire plot/project surface and convey it through a network of storm water system to discharge into a receiving body/outlet without causing adverse site impacts. A separate collection network is proposed for collection of Storm water.

Storm runoff is that portion of the precipitation which drains over the ground surface. Estimation of such runoff is dependent on the intensity and duration of rainfall, characteristics of tributary area and the time required for such flow to reach the drain.

Providing sustainable Drainage is one of the basic parameters for measuring infrastructure status of any Urban Town. The system shall contain dedicated storm water through RCC drains/Pipe Drains/Swales etc., designed with features such as energy dissipation structures etc. to mitigate the sudden fall in velocity, while at the same time maintaining the self-cleaning velocity. This shall not only mitigate the ponding in the system but make the system self-enough to carry the discharge for which it is designed to the final sink.

A Well designed & Operated Storm water will bring tangible benefits such as better health with abridged water borne & Vector borne diseases. A better health leads to better life, as it is said Better health is vital to human happiness and economic wellbeing.

- **Rainwater Harvesting**

Surface run-off collected from the terrace floor will be diverted to the rainwater harvesting ponds. The ponds will be adequate to handle the monsoon season. These shall be part of the development and to harvest the rain water. These shall act as rain water harvesting system and to be used as source of fresh water. These shall be able to mitigate the deficiency from river, as site has very good rainfall potential.

5.4.3 Solid Waste

For designing an effective solid waste management system, various aspects shall be considered, such as population, waste type and waste quantity, technology, legal, institutional, regulatory framework, finances and public attitude and awareness.

The solid waste likely to be generated will include domestic waste (general and hazardous waste), street sweeping waste, green waste from landscaped areas, industrial waste (hazardous and non-hazardous), biomedical waste, electronic waste (E) and Construction and Demolition (C&D) waste. Effective management of such huge quantities of waste is paramount to avoid any issues related to public health and environment protection. Hence, a comprehensive Solid Waste Management Plan, which will comply with the statutory requirements of the Municipal Solid Waste (Management and Handling) Rules, 2000 (MSW Rules, 2000). Municipal, hazardous and biomedical and E-waste management facility is to be provided at an appropriate location. The facilities will include storage, sorting, treatment and disposal facilities. A total of about 10 ha will be required.

The quantities of waste likely to be generated during construction and operation phases have been estimated on the basis of population and land use characteristics. Apart from municipal waste and industrial waste, solid waste in the form of dried sludge will also be generated from sewage treatment plant and other treatment plant.

About 600 MT of Solid Waste including sludge waste from Sewage Treatment Plant is envisaged per day.

5.4.4 Power and ICT Systems

Smart grid connected with distributed power generation that significantly generates reliable security of supply (SOS) and quality of electric energy shall be presented. This concept is practical and reliable as

numerous types of energy sources become available, such as solar, wind, biomass, and hydropower as a hybrid case.

The proposed development will spur demand for a wide array of spin-off businesses and will offer the full array of services required for a mega-scale city and the communities located within it. For the purpose of understanding and project of this magnitude, it becomes important to adopt a systematic & rigorous methodology & approach for power supply planning and overall demand. The demand like wet utilities shall be done for the horizon period.

The entire development will be divided into various cluster groups i.e. Residential, Commercial, Industrial, etc. The Built-up Area considering growth plans & Population density of various clusters will be used in assessment of the power demand and infrastructure planning of electrical power system. The Optimum Built-up Area for each Plot area is based on Floor Space Index norms and population density as applicable for each type of area.

Since each Cluster group is a mix type plot, at this stage it remains uncertain to identify whether it is dedicated for the specific purpose. For example, the cluster Residential zone may comprise of Residences, Commercial offices/retail, Leisure/hospitality, Community facilities, local public open space, roads, and utilities. Thus, based on overall land use plan average load shall be worked out for these plots based on utility norms / past project references.

The main objective of carrying out the demand assessment for complete development is to estimate the power demand, identify the right source for feeding the power and also to select the correct voltage levels for Transmission & Distribution (T&D) purposes.

Ring Main Unit (RMU) is a compact, sealed for life metal-enclosed switchgear widely used in Urban Power Distribution Network has been proposed. The brief features shall be as below:

- Feature-Rich Compact Designs: Ring Main Unit SF6 insulated compact Switchgear. Its compact design requires least possible space to install and operate.
- Time and Cost Savings: RMU is a complete switchgear and is easy to install, saving installation and commissioning time.
- Safety and Performance: Modern compact design and latest technology of the RMU ensure complete safety, connectivity, reliability, and efficiency.
- Smart Capabilities: Intelligent Electronic Devices and Communication capabilities the RMU is easy to integrate with Distribution Management System and in building a Smart Grid solution.

Chemical earthing has been proposed as the same is more efficient than the traditional Earthing. Street Lighting shall be LED with Glass Reinforced Poles to mitigate corrosion. The Street light shall be on auto mode with time/location and grouped for ease in operations.

Main receiving substation (MRSS) shall comprise of 400kV / 220kV / 132kV/110 kV substation. Based on load demand of various clusters and distribution network length the voltage shall be stepped down to 66kV or 33kV or 11 KV by using power transformers.

Further distribution to project site shall be through various Zonal (clustered) substations which may be of 66/11kV or 33/11kV. With project advancement the distribution shall be underground. Switching station, ring main units (RMU), package substations shall be proposed wherever required.



The Substation shall be Gas Insulated Sub Station (GIS) to optimize the land requirement land requirement and to have efficient O&M. As required may for smaller loads concentrated at one end/location to mitigate voltage drops in cables, Compact Substation may be proposed to optimize both the cost and technical constraints.

Understanding of Telecommunications and Control network and facilities of Subject Site and surrounding areas; number of lines available at present and future for the Subject Site and surrounding areas. Type of network (overhead, underground) available, type of cable (copper, fibre optics), latest technology and services available. Based on the data collected central Control room will be planned. A smart city also includes the city of a safe city. Surveillance shall be thoroughly planned. E-governance shall be planned. The communication may be wired if so, the cables will run underground from the property boundary to the central Command room and all facilities or may be wireless.

5.5 Industrial Area

The industrial area proposed during this phase of the development of the Township is a strip of coastal land at Campbell Bay that is currently put to industrial, logistics and transport use. There are two existing jetties within this area. The Concept Master Plan proposes to retain the existing industrial land use and allow parcels to be redeveloped as higher performing, more cutting-edge industrial facilities. These could include expansion of cold storage facilities (critical for development of the fishing industry) as well as ship repair and/or warehousing of goods for local consumption. Fish processing and packing is another potential activity on this industrial land. The anticipated industrial mix will be identified during the preparation of the Development Sector Identification Report. In addition to this is included a logistics centre at the west of the port. After the port is functional, this land can be programmed for the development of warehouses and other logistics facilities. Given the minor environmental impacts associated with future light industrial development, it is anticipated that the island's future wastewater collection and treatment system can also serve the industrial area. Pre-treatment may be required for industries such as seafood processing. The industrial area will also be served by municipal water and power systems.

5.6 Residential Area

Most residential areas proposed in the Concept Masterplan incorporate other uses such as neighbourhood-serving commercial. An exception is the Residential Low-Density land use category, which includes only single-family housing. Residential areas will be served by water supply, wastewater, storm water, electrical power and solid waste services. High-density mixed-use areas in Campbell Bay may be served by district cooling systems. (Economic and technical viability to be ascertained later in the study.)

5.7 Greenbelt

Rather than a green belt, the Township development in Great Nicobar includes green buffers separating the city from the national parks and the biosphere, on the one hand, and running along the coastline, on the other. The Coastal Buffer is as described above, and the forest buffer is described under the Ecotourism land use category. One-third of the project area will be green area.

5.8 Social Infrastructure

Future residents of Great Nicobar will enjoy a high level of social infrastructure services, including healthcare facilities, schools and community centres. The coverage area of these services will vary with the size of the urban centre. The city centre at Campbell Bay will be the site of a new or improved hospital and will also include public schools at all levels. The smaller sub-centres from Anderson Bay to Gandhi Nagar will have individual or shared primary healthcare clinics, primary and secondary schools and community centres. The current residents of the site clearly expressed to the consultant team during their visit, their desire for improved social infrastructure (especially schools and healthcare) to be provided as part of the future development of the city, which shall be catered to in the Masterplan.

5.9 Connectivity

External and internal connectivity are both critical for the future success of the proposed city. External connections by air and by sea to Port Blair must become more frequent, faster, and more affordable. Great Nicobar will require direct air connections from other Indian cities and connections to Southeast and East Asian destinations. The internal connectivity will be greatly improved by the construction of a central transport spine—combining a parkway that integrates rapid transit service (e.g., light rail or bus rapid transit) from the port to Campbell Bay. All communities in this area will have ‘last mile’ road, bicycle and pedestrian connections to the central spine.

6 REHABILITATION AND RESETTLEMENT

6.1 International Container Transshipment Terminal

No rehabilitation and resettlement of existing residents is anticipated for this project. There are currently no residents on the proposed site.

6.2 International Greenfield Airport

The proposed area is sparsely populated and there are only two villages in the area of proposed airport. Most of the area is revenue land except for approximately 32 ha, which is under forest land. The revenue villages lying in the area of proposed airport are Gandhi Nagar and Shastri Nagar, part of which will need to be displaced. The land to be utilised for the proposed airport is presently part vacant, tsunami submerged land, part is owned by villager's part owned by the Government. In view of this, a limited rehabilitation and resettlement plan for human habitat is required or is foreseen. The details of the population in revenue villages are given in Table-43

Table 43: Details of the households in revenue villages

S. No.	Revenue Villages	Population	Remarks
1	Gandhi Nagar	69	Partial displacement anticipated
2	Shastri Nagar	15	Total displacement anticipated
	Total	84	

6.3 Township and Area Development

Very little rehabilitation and resettlement of existing residents is anticipated for this project. Only the development of infrastructure will require resettlement. The development of a new north-south road will require some land takings for public utility. The planners that fix the road alignment will make every effort to avoid any settled areas, including tsunami villages. It is possible that some of the other infrastructure facilities (sewage treatment plants, etc.) may require resettlement, including acquisition of private land and/or homesteads. The total number of affected people will be modest. The specific impacts will only be determined at the Detailed Project Report stage.

6.4 Power Plant

No rehabilitation and resettlement of existing residents is anticipated for this project. There are currently no residents on the proposed site.

7 ANALYSIS OF PROPOSAL

7.1 International Container Transshipment Terminal

The project site faces no social issues. The final phase for marine infrastructure has been conceptualised in such a manner so as to reduce the environmental impacts of the project developments on the surrounding elements and the marine ecology.

The site has good marine access. The bathymetry at the harbour is good as it is deep enough to only require a moderate amount of dredging whilst not being excessively deep for breakwater construction. The site location is well balanced in terms of wave climate and sedimentation. The new harbour is expected to be relatively free from major sedimentation issues which can be a serious environmental problem.

The site falls partly under ICRZ Zone 1B. It has Turtle nesting site on the western side near the mouth and western beach of Galathea River. To preserve the turtle nesting site development of berths on the west side of Galathea bay will be avoided.

The project shall bring major investments to the region covering a wide range of sectors connectivity, shipping industry, social infrastructure.

The project once fully operational shall bring total employment potential of 1,250 and 4,200 persons and an investment of INR 18,308 Crores and INR 35,959 Crores during initial Phase and Final phase respectively, thereby opening up employment opportunities for the youth in the region.

The proposed container Transshipment terminal therefore immensely adds to the social economic value to the Great Nicobar Island.

7.2 International Greenfield Airport

Greater Nicobar Island needs to be developed in a holistic manner to ensure that it comes up with an infrastructure setup at par with the rest of the country. This island has considerable potential to be developed as an integrated hub supporting tourism, industry, Transshipment port and a viable place for the local population to flourish.

The precursor to development is infrastructure and connectivity; the current connectivity is limited to painstaking sea journey from Port Blair alone and a few flights a week by helicopters with limited capacity. Hence, there is need to plan a self-sustaining envelope of activity on this island that can support each other and provide economic viability.

The proximity to Indonesia, Malaysia, Myanmar and Thailand provides adequate opportunity to develop this island as a tourist destination by developing an airport which can support international operations.

The availability of adequate land coupled with the impetus by the Government both at Centre and UT can be the right opportunity to undertake the construction of an International airport which can obviate the primary hurdle of reaching there and being connected to the mainstream by providing air and sea connectivity.

The present site has always had a sizeable low-lying area which has further increased after the Boxing Day tsunami of 2004. The fluctuating water levels have further rendered part of this area inappropriate for

any other task but for this project. The grading of higher areas will generate considerable earth which will be utilised to provide fill for the low-lying areas.

Site drainage will be profiled to ensure safe and efficient drainage of water and adequate green areas will be maintained to ensure the environment is given due consideration.

In view of the forgoing discussions, the site appears to be feasible and the opening of Great Nicobar Island International Airport could generate a significant number of jobs over the next two decades and catalyse the socio-economic growth of the local population in addition to improving connectivity and developing eco-tourism of the region.

7.3 Township and Area Development

The development of a township on the majority of the 166 sq.km of the project area appears to be technically, socially, environmentally and economically viable.

The revenue lands can be redeveloped into compact, diverse, highly sustainable urban sub-centres connected by low-carbon rapid transit (land and sea). The key supporting infrastructure systems — water supply, waste water, storm water, roads, public transport and solid waste — can be feasibly developed on the island.

Connectivity to customers and markets is key to the development of the tourism sector at Great Nicobar Island. Up- market, high-end tourism is likely to be the most viable on GNI, given space constraints. It is also consistent with the eco-sensitive focus and high quality of the assets.

The A&N business community is willing and able to participate in development of the tourism and shipping sectors on the island. But given the scale of the projects, participation by large Indian and/or international players is also required. Breaking megaprojects into smaller chunks can help secure more local business participation. The business community is informed that the public sector mindset has changed, and that development on GNI can coexist with defence functions, in harmony with nature, aboriginals and the new city development.

7.4 Power Plant

The power plant is a viable investment that is anticipated to perform well economically and environmentally. The evolution of the source of power from diesel to liquid natural gas responds to the expediency of jump-starting the operation of the city and the port, on the one hand, and to the long term environmentally sustainable operation of the facility, on the other. No resettlement is required; the social costs of the project are minimal, and the social benefits in terms of reliable access to 24/7 power supply are anticipated to be considerable.



AECOM India Private Limited
9th Floor, Tower C, Building No. 9
DLF Cyber City, DLF Phase II
Gurgaon 122002, Haryana, India

T: +91 124 4830250
aecom.com

3

ANNEXURE 24

NITI AAYOG

SELECTION

OF

TECHNICAL CONSULTANT

REQUEST FOR PROPOSALS

FOR

PREPARATION OF MASTER PLAN FOR HOLISTIC
DEVELOPMENT OF GREAT NICOBAR ISLAND IN
ANDAMAN & NICOBAR ISLANDS


201 pages

S.No.	Contents	Page No.
	Preface	v
	Request for Proposals	5
	Disclaimer	6
	Glossary	8
	Invitation for Proposals	10
1	Introduction	11
2	Instructions to Applicants	15
	A. General	15
	B. Documents	28
	C. Preparation and Submission of Proposal	30
	D. Evaluation Process	38
	E. Appointment of Consultant	39
3	Criteria for Evaluation	42
4	Fraud and corrupt practices	47
5	Pre-Proposal Conference	49
6	Miscellaneous	50
	Schedules	52
1	Terms of Reference	53
2	Form of Agreement	107
	Annex-1: Terms of Reference	117
	Annex-2: Deployment of Personnel	134
	Annex-3: Estimate of Personnel Costs	136
	Annex-4: Approved Sub-Consultant(s)	137
	Annex-5: Cost of Services	138
	Annex-6: Payment Schedule	139
	Annex-7: Bank Guarantee for Performance Security	144

3	Guidance Note on Conflict of Interest	148
	Appendices	150
	Appendix-I: Technical Proposal	151
	Form 1: Letter of Proposal	151
	Form 2A: Particulars of the Applicant	155
	Form 2B: Format of Joint Bidding Agreement	158
	Form 3: Statement of Legal Capacity	159
	Form 4A: Power of Attorney for Authorised Representative	160
	Form 4B: Power of Attorney for Lead Member (In case of Consortium)	161
	Form 5: Financial Capacity of Applicant	161
	Form 6: Particulars of Key Personnel	163
	Form 7: Proposed Methodology and Work Plan	164
	Form 8: Abstract of Eligible Assignments of the Applicant	165
	Form 9: Abstract of Eligible Assignments of Key Personnel	168
	Form 10: Eligible Assignments of Applicant	170
	Form 11: Eligible Assignments of Key Personnel	171
	Form 12: Curriculum Vitae (CV) of Professional Personnel	173
	Form 13: Deployment of Personnel	176
	Form 14: Survey and Field Investigations	174
	Form 15: Proposal for Sub-Consultant(s)	176
	Form 16: Certificate Regarding Associates	178
2	Appendix-II: Financial Proposal	192
	Form 1: Covering Letter	192
	Form 2: Financial Proposal	193
	Form 3: Estimate of Personnel Costs	196
3	Appendix-III: List of Bid-specific provisions	198
4	Appendix-IV: Description of Great Nicobar Island	199

SELECTION
OF
TECHNICAL CONSULTANT

F.No.M-13040/32(2)/2020-IDA
Government of India
NITI Aayog
Natural Resources & Environment Vertical
Sansad Marg, New Delhi -110001

Request for Proposal (RfP)

7th September, 2020

Notice Inviting Request for Proposal (RfP) for “Preparation of Master Plan for Holistic Development of Great Nicobar Island in Andaman & Nicobar Islands”.

The National Institution for Transforming India (NITI) Aayog, Government of India, intends to engage Technical Consultant to facilitate holistic development of Great Nicobar Island in Andaman & Nicobar Islands details of which have been provided in the RfP document.

NITI Aayog invites on-line RfP for National Competitive Bidding (NCB) for Great Nicobar Island from national firms/ organisations/ institutions, which have requisite experience in this field as detailed in the RfP. The detail tender notice and RfP can be downloaded from Central Public Procurement Portal at <https://eprocure.gov.in/eprocure/app> and from the website of NITI Aayog at <https://niti.gov.in/tenders>. The salient features of the study, eligibility criteria and instructions on how to bid and other details are available in the RfP document uploaded on the websites <https://eprocure.gov.in/eprocure/app> and <http://NITI.gov.in>. No manual bids will be accepted under any circumstances.

Interested applicants are requested to submit their response to the ‘RfP’ on Central Public Procurement Portal as prescribed and titled as **RfP for Preparation of Master Plan for Holistic Development of Great Nicobar Island in Andaman & Nicobar Islands**” on or before, 6th October, 2020 1500 hrs.

The submission must be addressed to:
Specialist,
NRE Vertical – Island Development
(Saloni Goel)
Room No: 280,
NITI Aayog, Sansad Marg
New Delhi, 110001
Tel: +9111-23096 635
Email: saloni.goel@gov.in

Disclaimer

The information contained in this Request for Proposals document (“**RfP**”) or subsequently provided to Applicants, whether verbally or in documentary or any other form by or on behalf of the Authority or any of its employees or advisers, is provided to Applicants on the terms and conditions set out in this RFP and such other terms and conditions subject to which such information is provided.

This RfP is not an agreement and is neither an offer nor invitation by the Authority to the prospective Applicants or any other person. The purpose of this RfP is to provide interested parties with information that may be useful to them in the formulation of their Proposals pursuant to this RfP. This RfP includes statements, which reflect various assumptions and assessments arrived at by the Authority in relation to the Consultancy. Such assumptions, assessments and statements do not purport to contain all the information that each Applicant may require. This RFP may not be appropriate for all persons, and it is not possible for the Authority, its employees or advisers to consider the objectives, technical expertise and particular needs of each party who reads or uses this RfP. The assumptions, assessments, statements and information contained in this RfP, may not be complete, accurate, adequate or correct. Each Applicant should, therefore, conduct its own investigations and analysis and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions, assessments and information contained in this RFP and obtain independent advice from appropriate sources.

Information provided in this RfP to the Applicants is on a wide range of matters, some of which depends upon interpretation of law. The information given is not an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. The Authority accepts no responsibility for the accuracy or otherwise for any interpretation or opinion on the law expressed herein.

The Authority, its employees and advisers make no representation or warranty and shall have no liability to any person including any Applicant under any law, statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this RfP or otherwise, including the accuracy, adequacy, correctness, reliability or completeness of the RfP and any assessment, assumption, statement or information contained therein or deemed to form part of this RfP or arising in any way in this Selection Process.

The Authority also accepts no liability of any nature whether resulting from negligence or otherwise, howsoever caused, arising from reliance of any Applicant upon the statements contained in this RfP.

The Authority may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumption contained in this RfP.

The issue of this RfP does not imply that the Authority is bound to select an Applicant or to appoint the Selected Applicant, as the case may be, for the

Consultancy and the Authority reserves the right to reject all or any of the Proposals without assigning any reasons whatsoever.

The Applicant shall bear all its costs associated with or relating to the preparation and submission of its Proposal including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by the Authority or any other costs incurred in connection with or relating to its Proposal. All such costs and expenses will remain with the Applicant and the Authority shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by an Applicant in preparation or submission of the Proposal, regardless of the conduct or outcome of the Selection Process.

Glossary

Additional Costs	As in Item H of Form-2 of Appendix-II
Agreement	As defined in Schedule-2
Agreement Value	As defined in Clause 6.1.2 of Schedule-2
Applicable Laws	As defined in Schedule-2
Applicant	As defined in Clause 2.1.1
Associate	As defined in Clause 2.3.3 A
Authorised Representative	As defined in Clause 2.13.2
Authority	As defined in Clause 1.1.1
Bid Security	As defined in Clause 2.20.1
Concession Agreement	As defined in Clause 1.1.2
Concessionaire	As defined in Clause 1.1.2
Conditions of Eligibility	As defined in Clause 2.2.1
Conflict of Interest	As defined in Clause 2.3.1
Consortium	As defined in Clause 2.1.1
Consultancy	As defined in Clause 1.2
Consultancy Team	As defined in [Paragraph 8] of Schedule-1
Consultant	As defined in Clause 1.2
CV	Curriculum Vitae
DBFOT	Design, Build, Finance, Operate and Transfer
Deliverables	As defined in Paragraph 4 of Schedule-1
Documents	As defined in Clause 2.12
Effective Date	As defined in Clause 2.1 of Schedule-2
Eligible Assignments	As defined in Clause 3.1.4
Expatriate Personnel	As defined in Clause 1.1.1(i) of Schedule-2
Master Plan or MP	As specified in Paragraph 3 of Schedule-1
Financial Proposal	As defined in Clause 2.15.1
Form of Agreement	Form of Agreement as in Schedule-2
INR, Re, Rs.	Indian Rupee(s)
Inception Report	As specified in [Paragraph 4(A)] of Schedule-1
Joint Bidding Agreement	As defined in Clause 2.1.1 (vi)
Key Date or KD	As defined in [Paragraph 6.2] of Schedule-1
Key Personnel	As defined in Clause 2.1.4

Lead Member	As defined in Clause 2.1.1 (iii)
LOA	Letter of Award
Manual	As defined in Paragraph 1.2 of Schedule-1
MCA	As defined in Clause 1.1.3
Member	As defined in Clause 2.3.3 (a)
Official Website	As defined in Clause 1.11.2
Personnel	As defined in Clause 1.1.1(n) of Schedule-2
PPP	Public Private Partnership
Professional Personnel	As defined in Clause 2.14.6
Prohibited Practices	As defined in Clause 4.1
Project	As defined in Clause 1.1.1
Project Manager	As defined in Clause 4.6 of Schedule-2
Proposal	As defined in Clause 1.2
Proposal Due Date or PDD	As defined in Clauses 1.5 and 1.8
Resident Personnel	As defined in Clause 1.1.1(o) of Schedule-2
RFP	As defined in Disclaimer
Selected Applicant	As defined in Clause 1.6
Selection Process	As defined in Clause 1.6
Services	As defined in Clause 1.1.1(q) of Schedule-2
Sole Firm	As defined in Clause 2.1.1
Statement of Expenses	As defined in Note 13, Form-2 of Appendix-II
Statutory Auditor	An Auditor appointed under Applicable Laws
Sub-Consultant	As defined in Clause 1.1.1(r) of Schedule-2
Support Personnel	As defined in Clause 2.14.6
Team Leader	As defined in Clause 2.1.4
Technical Proposal	As defined in Clause 2.14.1
TOR	As defined in Clause 1.1.3
US\$	United States Dollar
WG	As defined in Paragraph 9.1 of Schedule-1

The words and expressions beginning with capital letters and defined in this document shall, unless repugnant to the context, have the meaning ascribed thereto herein.

Invitation for Proposals

1. INTRODUCTION[§]

1.1 Background¹

- 1.1.1 The President of India acting through the NITI Aayog and represented by Chief Executive Officer, NITI Aayog (the “**Authority**”) is engaged in the holistic development of identified islands and as part of this endeavour, the Authority has decided to undertake holistic development of Great Nicobar Island. (the “**Project**”) inter alia through Public Private Partnership (the “**PPP**”) and other modes.
- 1.1.2 With a view to inviting bids for the Project, the Authority has decided to conduct a feasibility study for determining the technical feasibility and financial viability of the Project. If found technically feasible and financially viable, the Project may be awarded to a private entity (the “**Concessionaire**”) selected through a competitive bidding process as feasible. The Project would be implemented in accordance with the terms and conditions stated in the concession agreement to be entered into between the Authority and the Concessionaire (the “**Concession Agreement**”).
- 1.1.3 In pursuance of the above, the Authority has decided to carry out the process for selection of a Technical Consultant for preparing the Master Plan. The Technical Consultant shall prepare the Master Plan, Preliminary Engineering Design Reports, Financial Feasibility and Project Structuring Report etc in accordance with the Terms of Reference specified at Schedule-1 (the “**TOR**”).
- 1.1.4 India has a total of nearly 1382 off-shore identifies islands consisting of 1093 shapes (islands) and 289 points (rocks/rocky islets). They are an integral part of our rich unexplored resources with a rich biodiversity. The potential of these

[§] Instructions for Applicants

Note 1: Blank spaces contain formats that are to be used by the Applicant after the RfP is issued. (See Appendix-III)

Note 2: Footnotes marked “\$” in the relevant Clauses of the RfP and Schedules are for guidance of the Applicants. In case of Appendices, the footnotes marked “\$” or in other non-numerical characters shall be omitted by the Applicants while submitting their respective Proposals. (See Appendix-III)

islands is still largely unexplored and untapped. The Government of India intends to set a model in place for holistic development of a few identified islands while preserving and maintaining the natural ecosystem and rich biodiversity that each of them possess.

- 1.1.5 Great Nicobar, with an area of approx. 1000 sq.km is one of the largest islands of the Andaman & Nicobar archipelago. In consultation with the concerned UT Administration and the concerned central Ministries/Departments, it has been decided to undertake the holistic development of Great Nicobar Island.

1.2 Request for Proposals

The Authority invites proposals (the “**Proposals**”) for selection of a Technical Consultant (the “**Consultant**”) who shall prepare a Master Plan for development of the Project. The Master Plan shall include data collection, identification of and consultation with various stakeholders, assessment of development potential, environment sensitivities and listings of potential projects; details of all identified development projects ; preparation of preliminary engineering design reports, Formulating Implementation Strategy for development including detail financial feasibility and projects structuring of identified projects for the identified/planned projects in conformity with the TOR (collectively the “**Consultancy**”).

The Authority intends to select the Consultant through an open national competitive bidding process in accordance with the procedure set out herein.

1.3 Due diligence by Applicants

Applicants are encouraged to inform themselves fully about the assignment and the local conditions before submitting the Proposal by paying a visit to the Authority and the Project site, sending written queries to the Authority, and attending a Pre-Proposal Conference on the date and time specified in Clause 1.10.

1.4 Obtaining RfP Document

The document can be downloaded from the Official Website <https://niti.gov.in/tenders> of NITI Aayog and the Central Public Procurement Portal (CPPP) at <https://eprocure.gov.in/eprocure/app>.

1.5 Validity of the Proposal

The Proposal shall be valid for a period of not less than 90 days from the Proposal Due Date (the “**PDD**”).

1.6 Brief description of the Selection Process

The Authority has adopted a two-stage selection process (collectively the “**Selection Process**”) for evaluating the Proposals comprising technical and financial bids. In the first stage, a technical evaluation will be carried out as specified in Clause 3.1. Based on this technical evaluation, a list of short-listed applicants shall be prepared as specified in Clause 3.2. In the second stage, a financial evaluation will be carried out as specified in Clause 3.3. Proposals will finally be ranked according to their combined technical and financial scores as specified in Clause 3.4. The first ranked Applicant shall be selected for negotiation (the “**Selected Applicant**”) while the second ranked Applicant will be kept in reserve.

1.7 Currency conversion rate and payment

1.7.1 For the purposes of technical evaluation of Applicants, Rs. 75 (Rupees seventy-five) per US\$ shall be considered as the applicable currency conversion rate. In case of any other currency, the same shall first be converted to US\$ as on the date 60 (sixty) days prior to the Proposal Due Date, and the amount so derived in US\$ shall be converted into INR at the aforesaid rate. The conversion rate of such currencies shall be the daily representative exchange rates published by the International Monetary Fund for the relevant date.

1.7.2 All payments to the Consultant shall be made in INR in accordance with the provisions of this RfP. The Consultant may convert INR into any foreign currency as per Applicable Laws and the exchange risk, if any, shall be borne by the Consultant.

1.8 Schedule of Selection Process

The Authority would endeavour to adhere to the following schedule:

	Event Description	Date
1.	Last date for receiving queries/clarifications	11 th September, 2020
2.	Pre-Proposal Conference (Conventional/Virtual)	15 th September, 2020
3.	Authority response to queries	22 nd September, 2020
4.	Proposal Due Date or PDD	6 th October, 2020
5.	Opening of Proposals	7 th October, 2020
6.	Letter of Award (LOA)	Within 15 days of PDD
7.	Signing of Agreement	Within 10 days of LOA
8.	Validity of Applications	90 days of Proposal Due Date

- 1.9 Pre-Proposal visit to the Site and inspection of data** Prospective Applicants may visit the Site and review the available data at any time prior to PDD. For this purpose, they will provide at least two days' notice to the nodal officer specified below:

Specialist,
NRE Vertical – Island Development
(Saloni Goel)
Room No: 280,
NITI Aayog, Sansad Marg
New Delhi, 110001
Tel: +9111-23096 635
Email: saloni.goel@gov.in

1.10 Pre-Proposal Conference

The date, time and venue of Pre-Proposal Conference shall be:
Date: 15th September, 2020
Time: 1400 hrs
Venue: NITI Aayog

1.11 Communications

- 1.11.1 All communications including the submission of Proposal should be addressed to:

Specialist,
NRE Vertical – Island Development
(Saloni Goel)
Room No: 280,
NITI Aayog, Sansad Marg
New Delhi, 110001
Tel: +9111-23096 635
Email: saloni.goel@gov.in

- 1.11.2 The **Official Website** of the Authority is:

<http://niti.gov.in/tenders>

Note: Please open the page 'Work with NITI' and then page 'Tenders' to access all the posted and uploaded documents related to this RfP.

- 1.11.3 All communications, including the envelopes, should contain the following information, to be marked at the top in bold letters:

RfP Notice No. ***** MASTER PLAN

RfP for Technical Consultant: Preparation of Master Plan for holistic development of Great Nicobar Island

2. INSTRUCTIONS TO APPLICANTS

A. GENERAL

2.1 Scope of Proposal

2.1.1 Detailed description of the objectives, scope of services, Deliverables and other requirements relating to this Consultancy are specified in this RfP. In case an applicant firm possesses the requisite experience and capabilities required for undertaking the Consultancy, it may participate in the Selection Process either individually (the “**Sole Firm**”) or as consortium of firms (the “**Consortium**”) in response to this invitation. The term applicant (the “**Applicant**”) will apply to both a single entity or a Consortium and its Members. However, no applicant applying individually or as a Member of a Consortium as the case may be can be Member of another Applicant. The manner in which the Proposal is required to be submitted, evaluated and accepted is explained in this RfP.

In case the Applicant is a Consortium, it shall, comply with the following additional requirements to be eligible:

- (i) Number of Members in a consortium shall not exceed 3 (three);
- (ii) Subject to the provisions of sub-clause (i) above, the Application should contain the information required for Member of the Consortium;
- (iii) Members of the Consortium shall nominate one Member as the lead member (the “Lead Member”). The nomination(s) shall be supported by a Power of Attorney, as per the format in this RfP, signed by all the other Members of the Consortium. The duties, responsibilities and powers of such Lead Member shall be specifically included in the Joint Bidding Agreement. It is expected that the Lead Member would be authorized to incur liabilities and to receive instructions and payments for and on behalf of the Consortium. The Authority expects that Lead Member should have maximum responsibility pertaining to execution of Consultancy;
- (iv) The Application should include a brief description of the roles and responsibilities of individual Members;
- (v) An individual Applicant cannot at the same time be a Member of a Consortium applying for the Consultancy. Further, a Member of a particular Consortium cannot be Member of any other Consortium applying for the Consultancy;

- (vi) Members of the Consortium shall enter into a binding Joint Bidding Agreement (the “**Joint Bidding Agreement**”), for the purpose of submitting a Proposal. The Joint Bidding Agreement, to be submitted along with the Application, shall, inter alia:
 - a. clearly outline the proposed roles and responsibilities, if any, of each Member;
 - b. include a statement to the effect that all Members of the Consortium shall be liable jointly and severally for all obligations of the Consultant in relation to the Consultancy until the completion of the Consultancy in accordance with the contract and the ToR;
 - c. clearly define the proposed administrative arrangements (organization chart) for the management and execution of the Consultancy, if awarded to the Consortium;

except as provided under this RfP, there shall not be any amendment to the Joint Bidding Agreement without the prior consent of the Authority.

- (vii) No change in composition of the Consortium will be submitted by the Authority during the Selection Process and during the subsistence of the Consultancy.
- (viii) All the Members of the Consortium shall be liable jointly and severally for all obligations of the Consultant in relation to the Consultancy until completion of Services in accordance with the Agreement and the ToR.

2.1.2 Applicants are advised that the selection of Consultant shall be on the basis of an evaluation by the Authority through the Selection Process specified in this RfP. Applicants shall be deemed to have understood and agreed that no explanation or justification for any aspect of the Selection Process will be given and that the Authority’s decisions are without any right of appeal whatsoever.

2.1.3 The Applicant shall submit its Proposal in the form and manner specified in this Part-2 of the RfP. The Technical proposal shall be submitted in the form at Appendix-I and the Financial Proposal shall be submitted in the form at Appendix-II. Upon selection, the Applicant shall be required to enter into an agreement with the Authority in the form specified at Schedule-2.

2.1.4 Key Personnel

The Consultancy Team shall consist of the following key personnel (the “**Key Personnel**”) who shall discharge their respective responsibilities as specified below:

Key Personnel	Responsibilities
----------------------	-------------------------

Team Leader	<p>S/He will lead, co-ordinate and supervise the multidisciplinary team for preparation of the Deliverables and act as a focal point to the Authority throughout the duration of the Consultancy. He shall spend at least 30 (thirty) days at the Project site/Project Office.</p> <p>S/He will be responsible for:</p> <ul style="list-style-type: none"> • Overall execution of the consultancy assignment. • Accountable leadership providing guidance, problem solving support and leading discussions with senior stakeholders • Ensure all deliverables and milestones are satisfactorily delivered • Provide insights from experience in project involving islands, riverine or maritime projects wherever applicable.
Project Manager/Urban Planner	<p>S/He will be responsible for assessment of project structuring models. He shall spend at least 30 (thirty) days at the Project site/Project Office.</p> <p>S/He will be responsible for:</p> <ul style="list-style-type: none"> • Coming up with workable strategies and recommendations for implementing the plans. • Ensuring seamless coordination between community stakeholders, focus groups, government and local officials. • Collecting and analyzing a wide range of data sources including environmental surveys. • Provide insights from experience in sustainably developing islands or it's parts/coastal areas/riverine/ maritime related ecosystem, wherever applicable.
Economic/Financial Expert	<p>S/He shall spend at least 20 (twenty) days at the Project site/Project Office. S/He will be responsible for:</p>

	<ul style="list-style-type: none"> • Providing economic perspectives on all aspects of the project, including boosting tourism sustainably. • Providing analysis, insights and inputs focussing on the cross-sectional themes of direct/indirect employment generation, impact on and role of private sector participation, community, tribal communities and civil society in the scheme. • Providing financial analysis and support throughout the consultancy. • Providing analysis, insights and inputs focussing on the cross-sectional theme of Public expenditure tracking.
Environmental Expert	<p>S/He will be responsible for Environmental Impact Assessment of the Project. S/He shall spend at least 40 (forty) days at the Project site/Project Office. S/He will be responsible for:</p> <ul style="list-style-type: none"> • Providing all subject matter support (documentation, technical input, preparing various forms and reports etc) for obtaining CRZ, Environmental and Forest Clearances wherever required for the planned projects. • Carrying out all relevant studies in this respect. • Reviewing development permit applications for compliance with local plans and regulations. • Providing expertise on assessing the integration of environmental sustainability and climate change in the planning process. Deliver environmentally responsible outcomes.
Water & Infrastructure resources Expert	<p>S/He will be responsible for activities related to water & infrastructure resources. S/He shall spend at least 20 (twenty) days at the Project site/Project Office. S/He will be responsible for:</p>

	<ul style="list-style-type: none"> • Providing all subject matter support (documentation, technical input, preparing various forms and reports etc) for planning water supply/treatment/recycling/desalination and any other relevant water-related topic • Carrying out all relevant studies in this respect. • Reviewing development permit applications for compliance with local plans and regulations. • Planning and management of water supply network in the island • Providing expertise on assessing the integration of environmental sustainability and water-use efficiency in the planning process
<p>Integrated Port Planning Expert</p>	<p>S/He will be responsible for Port-development related activities of the project. S/He shall spend at least 20 (twenty) days at the Project site/Project Office. S/He will be responsible for:</p> <ul style="list-style-type: none"> • Providing all subject matter support (documentation, technical input, preparing various forms and reports etc) for obtaining planning port-led development and port-related projects in the island • Carrying out all relevant studies in this respect. • Reviewing development permit applications for compliance with local plans and regulations.
<p>Airport Planning Expert</p>	<p>S/He will be responsible for Airport/Aviation – planning related activities of the project. S/He shall spend at least 20 (twenty) days at the Project site/Project Office. S/He will be responsible for:</p> <ul style="list-style-type: none"> • Providing all subject matter support (documentation, technical input, preparing various forms and reports etc) for planning airports and aviation

	<p>related activities in the island</p> <ul style="list-style-type: none"> • Carrying out all relevant studies in this respect. • Reviewing development permit applications for compliance with local plans and regulations.
--	--

2.2 Conditions of Eligibility of Applicants

2.2.1 Applicants must read carefully the minimum conditions of eligibility (the “**Conditions of Eligibility**”) provided herein. Proposals of only those Applicants who satisfy the Conditions of Eligibility will be considered for evaluation.

2.2.2 To be eligible for evaluation of its Proposal, the Applicant shall fulfil the following:

(A) **Technical Capacity:** The Applicant shall have, over the past 10 (ten) years preceding the PDD, undertaken a minimum of 5 (five) Eligible Assignments as specified in Clause 3.1.4. In case of a Consortium, at least 3 (three) eligible assignments should be of the Lead Member of the Consortium and other 2 (two) may be of the other members of the Consortium. Further, at least 1(one) eligible assignment should be from each of the categories as specified in 3.1.4.

(B) **Financial Capacity:** The Applicant shall have received a minimum income of Rs.100 (hundred) crore or US \$ 13.2 million per annum from professional fees during each of the 3 (three) financial years preceding the Proposal Due Date. For the purpose of evaluation, Applicants having comparatively larger revenues from professional fees shall be given added weightage. For the avoidance of doubt, professional fees hereunder refers to fees received by the Applicant for providing advisory or consultancy services to its clients.

In case of Consortium, the Financial Capacity of only the Lead Member/its Associate will be considered.

(C) **Availability of Key Personnel:** The Applicant shall offer and make available all Key Personnel meeting the requirements specified in Sub-clause (D) below.

(D) **Conditions of Eligibility for Key Personnel:** Each of the Key Personnel must fulfil the Conditions of Eligibility specified below:

Key Personnel	Educational Qualification	Length of Professional Experience	Experience on Eligible Assignments
Team Leader	Post Graduate in Urban Planning/Urban Design/Other	20 years	S/He should have led the master planning/feasibility study teams for 2

	relevant Infrastructure Design and/or Master Planning related disciplines		(two) Eligible Assignments. Experience in design and master planning of projects with tourism/culture/ecological/infrastructure /city development elements. Experience of leading projects involving holistic development of islands or its parts/coastal areas/riverine/maritime related ecosystem on a sustainable basis would be preferred.
Project Manager/Urban Planner	Post Graduate in Urban Planning/Urban Design or Master Planning related disciplines	10 years	S/He should have worked as a project manager/Urban Planner for 2 (two) Eligible Assignments. Experience in leading master planning projects for Government Sector and experience in working on greenfield/brown-field development projects preferably with tourism/cultural/ecological/city development elements. Experience in developing islands or its parts/coastal areas/riverine/maritime related ecosystem on a sustainable basis would be preferred.
Economic/Financial	MBA (Finance) or equivalent or	15 years	S/He should have worked as an

Expert	Masters' in Economics		Economic/ Financial expert for 2 (two) Eligible Assignments. Relevant experience of Financial Analysis/ financial structuring/ appraisal of similar development project. Experience of working on market analysis and product mix and conducting surveys. Experience of infrastructure projects/ program of similar nature in the field of infrastructure finance and PPP projects would be added advantage.
Environmental Expert	Masters/ Bachelor in Environmental Science or equivalent	10 years	S/He should have led the environmental impact assessment teams as project coordinator/equivalent or worked as a sole expert for 2 (two) Eligible Assignments. The expert should also be NABET accredited EIA Coordinator.
Water and Infrastructure resources expert	Bachelors' in Engineering/ Post-graduate in Water-resources engineering or equivalent	15 years	S/He should have led water and infrastructure resources studies/projects as team lead/project coordinator or worked as a sole water and infrastructure resources expert for 2 (two) eligible assignments.
Integrated Port	Post Graduate in Civil	20 years	S/He should have led transshipment terminal

Planning Expert	Engineering with experience in Ports & Harbour Engineering		planning studies/projects as team lead/project coordinator or worked as a sole port planning expert for 2 (two) eligible assignments.
Airport Planning Expert	Post graduate in planning/engineering or MBA with experience of working as a Team Leader for Airport development/ planning / design/ feasibility projects.	20 years	S/He should have led airport/aviation-planning studies/projects as team lead/project coordinator or worked as a sole airport/aviation expert for 2 (two) eligible assignments.

2.2.3 The Applicant shall enclose with its Proposal, certificate(s) from its Statutory Auditors[§] or its Associates' Statutory Auditors stating its total revenues from professional fees during each of the 3 (three) financial years preceding the PDD and the fee received in respect of each of the Eligible Assignments specified in the Proposal. In the event that the Applicant does not have a statutory auditor, it shall provide the requisite certificate(s) from the firm of Chartered Accountants that ordinarily audits the annual accounts of the Applicant.

2.2.3 A In computing the Technical Capacity and Financial Capacity of the Applicant under clauses 2.2.2, 2.2.3 and 3.1, the Technical Capacity and Financial Capacity (subject to clause 2.2.2 (B)) of their respective Associates would also be eligible hereunder. Applicant shall also enclose with its Proposal, a certificate from its Statutory Auditor/Company Secretary confirming the relationship of its Associate with the Applicant as per the format at Form- 16 of Appendix-I.

[§] Please do not attach complete printed annual financial statements. In case relevant extracts of duly audited annual financial statements containing the requisite details are provided, duly countersigned by the authorised signatory, a separate certification by statutory auditors would not be necessary in respect of clause 2.2.3.

For purposes of this RfP, Associate means, in relation to the Applicant, a person who controls, is controlled by, or is under the common control with such Applicant (the “Associate”). As used in this definition, the expression “control” means, with respect to a person which is a company or corporation, the ownership, directly or indirectly, of more than 50% (fifty per cent) of the voting shares of such person, and with respect to a person which is not a company or corporation, the power to direct the management and policies of such person by operation of law or by contract.

- 2.2.4 The Applicant should submit a Power of Attorney for authorised representative and Power of Attorney for Lead Member in case of Consortium as per the format at Form-4A/4B of Appendix-I; provided, however, that such Power of Attorney would not be required if the Application is signed by a partner of the Applicant, in case the Applicant is a partnership firm or limited liability partnership.
- 2.2.5 Any entity which has been barred by the Central Government, any State Government, a statutory authority or a public sector undertaking, as the case may be, from participating in any project, and the bar subsists as on the date of Proposal, would not be eligible to submit a Proposal either by itself or through its Associate.
- 2.2.6 An Applicant or its Associate should have, during the last three years, neither failed to perform on any agreement, as evidenced by imposition of a penalty by an arbitral or judicial authority or a judicial pronouncement or arbitration award against the Applicant or its Associate, nor been expelled from any project or agreement nor have had any agreement terminated for breach by such Applicant or its Associate.
- 2.2.7 While submitting a Proposal, the Applicant should attach clearly marked and referenced continuation sheets in the event that the space provided in the specified forms in the Appendices is insufficient. Alternatively, Applicants may format the specified forms making due provision for incorporation of the requested information.

2.3 Conflict of Interest

- 2.3.1 An Applicant shall not have a conflict of interest that may affect the Selection Process or the Consultancy (the “**Conflict of Interest**”). Any Applicant found to have a Conflict of Interest shall be disqualified. In the event of disqualification, the Authority shall forfeit and appropriate the Bid Security as mutually agreed genuine pre-estimated compensation and damages payable to the Authority for, *inter alia*, the time, cost and effort of the Authority including consideration of such Applicant’s Proposal, without prejudice to any other right or remedy that may be available to the Authority hereunder or otherwise.
- 2.3.2 The Authority requires that the Consultant provides professional, objective, and impartial advice and at all times hold the Authority’s interests paramount, avoid conflicts with other assignments or its own interests, and act without any consideration for future work. The Consultant shall not accept or engage in any assignment that would be in conflict with its prior or current obligations to other

clients, or that may place it in a position of not being able to carry out the assignment in the best interests of the Authority.

2.3.3 Some guiding principles for identifying and addressing Conflicts of Interest have been illustrated in the Guidance Note at Schedule-3. Without limiting the generality of the above, an Applicant shall be deemed to have a Conflict of Interest affecting the Selection Process, if:

- (a) the Applicant, its consortium member (the “**Member**”) or Associate (or any constituent thereof) and any other Applicant, its consortium member or Associate (or any constituent thereof) have common controlling shareholders or other ownership interest; provided that this disqualification shall not apply in cases where the direct or indirect shareholding or ownership interest of an Applicant, its Member or Associate (or any shareholder thereof having a shareholding of more than 5% (five per cent) of the paid up and subscribed share capital of such Applicant, Member or Associate, as the case may be) in the other Applicant, its consortium member or Associate is less than 5 per cent of the subscribed and paid up equity share capital thereof; provided further that this disqualification shall not apply to any ownership by a bank, insurance company, pension fund or a public financial institution referred to in sub-section (72) of section 2 of the Companies Act, 2013. For the purposes of this Clause 2.3.3(a), indirect shareholding held through one or more intermediate persons shall be computed as follows: (aa) where any intermediary is controlled by a person through management control or otherwise, the entire shareholding held by such controlled intermediary in any other person (the “**Subject Person**”) shall be taken into account for computing the shareholding of such controlling person in the Subject Person; and (bb) subject always to sub-clause (aa) above, where a person does not exercise control over an intermediary, which has shareholding in the Subject Person, the computation of indirect shareholding of such person in the Subject Person shall be undertaken on a proportionate basis; provided, however, that no such shareholding shall be reckoned under this sub-clause (bb) if the shareholding of such person in the intermediary is less than 26% (twenty six per cent) of the subscribed and paid up equity shareholding of such intermediary; or
- (b) a constituent of such Applicant is also a constituent of another Applicant; or
- (c) such Applicant or its Associate receives or has received any direct or indirect subsidy or grant from any other Applicant or its Associate or has provided any such subsidy, grant to any other Applicant, its Member or any Associate thereof; or
- (d) such Applicant has the same legal representative for purposes of this Application as any other Applicant; or

- (e) such Applicant has a relationship with another Applicant, directly or through common third parties, that puts them in a position to have access to each other's information about, or to influence the Application of either or each of the other Applicant; or
- (f) there is a conflict among this and other consulting assignments of the Applicant (including its personnel and Sub-consultant) and any subsidiaries or entities controlled by such Applicant or having common controlling shareholders. The duties of the Consultant will depend on the circumstances of each case. While providing consultancy services to the Authority for this particular assignment, the Consultant shall not take up any assignment that by its nature will result in conflict with the present assignment; or
- (g) a firm which has been engaged by the Authority to provide goods or works or services for a project, and its Associates, will be disqualified from providing consulting services for the same project save and except as provided in Clause 2.3.4; conversely, a firm hired to provide consulting services for the preparation or implementation of a project, and its Members or Associates, will be disqualified from subsequently providing goods or works or services related to the same project; or
- (h) the Applicant, its Member or Associate (or any constituent thereof), and the bidder or Concessionaire, if any, for the Project, its contractor(s) or sub-contractor(s) (or any constituent thereof) have common controlling shareholders or other ownership interest; provided that this disqualification shall not apply in cases where the direct or indirect shareholding or ownership interest of an Applicant, its Member or Associate (or any shareholder thereof having a shareholding of more than 5% (five per cent) of the paid up and subscribed share capital of such Applicant, Member or Associate, as the case may be,) in the bidder or Concessionaire, if any, or its contractor(s) or sub-contractor(s) is less than 5% (five per cent) of the paid up and subscribed share capital of such Concessionaire or its contractor(s) or sub-contractor(s); provided further that this disqualification shall not apply to ownership by a bank, insurance company, pension fund or a Public Financial Institution referred to in sub-section (72) of section 2 of the Companies Act, 2013. For the purposes of this sub-clause (h), indirect shareholding shall be computed in accordance with the provisions of sub-clause (a) above.

2.3.4 An Applicant eventually appointed to provide Consultancy for this Project, and its Associates, shall be disqualified from subsequently providing goods or works or services related to the construction and operation of the same Project and any breach of this obligation shall be construed as Conflict of Interest; provided that the restriction herein shall not apply after a period of 5 (five) years from the completion of this assignment or to consulting assignments granted by banks/ lenders at any time; provided further that this restriction shall not apply to

consultancy/ advisory services performed for the Authority in continuation of this Consultancy or to any subsequent consultancy/ advisory services performed for the Authority in accordance with the rules of the Authority. For the avoidance of doubt, an entity affiliated with the Consultant shall include a partner in the Consultant's firm or a person who holds more than 5% (five per cent) of the subscribed and paid up share capital of the Consultant, as the case may be, and any Associate thereof.

2.4 Number of Proposals

No Applicant or its Associate shall submit more than one Application for the Consultancy. An Applicant applying individually or as an Associate shall not be entitled to submit another application either individually or as a member of any consortium, as the case may be.

2.5 Cost of Proposal

The Applicants shall be responsible for all of the costs associated with the preparation of their Proposals and their participation in the Selection Process including subsequent negotiation, visits to the Authority, Project site, Project Office etc. The Authority will not be responsible or in any way liable for such costs, regardless of the conduct or outcome of the Selection Process.

2.6 Site visit and verification of information

Applicants are encouraged to submit their respective Proposals after visiting the Project site and ascertaining for themselves the site conditions, traffic, location, surroundings, climate, access to the site, availability of drawings and other data with the Authority, Applicable Laws and regulations or any other matter considered relevant by them. Reference may be made to Clause 1.9.

2.7 Acknowledgement by Applicant

2.7.1 It shall be deemed that by submitting the Proposal, the Applicant has:

- (a) made a complete and careful examination of the RfP;
- (b) received all relevant information requested from the Authority;
- (c) acknowledged and accepted the risk of inadequacy, error or mistake in the information provided in the RfP or furnished by or on behalf of the Authority or relating to any of the matters referred to in Clause 2.6 above;
- (d) satisfied itself about all matters, things and information, including matters referred to in Clause 2.6 herein above, necessary and required for submitting an informed Application and performance of all of its obligations thereunder;
- (e) acknowledged that it does not have a Conflict of Interest; and

- (f) agreed to be bound by the undertaking provided by it under and in terms hereof.
- 2.7.2 The Authority shall not be liable for any omission, mistake or error on the part of the Applicant in respect of any of the above or on account of any matter or thing arising out of or concerning or relating to RfP or the Selection Process, including any error or mistake therein or in any information or data given by the Authority.

2.8 Right to reject any or all Proposals

- 2.8.1 Notwithstanding anything contained in this RfP, the Authority reserves the right to accept or reject any Proposal and to annul the Selection Process and reject all Proposals, at any time without any liability or any obligation for such acceptance, rejection or annulment, and without assigning any reasons thereof.
- 2.8.2 Without prejudice to the generality of Clause 2.8.1, the Authority reserves the right to reject any Proposal if:
 - (a) at any time, a material misrepresentation is made or discovered, or
 - (b) the Applicant does not provide, within the time specified by the Authority, the supplemental information sought by the Authority for evaluation of the Proposal.

Misrepresentation/ improper response by the Applicant may lead to the disqualification of the Applicant. If the Applicant is the Lead Member of a consortium, then the entire consortium may be disqualified / rejected. If such disqualification / rejection occurs after the Proposals have been opened and the highest ranking Applicant gets disqualified / rejected, then the Authority reserves the right to consider the next best Applicant, or take any other measure as may be deemed fit in the sole discretion of the Authority, including annulment of the Selection Process.

B. DOCUMENTS

2.9 Contents of the RfP

This RfP comprises the Disclaimer set forth hereinabove, the contents as listed below and will additionally include any Addendum / Amendment issued in accordance with Clause 2.11:

Request for Proposal

- 1 Introduction
- 2 Instructions to Applicants
- 3 Criteria for Evaluation
- 4 Fraud and corrupt practices
- 5 Pre-Proposal Conference
- 6 Miscellaneous

Schedules

1 Terms of Reference

2 Form of Agreement

Annex-1: Terms of Reference

Annex-2: Deployment of Personnel

Annex-3: Estimate of Personnel Costs

Annex-4: Approved Sub-Consultant(s)

Annex-5: Cost of Services

Annex-6: Payment Schedule

Annex-7: Bank Guarantee for Performance Security

3 Guidance Note on Conflict of Interest

Appendices

Appendix-I: Technical Proposal

Form-1: Letter of Proposal

Form-2A: Particulars of the Applicant

Form-2B: Format of Joint Bidding Agreement

Form-3: Statement of Legal Capacity

Form-4A: Power of Attorney for Authorised Representative

Form-4B: Power of Attorney for Lead Member (In case of Consortium)

Form-5: Financial Capacity of Applicant

Form-6: Particulars of Key Personnel

Form-7: Proposed Methodology and Work Plan

Form-8: Abstract of Eligible Assignments of Applicant

Form-9: Abstract of Eligible Assignments of Key Personnel

Form-10: Eligible Assignments of Applicant

Form-11: Eligible Assignments of Key Personnel

Form-12: Curriculum Vitae (CV) of Key Personnel

Form-13: Deployment of Personnel

Form-14: Survey and Field Investigations

Form-15: Proposal for Sub-Consultant(s)

Form-16: Certificate Regarding Associates

Appendix-II: Financial Proposal

Form-1: Covering Letter

Form-2: Financial Proposal

Form-3: Estimate of Personnel Costs

2.10 Clarifications

2.10.1 Applicants requiring any clarification on the RfP may send their queries to the Authority in writing via e-mail before the date mentioned in the Schedule of Selection Process at Clause 1.8. The e-mail subject should be as follows:

"Queries concerning RfP for Master Plan for holistic development of Great Nicobar Island in Andaman & Nicobar Islands"

The Authority shall endeavour to respond to the queries within the period specified therein but not later than 7 (seven) days prior to the Proposal Due Date. The responses will be sent by e-mail. The Authority will post the reply to all such queries on the Official Website without identifying the source of queries.

2.10.2 The Authority reserves the right not to respond to any questions or provide any clarifications, in its sole discretion, and nothing in this Clause 2.10 shall be construed as obliging the Authority to respond to any question or to provide any clarification.

2.11 Amendment of RfP

2.11.1 At any time prior to the deadline for submission of Proposal, the Authority may, for any reason, whether at its own initiative or in response to clarifications requested by an Applicant, modify the RfP document by the issuance of Addendum/ Amendment and posting it on the Official Website.

2.11.2 All such amendments will be posted on the Official Website along with the revised RfP containing the amendments and will be binding on all Applicants.

2.11.3 In order to afford the Applicants a reasonable time for taking an amendment into account, or for any other reason, the Authority may, in its sole discretion, extend the Proposal Due Date[§].

C. PREPARATION AND SUBMISSION OF PROPOSAL

2.12 Language

[§] While extending the Proposal Due Date on account of an addendum, the Authority shall have due regard for the time required by Applicants to address the amendments specified therein. In the case of significant amendments, at least 15 (fifteen) days shall be provided between the date of amendment and the Proposal Due Date, and in the case of minor amendments, at least 7 (seven) days shall be provided.

The Proposal with all accompanying documents (the “**Documents**”) and all communications in relation to or concerning the Selection Process shall be in English language and strictly on the forms provided in this RfP. No supporting document or printed literature shall be submitted with the Proposal unless specifically asked for and in case any of these Documents is in another language, it must be accompanied by an accurate translation of the relevant passages in English, in which case, for all purposes of interpretation of the Proposal, the translation in English shall prevail.

2.13 Format and signing of Proposal

2.13.1 The Applicant shall provide all the information sought under this RfP. The Authority would evaluate only those Proposals that are received in the specified forms and complete in all respects

2.13.2 The Proposal shall be typed or written in indelible ink and shall be signed by the authorised signatory of the Applicant who shall initial each page, in blue ink. In case of printed and published Documents, only the cover shall be initialled. All the alterations, omissions, additions, or any other amendments made to the Proposal shall be initialled by the person(s) signing the Proposal. The Proposals must be properly signed by the authorised representative (the “**Authorised Representative**”) as detailed below:

- (a) by the proprietor, in case of a proprietary firm; or
- (b) by a partner, in case of a partnership firm and/or a limited liability partnership; or
- (c) by a duly authorised person holding the Power of Attorney, in case of a Limited Company or a corporation; or
- (d) by the Authorised Representative of the Lead Member, in case of consortium.

A copy of the Power of Attorney for Authorised Representative (in case of Consortium by Authorised Representative of Lead Member of Consortium) certified under the hands of a partner or director of the Applicant and notarised by a notary public in the form specified in Appendix-I (Form-4A/4B) shall accompany the Proposal.

2.13.3 The following documents shall be separately submitted in original to the person specified in the Clause 2.13.4 in a sealed envelope on or before the Bid Due Date, failing which the Bid shall be rejected:

- (a) Power of Attorney as required under Clause 2.13.2 (iii); and
- (b) Demand Draft towards Bid Security as required under Clause 2.20

The envelope specified in this clause 2.13.3 shall clearly bear the following identification:

“Enclosures of the RfP for Master Plan for holistic development of Great Nicobar Island”

If this envelope is not sealed and marked as instructed above, NITI Aayog assumes no responsibility for the misplacement or premature opening of the contents of the Bid and consequent losses, if any suffered by the bidder.

2.13.4 The envelope specified in Clause 2.13.3 shall be addressed to:

Specialist
NRE Vertical – Island Development
(Saloni Goel)
Room No. 280
Phone: +9111-23096 635
Email: saloni.goel@gov.in

Applicants should note the Proposal Due Date, as specified in Clause 1.8, for submission of Proposals. Except as specifically provided in this RfP, no supplementary material will be entertained by the Authority, and that evaluation will be carried out only on the basis of Documents received by the closing time of Proposal Due Date as specified in Clause 2.17.1. Applicants will ordinarily not be asked to provide additional material information or documents subsequent to the date of submission, and unsolicited material if submitted will be summarily rejected. For the avoidance of doubt, the Authority reserves the right to seek clarifications under and in accordance with the provisions of Clause 2.24.

2.14 Technical Proposal

2.14.1 Applicants shall submit the technical proposal in the formats at Appendix-I (the “**Technical Proposal**”).

2.14.2 While submitting the Technical Proposal, the Applicant shall, in particular, ensure that:

- (a) The Bid Security is provided;
- (b) all forms are submitted in the prescribed formats and signed by the prescribed signatories;
- (c) Power of Attorney for Authorised Representative (in case of Consortium by Authorised Representative of Lead Member of Consortium), if applicable, is executed as per Applicable Laws;
- (d) CVs of all Professional Personnel have been included;
- (e) Key Personnel have been proposed only if they meet the Conditions of Eligibility laid down at Clause 2.2.2 (D) of the RfP;
- (f) no alternative proposal for any Key Personnel is being made and only one CV for each position has been furnished;

- (g) the CVs have been recently signed and dated in blue ink by the respective Personnel and countersigned by the Applicant. Unsigned CVs shall be rejected;
- (h) the CVs shall contain an undertaking from the respective Key Personnel about his/her availability for the duration specified in the RfP;
- (i) Professional Personnel proposed have good working knowledge of English language;
- (j) Key Personnel would be available for the period indicated in the TOR;
- (k) no Key Personnel should have attained the age of 75 (seventy five) years at the time of submitting the proposal; and
- (l) the proposal is responsive in terms of Clause 2.22.3.
- (m) Joint Bidding Agreement is executed and enclosed as specified in Form 2B in case of Consortium.

2.14.3 Failure to comply with the requirements spelt out in this Clause 2.14 shall make the Proposal liable to be rejected.

2.14.4 If an individual Key Personnel makes a false averment regarding his qualification, experience or other particulars, or his commitment regarding availability for the Project is not fulfilled at any stage after signing of the Agreement, he shall be liable to be debarred for any future assignment of the Authority for a period of 5 (five) years. The award of this Consultancy to the Applicant may also be liable to cancellation in such an event.

2.14.5 The Technical Proposal shall not include any financial information relating to the Financial Proposal.

2.14.6 The proposed team shall be composed of experts and specialists (the “**Professional Personnel**”) in their respective areas of expertise and managerial/support staff (the “**Support Personnel**”) such that the Consultant should be able to complete the Consultancy within the specified time schedule. The Key Personnel specified in Clause 2.1.4 shall be included in the proposed team of Professional Personnel. Other competent and experienced Professional Personnel in the relevant areas of expertise must be added as required for successful completion of this Consultancy. The CV of each such Professional Personnel, if any, should also be submitted in the format at Form-12 of Appendix-I.

2.14.7 An Applicant may, if it considers necessary, propose suitable Sub-Consultants in specific areas of expertise. Credentials of such Sub-Consultants should be submitted in Form-15 of Appendix-I. A Sub-Consultant, however, shall not be a substitute for any Key Personnel.

2.14.8 The Authority reserves the right to verify all statements, information and documents, submitted by the Applicant in response to the RfP. Any such verification or the lack of such verification by the Authority to undertake such verification shall not relieve the Applicant of its obligations or liabilities hereunder nor will it affect any rights of the Authority thereunder.

2.14.9 In case it is found during the evaluation or at any time before signing of the Agreement or after its execution and during the period of subsistence thereof, that one or more of the eligibility conditions have not been met by the Applicant or the Applicant has made material misrepresentation or has given any materially incorrect or false information, the Applicant shall be disqualified forthwith if not yet appointed as the Consultant either by issue of the LOA or entering into of the Agreement, and if the Selected Applicant has already been issued the LOA or has entered into the Agreement, as the case may be, the same shall, notwithstanding anything to the contrary contained therein or in this RfP, be liable to be terminated, by a communication in writing by the Authority without the Authority being liable in any manner whatsoever to the Applicant or Consultant, as the case may be.

In such an event, the Authority shall forfeit and appropriate the Bid Security as mutually agreed pre-estimated compensation and damages payable to the Authority for, *inter alia*, time, cost and effort of the Authority, without prejudice to any other right or remedy that may be available to the Authority.

2.15 Financial Proposal

2.15.1 Applicants shall submit the financial proposal in the formats at Appendix-II (the “**Financial Proposal**”) clearly indicating the total cost of the Consultancy (Item [G] of Form-2 of Appendix-II) in both figures and words, in Indian Rupees, and signed by the Applicant’s Authorised Representative. In the event of any difference between figures and words, the amount indicated in words shall prevail. In the event of a difference between the arithmetic total and the total shown in the Financial Proposal, the lower of the two shall prevail.

2.15.2 While submitting the Financial Proposal, the Applicant shall ensure the following:

- (i) All the costs associated with the assignment shall be included in the Financial Proposal. These shall normally cover remuneration for all the Personnel (Expatriate and Resident, in the field, office etc.), accommodation, air fare, equipment, printing of documents, surveys, geo-technical investigations etc. The total amount indicated in the Financial Proposal shall be without any condition attached or subject to any assumption, and shall be final and binding. In case any assumption or condition is indicated in the Financial Proposal, it shall be considered non-responsive and liable to be rejected.
- (ii) The Financial Proposal shall take into account all expenses and tax liabilities. For the avoidance of doubt, it is clarified that all taxes shall be deemed to be included in the costs shown under different items of the

Financial Proposal. Further, all payments shall be subject to deduction of taxes at source as per Applicable Laws.

- (iii) Costs (including break down of costs) shall be expressed in INR.

2.16 Submission of Proposal

2.16.1 The Applicants shall submit the Proposal by uploading it on the Central Public Procurement Portal (“CPPP”) at ‘www.eprocure.gov.in’ on or before the specified time on the Proposal Due Date as per clause 1.8. on the said portal, and submission against RfP titled RfP for Technical Consultant for Preparation of Master Plan for Holistic Development of Great Nicobar Island. Proposals submitted by any other means including by post, fax, telex, telegrams or e-mail shall not be entertained.

2.16.2 The Proposal is to be submitted on the document downloaded from the Central Public Procurement Portal at ‘www.eprocure.gov.in’. The Applicant shall be responsible for the accuracy and correctness of the downloaded RfP as per the version uploaded by the Authority and shall ensure that there are no changes caused in the content of the downloaded document. In case of any discrepancy between the downloaded version of the RfP and the original RfP issued by the Authority, the latter shall prevail.

2.16.3 The “Technical Proposal” shall contain:

- (i) Application in the prescribed format (Form-1 of Appendix-I) along with Forms 2 to 16 of Appendix-I and supporting documents; and
- (ii) Bid security as specified in Clause 2.20.1
- (iii) Power of Attorney for signing the Bid as per the format at Appendix-I Form- 4A
- (iv) If applicable, the Power of Attorney for Lead Member of Consortium as per the format at Appendix-I Form 4B.
- (v) Joint Bidding Agreement, in case of a Consortium, substantially in the format at Appendix I Form 2B.
- (vi) The Financial Proposal shall be in the prescribed format (Forms 1, 2 & 3 of Appendix-II).

2.16.4 The Technical Proposal and Financial Proposal shall be typed or written in indelible ink and signed by the Authorised Representative of the Applicant. All pages of the original Technical Proposal and Financial Proposal must be numbered and initialled by the person or persons signing the Proposal.

2.16.5 The completed Proposal must be uploaded on or before the specified time on Proposal Due Date. Proposals submitted by post, fax, telex, telegram or e-mail shall not be entertained.

- 2.16.6 The Proposal shall be made in the Forms specified in this RfP. Any attachment to such Forms must be provided on separate sheets of paper and only information that is directly relevant should be provided. This may include photocopies of the relevant pages of printed documents. No separate documents like printed annual statements, company brochures, copy of contracts etc. will be entertained.
- 2.16.7 The rates quoted shall be firm throughout the period of performance of the assignment upto and including acceptance of the Master Plan by the Authority and discharge of all obligations of the Consultant under the Agreement.

2.17 Proposal Due Date

- 2.17.1 Proposal should be submitted at or before 1100 hrs on the Proposal Due Date specified in Clause 1.8 at the address provided in Clause 1.11.1 in the manner and form as detailed in this RfP.
- 2.17.2 The Authority may, in its sole discretion, extend the Proposal Due Date by issuing an Addendum in accordance with Clause 2.11 uniformly for all Applicants.

2.18 Late Proposals

Proposals received by the Authority after the specified time on Proposal Due Date shall not be eligible for consideration and shall be summarily rejected.

2.19 Modification/ substitution/ withdrawal of Proposals

- 2.19.1 The Applicant may modify, substitute, or withdraw its Proposal after submission, provided that the modification, substitution, or withdrawal is received by the Authority prior to Proposal Due Date. No Proposal shall be modified, substituted, or withdrawn by the Applicant on or after the Proposal Due Date.
- 2.19.2 Any alteration / modification in the Proposal or additional information or material supplied subsequent to the Proposal Due Date, unless the same has been expressly sought for by the Authority, shall be disregarded.

2.20 Bid Security

- 2.20.1 The Applicant shall furnish as part of its Proposal, a bid security of Rs. 10,00,000 (ten lakhs) in the form of a Demand Draft issued by one of the Nationalised/ Scheduled Banks in India in favour of the Pay and Accounts Officer, NITI Aayog payable at New Delhi (the “**Bid Security**”), returnable not later than 90 (ninety) days from PDD except in case of the two highest ranked Applicants as required in Clause 2.25.1. In the event that the first ranked Applicant commences the assignment as required in Clause 2.30, the second ranked Applicant, who has been kept in reserve, shall be returned its Bid Security forthwith, but in no case not later than 120 (one hundred and twenty) days from PDD. The Selected Applicant’s Bid Security shall be returned, upon the Applicant signing the Agreement and completing the Deliverables assigned

to it for the first 2 (two) months of the Consultancy in accordance with the provisions thereof.

- 2.20.2 Any Bid not accompanied by the Bid Security shall be rejected by the Authority as non-responsive.
- 2.20.3 The Authority shall not be liable to pay any interest on the Bid Security and the same shall be interest free.
- 2.20.4 The Applicant, by submitting its Application pursuant to this RfP, shall be deemed to have acknowledged that without prejudice to the Authority's any other right or remedy hereunder or in law or otherwise, the Bid Security shall be forfeited and appropriated by the Authority as the mutually agreed pre-estimated compensation and damage payable to the Authority for, *inter alia*, the time, cost and effort of the Authority in regard to the RfP including the consideration and evaluation of the Proposal under the following conditions:
- (a) If an Applicant submits a non-responsive Proposal;
 - (b) If an Applicant engages in any of the Prohibited Practices specified in Section 4 of this RfP;
 - (c) If an Applicant withdraws its Proposal during the period of its validity as specified in this RfP and as extended by the Applicant from time to time;
 - (d) In the case of the Selected Applicant, if the Applicant fails to reconfirm its commitments during negotiations as required vide Clause 2.25.1;
 - (e) In the case of a Selected Applicant, if the Applicant fails to sign the Agreement or commence the assignment as specified in Clauses 2.29 and 2.30 respectively; or
 - (f) If the Applicant is found to have a Conflict of Interest as specified in Clause 2.3.

2.21 Performance Security

- 2.21.1 The Applicant, by submitting its Application pursuant to this RfP, shall be deemed to have acknowledged that without prejudice to the Authority's any other right or remedy hereunder or in law or otherwise, its Performance Security shall be forfeited and appropriated by the Authority as the mutually agreed pre-estimated compensation and damages payable to the Authority for, *inter alia*, the time, cost and effort of the Authority in regard to the RfP, including the consideration and evaluation of the Proposal, under the following conditions:
- (a) If an Applicant engages in any of the Prohibited Practices specified in Clause 4.1 of this RfP;
 - (b) if the Applicant is found to have a Conflict of Interest as specified in Clause 2.3; and

(c) if the Selected Applicant commits a breach of the Agreement.

2.21.2 An amount equal to 5% (five per cent) of the Agreement Value shall be deemed to be the Performance Security for the purposes of this Clause 2.21, which may be forfeited and appropriated in accordance with the provisions hereof.

D. EVALUATION PROCESS

2.22 Evaluation of Proposals

2.22.1 The Authority shall open the Proposals at 1500 hours on 7th October, 2020 at the place specified in Clause 1.11.1 and in the presence of the Applicants who choose to attend. The “Technical Proposal” shall be opened first. The “Financial Proposal” shall be opened at a later date.

2.22.2 Proposals for which a notice of withdrawal has been submitted in accordance with Clause 2.19 shall not be opened.

2.22.3 Prior to evaluation of Proposals, the Authority will determine whether each Proposal is responsive to the requirements of the RfP. The Authority may, in its sole discretion, reject any Proposal that is not responsive hereunder. A Proposal shall be considered responsive only if:

- (a) the Technical Proposal is received in the form specified at Appendix-I;
- (b) it is received by the Proposal Due Date including any extension thereof pursuant to Clause 2.17;
- (c) it is accompanied by the Bid Security as specified in Clause 2.20.1.
- (d) it is signed, as stipulated in Clauses 2.13 and 2.16;
- (e) it is accompanied by the Power of Attorney as specified in Clause 2.2.4;
- (f) it contains all the information (complete in all respects) as requested in the RfP;
- (g) it does not contain any condition or qualification; and
- (h) it is not non-responsive in terms hereof.

2.22.4 The Authority reserves the right to reject any Proposal which is non-responsive and no request for alteration, modification, substitution or withdrawal shall be entertained by the Authority in respect of such Proposals.

2.22.5 The Authority shall subsequently examine and evaluate Proposals in accordance with the Selection Process specified at Clause 1.6 and the criteria set out in Section 3 of this RfP.

2.22.6 After the technical evaluation, the Authority shall prepare a list of pre-qualified and shortlisted Applicants in terms of Clause 3.2 for opening of their Financial Proposals. A date, time and venue will be notified to all Applicants for

announcing the result of evaluation and opening of Financial Proposals. Before opening of the Financial Proposals, the list of pre-qualified and shortlisted Applicants along with their Technical Score will be read out. The opening of Financial Proposals shall be done in presence of respective representatives of Applicants who choose to be present. The Authority will not entertain any query or clarification from Applicants who fail to qualify at any stage of the Selection Process. The financial evaluation and final ranking of the Proposals shall be carried out in terms of Clauses 3.3 and 3.4.

- 2.22.7 Applicants are advised that Selection shall be entirely at the discretion of the Authority. Applicants shall be deemed to have understood and agreed that the Authority shall not be required to provide any explanation or justification in respect of any aspect of the Selection Process or Selection.
- 2.22.8 Any information contained in the Proposal shall not in any way be construed as binding on the Authority, its agents, successors or assigns, but shall be binding against the Applicant if the Consultancy is subsequently awarded to it.

2.23 Confidentiality

Information relating to the examination, clarification, evaluation, and recommendation for the selection of Applicants shall not be disclosed to any person who is not officially concerned with the process or is not a retained professional adviser advising the Authority in relation to matters arising out of, or concerning the Selection Process. The Authority shall treat all information, submitted as part of the Proposal, in confidence and shall require all those who have access to such material to treat the same in confidence. The Authority may not divulge any such information unless it is directed to do so by any statutory entity that has the power under law to require its disclosure or is to enforce or assert any right or privilege of the statutory entity and/or the Authority or as may be required by law or in connection with any legal process.

2.24 Clarifications

- 2.24.1 To facilitate evaluation of Proposals, the Authority may, at its sole discretion, seek clarifications from any Applicant regarding its Proposal. Such clarification(s) shall be provided within the time specified by the Authority for this purpose. Any request for clarification(s) and all clarification(s) in response thereto shall be in writing.
- 2.24.2 If an Applicant does not provide clarifications sought under Clause 2.24.1 above within the specified time, its Proposal shall be liable to be rejected. In case the Proposal is not rejected, the Authority may proceed to evaluate the Proposal by construing the particulars requiring clarification to the best of its understanding, and the Applicant shall be barred from subsequently questioning such interpretation of the Authority.

E. APPOINTMENT OF CONSULTANT

2.25 Negotiations

- 2.25.1 The Selected Applicant may, if necessary, be invited for negotiations. The negotiations shall generally not be for reducing the price of the Proposal, but will be for re-confirming the obligations of the Consultant under this RfP. Issues such as deployment of Key Personnel, understanding of the RfP, methodology and quality of the work plan shall be discussed during negotiations. A Key Personnel who did not score 70% (seventy per cent) marks as required under Clause 3.1.2 shall be replaced by the Applicant with a better candidate to the satisfaction of the Authority. In case the Selected Applicant fails to reconfirm its commitment, the Authority reserves the right to designate the next ranked Applicant as the Selected Applicant and invite it for negotiations.
- 2.25.2 The Authority will examine the CVs of all other Professional Personnel and those not found suitable shall be replaced by the Applicant to the satisfaction of the Authority.
- 2.25.3 The Authority will examine the credentials of all Sub-Consultants proposed for this Consultancy and those not found suitable shall be replaced by the Applicant to the satisfaction of the Authority.

2.26 Substitution of Key Personnel

- 2.26.1 The Authority will not normally consider any request of the Selected Applicant for substitution of Key Personnel as the ranking of the Applicant is based on the evaluation of Key Personnel and any change therein may upset the ranking. Substitution will, however, be permitted if the Key Personnel is not available for reasons of any incapacity or due to health, subject to equally or better qualified and experienced personnel being provided to the satisfaction of the Authority.
- 2.26.2 The Authority expects all the Key Personnel to be available during implementation of the Agreement. The Authority will not consider substitution of Key Personnel except for reasons of any incapacity or due to health. Such substitution shall ordinarily be limited to one Key Personnel subject to equally or better qualified and experienced personnel being provided to the satisfaction of the Authority. As a condition to such substitution, a sum equal to 20% (twenty per cent) of the remuneration specified for the original Key Personnel shall be deducted from the payments due to the Consultant. In the case of a second substitution hereunder, such deduction shall be 50% (fifty per cent) of the remuneration specified for the original Key Personnel. Any further substitution may lead to disqualification of the Applicant or termination of the Agreement.
- 2.26.3 Substitution of the Team Leader will not normally be considered and may lead to disqualification of the Applicant or termination of the Agreement.

2.27 Indemnity

The Consultant shall, subject to the provisions of the Agreement, indemnify the Authority for an amount not exceeding 3 (three) times the value of the Agreement for any direct loss or damage that is caused due to any deficiency in services.

2.28 Award of Consultancy

After selection, a Letter of Award (the “LOA”) shall be issued, in duplicate, by the Authority to the Selected Applicant and the Selected Applicant shall, within 7 (seven) days of the receipt of the LOA, sign and return the duplicate copy of the LOA in acknowledgement thereof. In the event the duplicate copy of the LOA duly signed by the Selected Applicant is not received by the stipulated date, the Authority may, unless it consents to extension of time for submission thereof, appropriate the Bid Security of such Applicant as mutually agreed genuine pre-estimated loss and damage suffered by the Authority on account of failure of the Selected Applicant to acknowledge the LOA, and the next highest ranking Applicant may be considered.

2.29 Execution of Agreement

After acknowledgement of the LOA as aforesaid by the Selected Applicant, it shall execute the Agreement within the period prescribed in Clause 1.8. The Selected Applicant shall not be entitled to seek any deviation in the Agreement.

2.30 Commencement of assignment

The Consultant shall commence the Services at the Project site within 7 (seven) days of the date of the Agreement, or such other date as may be mutually agreed. If the Consultant fails to either sign the Agreement as specified in Clause 2.29 or commence the assignment as specified herein, the Authority may invite the second ranked Applicant for negotiations. In such an event, the Bid Security of the first ranked Applicant shall be forfeited and appropriated in accordance with the provisions of Clause 2.20.4.

2.31 Proprietary data

Subject to the provisions of Clause 2.23, all documents and other information provided by the Authority or submitted by an Applicant to the Authority shall remain or become the property of the Authority. Applicants and the Consultant, as the case may be, are to treat all information as strictly confidential. The Authority will not return any Proposal or any information related thereto. All information collected, analysed, processed or in whatever manner provided by the Consultant to the Authority in relation to the Consultancy shall be the property of the Authority.

3. CRITERIA FOR EVALUATION

3.1 Evaluation of Technical Proposals

- 3.1.1 In the first stage, the Technical Proposal will be evaluated on the basis of Applicant's experience, its understanding of TOR, proposed methodology and Work Plan, and the experience of Key Personnel. Only those Applicants whose Technical Proposals get a score of 70 (seventy) marks or more out of 100 (one hundred) shall qualify for further consideration, and shall be ranked from highest to the lowest on the basis of their technical score (S_T).
- 3.1.2 Each Key Personnel must score a minimum of 70% (seventy per cent) marks except as provided herein. A Proposal shall be rejected if the Team Leader scores less than 70% (seventy per cent) marks or any two of the remaining Key Personnel score less than 70% (seventy per cent) marks. In case the Selected Applicant has one Key Personnel, other than the Team Leader, who scores less than 70% marks, he would have to be replaced during negotiations, with a better candidate who, in the opinion of the Authority, would score 70% (seventy per cent) or above.
- 3.1.3 The scoring criteria to be used for evaluation shall be as follows.

Item Code	Parameter	Maximum Marks	Criteria
1.	Relevant Experience of the Applicant	30	30% of the maximum marks shall be awarded for the number of Eligible Assignments undertaken by the Applicant firm. The remaining 70% shall be awarded for: (i) the comparative size, and quality of Eligible Assignments; (ii) other relevant assignments or similar work in the infrastructure sectors; and (iii) overall turnover, experience and capacity of the firm.
2.	Presentation	5	Evaluation would be

			based on the quality of presentations based on the proposed methodology and Work Plan
3.	Proposed Methodology and Work Plan	5	Evaluation will be based on the quality of submissions.
4.	Relevant Experience of the Key Personnel²	60	30% of the maximum marks for each Key Personnel shall be awarded for the number of Eligible Assignments the respective Key Personnel has worked on. The remaining 70% shall be awarded for: (i) the comparative size and quality of Eligible Assignments; and (ii) other relevant assignments or similar work in infrastructure sectors.
4(a)	Team Leader	15	
4(b)	Project Manager/Urban Planner	5	
4(c)	Economic/Financial Expert	5	
4(d)	Environmental Expert	10	
4(e)	Water & Infrastructure Resources Expert	5	
4(f)	Integrated Port Planning Expert	10	

² The Key Personnel and their respective maximum marks may be suitably modified to address project-specific requirements.

4(g)	Airport Planning Expert	10	
Grand Total		100	

While awarding marks for the number of Eligible Projects, the Applicant or Key Personnel, as the case may be, that has undertaken the highest number of Eligible Assignments shall be entitled to the maximum score for the respective category and all other competing Applicants or respective Key Personnel, as the case may be, shall be entitled to a proportionate score. No score will be awarded to an Applicant/ Key Personnel for fulfilling the eligibility criteria of a minimum number of Eligible Assignments and only projects exceeding the eligibility criteria shall qualify for scoring. For the avoidance of doubt and by way of illustration, if the minimum number of Eligible Projects for meeting the eligibility criteria is say, 3 (three), then an equivalent number will be ignored for each Applicant/Key Personnel and only the balance remaining will be considered for awarding scores relating to the number of Eligible Assignments on a proportionate basis. However, for assigning scores in respect of the size and quality of Eligible Assignments, all Eligible Assignments of the Applicant/Key Personnel shall be considered.

Provided further, that in case of a Consortium, experience of individual Members against Eligible Assignments shall be added to arrive at the total experience of the Consortium for the purpose of evaluating eligibility as well as for the purposes of scoring.

3.1.4 Eligible Assignments

For the purposes of determining Conditions of Eligibility and for evaluating the Proposals under this RfP, advisory/ consultancy assignments, for the following projects shall be deemed as eligible assignments (the “**Eligible Assignments**”):

- (i) Experience of undertaking projects in India and/or abroad involving creation of holistic vision and integrated master plans related to maritime/island/coastal/riverine/tourism/city development ecosystem including review and assessment of carrying capacity to facilitate sustainable development with each project involving a minimum area of twenty five (25) sq km. with capital costs more than Rs. 500 Crore each. OR
- (ii) Projects which involve undertaking techno-economic feasibility, project structuring on PPP basis and development of implementation and marketing plans with capital costs more than Rs. 500 Crore each. OR
- (iii) Experience of undertaking environmental impact assessment studies, ecological/social assessments of projects related to maritime/island/coastal/riverine/tourism/city development ecosystem involving a minimum area of twenty-five (25) sq km with capital costs more than Rs. 500 Crore each. OR

(iv) Experience of projects involving undertaking Detailed Project Reports for the Development of Mega-infrastructure projects such as Greenfield Seaports/Greenfield Airports/water- waste water network/Power Infrastructure/desalination, etc with capital costs more than Rs. 500 crore.

Provided that the projects/assignments completed up to 80 percent or more shall only be considered for evaluation. However, the marks awarded for such projects shall only be up to 80 percent of the maximum marks. The Applicant shall provide the proof that the project is completed up to 80 per cent through copy of invoice or payment received till date or through certificate from the respective client for physical completion.

Provided further that the Applicant firm claiming credit for an Eligible Assignment shall have, prior to PDD, received professional fees of at least Rs. 50 (fifty) lakh for such assignment, and where credit is being claimed by a Key Personnel, she/he should have completed the relevant assignment prior to PDD.

Provided further that if the Applicant firm is taking credit for an Eligible Assignment which was undertaken for a private sector entity, such assignment shall have been completed prior to PDD and the Applicant shall have received professional fees of at least Rs. 1 (one) crore.

3.2 Short-listing of Applicants

Of the Applicants ranked as aforesaid, not more than 5 (five) shall be pre-qualified and short-listed for financial evaluation in the second stage. However, if the number of such pre-qualified Applicants is less than two, the Authority may, in its sole discretion, pre-qualify the Applicant(s) whose technical score is less than 70 (seventy) points even if such Applicant(s) do(es) not qualify in terms of Clause 3.1.2; provided that in such an event, the total number of pre-qualified and short-listed Applicants shall not exceed two.

3.3 Evaluation of Financial Proposal

- 3.3.1 In the second stage, the financial evaluation will be carried out as per this Clause 3.3. Each Financial Proposal will be assigned a financial score (S_F).
- 3.3.2 For financial evaluation, the total cost indicated in the Financial Proposal, excluding Additional Costs, will be considered. Additional Costs shall include items specified as such in Form-2 of Appendix-II.
- 3.3.3 The Authority will determine whether the Financial Proposals are complete, unqualified and unconditional. The cost indicated in the Financial Proposal shall be deemed as final and reflecting the total cost of services. Omissions, if any, in costing any item shall not entitle the firm to be compensated and the liability to fulfil its obligations as per the TOR within the total quoted price shall be that of the Consultant. The lowest Financial Proposal (F_M) will be given a financial score (S_F) of 100 points. The financial scores of other Proposals will be computed as follows:

$$S_F = 100 \times F_M/F$$

(F = amount of Financial Proposal)

3.4 Combined and final evaluation

- 3.4.1 Proposals will finally be ranked according to their combined technical (S_T) and financial (S_F) scores as follows:

$$S = S_T \times T_w + S_F \times F_w$$

Where S is the combined score, and T_w and F_w are weights assigned to Technical Proposal and Financial Proposal, which shall be 0.80 and 0.20 respectively.

- 3.4.2 The Selected Applicant shall be the first ranked Applicant (having the highest combined score). The second ranked Applicant shall be kept in reserve and may be invited for negotiations in case the first ranked Applicant withdraws, or fails to comply with the requirements specified in Clauses 2.25, 2.29 and 2.30, as the case may be.

4. FRAUD AND CORRUPT PRACTICES

- 4.1 The Applicants and their respective officers, employees, agents and advisers shall observe the highest standard of ethics during the Selection Process. Notwithstanding anything to the contrary contained in this RfP, the Authority shall reject a Proposal without being liable in any manner whatsoever to the Applicant, if it determines that the Applicant has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice (collectively the “**Prohibited Practices**”) in the Selection Process. In such an event, the Authority shall, without prejudice to its any other rights or remedies, forfeit and appropriate the Bid Security or Performance Security, as the case may be, as mutually agreed genuine pre-estimated compensation and damages payable to the Authority for, *inter alia*, time, cost and effort of the Authority, in regard to the RfP, including consideration and evaluation of such Applicant’s Proposal.
- 4.2 Without prejudice to the rights of the Authority under Clause 4.1 hereinabove and the rights and remedies which the Authority may have under the LOA or the Agreement, if an Applicant or Consultant, as the case may be, is found by the Authority to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice during the Selection Process, or after the issue of the LOA or the execution of the Agreement, such Applicant or Consultant shall not be eligible to participate in any tender or RfP issued by the Authority during a period of 2 (two) years from the date such Applicant or Consultant, as the case may be, is found by the Authority to have directly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice, as the case may be.
- 4.3 For the purposes of this Section, the following terms shall have the meaning hereinafter respectively assigned to them:
- (a) “**corrupt practice**” means (i) the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of any person connected with the Selection Process (for avoidance of doubt, offering of employment to or employing or engaging in any manner whatsoever, directly or indirectly, any official of the Authority who is or has been associated in any manner, directly or indirectly with the Selection Process or the LOA or has dealt with matters concerning the Agreement or arising therefrom, before or after the execution thereof, at any time prior to the expiry of one year from the date such official resigns or retires from or otherwise ceases to be in the service of the Authority, shall be deemed to constitute influencing the actions of a person connected with the Selection Process); or (ii) save as provided herein, engaging in any manner whatsoever, whether during the Selection Process or after the issue of the

LOA or after the execution of the Agreement, as the case may be, any person in respect of any matter relating to the Project or the LOA or the Agreement, who at any time has been or is a legal, financial or technical consultant/ adviser of the Authority in relation to any matter concerning the Project;

- (b) **“fraudulent practice”** means a misrepresentation or omission of facts or disclosure of incomplete facts, in order to influence the Selection Process;
- (c) **“coercive practice”** means impairing or harming or threatening to impair or harm, directly or indirectly, any persons or property to influence any person’s participation or action in the Selection Process;
- (d) **“undesirable practice”** means (i) establishing contact with any person connected with or employed or engaged by the Authority with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Selection Process; or (ii) having a Conflict of Interest; and
- (e) **“restrictive practice”** means forming a cartel or arriving at any understanding or arrangement among Applicants with the objective of restricting or manipulating a full and fair competition in the Selection Process.

5. PRE-PROPOSAL CONFERENCE

- 5.1 Pre-Proposal Conference of the Applicants shall be convened at the designated date, time and place. Only those Applicants, who have downloaded the RfP document from the Official Website of the Authority, shall be allowed to participate in the Pre-Proposal Conference. A maximum of two representatives of each Applicant shall be allowed to participate on production of an authority letter from the Applicant.
- 5.2 During the course of Pre-Proposal Conference, the Applicants will be free to seek clarifications and make suggestions for consideration of the Authority. The Authority shall endeavour to provide clarifications and such further information as it may, in its sole discretion, consider appropriate for facilitating a fair, transparent and competitive Selection Process.

6. MISCELLANEOUS

- 6.1 The Selection Process shall be governed by, and construed in accordance with, the laws of India and the Courts in the State in which the Authority has its headquarters shall have exclusive jurisdiction over all disputes arising under, pursuant to and/or in connection with the Selection Process.
- 6.2 The Authority, in its sole discretion and without incurring any obligation or liability, reserves the right, at any time, to:
- (a) suspend and/or cancel the Selection Process and/or amend and/or supplement the Selection Process or modify the dates or other terms and conditions relating thereto;
 - (b) consult with any Applicant in order to receive clarification or further information;
 - (c) retain any information and/or evidence submitted to the Authority by, on behalf of and/or in relation to any Applicant; and/or
 - (d) independently verify, disqualify, reject and/or accept any and all submissions or other information and/or evidence submitted by or on behalf of any Applicant.
- 6.3 It shall be deemed that by submitting the Proposal, the Applicant agrees and releases the Authority, its employees, agents and advisers, irrevocably, unconditionally, fully and finally from any and all liability for claims, losses, damages, costs, expenses or liabilities in any way related to or arising from the exercise of any rights and/or performance of any obligations hereunder, pursuant hereto and/or in connection herewith and waives any and all rights and/or claims it may have in this respect, whether actual or contingent, whether present or future.
- 6.4 All documents and other information supplied by the Authority or submitted by an Applicant shall remain or become, as the case may be, the property of the Authority. The Authority will not return any submissions made hereunder. Applicants are required to treat all such documents and information as strictly confidential.
- 6.5 The Authority reserves the right to make inquiries with any of the clients listed by the Applicants in their previous experience record.

SCHEDULES

SCHEDULE-1

(See Clause 1.1.3)

Consultancy for a Master Plan for

Holistic development of Great Nicobar Island in
Andaman & Nicobar Islands

Terms of Reference (TOR)

for

TECHNICAL CONSULTANT

Contents

- 1. General**
- 2. Objective**
- 3. Scope of Services**
- 4. Deliverables**
- 5. Time and Payment Schedule**
- 6. Meetings**
- 7. Consultancy Team**
- 8. Reporting**
- 9. Data to be made available by the Authority**
- 10. Completion of Services**

Terms of Reference (TOR)

1. GENERAL

- 1.1. The Authority seeks the services of qualified firms for preparing a Master Plan, for holistic development of Great Nicobar Island. The Terms of Reference (the “**TOR**”) for this assignment are specified below.

2. OBJECTIVE

The key objectives of this Consultancy include:

- (i) Develop a robust base for India’s presence in the Bay of Bengal/Indian Ocean for a maritime economy.
- (ii) Holistic Development addressing Environmental, Anthropological & developmental issues in an interrelated and synergistic manner.
- (iii) Creating a transshipment terminal and tapping into the unutilised potential of the island and building a new Global destination
- (iv) Creating a diverse economic base for holistic development of Great Nicobar Island
- (v) Identify priority projects and areas for potential development for specific economic drivers and supporting infrastructure.
- (vi) Attract investment in infrastructure and tourism sector by developing theme-based activities and projects.
- (vii) Facilitate the long-term growth and development of the tourism industry in a sustainable tourism planning principles.
- (viii) Specify the major programmes, roles and responsibilities of key players, institutional arrangements and resources requirements through proper project structuring.

3. SCOPE OF SERVICES

- 3.1. Considering the overall intent for facilitating holistic and sustainable development of Great Nicobar Island, the scope of consultancy study has been designed to ensure inclusion of all requisite studies, services, surveys, etc. All the studies required – technical, financial and managerial-

will be carried out by the Consultant for the identification of projects and their location/area/site. All project details required for their implementation will be prepared by the Consultant. The Consultant shall submit within 30 (thirty) days of Award of work, a detailed schedule for the Consultant's scope of work. The Schedule should include all the deliverables and key milestones at the top of the schedule.

- a) All schedules shall be created, maintained and submitted to Client in the latest version of Oracle Primavera P6 or Microsoft Project in an electronic format.
- b) The Consultant shall create and submit an initial Baseline Schedule that will be approved by Client. Upon approval, the copy of the Baseline will become the first Current Schedule.
- c) The Current Schedule shall be actively updated and maintained by the Consultant every month.
- d) All schedules shall follow the Critical Path Method (CPM)/GANTT chart of scheduling and shall have meaningful and realistic logical ties and relationships between activities.
- e) The Primavera P6 or Microsoft schedule file should be updated and submitted at least once a month.
- f) Activity durations should be reasonable (typically not more than 30 days duration except for project management tasks, procurement activities for long lead items or any other activity that obviously needs to be of longer duration).
- g) The Consultant shall use only zero or positive total float and lags on all activities in the baseline and all other versions of the schedule.
- h) A schedule narrative document shall accompany the electronic schedule describing work performed in the past month.
- i) List the major tasks completed to date and the planned work that will be performed in the upcoming month.

The scope of work for this project as described below is broadly divided into five Stages and pertains to Great Nicobar Island

Stage I: Data collection, identification of and consultation with various stakeholders, assessment of development potential, environment sensitivities and listing of potential projects;

Stage II: Identification of development sectors and delineation of area for development Great Nicobar Island

Stage III: Preparation of Detailed Master Plan, infrastructure plans, and all studies required for the purpose of obtaining necessary environmental and other related clearances. The Master Plan would include the locational details of all identified development projects

Stage IV: Preparation of Preliminary Engineering Design Reports for key identified projects

Stage V: Formulating Implementation Strategy for development including detail financial feasibility and project structuring of identified projects

3.2. The Consultant would frequently conduct interactions/discussions with all relevant departments/stakeholders of Great Nicobar Island. Development strategies need to be formulated and implemented in consultation with the stakeholders.

3.3. STAGE – I:

Data collection, identification of and consultation with various stakeholders, assessment of development potential, environment sensitivities and listing of potential projects;

3.3.1. Data Collection and analysis:

A study needs to be conducted to assess the existing scenario of all the islands/sites in islands. The Consultant shall have to procure all necessary data including secondary information required at this stage for all the selected Great Nicobar Island. This will include but not be limited to:

- Location/connectivity to the island Demographic and economic profile (should include tribal profiles)
- Hydrological data (fresh water availability)
- Climate- rainfall, wind etc
- HFL/ Tsunami data, if any

- Seismic data
- Topographic data
- Flora and Fauna/ Wild life/ Sanctuary Habitats, etc
- Military Regulations, if any
- Existing Infrastructure, if any (Water, Electricity, etc)
- Main business for living/existing tourism sectors, if any
- Land Bank - Government land/ private land availability
- Contour Survey of the selected project site/island.
- Existing studies, if any.

NITI Aayog shall share the data/ details to the extent available and help in procuring the readily available data including recent satellite images and GIS data base for these islands. However, cost for procurement of the available data would be borne by the Consultant. In case of non-availability of data required for this assignment, the Consultant would generate data through ground survey or other scientific methods. The data to be used in this assignment has to be fully reliable and acceptable to the Client. Any initial observations or deviations related to the above shall be highlighted by the Consultant as a part of their review report.

3.3.2. Reconnaissance Survey

Site visits would need to be conducted to understand the nature and activities happening on the island.. All the requisite logistics support, permits, approvals etc will be facilitated by the client in order to organise these site visits. However, cost for the site visit, collection of data, carrying out scientific analysis etc. would be borne by the Consultant. The key issues to be covered during site visits and initial assessment will include but not limited to: Socio-cultural profile of these islands/sites, available infrastructure, economic drivers such as any rich mineral, herbal resource, available transit terminals like ports, airports, jetties etc. The island may have tribal population staying there for generations and are completely detached with the mainstream. It is particularly important to work with the local tribal group (s) in the process of economic/tourism development so that their voice is reflected in the decision-making process. The tourism

market should eventually lead to employment generation for the local population.

The consultant shall identify, visit and document all existing/ potential tourism sites in consultation with the stakeholders. The sites may include heritage structure, coral reef, water features, scenic sites, beaches, forests etc. Although tourism would be the key driver of economic growth, focus of development under this assignment would also be on development of fisheries, exports of seafood and other products made in the islands, organic farming of high-value crops and other possible activities of sustainable development.

3.3.3. Preliminary assessment of Development Potential

The following would be considered for the assessment of development potential:

- Accessibility and connectivity
- Disaster vulnerability and development area
- Environment (Protection) Act, 1986, and notifications issued thereunder including Coastal Regulation Zone Notification 2019, Island Protection Zone Notification 2019, Environment Impact Assessment Notification, various waste management rules currently in force. In addition, Wildlife (Protection) Act, 1972, Forest (Conservation) Act, 1980, Water (Prevention of Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981.
- Potential economic sectors for development (tourism, agriculture and allied activities, ayush/herbal, manufacturing etc.)
- Infrastructure development
- Tourism/ natural resources
- Andaman & Nicobar Islands (Protection of Aboriginal Tribes) Regulation, 1956 and other acts/ rules applicable for protection of tribal areas.
- Orders of Hon'ble Supreme Court of India and other judgements as applicable for Andaman & Nicobar Islands.

- Existing situation assessment should be done as part of the assessment report which shall include but not be limited to the following:
 1. Review of all existing proposal, sectorial policies, strategies available
 2. Demographic Characteristics
 3. Regional Economic base assessment & Economic sector assessment
 4. Transport sector assessment
 5. Infrastructure and utilities assessment
 6. Water resource and water management assessment
 7. Geomorphological studies
 8. Coastal areas and its management
 9. Environment mapping and its assessment
 10. Heritage and conservation

Further, a list of potential economic sectors which can be developed considering a port-based development model should also be compiled and discussed with NITI Aayog.

3.3.4. Base Mapping

Consultant shall prepare the base map of Great Nicobar Island on CAD and GIS with all layers super-imposed considering the following:

- The High-Resolution of 0.5/0.6 M of Geo-eye/Quick Bird or latest Satellite Imagery will be procured by the consultant from National Remote Sensing Centre (NRSC) as per the availability of the data. The cost for the procurement of the satellite imagery shall be borne by the Consultant.
- Geo-referencing of Satellite image with revenue maps and verification of the same with the topographic survey data.

Digitization of geo-referenced revenue village maps wherever required.

- Preparation of updated base map by superimposition of combined maps over satellite imagery.
- The Final Base Map shall highlight the existing settlements in the vicinity and within the site (if any), existing road network within and in the vicinity of the site, existing physical features such as water bodies, streams, hills/hillocks, rocky areas, forests etc., administrative boundaries of villages that fall within the site, built up features such as temples/shrines etc.

Updated Island Coastal Regulation Zone (ICRZ) Plans, wherever applicable, must be taken into consideration.

3.3.5. Eco sensitivity analysis

Eco sensitivity analysis should be undertaken by the Consultant to understand the status of existing ecology of the island(s). The assessment shall be based on detailed ecological survey (both terrestrial and marine). The outcome of the survey shall provide details of the fauna and flora population, their conservation status, richness of species and bio-diversity-index. Eco-sensitivity analysis of the island eco-system, both terrestrial and marine eco-system, with reference to the identified projects would also be carried out by the Consultant. The analysis should categorically comment upon the sensitivity of the eco-system to any possible development. The findings of the eco-sensitivity analysis, so carried out, would be used for identification of projects and also for preparing Environment Impact Assessment (EIA)/Rapid EIA as and when required.

The consultant shall provide detailed evaluation of the sensitivities of the island eco-system, as mentioned above. Issues such as vulnerability to natural disasters and climate change (mitigation and adaptation capacity) shall also be highlighted as part of the assessment. A consolidated Eco-sensitivity analysis providing clear assessment and requisite management measures would be undertaken by the Consultant.

3.3.6. Land Bank Assessment

Land in the islands should be mapped on GIS-based platform showing details of ownership (Government/private/community); type of land (forests/non-forest), tribal reserves/areas, protected areas, vegetation status, eco-sensitivity etc.

3.3.7. Land suitability Assessment

Land Suitability assessment of the Island shall be undertaken to delineate all environmentally sensitive areas and to provide a development suitability map of the Island. The land suitability assessment shall be based on the analysis of land use, slopes and other physical features using the latest satellite imagery and Digital Elevation Model. All details such as land type, forest cover, water bodies, topography, existing settlements, drainage, hills etc. shall be considered for the assessment.

The output of Land suitability assessment shall be a GIS based map detailing all areas with low, medium and high development suitability. The Land suitability Assessment will form an important input to the master planning exercise. The Consultant would be required to prepare a grid of appropriate scale for the same and parametric values are to be provided for each grid for various factors to arrive at a composite map.

It is required to derive quantitative assessments for the same for evolving necessary product mix, essential physical, social and transportation networks, environment/water network and selection of the suitability of the land for the defined product mix.

3.3.8. Socio- economic assessment

Socio-economic assessment should include assessment of the demographic profile for each of the islands, detailing population type, literacy, occupation type, customs and practices etc. The social assessment shall be based on published information with Census Survey of India or any authorised source. Inputs based on direct social consultations shall be included wherever such published data is not available in the public domain.

The socio-economic profile shall also highlight the income level of the people, their occupation and dependency on aspects such as fishing, aquaculture, agriculture, tourism etc. Any impact on the micro-economy of the island, change in occupational pattern, need for resettlement/rehabilitation shall be identified and documented.

Presence of indigenous community, or religious structure, or traditions associated with the Island, shall be identified and documented as part of the assessment.

3.3.9. Accessibility and Connectivity

Consultant shall study accessibility (regional and intra-island) and connectivity (transportation mode and infrastructure) to the project destinations. The study shall include analysis of traffic volume and frequency for all existing transport modes including air, water and road, while projecting the future scenario.

3.3.10. Stakeholder consultations

The consultant at this stage is required to conduct interactions/ discussions with all relevant departments/ stakeholders of Great Nicobar Island. The discussions/ interactions should be aimed at validating all the preliminary analysis done based on the information/ data collected as well as identification of development potential. The consultant, shall also submit a Stakeholder Consultation Report. This report shall spell out clearly, but not be limited to the following:

- a) Schedule of Consultations
- b) List of Participants
- c) Methodologies and formats for discussions
- d) Discussion outcomes

3.3.11. Carrying Capacity

The Consultant shall assess the carrying capacity for the island, based upon scientific principles. The consultant shall undertake a comprehensive carrying capacity assessment for the island to provide threshold limits for tourists' inflow. This shall be based on availability of suitable land, permitted activities etc. Needs of the local people would be accorded priority while determining carry capacity for tourism development. The consultant shall also provide a framework for continued monitoring and evaluation, as well as framework for periodic revision of carrying capacity based on environmental quality, tourist/resident behaviour pattern and technological advancement. The consultant shall also ensure consensus among all stakeholders regarding the carrying capacity numbers and getting these notified by the U.T. Administration. Wherever sites have been specified, carrying capacity would be determined for each of the sites and its influence zone. Wherever sites have not been specified in these packages, carrying capacity would be determined for each of the islands mentioned therein. The consultant should ensure than any existing studies conducted in this regard by reputed organizations are accounted for.

3.3.12. Draft Site Development Potential report:

After thorough analysis and deliberations with relevant stakeholders, consultants will submit and present draft site development potential report for holistic development of the short-listed Great Nicobar Island incorporating all the analyses mentioned from 3.3.1 to 3.3.11. The report shall clearly indicate the potential and development options for the island. The report shall also include geo-tagged images/ photographs to show- case the site surveys (to the extent considered reasonable by the Consultant and the Client for the purposes of this Study) and primary stakeholder assessments undertaken by the Consultants for this purpose.

The draft Site Development Potential report shall also clearly spell out various issues and gaps in infrastructure, livelihood creation, economic activities, etc. and provide broad recommendations for mitigating the same. In this regard, the Consultant would also conduct (1) Constructability Review and (2) Value Engineering session with stakeholders, the details of which would be provided by the Client at a later date. Constructability is part of the design process. Constructability reviews during preliminary design consists of (a) viability of constructing the design as proposed i.e. can it be built in a cost effective manner or are there better alternative (b) ensures incorporation of sustainability during construction (material sourcing, recycling, water usage, storage etc) (c) ensures environmental, health and safety practices as per program standards. The consultant shall further undertake assessment of the institutional framework, statutory clearances/approvals, regulatory roadblocks, legal encumbrances etc. that govern development proposals envisaged, and will suggest suitable action points on the same.

The report shall also discuss the potential locations for development of Airport, port, town and all other infrastructure projects required for holistic development of Great Nicobar Island.

3.4. Stage – II

Identification of development sectors and delineation of area for development Of Great Nicobar Island

3.4.1. Market and Technical Assessment for economic drivers including Tourism Sector

The objective of this task is to assess the economic drivers for the island by analysing available resources and potential development scenarios at

various levels; national, local, regional, heritage, beach, mountains etc. Comparable international market should be assessed and the investment climate should be analyzed with respect to existing resources and economic sectors that would influence the successful development of Great Nicobar Island.

The assessment should include analysis of development prospects, target sectors/markets based on the competitive and comparative advantages for enhancing the pace of economic development, promoting exports and ensuring balanced development. Parameters that influence attractiveness of Great Nicobar should be identified and be evaluated critically to derive key drivers for enabling realization of project goals. The development sectors and potential market sectors identified should be benchmarked with global best practices. .

Consultant should also prepare a list of potential economic sectors, including but not limited to – manufacturing, transport, logistics, service-based industries, tourism and hospitality and support infrastructure for development of Great Nicobar Island.

The Tourism Market Assessment shall be carried out to assess the potential for promoting tourism hub concept with multiple attractions at a single location. Study will also do an assessment of activities which can attract investments for the enhancement of the socio-economic base of the island and generate employment for the local population through tourism and other development activities. The specific activities envisaged to be taken up for the purpose of this task will include the following:

- (i) Analyse the tourism sector in the country and study the region based on various relevant parameters. Analyse the future development prospects; identify target components within tourism sector based on the competitive and comparative advantages to enhance the pace of economic development.
- (ii) Assess location strengths and constraints for various sites within the study area in the context of potential themes identified for the development of an island/ cluster of islands as a tourism hub.
- (iii) Analyse the investment climate with respect to existing resources that would influence the successful development of tourism themes to potential investors to address the future growth trends, and identifying their concerns and expectations from the Project.
- (iv) Identify parameters that influence the attractiveness of the proposed tourism concept/ theme and critical evaluation of the same to derive key drivers for enabling realization of project goals.

- (v) Identify all regulatory clearances, approvals, etc. required for various hospitality/tourism and other development projects/activities.
- (vi) Evolve Suitable Product/ Activity Mix for the region and assess the likely investment potential. The analysis shall be substantiated by credible research and domestic/international examples/benchmarks.

3.4.2. Infrastructure Demand Assessment

The consultant shall carry out demand-supply analysis of the available infrastructure, both physical and social, and identify gaps in future infrastructure requirement based on projected population and tourist inflow. The analysis shall identify Strengths, Weaknesses, Opportunities and Challenges (SWOC) of each component.

Assessment of Physical Infrastructure shall include but not limited to:

- Water Supply (potable)
- Sewerage network and treatment
- Solid waste management
- Power
- Telecommunication/ ICT

Social Infrastructure assessment shall include but not limited to

- Health
- Education
- Community
- Disaster Management

3.4.3. Draft area delineation options

Great Nicobar Island has the total island area of approximately 1000 sq km. Out of this, less than 300 sq. km. area (approx. 25-30% of total island area) shall be delineated and identified for future developmental activities. This shall be termed as developable area. The exact developable area shall be delineated by the Consultant in their reports. The master planning shall be done for the entire delineated developable area. Delineations and identification of future developmental activities shall be done with valid reasoning and site potential. The total size of delineated zone should cater

to the developmental needs for the next 30 years. The consultant's analysis should be justified through credible norms and basis from the best international practices.

Within the developable area, it is proposed to develop, inter alia, Deep Berth Port (along with ancillary areas for International Trans-shipment Terminal), International airport (along with ancillary areas), Water Treatment and waste treatment system, power generation and distribution network and jetty/marina for public transport and connectivity.

3.4.4. Presentation before the Inter-Ministerial Group (IMG)/ any other forum:

Once the report is finalised by NITI Aayog, consultant may be required to make a presentation before the IMG, or any other platform, defining the final delineated options and sectors for development. The rationale for delineation and preferred options are to be presented as well. The changes as suggested by such authority may be required to be incorporated in the report and submitted for final approval.

3.5. Stage-III

Preparation of Detailed Master Plan, infrastructure plans, and all studies required for the purpose of obtaining necessary environmental and other related clearances. The Master Plan would include the locational details of all identified development projects.

Subsequent to finalisation of the delineated site boundary for Great Nicobar Island and Development Potential Report, the consultant shall initiate the process of preparation of Detailed Master Plan for the development of Great Nicobar Island. The process would entail the following steps among others:

3.5.1. Topographic survey

Based on the final delineated boundary, consultant shall conduct topographic survey of the area within the final site boundary including 500 mts buffer from the boundary. Techniques such as LIDAR, total station survey, remote sensing etc. shall be evaluated to finalise the best techniques to get accurate results. Topographic map with all attributes (physical and man-made) upto an accuracy of 0.5 mts is desired from the survey.

3.5.2. Draft Master Plan

A Draft Master Plan will incorporate:

- Final list of development Projects including port, airport, jetty, EPZ and Tourism, Infrastructure (road, air and sea connectivity), web connectivity, education, health, agriculture and allied sector, fisheries, export of sea food and coconut and other products made in the islands and other economic sectors.
- Multi-modal Traffic and Transportation Management proposals addressing the existing and future mobility requirements.
- Physical infrastructure proposals for water supply, sewerage, drainage, power (including renewables), solid waste management, recycle and re-use of water, rain water harvesting etc. based on techno-economic parameters
- Projects for reclamation of land, wherever technically feasible and ecologically sustainable
- Projects for water/lagoon villas, wherever technically feasible and ecologically sustainable.
- Social Infrastructure proposals including health, education, civil supplies, disaster management, etc. based on techno-economic parameters
- Block cost estimates for all development proposals, as per the methodology followed by the concerned UT Administration.
- Livelihood Enhancement Strategies- Market Linkages
- Final Tourism clusters/circuits/hubs & marketing strategy
- Land Use Zoning shall demarcate existing built fabric, infrastructure zone, tourism zones, ecologically sensitive areas etc. while also identifying land for future development.
- Value addition to existing policies, regulations, plans etc.
- Legal/regulatory changes
- Sectoral Management plans

- Capacity Building Plan
- Strategic Action Plan for Implementation
- Project Phasing & Institutional Framework
- Preliminary 3D sketches for design theme and character of the development
- Draft landuse plan identifying all land uses and critical infrastructure component including Physical and Social infrastructure.
- Concept Infrastructure Plan.

Overall illustrative master plan at a scale of 1:2500 not limited to but including illustrating general delineation of proposed land uses, building massing, vehicular and pedestrian circulation, open space relationships, and development character.

3.5.3. Concept Infrastructure Planning

Water Management

Source identification, reliability and its sustainability based on estimated water demand and design period for various sectors and to ensure continuous water availability. Also formulate strategies for integrated water management which shall include source management, planning of new water supply system and use of recycled water based on latest international technology and practice.

Wastewater/Solid/Hazardous waste Management

Consultant needs to develop wastewater treatment and conveyance system, common effluent treatment plant/ hazardous waste management facility and solid waste management system. The consultant shall prepare an effective, sustainable and scientific solid waste management system for the entire site which ensures effective and safe disposal of waste generated from the various uses.

Drainage

Consultant shall plan the complete drainage network including storm water drainage for the Great Nicobar Island considering rain water harvesting mechanisms. Emphasis should be on proposing innovative measures for rain water harvesting, recycle and reuse strategies.

Conventional and Non-Conventional Power

Generation and distribution requirements on the island. Evolve suitable measures for ensuring reliable and uninterrupted power supply in the delineated region, identification of power supply sources for the zone, available opportunities, and fuel source including ensuring availability of adequate power supply through development of captive / independent power plants / group captive power plants. The consultant has to evolve strategies for energy saving (moon light plan/sunshine plan), use of renewal energy, based on National Energy Efficiency guidelines/ International best practices etc. Clean energy sources need to be emphasized upon.

Based on the master plan, the consultant shall prepare the trunk power distribution system for the entire site. The consultant shall identify the necessary routes and reserve corridors for the network. The scope also includes, estimation of phase wise power requirement, identification of source of power supply (on-site &/or off-site), Assessment of power consumptions, Identify the locations and capacity of major stations and sub-substations.

Transportation network

Prepare complete transportation network for the island considering hierarchy roads, pedestrian network, multi modal transit centres, MRT network, port airport and jetties. The network should be designed considering minimal emission and maximising use of sustainable and green transportation modes.

Telecom and ICT Network

The consultant shall prepare the telecom and ICT network for the entire site such that high-speed data and voice communications can be operationalized. The consultant shall advise the client on the latest advancement in available and implementable technologies that can be used for the site. For forming a global destination, the client lays extra

importance to a robust telecom network that is available to all and augmentable due to changing requirements and technologies.

3.5.4. Draft Master Plan Report

Consultant will prepare draft master plan report integrating landuse and infrastructure plan and submit it to the client for approval. The report will include:-

- Site analysis
- Site suitability and delineation
- Development sectors and development programme
- Population projection
- Landuse plan
- Zonal plans
- Environmental management plan
- Draft design guidelines
- Concept infrastructure plan

3.5.5. Environment and related Clearances

Consultant shall be responsible for providing necessary support for obtaining Environmental Clearance, CRZ Clearance and other clearances and approvals pertaining to the Master Plan. All studies, including Environment Impact Assessment, required for the purpose shall be undertaken by the Consultant. The consultant shall also provide all necessary support for obtaining the clearances.

The Consultant shall also assist the Authority in conducting public hearing, preparing and making presentations etc., and addressing the comments and suggestions received during the EC process with a view to getting environmental clearance from the competent authority.

The Consultant shall also list out all clearances that shall be required for purpose of implementation of projects identified from the Master Plan for the holistic development of Great Nicobar, and also support with information/data/documents required for obtaining clearances.

3.5.6. Design Guidelines and Development Control Regulations

The consultant shall lay out design concept(s) and development codes to guide development proposals affecting the built fabric of the islands, considering aspects like

- Zonal Controls
- FAR, Ground coverage, setbacks zone wise
- Energy conservation and use of eco-friendly building materials
- Provisions for rainwater harvesting
- Height restriction for buildings
- Visual integration of the island
- Circulation plan emphasizing unhindered access & movement, parking and pedestrian movement
- Designing and Proposals for public spaces, street furniture and signages

3.5.7. Broad Cost estimates

The Consultant shall also prepare broad cost estimates for the identified projects included in the Master Plan along with phasing thereof. Broad cost estimates for site development shall include but not limited to costs for earthworks, civil works, roads & services/ utilities, cost of treatment plants, common infrastructure etc. Broad Cost Estimates shall be prepared as per the methodology adopted by the concerned UT Administration.

3.5.8. Final Master Plan, Infrastructure Plan, EIA Studies and cost estimates

Draft Master Plan will be shared with the concerned UT administration and central Ministries/Departments. It would also be presented to the Inter-Ministerial Group (IMG). Suggestions received would be suitably

incorporated and the Final Master Plan for Development would be prepared and submitted to NITI Aayog through the UT Administration.

3.6. Stage IV

Preparation of Preliminary Engineering Design Reports for key identified projects

After submission of Master Plan, the Consultant shall prepare Preliminary Engineering Design Reports of identified projects, which shall be inter alia, Deep Berth Port (along with ancillary areas for International Transshipment Terminal), International airport (along with ancillary areas), Water Treatment and waste treatment system, power generation and distribution network and jetty/marina for public transport and connectivity.

This shall also incorporate strategies including sustainability (during and after construction) which will allow for phased construction in accordance with Client's mandate.

The planning and design of the required infrastructure should meet the best international practices, specifications and standards in terms of quality and sustainability. The Consultant would ensure that the design and the preliminary engineering is done with the objective of delivering world class infrastructure and is in compliance. Review and comparison of best practices in this regard should be accompanied by appropriated documents/information.

As a part of the Preliminary Engineering Design Reports, the consultant shall prepare EIA/EMP Study Reports, CRZ Mapping and all connected documents and reports required for obtaining Environmental/CRZ and other clearances, as required. This may be accomplished by getting assistance from the accredited agencies of MoEF&CC through steps /procedures prescribed by MoEF&CC.

The Consultant shall also undertake social impact assessment due to the proposed improvements, especially with regards to the persons affected due to the Project and requiring resettlement and rehabilitation.

(i) Deep Berth port along with ancillary areas for International Transshipment Terminal

Development of a Deep-Sea Port at Great Nicobar utilizing availability of deep waters close to the shoreline is a long felt need for India maritime industry. With the strategic location near to international shipping route through Malacca Strait, the island has huge potential for development of a deep berth port and a transshipment terminal.

The consultant shall assist the Authority in obtaining Environmental Clearance from MoEF&CC. The consultant shall also participate in the pre-bid conference with the bidders of the Project works and assist the authority in clarifying the technical aspects arising from the Bid documents including PEDR.

Scope for work for this chapter includes

- **Traffic Studies & Demand Assessment**

Review of the container traffic passing by the proposed location, assess the potential and arrive at the enablers for the proposed location to be developed as a container transshipment owing to its proximity to shipping routes. Firm up the container Traffic Estimates, Phase-wise starting from the year 2025 to 2050, Vessel Trend Analysis, Percentage share of vessels & average parcel sizes, no. of ship calls etc.

- **Alternative locations of the Port Development**

Carry out desk studies and site reconnaissance surveys to study 4 alternative locations and arrive at the suitable location for the port development.

- **Engineering Surveys and Investigations**

- i. Metrologic & Oceanographic data*

Firm-up and summarize data on wind, waves, tides, currents etc which will form the basic inputs for planning the Port layout, design of breakwaters and other structures, Wave model studies, Real Time Ship simulation studies etc.

- ii. Topographic Survey*

Carryout topographic survey in the proposed Port area. This will basically include the following:

- Establishment of Reference bench marks, and control points on the terrain
- Cross sections of every 50m wide strips at every 50m along shoreline for a minimum length of 1km for Phase-I development
- Prepare maps using appropriate scales

- iii. Bathymetric and Geophysical Survey*

Conduct Bathymetric & shallow Seismic surveys and Collection of Oceanographic data required for EIA studies and sedimentation studies.

The surveys to be carried out based on WGS-84 Datum using UTM as a grids, supplemented by geophysical co-ordinates indicating the latitude & longitude.

The survey shall cover an area of about 2.5 x 6 km at a 100m x 100m grids covering all the Phases of development and 2.5 x 4 km @ 50m x 50m grid for Phase-I development area.

The surveys shall be performed by means of an echo sounder, a side scan sonar and a sub-bottom profiler and other required equipment.

iv. *Geotechnical Investigations: (Boreholes)*

Geotechnical Investigations, preferably in the form of bore holes and collection of subsoil data, are required for planning and designing marine structures (Breakwaters, berth structures), dredging areas and onshore structures. At least 6 marine boreholes and 10 land boreholes shall be carried out.

Soil and rock samples from each boreholes shall be collected in every 1m depth as per standard specifications and be tested to collect all relevant data /characteristics of soil/rock strata at the authorized laboratory as required for structural design and planning dredging works.

• **Port Design**

i. *Design Criteria*

Firmed up Traffic Estimate with Phases, Design vessels. Benchmarking & capacity calculations of berths which are inputs for planning the layout, design of structures and fixing depth for dredging works.

ii. *Port layout*

Planning the configuration of the Port layout, positioning and alignment of components like breakwaters, berth structures, operational areas, harbor basin & manoeuvring (turning) circles, approach channel with clear dimensions, Planning of layout shall be in the order of phase giving more focus to Phase-I Development.

The proposed Port Layout shall be checked through Mathematical Model studies for its adequacy and wave tranquillity and Real time Ship Simulation Studies to ensure safe manoeuvring of ships; Sediment transportation studies etc, preparation of clear layout drawings.

iii. *Breakwaters*

Planning & Design of Breakwaters supported by design calculations, firming up the type of breakwater at different segments, alignment of breakwater, wave flume tests to check the stability of Breakwater cross sections, calculation of quantities, source of the materials, methodology of construction and preparation of connected drawings.

iv. *Berth structures:*

Planning & Design of berth structures including piles and super structure, reinforcement details, founding levels and preparation of connected drawings (longitudinal and cross sections).

v. *Dredging*

Fixation of keel clearances for design vessels, depths of dredging in berth areas, Port basin & manoeuvring areas and approach channel, computation of dredging quantities with supporting calculations, dredging methods, details of reclamation /dumping grounds by matching the dredge quantity with reclamation quantity for economic optimization etc.

vi. *Operational areas/ yards*

Layout of Operational areas, Container yards, ground slots for containers, design of terminal pavements, and foundation for equipment and buildings, receipt and delivery areas.

vii. *Utilities:*

Basic calculations and drawings for water supply, electrical power supply, sewerage, lighting, fire-fighting and communications.

viii. *Buildings.*

Basic design and drawings of the Port buildings, including Parking areas, and architectural views of main buildings.

ix. *Cargo Handling Equipment*

Planning & design of container handling equipment, STS cranes, Container yard etc including broad specifications, No. of units in each category etc.

• **Environmental and Social Impact Assessment**

As a part of the Preliminary Engineering Design Report, the consultant shall prepare EIA/EMP Study Reports, CRZ Mapping and all connected

documents and reports required for Environmental /CRZ Clearances by getting assistance from the accredited agencies of MoEF&CC and assist the Port in obtaining Environmental Clearance going through steps /procedures prescribed by MoEF&CC.

The Consultant shall undertake social impact assessment due to the improvements such as Port Layout, Road and Rail connectivity and other related facilities proposed on the Project, especially the persons affected due to the Project and requiring resettlement and rehabilitation.

- **Project Cost and feasibility**

The Consultant shall work out detailed Bill of Quantities (BOQ) for all project components including equipments, yard, & utilities with supporting calculations and prepare cost estimates of the Project with a break-down cost for each component separately, Cost estimating for rail and road network should also be included.

- i. The cost estimates be based on the schedule of rates/current market rates and /or budgetary quotations. The cost estimates shall be Phase-wise with more details for Phase-I Development.
- ii. The consultant shall ensure to adopt the market rates with reasonable escalations while preparing the Cost Estimates.

(ii) Preliminary Design for an International Airport along with all ancillary areas

Globally success of new greenfield cities is dependent on how best these cities are connected with rest of the world. Success and pace of development at Great Nicobar is also dependent on how fast the island can be put on the Global Aviation map. Thus, the need for construction of airport in Phase I development is established vital for development of this island.

- Identification of Potential Sites and recommendations for establishing Greenfield Airport:
 - i. Review of Guidelines for setting up of Greenfield Airports and National Civil Aviation Policy of Ministry of Civil Aviation, Guidelines of DGCA, Government of India, data regarding existing airports near Chennai, Airspace Availability and Interference.

- ii. Assess the land requirement for the airport and various infrastructure facilities required to be developed to cater to the projected traffic and also for development of parking and commercial facilities on the land side and also the land requirement for possibilities of developing an Aerotropolis.
- iii. Identification of at least 3 potential sites for development of new Greenfield airport on Great Nicobar island by assessing the following key factors:
 - 1. Physical:
 - Topography, Geology, Obstructions, Climatic Conditions and Services availability
 - Geographic and meteorological perspective of the Site including visibility and rainfall data
 - Location on Survey of India Topo sheets, list and location of DGPS pillar locations, list and location of DGPS control points, other topographic details, photographs of the Site etc.
 - 2. Airspace: ATC, Existing Civil and Military operations;
 - 3. Access: Airfield pavements, Road and Rail catchments; d) Planning and Environment: Surrounding Development, Population, Noise and disturbances;
 - 4. Land availability
 - 5. Cost of pre-development works, etc.
- iv. Preparation of the Detailed Project Report for setting up the proposed new Greenfield Airport based on the Obstacle Limitation Surface (OLS) survey, Environmental Impact Analysis and other considerations identified as above and other factors as may be relevant. The study should cover the activities such as (but not limited to):
 - Assessment of Land Size for developing required project facilities in Air side and Land side,
 - Locational advantages,
 - Contour mapping,
 - Topographical map,
 - Geotechnical survey,
 - Meteorological Assessment,
 - Hydrological Survey,
 - Assessment of Access,
 - External Services,
 - Air Navigation,
 - Socio-Economic data,
- v. Assess the potential to develop as an Aerotropolis.
- vi. Assess the suitability of the site for obtaining clearance/approvals from statutory authorities.

- vii. The consultant shall recommend the preferred site for the airport based on a relative assessment of the advantages and disadvantages with respect to each site.

- *Preparation of Airport Master Plan*

Preparation of Master Layout plan and preliminary Engineering design, assessment of planning parameters and facility/Infrastructure requirements including commercial activities, Environment Impact Assessment Study, Preparation of land use planning and zoning, Assessment of development options/Recommendation of preferred and phase wise development options, project schedule. The master plan shall be prepared considering

- i. airside and airfield development options,
- ii. passenger and cargo terminal development and utilisation options,
- iii. ground access and external connectivity infrastructure,
- iv. Non-aviation uses, commercial infrastructure and supporting business development requirements.

The Consultant shall prepare a Master Plan with the following requirements (but not limited to):

- i. *Number* and length of Runways and taxiways and number of aircraft parking stands. These should be designed for the Critical Aircraft type that is selected and proposed by the Consultant with scope for expansion;
- ii. Passenger terminal and Cargo terminal;
- iii. Identification and assessment of potential cargo that can be economically handled at the Airport;
- iv. Work out the economics of stopover of the over-flying crafts at Airport;
- v. Assessment of possible diversion of cargo movement from other airports;
- vi. Parking for cars, buses, cargo vehicles and staff vehicles;
- vii. Communications & navigational aids, airfield lighting and meteorological facilities in compliance with applicable standards;
- viii. Interface with possible modes of surface and sea transport;
- ix. Amenities and accommodation requirement for tourists at the Airport;
- x. Interface of other tourism related infrastructure and facilities with Airport.
- xi. Construction Cost

With the above identification of the key facilities and associated areas, the concept Master Plan shall be prepared showing the location of all airport facilities and ensure that the city side development proposals are

properly integrated with the overall development. The Consultant shall chalk out bulk land/space allotment for various users in the Concept Master Plan.

- Prepare a Financial Model for the airport with following major assumptions, but not limited to:
 - i. Passenger Traffic forecast (domestic and international),
 - ii. Capital expenditure,
 - iii. Passenger related aero and non-aero revenues estimates,
 - iv. Other revenues such as cargo, MRO etc.,
 - v. Operational expenditure,
 - vi. Land cost and leasing options,
 - vii. Tariff regulatory guidelines of AERA,
 - viii. Financing and tax related issues, etc

(iii) Preliminary Engineering Design Report for Water Treatment and waste treatment system

As part of the consultancy assignment, consultant will prepare a preliminary engineering design report for water treatment/desalination and waste water treatment facilities and will explore possibilities for development of these facilities on PPP basis. The design will be based on the infrastructure network proposed at Stage III. The Preliminary Engineering Design Report will include but not be limited to:

- i. Demand assessment
- ii. Site identification
- iii. Site Surveys and investigations.
- iv. Technology proposed
- v. Layout plan and details
- vi. Costing
- vii. Feasibility and implementation framework

(iv) Preliminary Engineering Design Report for power generation and distribution network:

As part of the consultancy assignment, consultant will prepare a preliminary engineering design report for renewable power generation, alternative power generation (gas/ coal/ oil) and distribution network for Phase I development. the objective will be to plan for uninterrupted power supply for entire city and detailing for Phase I development. The design

will be based on the infrastructure network proposed at Stage III. The Preliminary Engineering Design Report will include but not limit to:

- i. Demand assessment
- ii. Site identification for setting up of power plants
- iii. Site Surveys and investigations.
- iv. Technology proposed
- v. Layout plan and details
- vi. Costing
- vii. Feasibility and implementation framework

(v) Preliminary Design for jettv/marina for public transport and connectivity purpose.

Along with preliminary engineering design report, tender document for EPC (Engineering, Procurement and Construction) for development of trunk infrastructure are also required to be developed. The layout and preliminary engineering designs shall be supplemented with explanatory drawings, statements, charts, notes as necessary.

3.7. Stage V

Formulating Implementation Strategy for development including detail financial feasibility and project structuring of identified projects

3.7.1. Financial Feasibility

The Consultant would evolve an optimal structure for the finalized projects and assess the financial feasibility of development on a mix of public funding, Public-Private Partnership (PPP) model, donor investments and purely private investment or otherwise.

- Consultant shall evolve project structuring model (EPC/PPP) for implementation through private sector funding/public private partnership for enhancing the overall viability of the project. The Consultant should provide clear recommendations after extensive stakeholder consultations with UT Government/Client/Private developers etc with various options in terms of developing and implementing trunk infrastructure components on PPP route. The consultant shall suggest the project structuring options by also

keeping in mind all the relevant policies and guidelines of Government of India and/or any other agency issued from time to time.

- The consultant would undertake overall financial feasibility of the finalized projects as per the Master Plan of Development. The consultant would bring out various assumptions for revenue, cost and others, including basis thereof, which are used by it in the financial model. The analysis shall include all the elements of the project.

- The Consultant shall also undertake sensitivity analysis by identifying the most critical factors and determine their impact on the IRR, including varying project costs and benefits, implementation period, and combinations of these factors.

- **Risk analysis:** The consultant shall conduct a risk analysis of the development to determine, assess, allocate and manage/ mitigate risks (such as, but not limited to project, commercial, financial, political, economic, and legal risks) during all project stages;

- **Milestones:** The Consultant shall identify milestones from starting to the end of project and shall prepare suggested time-table to achieve the identified milestones.

3.7.2. Regulatory Framework

The Consultant shall review and assess appropriate institutional, legal and regulatory framework for development of the Project through different options including the public private partnership mode. The Consultant shall also list out the incentives (if required) to be provided by the concerned authorities to make the projects attractive for the users and investors. The Consultant shall also work out long term marketing strategy to enable this project to remain attractive for user agencies and demand responsive.

The scope of work would include details of prevailing legal and statutory framework, existing/ proposed policy initiatives at State/ Central level for promoting investments, developing tourism industry and other infrastructure projects; determining the prospects of delineated zone's contribution towards meeting Project Goals with respect to employment opportunities, economic growth /GDP and also, recommending changes in existing policies, guidelines, regulations, etc., while also suggesting new regulatory measures (new policies, guidelines, single window systems, etc.) for ease of development.

3.7.3. Approvals and Clearances

The Consultant shall identify and outline the process for procuring various approvals for all projects identified under the Master Plan that would be required from various regulatory agencies. The consultant shall also provide full support (documentation, technical input, preparing various forms & reports, etc.) in obtaining CRZ, Environmental Clearances, wherever required for the planned Projects. All studies required for this purpose would be carried out by the consultant.

3.7.4. Project Structuring

Based on the regulatory framework and the financial feasibility after incorporating comments and feedback from the Client, suitable project structuring models shall be assessed, and the most suitable model shall be recommended by the consultant keeping in view the quick implementation and the acceptability and marketability to the investors. This may include a project structure and funding models with a basket of public funding, investment through the public-private partnership mode, and purely private investment initiatives etc.

4. DELIVERABLES

The Consultant shall deliver the following deliverables (the “**Deliverables**”) during the course of this Consultancy. The Deliverables shall be so drafted that they could be given to the prospective bidders for guidance in preparation of their bids.

The staged deliverables will include:

Stage	Deliverable	Cumulative time frame (months)
Signing of Contract		D
Stage I Data Collection and Site Analysis	Inception Report (including but not limited to details of Approach & Methodology, strategy for data collection and analysis, team deployment plan and work plan to achieve deliverables within envisaged timelines).	D+ 0.5
	Site Assessment Report (as per activities listed under Clause 3.3 of the Scope of Work)	D+ 2.5
Stage II Identification of development sectors and delineation of area for development	Draft area delineation and development sector identification Report (as per activities listed under Clause 3.4 of the Scope of Work)	D+ 4.5
	Final Area Delineation and development sector identification (as per activities listed under Clause 3.4 of the Scope of Work)	D+ 5.0
Stage-III Preparation of Detailed Master Plan, infrastructure plans, and all studies required for the purpose of obtaining necessary environmental and other related	Draft Master Plan report including infrastructure plan (as per activities listed under Clause 3.5 of the Scope of Work)	D+ 10.0
	Submission of draft EIA/ CRZ reports (as per activities listed under 3.4 of the Scope of Work)	D+ 10.0
	Draft Design Guidelines and preliminary costing (as per activities listed under 3.5 of the Scope of Work)	D+ 12.0
	Final Master Plan, infrastructure plan,	D+ 14.0

Stage	Deliverable	Cumulative time frame (months)
clearances. The Master Plan would include the locational details of all identified development projects.	design guidelines and preliminary costing after suitably incorporating suggestions received on the draft report (as per activities listed under 3.5 of the Scope of Work)	
	Submission of final EIA/ CRZ reports (as per activities listed under 3.5 of the Scope of Work)	D+ 14.0
Stage IV Preliminary Engineering Design Report	Site Analysis, demand projection, Alternative options for site location and detail development programme for port	D+ 5
	Draft PEDR for port/transshipment terminal	D+ 7
	Final PEDR for port/transshipment terminal	D+ 9
	Site Analysis, demand projection, alternative options for site location and detail development programme for international Airport.	D+ 5
	Draft PEDR for International Airport	D+ 7
	Final PEDR for International Airport	D+ 9
	Site Analysis, demand projection, Alternative options for site location and detail of technology proposed for treatment and distribution for water and waste water treatment.	D+ 14
	Draft PEDR for Water and Waste Water treatment system	D+ 16
	Final PEDR for Water and Waste Water treatment system	D+ 18

Stage	Deliverable	Cumulative time frame (months)
	Site Analysis, demand projection, Alternative options for site location and detail of technology proposed for power generation and distribution	D+ 14
	Draft PEDR for power generation and distribution	D+ 16
	Final PEDR for power generation and distribution	D+ 18
	Site Analysis, demand projection, Alternative options for site location and detail of technology proposed for Jetty/marina for public transport and connectivity purpose	D+ 14
	Draft PEDR for Jetty/marina for public transport and connectivity purpose	D+ 16
	Final PEDR for Jetty/marina for public transport and connectivity purpose	D+ 18
Stage V Implementation Framework & financial feasibility	Draft financial feasibility report and project structuring report (as per activities listed under 3.7 of the Scope of Work)	D+ 16
	Final financial feasibility and project structuring report after suitably incorporating suggestions received on the draft report. Also, preparation of data/information/documents required for any other clearances for the identified projects.	D+ 18

6. TIME AND PAYMENT SCHEDULE

- 6.1 The total duration for preparation of the Master Plan including all deliverables as indicated in Clause 4 above shall be 18 (eighteen) months, excluding the time taken by the Authority in providing the requisite documents or in conveying its comments on the Draft Reports. The Consultant shall deploy its Key Personnel as per the Deployment of Personnel proposed.
- 6.2 Time schedule for important Deliverables of the Consultancy and the payment schedule linked to the specified Deliverables is given below:

Stage	Deliverable	Cumulative time frame (months)	Percentage payment
Signing of Contract		D	Nil
Stage I Data Collection and Site Analysis	Inception Report (including but not limited to details of Approach & Methodology, strategy for data collection and analysis, team deployment plan and work plan to achieve deliverables within envisaged timelines).	D+ 0.5	10%
	Site Assessment Report (as per activities listed under Clause 3.3 of the Scope of Work)	D+ 2.5	5%
Stage II Development Sectors and Delineation of development boundary	Draft area delineation and development sector identification (as per activities listed under Clause 3.4 of the Scope of Work)	D+ 4.5	5%
	Final Area Delineation and	D+ 5.0	10%

Stage	Deliverable	Cumulative time frame (months)	Percentage payment
	development sector identification (as per activities listed under Clause 3.4 of the Scope of Work)		
Stage-III Master Plan and EIA/ CRZ	Draft Master Plan report including infrastructure plan (as per activities listed under Clause 3.5 of the Scope of Work)	D+ 10.0	5%
	Submission of draft EIA/ CRZ reports (as per activities listed under 3.5 of the Scope of Work)	D+ 10.0	5%
	Draft Design Guidelines and preliminary costing (as per activities listed under 3.5 of the Scope of Work)	D+ 12.0	5%
	Final Master Plan, infrastructure plan, design guidelines and preliminary costing after suitably incorporating suggestions received on the draft report (as per activities listed under 3.5 of the Scope of Work)	D+ 14.0	10%
	Submission of final EIA/ CRZ reports (as per activities listed under 3.5 of the Scope of Work)	D+ 14.0	5%
Stage IV Preliminary Engineering Design	Analysis, demand projection, Alternative options for site location and detail development	D+ 5	Nil

Stage	Deliverable	Cumulative time frame (months)	Percentage payment
Reports	programme for port		
	Draft PEDR for port/transshipment terminal	D+ 7	2%
	Final PEDR for port/transshipment terminal	D+ 9	2%
	Site Analysis, demand projection, alternative options for site location and detail development programme for international Airport.	D+ 5	Nil
	Draft PEDR for International Airport	D+ 7	2%
	Final PEDR for International Airport	D+ 9	2%
	Site Analysis, demand projection, Alternative options for site location and detail of technology proposed for treatment and distribution for water and waste water treatment.	D+ 14	Nil
	Draft PEDR for Water and Waste Water treatment system	D+ 16	2%
	Final PEDR for Water and Waste Water treatment system	D+ 18	2%
	Site Analysis, demand projection, Alternative options for site location and detail of technology proposed for power generation and distribution	D+ 14	Nil

Stage	Deliverable	Cumulative time frame (months)	Percentage payment
	Draft PEDR for power generation and distribution	D+ 16	2%
	Final PEDR for power generation and distribution	D+ 18	2%
	Site Analysis, demand projection, Alternative options for site location and detail of technology proposed for Jetty/marina for public transport and connectivity purpose	D+ 14	Nil
	Draft PEDR for Jetty/marina for public transport and connectivity purpose	D+ 16	2%
	Final PEDR for Jetty/marina for public transport and connectivity purpose	D+ 18	2%
Stage V Implementation Framework & financial feasibility	Draft financial feasibility report and project structuring report (as per activities listed under 3.7 of the Scope of Work)	D+ 16	10%
	Final financial feasibility and project structuring report after suitably incorporating suggestions received on the draft report. Also preparation of data/information/documents required for any other clearances for the identified projects.	D+ 18	10%

⁸Excludes the time taken by the Authority in providing its comments on the Draft Reports. The Consultant shall get one week for submission of the Final Report after comments of the Authority are provided.

- 6.3 The ToR for the Consultant envisages assistance in the process of public hearings etc in respect of Environment Impact Assessment (EIA) as specified in paragraph 3.5.5. In the event that the process cannot be completed within the period specified herein for completion of all the deliverables, the EIA Report may be completed and submitted to the Authority within an extended period of 6 (six) weeks after submission of the final deliverable. A sum equal to 5% (five per cent) of the total payment due shall be withheld and paid to the Consultant upon submission of the EIA Report.
- 6.4 Mobilization Advance up to 10% (ten per cent) of the total Agreement Value shall be paid on request against Bank Guarantee of a Scheduled Bank. This shall attract 10% (ten per cent) simple interest per annum and shall be adjusted against the first four bills in four equal instalments and the accrued interest shall be recovered from the fifth bill.
- 6.5 A bond shall be executed by the selected firm on non-judicial Stamp paper to initiate the process of release of funds with the acceptance of Work Order.
- 6.6 All payments under this Agreement shall be made to the bank account specified by the firm as may be notified to the NITI Aayog by the Consultant. Before any payment is made released, the comments of the concerned UT Administration will be taken into account by the Authority.

7. MEETINGS

The Authority may review with the Consultant, any or all of the documents and advice forming part of the Consultancy, in meetings and conferences which will be held at the Authority's office. Further, the Consultant may be required to attend meetings and conferences with pre-qualified bidders or the selected bidder. The expenses towards attending such meetings during the period of Consultancy, including travel costs and *per diem*, shall be reimbursed in accordance with the Financial Proposal contained in Form-2 of Appendix-II of the RfP. The days required to be spent at the office of the

Authority shall be computed at the rate of 8 (eight) man hours a day in case of an outstation Consultant. For a Consultant having its office within or near the city where the Authority's office is situated, the time spent during meetings at the Authority's office shall be calculated as per actuals. No travel time shall be payable except in case of an expatriate Consultant who will be entitled to claim actual travel time, subject to a maximum of 10 (ten) man hours for a return journey.

8. CONSULTANCY TEAM

- 8.1 The Consultant shall form a multi-disciplinary team (the "**Consultancy Team**") for undertaking this assignment. The following Key Personnel whose experience and responsibilities are briefly described herein would be considered for evaluation of the Technical Proposal. Other expertise such as ecological expert, GIS Expert, Power infrastructure expert, Transportation planning expert, Social expert, infrastructure expert, tourism and hospitality expert, port planning expert, airport planning and engineering expert and Tribal/Antropology expert, shall be included in the Team either through the Key Personnel specified below or through other Professional Personnel, as necessary.

(a) Team Leader

Educational Qualifications	Post Graduate in Urban Planning/Urban Design/other relevant Infrastructure Design and/or Master Planning related disciplines.
Essential Experience	20 years of experience is required. S/He should have led the master planning/feasibility study teams for 2 (two) Eligible Assignments. Experience in design and master planning of projects with tourism/culture/ecological/infrastructure/city development elements. Experience of leading projects involving holistic development of islands or its parts/coastal areas/riverine/maritime related ecosystem on a sustainable basis would be preferred.
Job responsibilities	S/He will lead, co-ordinate and supervise the multidisciplinary team for preparation of the Master Plan and act as a focal point to the Authority throughout the duration of the Consultancy. He shall spend at least 30 (thirty) days at the Project site/Project Office.

	<p>S/He will be responsible for:</p> <ul style="list-style-type: none"> • Overall execution of the consultancy assignment. • Accountable leadership providing guidance, problem solving support and leading discussions with senior stakeholders • Ensure all deliverables and milestones are satisfactorily delivered <p>Provide insights from experience in project involving islands, riverine or maritime projects wherever applicable.</p>
Minimum time required on site	30 (thirty) days

(b) Project Manager/Urban Planner

Educational Qualifications	Post Graduate in Urban Planning/Urban Design or Master Planning related disciplines
Essential Experience	10 years of experience is required. S/He should have worked as a project manager/Urban Planner for 2 (two) Eligible Assignments. Experience in leading master planning projects for Government Sector and experience in working on greenfield/brown-field development projects preferably with tourism/cultural/ecological/city development elements. Experience in developing islands or its parts/coastal areas/riverine/maritime related ecosystem on a sustainable basis would be preferred.
Job responsibilities	<p>S/He will be responsible for assessment of project structuring models. S/He shall spend at least 30 (thirty) days at the Project site/Project Office.</p> <p>S/He will be responsible for:</p>

	<ul style="list-style-type: none"> • Coming up with workable strategies and recommendations for implementing the plans. • Ensuring seamless coordination between community stakeholders, focus groups, government and local officials. • Collecting and analyzing a wide range of data sources including environmental surveys. <p>Provide insights from experience in sustainably developing islands or it's parts/coastal areas/riverine/ maritime related ecosystem, wherever applicable.</p>
Minimum time required at site	30 (thirty) days

(c) Economic/Financial Expert

Educational Qualifications	MBA (Finance) or equivalent or Masters' in Economics
Essential Experience	15 years of experience is required. S/He should have worked as an Economic/Financial expert for 2 (two) Eligible Assignments. Relevant experience of Financial Analysis/ financial structuring/ appraisal of similar development project. Experience of working on market analysis and product mix and conducting surveys. Experience of infrastructure projects/ program of similar nature in the field of infrastructure finance and PPP projects would be added advantage.
Job responsibilities	S/He shall spend at least 20 (twenty) days at the Project site/Project Office. S/He will be responsible for: <ul style="list-style-type: none"> • Providing economic perspectives on all aspects of the project, including boosting tourism sustainably.

	<ul style="list-style-type: none"> • Providing analysis, insights and inputs focussing on the cross-sectional themes of direct/indirect employment generation, impact on and role of private sector participation, community, tribal communities and civil society in the scheme. • Providing financial analysis and support throughout the consultancy. <p>Providing analysis, insights and inputs focussing on the cross-sectional theme of Public expenditure tracking</p>
Minimum time required at site	20 (twenty) days

(d) Environmental Expert

Educational Qualifications	Masters/Bachelor in Environmental Science or equivalent
Essential Experience	10 years of experience is required. S/He should have led the environmental impact assessment teams or worked as a sole expert for 2 (two) Eligible Assignments. The expert should also be NABET accredited EIA Coordinator.
Job responsibilities	<p>S/He will be responsible for Environmental Impact Assessment of the Project. S/He shall spend at least 40 (forty) days at the Project site/Project Office. S/He will be responsible for:</p> <ul style="list-style-type: none"> • Providing all subject matter support (documentation, technical input, preparing various forms and reports etc) for obtaining CRZ, Environmental and Forest Clearances wherever required for the planned projects. • Carrying out all relevant studies in this

	<p>respect.</p> <ul style="list-style-type: none"> • Reviewing development permit applications for compliance with local plans and regulations. <p>Providing expertise on assessing the integration of environmental sustainability and climate change in the planning process. Deliver environmentally responsible outcomes.</p>
Minimum time required at site	40 (forty) days

(e) Water & Infrastructure Resources Expert

Educational Qualifications	Bachelors' in Engineering/ Post-graduate in Water-resources engineering or equivalent
Essential Experience	15 years of experience is required. S/he should have experience in water sourcing, planning & management of water supply, desalination, and wastewater recycle and reuse including rainwater harvesting.
Job responsibilities	<p>S/He will be responsible for activities related to water & infrastructure resources. S/He shall spend at least 20 (forty) days at the Project site/Project Office. S/He will be responsible for:</p> <ul style="list-style-type: none"> • Providing all subject matter support (documentation, technical input, preparing various forms and reports etc) for planning water supply/treatment/recycling/desalination and any other relevant water-related topic • Carrying out all relevant studies in this respect. • Reviewing development permit

	<p>applications for compliance with local plans and regulations.</p> <ul style="list-style-type: none"> • Planning and management of water supply network in the island • Providing expertise on assessing the integration of environmental sustainability and water-use efficiency in the planning process
Minimum time required at site	20 (forty) days

(f) Integrated Port Planning Expert

Educational Qualifications	Post Graduate in Civil Engineering with experience in Ports & Harbour Engineering
Essential Experience	20 years of experience is required. S/He should have experience in Port Management and exposure to preparation of TEFR /DPR development of Port projects involving Breakwaters, dredging, cargo terminals, connectivity and Structuring of Port projects.
Job responsibilities	<p>S/He will be responsible for Port-development related activities of the project. S/He shall spend at least 20 (forty) days at the Project site/Project Office. S/He will be responsible for:</p> <ul style="list-style-type: none"> • Providing all subject matter support (documentation, technical input, preparing various forms and reports etc) for obtaining planning port-led development and port-related projects in the island • Carrying out all relevant studies in this respect. • Reviewing development permit applications for compliance with local plans and regulations.

Minimum time required at site	20 (forty) days
-------------------------------	-----------------

(g) Airport Planning Expert

Educational Qualifications	Postgraduate in engineering or MBA with experience of working as a Team Leader for Airport development/ planning / design/ feasibility projects.
Essential Experience	20 years of experience is required. S/He should have experience in dealing with air traffic growth, airport administration, operation, management and aviation forecasting and Policy related matters for Aviation Sector.
Job responsibilities	<p>S/He will be responsible for Airport/Aviation – planning related activities of the project. S/He shall spend at least 20 (forty) days at the Project site. S/He will be responsible for:</p> <ul style="list-style-type: none"> • Providing all subject matter support (documentation, technical input, preparing various forms and reports etc) for planning airports and aviation related activities in the island • Carrying out all relevant studies in this respect • Reviewing development permit applications for compliance with local plans and regulations.
Minimum time required at site	20 (forty) days

- 8.2 The Consultant shall establish a Project Office at Port Blair/Car Nicobar, for efficient and coordinated performance of its Services. All the Key Personnel shall be deployed at this office/project site as specified in the Manning Schedule forming part of the Agreement. The authorised officials of the Authority may visit the Consultant's Project Office any time during office hours for inspection and interaction with the Consultant's Personnel. It is not expected of the Consultant to carry out the operations from the Head/Home Office. However, he may do so for the remaining consultancy services beyond the minimum time required on Project site/project office.
- 8.3 The Consultant shall mobilise and demobilise its Professional Personnel and Support Personnel with the concurrence of the Authority and shall maintain the time sheet/ attendance sheet of the working of all Personnel in the Project Office. These time sheets/ attendance sheets shall be made available to the Authority as and when asked for and a copy of such record shall be submitted to the Authority at the end of each calendar month.

9. REPORTING

- 9.1 The Consultant will work closely with the Authority. The Authority has established a Working Group (the "WG") to enable conduct of this assignment. A designated Project Director of the Authority will be responsible for the overall coordination and project development. He will play a coordinating role in dissemination of the Consultant's outputs, facilitating discussions, and ensuring required reactions and responses to the Consultant.
- 9.2 The Consultant may prepare Issue Papers highlighting issues that could become critical for the timely completion of the Project and that require attention from the Authority.
- 9.3 The Consultant will make a presentation on the Inception Report for discussion with the WG at a meeting. This will be a working document. The Consultant is required to prepare and submit a monthly report that includes and describes, *inter alia*, general progress to date; data and reports obtained and reviewed, conclusions to date, if any; concerns about availability of, or access to, data, analyses, reports; questions regarding the TOR or any other matters regarding work scope and related issues; and so on. The Consultants' work on the TOR tasks should continue while the report is under consideration and is being discussed.
- 9.4 Regular communication with the WG and the Project Director is required in addition to all key communications. This may take the form of telephone/ teleconferencing, emails, faxes, and occasional meetings.

9.5 The Deliverables will be submitted as per schedule provided in this RfP.

10. DATA TO BE MADE AVAILABLE BY THE AUTHORITY

Available data as may be required by the Consultant will be provided by the Authority on request. The Nodal Officer designated by the Authority shall facilitate handing over of such information to the Consultant.

11. COMPLETION OF SERVICES

11.1 All the study outputs including primary data shall be compiled, classified and submitted by the Consultant to the Authority in soft form apart from the reports indicated in the Deliverables (Paragraph 4). The study outputs shall remain the property of the Authority and shall not be used for any purpose other than that intended under these Terms of Reference without the permission of the Authority. The Consultancy shall stand completed on acceptance by the Authority of all the Deliverables of the Consultant and execution of the Concession Agreement or 18 (eighteen) months from the Effective Date, whichever is earlier. The Authority shall issue a certificate to that effect. The Consultancy shall in any case be deemed to be completed upon expiry of 19 (nineteen) months from the Effective Date, unless extended by mutual consent of the Authority and the Consultant.

SCHEDULE-2

(See Clause 2.1.3)

AGREEMENT

FOR

PREPARATION OF MASTER PLAN FOR

**Holistic Development of Great Nicobar Island in Andaman &
Nicobar Islands**

CONTENTS

1. General

- 1.1 Definitions and Interpretation
- 1.2 Relation between the Parties
- 1.3 Rights and Obligations
- 1.4 Governing law and jurisdiction
- 1.5 Language
- 1.6 Table of contents and headings
- 1.7 Notices
- 1.8 Location
- 1.9 Authority of Member-in-Charge
- 1.10 Authorised representatives
- 1.11 Taxes and duties

2. Commencement, Completion and Termination of Agreement

- 2.1 Effectiveness of Agreement
- 2.2 Commencement of Services
- 2.3 Termination of Agreement for failure to commence Services
- 2.4 Expiry of Agreement
- 2.5 Entire Agreement
- 2.6 Modification of Agreement

- 2.7 Force Majeure
- 2.8 Suspension of Agreement
- 2.9 Termination of Agreement

3. Obligations of the Consultant

- 3.1 General
- 3.2 Conflict of Interest
- 3.3 Confidentiality
- 3.4 Liability of the Consultant
- 3.5 Insurance to be taken out by the Consultant
- 3.6 Accounting, inspection and auditing
- 3.7 Consultant's actions requiring the Authority's prior approval
- 3.8 Reporting obligations
- 3.9 Documents prepared by the Consultant to be the property of the Authority
- 3.10 Equipment and materials furnished by the Authority
- 3.11 Providing access to the Project Office and Personnel
- 3.12 Accuracy of Documents

4. Consultant's Personnel and Sub-Consultant

- 4.1 General
- 4.2 Deployment of Personnel
- 4.3 Approval of Personnel

- 4.4 Substitution of Key Personnel
- 4.5 Working hours, overtime, leave etc.
- 4.6 Resident Team Leader and Project Manager
- 4.7. Sub-Consultants

5. Obligations of the Authority

- 5.1 Assistance in clearances etc.
- 5.2 Access to land and property
- 5.3 Change in Applicable Law
- 5.4 Payment

6. Payment to the Consultant

- 6.1 Cost estimates and Agreement Value
- 6.2 Currency of payment
- 6.3 Mode of billing and payment

7. Liquidated damages and penalties

- 7.1 Performance Security
- 7.2 Liquidated Damages
- 7.3 Penalty for deficiency in Services

8. Fairness and Good Faith

- 8.1 Good Faith
- 8.2 Operation of the Agreement

Settlement of Disputes

- 9.1 Amicable settlement
- 9.2 Dispute resolution
- 9.3 Conciliation
- 9.4 Arbitration

ANNEXES

- Annex-1: Terms of Reference
- Annex-2: Deployment of Personnel
- Annex-3: Estimate of Personnel Costs
- Annex-4: Approved Sub-Consultant(s)
- Annex-5: Cost of Services
- Annex-6: Payment Schedule
- Annex-7: Bank Guarantee for Performance Security

AGREEMENT

Preparation of Master Plan for Holistic Development of Great Nicobar Island in Andaman & Nicobar Islands

This AGREEMENT (hereinafter called the “**Agreement**”) is made on the day of the month of 20..., between, on the one hand, the [President of India acting through] (hereinafter called the “**Authority**” which expression shall include their respective successors and permitted assigns, unless the context otherwise requires) and, on the other hand, (hereinafter called the “**Consultant**” which expression shall include their respective successors and permitted assigns).

WHEREAS

- (A) The Authority vide its Request for Proposal for Preparation of Master Plan for holistic development of Great Nicobar Island (hereinafter called the “**Consultancy**”) for the Project (hereinafter called the “**Project**”);
- (B) the Consultant submitted its proposals for the aforesaid work, whereby the Consultant represented to the Authority that it had the required professional skills, and in the said proposals the Consultant also agreed to provide the Services to the Authority on the terms and conditions as set forth in the RfP and this Agreement; and
- (C) the Authority, on acceptance of the aforesaid proposals of the Consultant, awarded the Consultancy to the Consultant vide its Letter of Award dated (the “**LOA**”); and
- (D) in pursuance of the LOA, the parties have agreed to enter into this Agreement.

NOW, THEREFORE, the parties hereto hereby agree as follows:

1. GENERAL

1.1 Definitions and Interpretation

- 1.1.1 The words and expressions beginning with capital letters and defined in this Agreement shall, unless the context otherwise requires, have the meaning hereinafter respectively assigned to them:

- (a) “**Additional Costs**” shall have the meaning set forth in Clause 6.1.2;
- (b) “**Agreement**” means this Agreement, together with all the Annexes;
- (c) “**Agreement Value**” shall have the meaning set forth in Clause 6.1.2;
- (d) “**Applicable Laws**” means the laws and any other instruments having the force of law in India as they may be issued and in force from time to time;
- (e) “**Confidential Information**” shall have the meaning set forth in Clause 3.3;
- (f) “**Conflict of Interest**” shall have the meaning set forth in Clause 3.2 read with the provisions of RfP;
- (g) “**Dispute**” shall have the meaning set forth in Clause 9.2.1;
- (h) “**Effective Date**” means the date on which this Agreement comes into force and effect pursuant to Clause 2.1;
- (i) “**Expatriate Personnel**” means such persons who at the time of being so hired had their domicile outside India;
- (j) “**Government**” means the Government of
- (k) “**INR, Re. or Rs.**” means Indian Rupees;
- (l) “**Member**”, in case the Consultant consists of a joint venture or consortium of more than one entity, means any of these entities, and “**Members**” means all of these entities;
- (m) “**Party**” means the Authority or the Consultant, as the case may be, and Parties means both of them;
- (n) “**Personnel**” means persons hired by the Consultant or by any Sub-Consultant as employees and assigned to the performance of the Services or any part thereof;
- (o) “**Resident Personnel**” means such persons who at the time of being so hired had their domicile inside India;
- (p) “**RfP**” means the Request for Proposal document in response to which the Consultant’s proposal for providing Services was accepted;

- (q) “**Services**” means the work to be performed by the Consultant pursuant to this Agreement, as described in the Terms of Reference hereto;
- (r) “**Sub-Consultant**” means any entity to which the Consultant subcontracts any part of the Services in accordance with the provisions of Clause 4.7; and
- (s) “**Third Party**” means any person or entity other than the Government, the Authority, the Consultant or a Sub-Consultant.

All terms and words not defined herein shall, unless the context otherwise requires, have the meaning assigned to them in the RfP.

1.1.2 The following documents along with all addenda issued thereto shall be deemed to form and be read and construed as integral parts of this Agreement and in case of any contradiction between or among them the priority in which a document would prevail over another would be as laid down below beginning from the highest priority to the lowest priority:

- (a) Agreement;
- (b) Annexes of Agreement;
- (c) RfP; and
- (d) Letter of Award.

1.2 Relation between the Parties

Nothing contained herein shall be construed as establishing a relation of master and servant or of agent and principal as between the Authority and the Consultant. The Consultant shall, subject to this Agreement, have complete charge of Personnel performing the Services and shall be fully responsible for the Services performed by them or on their behalf hereunder.

1.3 Rights and obligations

The mutual rights and obligations of the Authority and the Consultant shall be as set forth in the Agreement, in particular:

- (a) the Consultant shall carry out the Services in accordance with the provisions of the Agreement; and
- (b) the Authority shall make payments to the Consultant in accordance with the provisions of the Agreement.

1.4 Governing law and jurisdiction

This Agreement shall be construed and interpreted in accordance with and governed by the laws of India, and the courts in the State in which the Authority has its headquarters shall have exclusive jurisdiction over matters arising out of or relating to this Agreement.

1.5 Language

All notices required to be given by one Party to the other Party and all other communications, documentation and proceedings which are in any way relevant to this Agreement shall be in writing and in English language.

1.6 Table of contents and headings

The table of contents, headings or sub-headings in this Agreement are for convenience of reference only and shall not be used in, and shall not affect, the construction or interpretation of this Agreement.

1.7 Notices

Any notice or other communication to be given by any Party to the other Party under or in connection with the matters contemplated by this Agreement shall be in writing and shall:

- (a) in the case of the Consultant, be given by e-mail and by letter delivered by hand to the address given and marked for attention of the Consultant's Representative set out below in Clause 1.10 or to such other person as the Consultant may from time to time designate by notice to the Authority; provided that notices or other communications to be given to an address outside the city specified in Sub-clause (b) below may, if they are subsequently confirmed by sending a copy thereof by registered acknowledgement due, air mail or by courier, be sent by e-mail to the number as the Consultant may from time to time specify by notice to the Authority;
- (b) in the case of the Authority, be given by e-mail and by letter delivered by hand and be addressed to the Authority with a copy delivered to the Authority Representative set out below in Clause 1.10 or to such other person as the Authority may from time to time designate by notice to the Consultant; provided that if the Consultant does not have an office in the same city as the Authority's office, it may send such notice by e-mail and by registered acknowledgement due, air mail or by courier; and
- (c) any notice or communication by a Party to the other Party, given in accordance herewith, shall be deemed to have been delivered when

in the normal course of post it ought to have been delivered and in all other cases, it shall be deemed to have been delivered on the actual date and time of delivery; provided that in the case of e-mail, it shall be deemed to have been delivered on the working days following the date of its delivery.

1.8 Location

The Services shall be performed at the site of the Project in accordance with the provisions of RfP and at such locations as are incidental thereto, including the offices of the Consultant.

1.9 Authority of Member-in-charge

In case the Consultant consists of a consortium of more than one entity, the Parties agree that the Lead Member shall act on behalf of the Members in exercising all the Consultant's rights and obligations towards the Authority under this Agreement, including without limitation the receiving of instructions and payments from the Authority.

1.10 Authorised Representatives

1.10.1 Any action required or permitted to be taken, and any document required or permitted to be executed, under this Agreement by the Authority or the Consultant, as the case may be, may be taken or executed by the officials specified in this Clause 1.10.

1.10.2 The Authority may, from time to time, designate one of its officials as the Authority Representative. Unless otherwise notified, the Authority Representative shall be:

.....

.....

Tel:

Mobile:

Email:

1.10.3 The Consultant may designate one of its employees as Consultant's Representative. Unless otherwise notified, the Consultant's Representative shall be:

.....

.....

Tel:

Mobile:

Email:

1.11 Taxes and duties

Unless otherwise specified in the Agreement, the Consultant shall pay all such taxes, duties, fees and other impositions as may be levied under the Applicable Laws and the Authority shall perform such duties in regard to the deduction of such taxes as may be lawfully imposed on it.

2. COMMENCEMENT, COMPLETION AND TERMINATION OF AGREEMENT

2.1 Effectiveness of Agreement

This Agreement shall come into force and effect on the date of this Agreement (the “**Effective Date**”).

2.2 Commencement of Services

The Consultant shall commence the Services within a period of 7 (seven) days from the Effective Date, unless otherwise agreed by the Parties.

2.3 Termination of Agreement for failure to commence Services

If the Consultant does not commence the Services within the period specified in Clause 2.2 above, the Authority may, by not less than 2 (two) weeks’ notice to the Consultant, declare this Agreement to be null and void, and in the event of such a declaration, the Bid Security of the Consultant shall stand forfeited.

2.4 Expiry of Agreement

Unless terminated earlier pursuant to Clauses 2.3 or 2.9 hereof, this Agreement shall, unless extended by the Parties by mutual consent, expire upon the earlier of (i) expiry of a period of 90 (ninety) days after the delivery of the final deliverable to the Authority; and (ii) the expiry of [1 (one) year] from the Effective Date. Upon Termination, the Authority shall make payments of all amounts due to the Consultant hereunder.

2.5 Entire Agreement

2.5.1 This Agreement and the Annexes together constitute a complete and exclusive statement of the terms of the agreement between the Parties on the subject hereof, and no amendment or modification hereto shall be valid

and effective unless such modification or amendment is agreed to in writing by the Parties and duly executed by persons especially empowered in this behalf by the respective Parties. All prior written or oral understandings, offers or other communications of every kind pertaining to this Agreement are abrogated and withdrawn; provided, however, that the obligations of the Consultant arising out of the provisions of the RfP shall continue to subsist and shall be deemed to form part of this Agreement.

- 2.5.2 Without prejudice to the generality of the provisions of Clause 2.5.1, on matters not covered by this Agreement, the provisions of RfP shall apply.

2.6 Modification of Agreement

Modification of the terms and conditions of this Agreement, including any modification of the scope of the Services, may only be made by written agreement between the Parties. Pursuant to Clauses 4.2.3 and 6.1.3 hereof, however, each Party shall give due consideration to any proposals for modification made by the other Party.

2.7 Force Majeure

2.7.1 Definition

- (a) For the purposes of this Agreement, “**Force Majeure**” means an event which is beyond the reasonable control of a Party, and which makes a Party’s performance of its obligations hereunder impossible or so impractical as reasonably to be considered impossible in the circumstances, and includes, but is not limited to, war, riots, civil disorder, earthquake, fire, explosion, storm, flood or other adverse weather conditions, strikes, lockouts or other industrial action (except where such strikes, lockouts or other industrial action are within the power of the Party invoking Force Majeure to prevent), confiscation or any other action by government agencies.
- (b) Force Majeure shall not include (i) any event which is caused by the negligence or intentional action of a Party or such Party’s Sub-Consultant or agents or employees, nor (ii) any event which a diligent Party could reasonably have been expected to both (A) take into account at the time of the conclusion of this Agreement, and (B) avoid or overcome in the carrying out of its obligations hereunder.
- (c) Force Majeure shall not include insufficiency of funds or failure to make any payment required hereunder.

2.7.2 No breach of Agreement

The failure of a Party to fulfil any of its obligations hereunder shall not be considered to be a breach of, or default under, this Agreement insofar as such inability arises from an event of Force Majeure, provided that the Party affected by such an event has taken all reasonable precautions, due care and reasonable alternative measures, all with the objective of carrying out the terms and conditions of this Agreement.

2.7.3 Measures to be taken

- (a) A Party affected by an event of Force Majeure shall take all reasonable measures to remove such Party's inability to fulfil its obligations hereunder with a minimum of delay.
- (b) A Party affected by an event of Force Majeure shall notify the other Party of such event as soon as possible, and in any event not later than 14 (fourteen) days following the occurrence of such event, providing evidence of the nature and cause of such event, and shall similarly give notice of the restoration of normal conditions as soon as possible.
- (c) The Parties shall take all reasonable measures to minimise the consequences of any event of Force Majeure.

2.7.4 Extension of time

Any period within which a Party shall, pursuant to this Agreement, complete any action or task, shall be extended for a period equal to the time during which such Party was unable to perform such action as a result of Force Majeure.

2.7.5 Payments

During the period of its inability to perform the Services as a result of an event of Force Majeure, the Consultant shall be entitled to be reimbursed for Additional Costs reasonably and necessarily incurred by it during such period for the purposes of the Services and in reactivating the Services after the end of such period.

2.7.6 Consultation

Not later than 30 (thirty) days after the Consultant has, as the result of an event of Force Majeure, become unable to perform a material portion of the Services, the Parties shall consult with each other with a view to agreeing on appropriate measures to be taken in the circumstances.

2.8 Suspension of Agreement

The Authority may, by written notice of suspension to the Consultant, suspend all payments to the Consultant hereunder if the Consultant shall be in breach of this Agreement or shall fail to perform any of its obligations under this Agreement, including the carrying out of the Services; provided that such notice of suspension (i) shall specify the nature of the breach or failure, and (ii) shall provide an opportunity to the Consultant to remedy such breach or failure within a period not exceeding 30 (thirty) days after receipt by the Consultant of such notice of suspension.

2.9 Termination of Agreement

2.9.1 By the Authority

The Authority may, by not less than 30 (thirty) days' written notice of termination to the Consultant, such notice to be given after the occurrence of any of the events specified in this Clause 2.9.1, terminate this Agreement if:

- (a) the Consultant fails to remedy any breach hereof or any failure in the performance of its obligations hereunder, as specified in a notice of suspension pursuant to Clause 2.8 hereinabove, within 30 (thirty) days of receipt of such notice of suspension or within such further period as the Authority may have subsequently granted in writing;
- (b) the Consultant becomes insolvent or bankrupt or enters into any agreement with its creditors for relief of debt or take advantage of any law for the benefit of debtors or goes into liquidation or receivership whether compulsory or voluntary;
- (c) the Consultant fails to comply with any final decision reached as a result of arbitration proceedings pursuant to Clause 9 hereof;
- (d) the Consultant submits to the Authority a statement which has a material effect on the rights, obligations or interests of the Authority and which the Consultant knows to be false;
- (e) any document, information, data or statement submitted by the Consultant in its Proposals, based on which the Consultant was considered eligible or successful, is found to be false, incorrect or misleading;
- (f) as the result of Force Majeure, the Consultant is unable to perform a material portion of the Services for a period of not less than 60 (sixty) days; or
- (g) the Authority, in its sole discretion and for any reason whatsoever, decides to terminate this Agreement.

2.9.2 By the Consultant

The Consultant may, by not less than 30 (thirty) days' written notice to the Authority, such notice to be given after the occurrence of any of the events specified in this Clause 2.9.2, terminate this Agreement if:

- (a) the Authority fails to pay any money due to the Consultant pursuant to this Agreement and not subject to dispute pursuant to Clause 9 hereof within 45 (forty-five) days after receiving written notice from the Consultant that such payment is overdue;
- (b) the Authority is in material breach of its obligations pursuant to this Agreement and has not remedied the same within 45 (forty-five) days (or such longer period as the Consultant may have subsequently granted in writing) following the receipt by the Authority of the Consultant's notice specifying such breach;
- (c) as the result of Force Majeure, the Consultant is unable to perform a material portion of the Services for a period of not less than 60 (sixty) days; or
- (d) the Authority fails to comply with any final decision reached as a result of arbitration pursuant to Clause 9 hereof.

2.9.3 Cessation of rights and obligations

Upon termination of this Agreement pursuant to Clauses 2.3 or 2.9 hereof, or upon expiration of this Agreement pursuant to Clause 2.4 hereof, all rights and obligations of the Parties hereunder shall cease, except (i) such rights and obligations as may have accrued on the date of termination or expiration, or which expressly survive such Termination; (ii) the obligation of confidentiality set forth in Clause 3.3 hereof; (iii) the Consultant's obligation to permit inspection, copying and auditing of such of its accounts and records set forth in Clause 3.6, as relate to the Consultant's Services provided under this Agreement; and (iv) any right or remedy which a Party may have under this Agreement or the Applicable Law.

2.9.4 Cessation of Services

Upon termination of this Agreement by notice of either Party to the other pursuant to Clauses 2.9.1 or 2.9.2 hereof, the Consultant shall, immediately upon dispatch or receipt of such notice, take all necessary steps to bring the Services to a close in a prompt and orderly manner and shall make every reasonable effort to keep expenditures for this purpose to a minimum. With respect to documents prepared by the Consultant and equipment and materials furnished by the Authority, the Consultant shall proceed as provided respectively by Clauses 3.9 or 3.10 hereof.

2.9.5 Payment upon Termination

Upon termination of this Agreement pursuant to Clauses 2.9.1 or 2.9.2 hereof, the Authority shall make the following payments to the Consultant (after offsetting against these payments any amount that may be due from the Consultant to the Authority):

- (i) remuneration pursuant to Clause 6 hereof for Services satisfactorily performed prior to the date of termination;
- (ii) reimbursable expenditures pursuant to Clause 6 hereof for expenditures actually incurred prior to the date of termination; and
- (iii) except in the case of termination pursuant to sub-clauses (a) through (e) of Clause 2.9.1 hereof, reimbursement of any reasonable cost incidental to the prompt and orderly termination of the Agreement including the cost of the return travel of the Consultant's personnel.

2.9.6 Disputes about Events of Termination

If either Party disputes whether an event specified in Clause 2.9.1 or in Clause 2.9.2 hereof has occurred, such Party may, within 30 (thirty) days after receipt of notice of termination from the other Party, refer the matter to arbitration pursuant to Clause 9 hereof, and this Agreement shall not be terminated on account of such event except in accordance with the terms of any resulting arbitral award.

3. OBLIGATIONS OF THE CONSULTANT

3.1 General

3.1.1 Standards of Performance

The Consultant shall perform the Services and carry out its obligations hereunder with all due diligence, efficiency and economy, in accordance with generally accepted professional techniques and practices, and shall observe sound management practices, and employ appropriate advanced technology and safe and effective equipment, machinery, materials and methods. The Consultant shall always act, in respect of any matter relating to this Agreement or to the Services, as a faithful adviser to the Authority, and shall at all times support and safeguard the Authority's legitimate interests in any dealings with Sub-Consultants or Third Parties.

3.1.2 Terms of Reference

The scope of services to be performed by the Consultant is specified in the Terms of Reference (the "TOR") at Annex-1 of this Agreement. The

Consultant shall provide the Deliverables specified therein in conformity with the time schedule stated therein.

3.1.3 Applicable Laws

The Consultant shall perform the Services in accordance with the Applicable Laws and shall take all practicable steps to ensure that any Sub-Consultant, as well as the Personnel and agents of the Consultant and any Sub-Consultant, comply with the Applicable Laws.

3.2 Conflict of Interest

3.2.1 The Consultant shall not have a Conflict of Interest and any breach hereof shall constitute a breach of the Agreement.

3.2.2 Consultant and Affiliates not to be otherwise interested in the Project

The Consultant agrees that, during the term of this Agreement and after its termination, the Consultant or any Associate thereof and any entity affiliated with the Consultant, as well as any Sub-Consultant and any entity affiliated with such Sub-Consultant, shall be disqualified from providing goods, works, services, loans or equity for any project resulting from or closely related to the Services and any breach of this obligation shall amount to a Conflict of Interest; provided that the restriction herein shall not apply after a period of five years from the completion of this assignment or to consulting assignments granted by banks/ lenders at any time; provided further that this restriction shall not apply to consultancy/ advisory services provided to the Authority in continuation of this Consultancy or to any subsequent consultancy/ advisory services provided to the Authority in accordance with the rules of the Authority. For the avoidance of doubt, an entity affiliated with the Consultant shall include a partner in the Consultant's firm or a person who holds more than 5% (five per cent) of the subscribed and paid up share capital of the Consultant, as the case may be, and any Associate thereof.

3.2.3 Prohibition of conflicting activities

Neither the Consultant nor its Sub-Consultant nor the Personnel of either of them shall engage, either directly or indirectly, in any of the following activities:

- (a) during the term of this Agreement, any business or professional activities which would conflict with the activities assigned to them under this Agreement;
- (b) after the termination of this Agreement, such other activities as may be specified in the Agreement; or

- (c) at any time, such other activities as have been specified in the RfP as Conflict of Interest.

3.2.4 Consultant not to benefit from commissions, discounts, etc.

The remuneration of the Consultant pursuant to Clause 6 hereof shall constitute the Consultant's sole remuneration in connection with this Agreement or the Services and the Consultant shall not accept for its own benefit any trade commission, discount or similar payment in connection with activities pursuant to this Agreement or to the Services or in the discharge of its obligations hereunder, and the Consultant shall use its best efforts to ensure that any Sub-Consultant, as well as the Personnel and agents of either of them, similarly shall not receive any such additional remuneration.

3.2.5 The Consultant and its Personnel shall observe the highest standards of ethics and shall not have engaged in and shall not hereafter engage in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice (collectively the "**Prohibited Practices**"). Notwithstanding anything to the contrary contained in this Agreement, the Authority shall be entitled to terminate this Agreement forthwith by a communication in writing to the Consultant, without being liable in any manner whatsoever to the Consultant, if it determines that the Consultant has, directly or indirectly or through an agent, engaged in any Prohibited Practices in the Selection Process or before or after entering into of this Agreement. In such an event, the Authority shall forfeit and appropriate the performance security, if any, as mutually agreed genuine pre-estimated compensation and damages payable to the Authority towards, *inter alia*, the time, cost and effort of the Authority, without prejudice to the Authority's any other rights or remedy hereunder or in law.

3.2.6 Without prejudice to the rights of the Authority under Clause 3.2.5 above and the other rights and remedies which the Authority may have under this Agreement, if the Consultant is found by the Authority to have directly or indirectly or through an agent, engaged or indulged in any Prohibited Practices, during the Selection Process or before or after the execution of this Agreement, the Consultant shall not be eligible to participate in any tender or RfP issued during a period of 2 (two) years from the date the Consultant is found by the Authority to have directly or indirectly or through an agent, engaged or indulged in any Prohibited Practices.

3.2.7 For the purposes of Clauses 3.2.5 and 3.2.6, the following terms shall have the meaning hereinafter respectively assigned to them:

- (a) "**corrupt practice**" means (i) the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence the actions of any person connected with the Selection Process (for

removal of doubt, offering of employment or employing or engaging in any manner whatsoever, directly or indirectly, any official of the Authority who is or has been associated in any manner, directly or indirectly with Selection Process or LOA or dealing with matters concerning the Agreement before or after the execution thereof, at any time prior to the expiry of one year from the date such official resigns or retires from or otherwise ceases to be in the service of the Authority, shall be deemed to constitute influencing the actions of a person connected with the Selection Process); or (ii) engaging in any manner whatsoever, whether during the Selection Process or after the issue of LOA or after the execution of the Agreement, as the case may be, any person in respect of any matter relating to the Project or the LOA or the Agreement, who at any time has been or is a legal, financial or technical adviser the Authority in relation to any matter concerning the Project;

- (b) “**fraudulent practice**” means a misrepresentation or omission of facts or suppression of facts or disclosure of incomplete facts, in order to influence the Selection Process;
- (c) “**coercive practice**” means impairing or harming, or threatening to impair or harm, directly or indirectly, any person or property to influence any person’s participation or action in the Selection Process or the exercise of its rights or performance of its obligations by the Authority under this Agreement;
- (d) “**undesirable practice**” means (i) establishing contact with any person connected with or employed or engaged by the Authority with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Selection Process; or (ii) having a Conflict of Interest; and
- (e) “**restrictive practice**” means forming a cartel or arriving at any understanding or arrangement among Applicants with the objective of restricting or manipulating a full and fair competition in the Selection Process.

3.3 Confidentiality

The Consultant, its Sub-Consultants and the Personnel of either of them shall not, either during the term or within two years after the expiration or termination of this Agreement disclose any proprietary information, including information relating to reports, data, drawings, design software or other material, whether written or oral, in electronic or magnetic format, and the contents thereof; and any reports, digests or summaries created or derived from any of the foregoing that is provided by the Authority to the

Consultant, its Sub-Consultants and the Personnel; any information provided by or relating to the Authority, its technology, technical processes, business affairs or finances or any information relating to the Authority's employees, officers or other professionals or suppliers, customers, or contractors of the Authority; and any other information which the Consultant is under an obligation to keep confidential in relation to the Project, the Services or this Agreement ("**Confidential Information**"), without the prior written consent of the Authority.

Notwithstanding the aforesaid, the Consultant, its Sub-Consultants and the Personnel of either of them may disclose Confidential Information to the extent that such Confidential Information:

- (i) was in the public domain prior to its delivery to the Consultant, its Sub-Consultants and the Personnel of either of them or becomes a part of the public knowledge from a source other than the Consultant, its Sub-Consultants and the Personnel of either of them;
- (ii) was obtained from a third party with no known duty to maintain its confidentiality;
- (iii) is required to be disclosed by Applicable Laws or judicial or administrative or arbitral process or by any governmental instrumentalities, provided that for any such disclosure, the Consultant, its Sub-Consultants and the Personnel of either of them shall give the Authority, prompt written notice, and use reasonable efforts to ensure that such disclosure is accorded confidential treatment; and
- (iv) is provided to the professional advisers, agents, auditors or representatives of the Consultant or its Sub-Consultants or Personnel of either of them, as is reasonable under the circumstances; provided, however, that the Consultant or its Sub-Consultants or Personnel of either of them, as the case may be, shall require their professional advisers, agents, auditors or its representatives, to undertake in writing to keep such Confidential Information, confidential and shall use its best efforts to ensure compliance with such undertaking.

3.4 Liability of the Consultant

- 3.4.1 The Consultant's liability under this Agreement shall be determined by the Applicable Laws and the provisions hereof.
- 3.4.2 The Consultant shall, subject to the limitation specified in Clause 3.4.3, be liable to the Authority for any direct loss or damage accrued or likely to accrue due to deficiency in Services rendered by it.

- 3.4.3 The Parties hereto agree that in case of negligence or wilful misconduct on the part of the Consultant or on the part of any person or firm acting on behalf of the Consultant in carrying out the Services, the Consultant, with respect to damage caused to the Authority's property, shall not be liable to the Authority:
- (i) for any indirect or consequential loss or damage; and
 - (ii) for any direct loss or damage that exceeds (a) the Agreement Value set forth in Clause 6.1.2 of this Agreement, or (b) the proceeds the Consultant may be entitled to receive from any insurance maintained by the Consultant to cover such a liability in accordance with Clause 3.5.2, whichever of (a) or (b) is higher.
- 3.4.4 This limitation of liability specified in Clause 3.4.3 shall not affect the Consultant's liability, if any, for damage to Third Parties caused by the Consultant or any person or firm acting on behalf of the Consultant in carrying out the Services subject, however, to a limit equal to 3 (three) times the Agreement Value.

3.5 Insurance to be taken out by the Consultant

- 3.5.1 (a) The Consultant shall, for the duration of this Agreement, take out and maintain, and shall cause any Sub-Consultant to take out and maintain, at its (or the Sub-Consultant's, as the case may be) own cost, but on terms and conditions approved by the Authority, insurance against the risks, and for the coverages, as specified in the Agreement and in accordance with good industry practice.
- (b) Within 15 (fifteen) days of receiving any insurance policy certificate in respect of insurances required to be obtained and maintained under this clause, the Consultant shall furnish to the Authority, copies of such policy certificates, copies of the insurance policies and evidence that the insurance premia have been paid in respect of such insurance. No insurance shall be cancelled, modified or allowed to expire or lapse during the term of this Agreement.
- (c) If the Consultant fails to effect and keep in force the aforesaid insurances for which it is responsible pursuant hereto, the Authority shall, apart from having other recourse available under this Agreement, have the option, without prejudice to the obligations of the Consultant, to take out the aforesaid insurance, to keep in force any such insurances, and pay such premia and recover the costs thereof from the Consultant, and the Consultant shall be liable to pay such amounts on demand by the Authority.

- (d) Except in case of Third Party liabilities, the insurance policies so procured shall mention the Authority as the beneficiary of the Consultant and the Consultant shall procure an undertaking from the insurance company to this effect; provided that in the event the Consultant has a general insurance policy that covers the risks specified in this Agreement and the amount of insurance cover is equivalent to 3 (three) times the cover required hereunder, such insurance policy may not mention the Authority as the sole beneficiary of the Consultant or require an undertaking to that effect.

3.5.2 The Parties agree that the risks and coverages shall include but not be limited to the following:

- (a) Third Party liability insurance as required under Applicable Laws, with a minimum coverage of Rs. 1 (one) crore;
- (b) employer's liability and workers' compensation insurance in respect of the Personnel of the Consultant and of any Sub-Consultant, in accordance with Applicable Laws; and
- (c) professional liability insurance for an amount no less than the Agreement Value.

The indemnity limit in terms of "Any One Accident" (AOA) and "Aggregate limit on the policy period" (AOP) should not be less than the amount stated in Clause 6.1.2 of the Agreement. In case of consortium, the policy should be in the name of Lead Member and not in the name of individual Members of the consortium.

3.6 Accounting, inspection and auditing

The Consultant shall:

- (a) keep accurate and systematic accounts and records in respect of the Services provided under this Agreement, in accordance with internationally accepted accounting principles and in such form and detail as will clearly identify all relevant time charges and cost, and the basis thereof (including the basis of the Consultant's costs and charges); and
- (b) permit the Authority or its designated representative periodically, and up to one year from the expiration or termination of this Agreement, to inspect the same and make copies thereof as well as to have them audited by auditors appointed by the Authority.

3.7 Consultant's actions requiring the Authority's prior approval

The Consultant shall obtain the Authority's prior approval in writing before taking any of the following actions:

- (a) appointing such members of the Professional Personnel as are not listed in Annex-2.
- (b) entering into a subcontract for the performance of any part of the Services, it being understood (i) that the selection of the Sub-Consultant and the terms and conditions of the subcontract shall have been approved in writing by the Authority prior to the execution of the subcontract, and (ii) that the Consultant shall remain fully liable for the performance of the Services by the Sub-Consultant and its Personnel pursuant to this Agreement; or
- (c) any other action that is specified in this Agreement.

3.8 Reporting obligations

The Consultant shall submit to the Authority the reports and documents specified in the Agreement, in the form, in the numbers and within the time periods set forth therein.

3.9 Documents prepared by the Consultant to be property of the Authority

- 3.9.1 All plans, drawings, specifications, designs, reports and other documents (collectively referred to as “**Consultancy Documents**”) prepared by the Consultant (or by the Sub-Consultants or any Third Party) in performing the Services shall become and remain the property of the Authority, and all intellectual property rights in such Consultancy Documents shall vest with the Authority. Any Consultancy Document, of which the ownership or the intellectual property rights do not vest with the Authority under law, shall automatically stand assigned to the Authority as and when such Consultancy Document is created and the Consultant agrees to execute all papers and to perform such other acts as the Authority may deem necessary to secure its rights herein assigned by the Consultant.
- 3.9.2 The Consultant shall, not later than termination or expiration of this Agreement, deliver all Consultancy Documents to the Authority, together with a detailed inventory thereof. The Consultant may retain a copy of such Consultancy Documents. The Consultant, its Sub-Consultants or a Third Party shall not use these Consultancy Documents for purposes unrelated to this Agreement without the prior written approval of the Authority.
- 3.9.3 The Consultant shall hold the Authority harmless and indemnified for any losses, claims, damages, expenses (including all legal expenses), awards, penalties or injuries (collectively referred to as ‘Claims’) which may arise from or due to any unauthorised use of such Consultancy Documents, or

due to any breach or failure on part of the Consultant or its Sub-Consultants or a Third Party to perform any of its duties or obligations in relation to securing the aforementioned rights of the Authority.

3.10 Equipment and materials furnished by the Authority

Equipment and materials made available to the Consultant by the Authority shall be the property of the Authority and shall be marked accordingly. Upon termination or expiration of this Agreement, the Consultant shall furnish forthwith to the Authority, an inventory of such equipment and materials and shall dispose of such equipment and materials in accordance with the instructions of the Authority. While in possession of such equipment and materials, the Consultant shall, unless otherwise instructed by the Authority in writing, insure them in an amount equal to their full replacement value.

3.11 Providing access to Project Office and Personnel

The Consultant shall ensure that the Authority, and officials of the Authority having authority from the Authority, are provided unrestricted access to the Project Office and to all Personnel during office hours. The Authority's official, who has been authorised by the Authority in this behalf, shall have the right to inspect the Services in progress, interact with Personnel of the Consultant and verify the records relating to the Services for his satisfaction.

3.12. Accuracy of Documents

The Consultant shall be responsible for accuracy of the data collected by it directly or procured from other agencies/authorities, the designs, drawings, estimates and all other details prepared by it as part of these services. Subject to the provisions of Clause 3.4, it shall indemnify the Authority against any inaccuracy in its work which might surface during implementation of the Project, if such inaccuracy is the result of any negligence or inadequate due diligence on part of the Consultant or arises out of its failure to conform to good industry practice. The Consultant shall also be responsible for promptly correcting, at its own cost and risk, the drawings including any re-survey / investigations.

4. CONSULTANT'S PERSONNEL AND SUB-CONSULTANTS

4.1 General

The Consultant shall employ and provide such qualified and experienced Personnel as may be required to carry out the Services.

4.2 Deployment of Personnel

- 4.2.1 The designations, names and the estimated periods of engagement in carrying out the Services by each of the Consultant's Personnel are described in Annex-2 of this Agreement. The estimate of Personnel costs and man day rates are specified in Annex-3 of this Agreement.
- 4.2.2 Adjustments with respect to the estimated periods of engagement of Personnel set forth in the aforementioned Annex-3 may be made by the Consultant by written notice to the Authority, provided that: (i) such adjustments shall not alter the originally estimated period of engagement of any individual by more than 20% (twenty per cent) or one week, whichever is greater, and (ii) the aggregate of such adjustments shall not cause payments under the Agreement to exceed the Agreement Value set forth in Clause 6.1.2 of this Agreement. Any other adjustments shall only be made with the written approval of the Authority.
- 4.2.3 If additional work is required beyond the scope of the Services specified in the Terms of Reference, the estimated periods of engagement of Personnel, set forth in the Annexes of the Agreement may be increased by agreement in writing between the Authority and the Consultant, provided that any such increase shall not, except as otherwise agreed, cause payments under this Agreement to exceed the Agreement Value set forth in Clause 6.1.2.

4.3 Approval of Personnel

- 4.3.1 The Professional Personnel listed in Annex-2 of the Agreement are hereby approved by the Authority. No other Professional Personnel shall be engaged without prior approval of the Authority.
- 4.3.2 If the Consultant hereafter proposes to engage any person as Professional Personnel, it shall submit to the Authority its proposal along with a CV of such person in the form provided at Appendix-I (Form-12) of the RfP. The Authority may approve or reject such proposal within 14 (fourteen) days of receipt thereof. In case the proposal is rejected, the Consultant may propose an alternative person for the Authority's consideration. In the event the Authority does not reject a proposal within 14 (fourteen) days of the date of receipt thereof under this Clause 4.3, it shall be deemed to have been approved by the Authority.

4.4 Substitution of Key Personnel

The Authority expects all the Key Personnel specified in the Proposal to be available during implementation of the Agreement. The Authority will not consider any substitution of Key Personnel except under compelling circumstances beyond the control of the Consultant and the concerned Key Personnel. Such substitution shall be limited to not more than two Key Personnel subject to equally or better qualified and experienced personnel being provided to the satisfaction of the Authority. Without prejudice to the

foregoing, substitution of one Key Personnel shall be permitted subject to reduction of remuneration equal to 20% (twenty per cent) of the total remuneration specified for the Key Personnel who is proposed to be substituted. In case of a second substitution, such reduction shall be equal to 50% (fifty per cent) of the total remuneration specified for the Key Personnel who is proposed to be substituted.

4.5 Working hours, overtime, leave, etc.

The Personnel shall not be entitled to be paid for overtime nor to take paid sick leave or vacation leave except as specified in the Agreement, and the Consultant's remuneration shall be deemed to cover these items. All leave to be allowed to the Personnel is excluded from the man days of service set forth in Annex-2. Any taking of leave by any Personnel for a period exceeding 7 (seven) days shall be subject to the prior approval of the Authority, and the Consultant shall ensure that any absence on leave will not delay the progress and quality of the Services.

4.6 Resident Team Leader and Project Manager

The person designated as the Team Leader of the Consultant's Personnel shall be responsible for the coordinated, timely and efficient functioning of the Personnel. In addition, the Consultant shall designate a suitable person as Project Manager (the "**Project Manager**") who shall be responsible for day to day performance of the Services.

4.7 Sub-Consultants

Sub-Consultants listed in Annex-4 of this Agreement are hereby approved by the Authority. The Consultant may, with prior written approval of the Authority, engage additional Sub-Consultants or substitute an existing Sub-Consultant. The hiring of Personnel by the Sub-Consultants shall be subject to the same conditions as applicable to Personnel of the Consultant under this Clause 4.

5. OBLIGATIONS OF THE AUTHORITY

5.1 Assistance in clearances etc.

Unless otherwise specified in the Agreement, the Authority shall make best efforts to ensure that the Government shall:

- (a) provide the Consultant, its Sub-Consultants and Personnel with work permits and such other documents as may be necessary to enable the Consultant, its Sub-Consultants or Personnel to perform the Services;

- (b) facilitate prompt clearance through customs of any property required for the Services; and
- (c) issue to officials, agents and representatives of the Government all such instructions as may be necessary or appropriate for the prompt and effective implementation of the Services.

5.2 Access to land and property

The Authority warrants that the Consultant shall have, free of charge, unimpeded access to the site of the project in respect of which access is required for the performance of Services; provided that if such access shall not be made available to the Consultant as and when so required, the Parties shall agree on (i) the time extension, as may be appropriate, for the performance of Services, and (ii) the additional payments, if any, to be made to the Consultant as a result thereof pursuant to Clause 6.1.3.

5.3 Change in Applicable Law

If, after the date of this Agreement, there is any change in the Applicable Laws with respect to taxes and duties which increases or decreases the cost or reimbursable expenses incurred by the Consultant in performing the Services, by an amount exceeding 2% (two per cent) of the Agreement Value specified in Clause 6.1.2, then the remuneration and reimbursable expenses otherwise payable to the Consultant under this Agreement shall be increased or decreased accordingly by agreement between the Parties hereto, and corresponding adjustments shall be made to the aforesaid Agreement Value.

5.4 Payment

In consideration of the Services performed by the Consultant under this Agreement, the Authority shall make to the Consultant such payments and in such manner as is provided in Clause 6 of this Agreement.

6. PAYMENT TO THE CONSULTANT

6.1 Cost estimates and Agreement Value

- 6.1.1 An abstract of the cost of the Services payable to the Consultant is set forth in Annex-5 of the Agreement.
- 6.1.2 Except as may be otherwise agreed under Clause 2.6 and subject to Clause 6.1.3, the payments under this Agreement shall not exceed the agreement value specified herein (the “**Agreement Value**”). The Parties agree that the Agreement Value is Rs. (Rupees.), which

does not include the Additional Costs specified in Annex-5 (the “**Additional Costs**”).

- 6.1.3 Notwithstanding anything to the contrary contained in Clause 6.1.2, if pursuant to the provisions of Clauses 2.6 and 2.7, the Parties agree that additional payments shall be made to the Consultant in order to cover any additional expenditures not envisaged in the cost estimates referred to in Clause 6.1.1 above, the Agreement Value set forth in Clause 6.1.2 above shall be increased by the amount or amounts, as the case may be, of any such additional payments.

6.2 Currency of payment

All payments shall be made in Indian Rupees. The Consultant shall be free to convert Rupees into any foreign currency as per Applicable Laws.

6.3 Mode of billing and payment

Billing and payments in respect of the Services shall be made as follows:

- (a) A Mobilisation Advance for an amount up to 10% (ten per cent) of the Agreement Value shall be paid to the Consultant on request and against a Bank Guarantee from a Scheduled Bank in India in an amount equal to such advance, such Bank Guarantee to remain effective until the advance payment has been fully set off as provided herein. The advance outstanding shall attract simple interest @ 10% (ten per cent) per annum and shall be adjusted in four equal instalments from the first four stage payments due and payable to the Consultant, and the accrued interest shall be recovered from the fifth instalment due and payable thereafter.
- (b) The Consultant shall be paid for its services as per the Payment Schedule at Annex-6 of this Agreement, subject to the Consultant fulfilling the following conditions:
 - (i) No payment shall be due for the next stage till the Consultant completes, to the satisfaction of the Authority, the work pertaining to the preceding stage.
 - (ii) The Authority shall pay to the Consultant, only the undisputed amount.
- (c) The Authority shall cause the payment due to the Consultant to be made within 30 (thirty) days after the receipt by the Authority of duly completed bills with necessary particulars (the “**Due Date**”). Interest at the rate of 10% (ten per cent) per annum shall become

payable as from the Due Date on any amount due by, but not paid on or before, such Due Date.

- (d) The final payment under this Clause shall be made only after the final report and a final statement, identified as such, shall have been submitted by the Consultant and approved as satisfactory by the Authority. The Services shall be deemed completed and finally accepted by the Authority and the final deliverable shall be deemed approved by the Authority as satisfactory upon expiry of 90 (ninety) days after receipt of the final deliverable by the Authority unless the Authority, within such 90 (ninety) day period, gives written notice to the Consultant specifying in detail, the deficiencies in the Services. The Consultant shall thereupon promptly make any necessary corrections and/or additions, and upon completion of such corrections or additions, the foregoing process shall be repeated. The Authority shall make the final payment upon acceptance or deemed acceptance of the final deliverable by the Authority.
- (e) Any amount which the Authority has paid or caused to be paid in excess of the amounts actually payable in accordance with the provisions of this Agreement shall be reimbursed by the Consultant to the Authority within 30 (thirty) days after receipt by the Consultant of notice thereof. Any such claim by the Authority for reimbursement must be made within 1 (one) year after receipt by the Authority of a final report in accordance with Clause 6.3 (d). Any delay by the Consultant in reimbursement by the due date shall attract simple interest @ 10% (ten per cent) per annum.
- (f) All payments under this Agreement shall be made to the account of the Consultant as may be notified to the Authority by the Consultant.

7. LIQUIDATED DAMAGES AND PENALTIES

7.1 Performance Security

- 7.1.1 The Authority shall retain by way of performance security (the “**Performance Security**”), 5% (five per cent) of all the amounts due and payable to the Consultant, to be appropriated against breach of this Agreement or for recovery of liquidated damages as specified in Clause 7.2. The balance remaining out of the Performance Security shall be returned to the Consultant at the end of 3 (three) months after the expiry of this Agreement pursuant to Clause 2.4 hereof. For the avoidance of doubt, the parties hereto expressly agree that in addition to appropriation of the amounts withheld hereunder, in the event of any default requiring the

appropriation of further amounts comprising the Performance Security, the Authority may make deductions from any subsequent payments due and payable to the Consultant hereunder, as if it is appropriating the Performance Security in accordance with the provisions of this Agreement.

- 7.1.2 The Consultant may, in lieu of retention of the amounts as referred to in Clause 7.1.1 above, furnish a Bank Guarantee substantially in the form specified at Annex-7 of this Agreement.

7.2 Liquidated Damages

- 7.2.1 Liquidated Damages for error/variation

In case any error or variation is detected in the reports submitted by the Consultant and such error or variation is the result of negligence or lack of due diligence on the part of the Consultant, the consequential damages thereof shall be quantified by the Authority in a reasonable manner and recovered from the Consultant by way of deemed liquidated damages, subject to a maximum of 50% (fifty per cent) of the Agreement Value.

- 7.2.2 Liquidated Damages for delay

In case of delay in completion of Services, liquidated damages not exceeding an amount equal to 0.2% (zero point two per cent) of the Agreement Value per day, subject to a maximum of 10% (ten per cent) of the Agreement Value will be imposed and shall be recovered by appropriation from the Performance Security or otherwise. However, in case of delay due to reasons beyond the control of the Consultant, suitable extension of time shall be granted.

- 7.2.3 Encashment and appropriation of Performance Security

The Authority shall have the right to invoke and appropriate the proceeds of the Performance Security, in whole or in part, without notice to the Consultant in the event of breach of this Agreement or for recovery of liquidated damages specified in this Clause 7.2.

7.3 Penalty for deficiency in Services

In addition to the liquidated damages not amounting to penalty, as specified in Clause 7.2, warning may be issued to the Consultant for minor deficiencies on its part. In the case of significant deficiencies in Services causing adverse effect on the Project or on the reputation of the Authority, other penal action including debarring for a specified period may also be initiated as per policy of the Authority.

8. FAIRNESS AND GOOD FAITH

8.1 Good Faith

The Parties undertake to act in good faith with respect to each other's rights under this Agreement and to adopt all reasonable measures to ensure the realisation of the objectives of this Agreement.

8.2 Operation of the Agreement

The Parties recognise that it is impractical in this Agreement to provide for every contingency which may arise during the life of the Agreement, and the Parties hereby agree that it is their intention that this Agreement shall operate fairly as between them, and without detriment to the interest of either of them, and that, if during the term of this Agreement either Party believes that this Agreement is operating unfairly, the Parties will use their best efforts to agree on such action as may be necessary to remove the cause or causes of such unfairness, but failure to agree on any action pursuant to this Clause shall not give rise to a dispute subject to arbitration in accordance with Clause 9 hereof.

9. SETTLEMENT OF DISPUTES

9.1 Amicable settlement

The Parties shall use their best efforts to settle amicably all disputes arising out of or in connection with this Agreement or the interpretation thereof.

9.2 Dispute resolution

9.2.1 Any dispute, difference or controversy of whatever nature howsoever arising under or out of or in relation to this Agreement (including its interpretation) between the Parties, and so notified in writing by either Party to the other Party (the "**Dispute**") shall, in the first instance, be attempted to be resolved amicably in accordance with the conciliation procedure set forth in Clause 9.3.

9.2.2 The Parties agree to use their best efforts for resolving all Disputes arising under or in respect of this Agreement promptly, equitably and in good faith, and further agree to provide each other with reasonable access during normal business hours to all non-privileged records, information and data pertaining to any Dispute.

9.3 Conciliation

In the event of any Dispute between the Parties, either Party may call upon CEO, NITI Aayog and the Chairman of the Board of Directors of the Consultant or a substitute thereof for amicable settlement, and upon such

reference, the said persons shall meet no later than 10 (ten) days from the date of reference to discuss and attempt to amicably resolve the Dispute. If such meeting does not take place within the 10 (ten) day period or the Dispute is not amicably settled within 15 (fifteen) days of the meeting or the Dispute is not resolved as evidenced by the signing of written terms of settlement within 30 (thirty) days of the notice in writing referred to in Clause 9.2.1 or such longer period as may be mutually agreed by the Parties, either Party may refer the Dispute to arbitration in accordance with the provisions of Clause 9.4.

9.4 Arbitration

- 9.4.1 Any Dispute which is not resolved amicably by conciliation, as provided in Clause 9.3, shall be finally decided by reference to arbitration by an Arbitral Tribunal appointed in accordance with Clause 9.4.2. Such arbitration shall be held in accordance with the Rules of Arbitration of the International Centre for Alternative Dispute Resolution, New Delhi (the “**Rules**”), or such other rules as may be mutually agreed by the Parties, and shall be subject to the provisions of the Arbitration and Conciliation Act, 1996. The place of such arbitration shall be the capital of the State where the Authority has its headquarters and the language of arbitration proceedings shall be English.
- 9.4.2 There shall be an Arbitral Tribunal of three arbitrators, of whom each Party shall select one, and the third arbitrator shall be appointed by the two arbitrators so selected, and in the event of disagreement between the two arbitrators, the appointment shall be made in accordance with the Rules.
- 9.4.3 The arbitrators shall make a reasoned award (the “**Award**”). Any Award made in any arbitration held pursuant to this Clause 9 shall be final and binding on the Parties as from the date it is made, and the Consultant and the Authority agree and undertake to carry out such Award without delay.
- 9.4.4 The Consultant and the Authority agree that an Award may be enforced against the Consultant and/or the Authority, as the case may be, and their respective assets wherever situated.
- 9.4.5 This Agreement and the rights and obligations of the Parties shall remain in full force and effect, pending the Award in any arbitration proceedings hereunder.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be signed in their respective names as of the day and year first above written.

SIGNED, SEALED AND DELIVERED

For and on behalf of

Consultant:

SIGNED, SEALED AND DELIVERED

For and on behalf of

Authority

(Signature)
(Name)
(Designation)
(Address)

(Signature)
(Name)
(Designation)
(Address)

In presence of:

1.

2.

Annex-1

Terms of Reference

(Refer Clause 3.1.2)

(Reproduce Schedule-1 of RfP)

Annex-2

Deployment of Personnel

(Refer Clause 4.2)

(Reproduce as per Form-13 of Appendix-I)

Annex-3

Estimate of Personnel Costs

(Refer Clause 4.2)

(Reproduce as per Form-3 of Appendix-II)

Annex-4

Approved Sub-Consultant(s)

(Refer Clause 4.7)

(Reproduce as per Form-15 of Appendix-I)

Annex-5

Cost of Services

(Refer Clause 6.1)

(Reproduce as per Form-2 of Appendix-II)

Annex-6

Payment Schedule*(Refer Clause 6.3)*

Stage	Deliverable	Cumulative time frame (months)	Percentage payment
Signing of Contract		D	Nil
Stage I Data Collection and Site Analysis	Inception Report (including but not limited to details of Approach & Methodology, strategy for data collection and analysis, team deployment plan and work plan to achieve deliverables within envisaged timelines).	D+ 0.5	10%
	Site Assessment Report (as per activities listed under Clause 3.3 of the Scope of Work)	D+ 2.5	5%
Stage II Development Sectors and Delineation of development boundary	Draft area delineation and development sector identification (as per activities listed under Clause 3.4 of the Scope of Work)	D+ 4.5	5%
	Final Area Delineation and development sector identification (as per activities listed under Clause 3.4 of the Scope of Work)	D+ 5.0	10%

Stage	Deliverable	Cumulative time frame (months)	Percentage payment
Stage-III Master Plan and EIA/ CRZ	Draft Master Plan report including infrastructure plan (as per activities listed under Clause 3.5 of the Scope of Work)	D+ 10.0	5%
	Submission of draft EIA/ CRZ reports (as per activities listed under 3.5 of the Scope of Work)	D+ 10.0	5%
	Draft Design Guidelines and preliminary costing (as per activities listed under 3.5 of the Scope of Work)	D+ 12.0	5%
	Final Master Plan, infrastructure plan, design guidelines and preliminary costing after suitably incorporating suggestions received on the draft report (as per activities listed under 3.5 of the Scope of Work)	D+ 14.0	10%
	Submission of final EIA/ CRZ reports (as per activities listed under 3.5 of the Scope of Work)	D+ 14.0	5%
Stage IV Preliminary Engineering Design Reports	Analysis, demand projection, Alternative options for site location and detail development programme for port	D+ 5	Nil
	Draft PEDR for port/transshipment terminal	D+ 7	2%
	Final PEDR for	D+ 9	2%

Stage	Deliverable	Cumulative time frame (months)	Percentage payment
	port/transshipment terminal		
	Site Analysis, demand projection, alternative options for site location and detail development programme for international Airport.	D+ 5	Nil
	Draft PEDR for International Airport	D+ 7	2%
	Final PEDR for International Airport	D+ 9	2%
	Site Analysis, demand projection, Alternative options for site location and detail of technology proposed for treatment and distribution for water and waste water treatment.	D+ 14	Nil
	Draft PEDR for Water and Waste Water treatment system	D+ 16	2%
	Final PEDR for Water and Waste Water treatment system	D+ 18	2%
	Site Analysis, demand projection, Alternative options for site location and detail of technology proposed for power generation and distribution	D+ 14	Nil
	Draft PEDR for power generation and distribution	D+ 16	2%
	Final PEDR for power generation and distribution	D+ 18	2%

Stage	Deliverable	Cumulative time frame (months)	Percentage payment
	Site Analysis, demand projection, Alternative options for site location and detail of technology proposed for Jetty/marina for public transport and connectivity purpose	D+ 14	Nil
	Draft PEDR for Jetty/marina for public transport and connectivity purpose	D+ 16	2%
	Final PEDR for Jetty/marina for public transport and connectivity purpose	D+ 18	2%
Stage V Implementation Framework & financial feasibility	Draft financial feasibility report and project structuring report (as per activities listed under 3.7 of the Scope of Work)	D+ 16	10%
	Final financial feasibility and project structuring report after suitably incorporating suggestions received on the draft report. Also preparation of data/information/documents required for any other clearances for the identified projects.	D+ 18	10%

^s Excludes the time taken by the Authority in providing its comments on the Draft Reports. The Consultant shall get one week for submission of the Final Reports after comments of the Authority are provided.

Notes:

1. *The above payments shall be made to the Consultant provided that the payments to be made at any time shall not exceed the amount certified by the Consultant in its Statement of Expenses.*
2. *All Reports shall first be submitted as draft reports for comments of the Authority. The Authority shall provide its comments no later than 3 (three) weeks from the date of receiving a draft report and in case no comments are provided within such 3 (three) weeks, the Consultant shall finalise its report. Provided, however, that the Authority may take upto 4 (four) weeks in providing its comments on the Draft Reports.*
3. *Master Plan shall be completed in 18 (eighteen) months excluding the time taken by the Authority in providing its comments on the Draft Report. The Consultant may take 1 (one) week for submitting its Final Report after receipt of comments from the Authority.*
4. *Mobilisation Advance upto 10% (ten per cent) of the total Agreement Value shall be paid on request against Bank Guarantee of a Scheduled Bank. This shall attract 10% (ten per cent) simple interest per annum and shall be adjusted against the first 4 (four) bills in four equal instalments and the accrued interest will be recovered from the 5th (fifth) bill.*

Annex- 7

Bank Guarantee for Performance Security

(Refer Clause 7.1.2)

To

[The President of India /Governor of]

acting through

.....
.....
.....

In consideration of acting on behalf of the [President of India/Governor of] (hereinafter referred as the “**Authority**”, which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators and assigns) awarding to, having its office at (hereinafter referred as the “**Consultant**” which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns), vide the Authority’s Agreement no. dated valued at Rs. (Rupees), (hereinafter referred to as the “**Agreement**”) the assignment for consultancy services in respect of the Project, and the Consultant having agreed to furnish a Bank Guarantee amounting to Rs. (Rupees) to the Authority for performance of the said Agreement.

We, (hereinafter referred to as the “**Bank**”) at the request of the Consultant do hereby undertake to pay to the Authority an amount not exceeding Rs. (Rupees) against any loss or damage caused to or suffered or would be caused to or suffered by the Authority by reason of any breach by the said Consultant of any of the terms or conditions contained in the said Agreement.

2. We, (indicate the name of the Bank) do hereby undertake to pay the amounts due and payable under this Guarantee without any demur, merely on a demand from the Authority stating that the amount/claimed is due by way of loss or damage caused to or would be caused to or suffered by the Authority by reason of breach by the said Consultant of any of the terms or conditions contained in the said Agreement or by reason of the Consultant's failure to perform the said Agreement. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs. (Rupees ..).
3. We, (indicate the name of the Bank) do hereby undertake to pay to the Authority any money so demanded notwithstanding any dispute or disputes raised by the Consultant in any suit or proceeding pending before any court or tribunal relating thereto, our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the Consultant shall have no claim against us for making such payment.
4. We, (indicate the name of Bank) further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be required for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Authority under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till the Authority certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Consultant and accordingly discharges this Guarantee. Unless a demand or claim under this Guarantee is made on us in writing on or before a period of one year from the date of this Guarantee, we shall be discharged from all liability under this Guarantee thereafter.
5. We, (indicate the name of Bank) further agree with the Authority that the Authority shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Consultant from time to time or to postpone for any time or from time to time any of the powers exercisable by the Authority against the said Consultant and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Consultant or for any forbearance, act or omission on the part of the Authority or any indulgence by the Authority to the said Consultant or any such matter or thing whatsoever which under the law

relating to sureties would, but for this provision, have the effect of so relieving us.

6. This Guarantee will not be discharged due to the change in the constitution of the Bank or the Consultant(s).
7. We, (indicate the name of Bank) lastly undertake not to revoke this Guarantee during its currency except with the previous consent of the Authority in writing.
8. For the avoidance of doubt, the Bank's liability under this Guarantee shall be restricted to Rs. crore (Rupees crore) only. The Bank shall be liable to pay the said amount or any part thereof only if the Authority serves a written claim on the Bank in accordance with Paragraph 2 hereof, on or before [..... (indicate the date falling 365 days after the date of this Guarantee)].

For

Name of Bank:

Seal of the Bank:

Dated, theday of, 20.....

(Signature, name and designation of the authorised signatory)

NOTES:

- (i) The Bank Guarantee should contain the name, designation and code number of the officer(s) signing the Guarantee.
- (ii) The address, telephone no. and other details of the Head Office of the Bank as well as of issuing Branch should be mentioned on the covering letter of issuing Branch.

SCHEDULE-3

(See Clause 2.3.3)

Guidance Note on Conflict of Interest

1. This Note further explains and illustrates the provisions of Clause 2.3 of the RfP and shall be read together therewith in dealing with specific cases.
2. Consultants should be deemed to be in a conflict of interest situation if it can be reasonably concluded that their position in a business or their personal interest could improperly influence their judgment in the exercise of their duties. The process for selection of consultants should avoid both actual and perceived conflict of interest.
3. Conflict of interest may arise between the Authority and a consultant or between consultants and present or future concessionaries/ contractors. Some of the situations that would involve conflict of interest are identified below:
 - (a) Authority and consultants:
 - (i) Potential consultant should not be privy to information from the Authority which is not available to others;
 - (ii) potential consultant should not have defined the project when earlier working for the Authority;
 - (iii) potential consultant should not have recently worked for the Authority overseeing the project.
 - (b) Consultants and concessionaires/contractors:
 - (i) No consultant should have an ownership interest or a continuing business interest or an on-going relationship with a potential concessionaire/ contractor save and except relationships restricted to project-specific and short-term assignments; or
 - (ii) no consultant should be involved in owning or operating entities resulting from the project; or
 - (iii) no consultant should bid for works arising from the project.

The participation of companies that may be involved as investors or consumers and officials of the Authority who have current or recent connections to the companies involved, therefore, needs to be avoided.

4. The normal way to identify conflicts of interest is through self-declaration by consultants. Where a conflict exists, which has not been declared, competing companies are likely to bring this to the notice of the Authority. All conflicts must be declared as and when the consultants become aware of them.
5. Another approach towards avoiding a conflict of interest is through the use of “Chinese walls” to avoid the flow of commercially sensitive information from one part of the consultant’s company to another. This could help overcome the problem of availability of limited numbers of experts for the project. However, in reality effective operation of “Chinese walls” may be a difficult proposition. As a general rule, larger companies will be more capable of adopting Chinese walls approach than smaller companies. Although, “Chinese walls” have been relatively common for many years, they are an increasingly discredited means of avoiding conflicts of interest and should be considered with caution. As a rule, “Chinese walls” should be considered as unacceptable and may be accepted only in exceptional cases upon full disclosure by a consultant coupled with provision of safeguards to the satisfaction of the Authority.
6. Another way to avoid conflicts of interest is through the appropriate grouping of tasks. For example, conflicts may arise if consultants drawing up the terms of reference or the proposed documentation are also eligible for the consequent assignment or project.
7. Another form of conflict of interest called “scope–creep” arises when consultants advocate either an unnecessary broadening of the terms of reference or make recommendations which are not in the best interests of the Authority but which will generate further work for the consultants. Some forms of contractual arrangements are more likely to lead to scope-creep. For example, lump-sum contracts provide fewer incentives for this, while time and material contracts provide built in incentives for consultants to extend the length of their assignment.
8. Every project contains potential conflicts of interest. Consultants should not only avoid any conflict of interest, they should report any present/potential conflict of interest to the Authority at the earliest. Officials of the Authority involved in development of a project shall be responsible for identifying and resolving any conflicts of interest. It should be ensured that safeguards are in place to preserve fair and open competition and measures should be taken to eliminate any conflict of interest arising at any stage in the process.

APPENDICES

APPENDIX-I

(See Clause 2.1.3)

TECHNICAL PROPOSAL

Form-1

Letter of Proposal

(On Applicant's letter head)

(Date and Reference)

To,

.....

.....

.....

Sub: Appointment of Consultant for preparation of Master Plan for holistic development of Great Nicobar Island in Andaman & Nicobar Islands

Dear Sir,

With reference to your RfP Document dated, I/we, having examined all relevant documents and understood their contents, hereby submit our Proposal for selection as Consultant for the Project. The proposal is unconditional and unqualified.

2. All information provided in the Proposal and in the Appendices is true and correct and all documents accompanying such Proposal are true copies of their respective originals.
3. This statement is made for the express purpose of appointment as the Consultant for the aforesaid Project.
4. I/We shall make available to the Authority any additional information it may deem necessary or require for supplementing or authenticating the Proposal.
5. I/We acknowledge the right of the Authority to reject our application without assigning any reason or otherwise and hereby waive our right to challenge the same on any account whatsoever.

6. I/We certify that in the last three years, we or any of our Associates have neither failed to perform on any contract, as evidenced by imposition of a penalty by an arbitral or judicial authority or a judicial pronouncement or arbitration award against the Applicant, nor been expelled from any project or contract by any public authority nor have had any contract terminated by any public authority for breach on our part.
7. I/We declare that:
 - (a) I/We have examined and have no reservations to the RfP Documents, including any Addendum issued by the Authority;
 - (b) I/We do not have any Conflict of Interest in accordance with Clause 2.3 of the RfP Document;
 - (c) I/We have not directly or indirectly or through an agent engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice, as defined in Clause 4.3 of the RfP document, in respect of any tender or request for proposal issued by or any agreement entered into with the Authority or any other public sector enterprise or any government, Central or State; and
 - (d) I/We hereby certify that we have taken steps to ensure that in conformity with the provisions of Section 4 of the RfP, no person acting for us or on our behalf will engage in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice.
8. I/We understand that you may cancel the Selection Process at any time and that you are neither bound to accept any Proposal that you may receive nor to select the Consultant, without incurring any liability to the Applicants in accordance with Clause 2.8 of the RfP document.
9. I/We declare that we/any member of the consortium, are/is not a Member of a/any other Consortium applying for Selection as a Consultant.
10. I/We certify that in regard to matters other than security and integrity of the country, we or any of our Associates have not been convicted by a Court of Law or indicted or adverse orders passed by a regulatory authority which would cast a doubt on our ability to undertake the Consultancy for the Project or which relates to a grave offence that outrages the moral sense of the community.
11. I/We further certify that in regard to matters relating to security and integrity of the country, we have not been charge-sheeted by any agency of

the Government or convicted by a Court of Law for any offence committed by us or by any of our Associates.

12. I/We further certify that no investigation by a regulatory authority is pending either against us or against our Associates or against our CEO or any of our Directors/Managers/employees.⁵
13. I/We hereby irrevocably waive any right or remedy which we may have at any stage at law or howsoever otherwise arising to challenge or question any decision taken by the Authority [and/ or the Government of India] in connection with the selection of Consultant or in connection with the Selection Process itself in respect of the above mentioned Project.
14. The Bid Security of Rs. (Rupees) in the form of a Demand Draft is attached, in accordance with the RfP document.
15. I/We agree and understand that the proposal is subject to the provisions of the RfP document. In no case, shall I/we have any claim or right of whatsoever nature if the Consultancy for the Project is not awarded to me/us or our proposal is not opened or rejected.
16. I/We agree to keep this offer valid for 90 (ninety) days from the Proposal Due Date specified in the RfP.
17. A Power of Attorney in favour of the authorised signatory to sign and submit this Proposal and documents is attached herewith in Form-4A/4B.
18. In the event of my/our firm/ consortium being selected as the Consultant, I/we agree to enter into an Agreement in accordance with the form at Schedule–2 of the RfP. We agree not to seek any changes in the aforesaid form and agree to abide by the same.
19. I/We have studied RfP and all other documents carefully and also surveyed the Project site. We understand that except to the extent as expressly set forth in the Agreement, we shall have no claim, right or title arising out of any documents or information provided to us by the Authority or in respect

⁵ In case the Applicant is unable to provide the certification specified in Paragraph 12, it may precede the Paragraph by the words viz. “Except as specified in Schedule hereto”. The exceptions to the certification or any disclosures relating thereto may be clearly stated in a Schedule to be attached to the Application. The Authority will consider the contents of such Schedule and determine whether or not the exceptions/disclosures are material to the suitability of the Applicant for pre-qualification hereunder.

of any matter arising out of or concerning or relating to the Selection Process including the award of Consultancy.

20. The Financial Proposal is being submitted in a separate cover. This Technical Proposal read with the Financial Proposal shall constitute the Application which shall be binding on us.
- 21 I/We agree and undertake to abide by all the terms and conditions of the RfP Document. In witness thereof, I/we submit this Proposal under and in accordance with the terms of the RfP Document.

Yours faithfully,

(Signature, name and designation of the authorised signatory)
(Name and seal of the Applicant / Lead Member)

APPENDIX-I

Form-2A

Particulars of the Applicant

1.1	Title of Consultancy: PREPARATION OF MASTER PLAN
1.2	Title of Project: Great Nicobar Island in Andaman & Nicobar Islands
1.3	State whether applying as Sole Firm or Lead Member of a consortium: Sole Firm or Lead Member of a consortium
1.4	State the following: Name of Company or Firm: Legal status (e.g. incorporated private company, unincorporated business, partnership etc.): Country of incorporation: Registered address: Year of Incorporation: Year of commencement of business: Principal place of business: Brief description of the Company including details of its main lines of business Name, designation, address and phone numbers of authorised signatory of the Applicant: Name: Designation: Company: Address:

	<p>Phone No.:</p> <p>E-mail address:</p>
1.5	<p>If the Applicant is Lead Member of a consortium, state the following for each of the other Member Firms:</p> <p>(i) Name of Firm:</p> <p>(ii) Legal Status and country of incorporation</p> <p>(iii) Registered address and principal place of business.</p>
1.6	<p>For the Applicant, (in case of a consortium, for each Member), state the following information:</p> <p>(i) In case of non Indian Firm, does the Firm have business presence in India?</p> <p style="text-align: right;">Yes/No</p> <p>If so, provide the office address(es) in India.</p> <p>(ii) Has the Applicant or any of the Members in case of a consortium been penalized by any organization for poor quality of work or breach of contract in the last five years?</p> <p style="text-align: right;">Yes/No</p> <p>(iii) Has the Applicant/ Member ever failed to complete any work awarded to it by any public authority/ entity in last five years?</p> <p style="text-align: right;">Yes/No</p> <p>(iv) Has the Applicant or any member of the consortium been blacklisted by any Government department/Public Sector Undertaking in the last five years?</p> <p style="text-align: right;">Yes/No</p> <p>(v) Has the Applicant or any of the Members, in case of a consortium, suffered bankruptcy/insolvency in the last five years?</p> <p style="text-align: right;">Yes/No</p> <p>Note: If answer to any of the questions at (ii) to (v) is yes, the Applicant is not eligible for this consultancy assignment.</p>
1.7	<p>Does the Applicant's firm/company (or any member of the consortium) combine functions as a consultant or adviser along with the functions as a contractor and/or a manufacturer?</p> <p style="text-align: right;">Yes/No</p> <p>If yes, does the Applicant (and other Member of the Applicant's</p>

	<p>consortium) agree to limit the Applicant’s role only to that of a consultant/ adviser to the Authority and to disqualify themselves, their Associates/ affiliates, subsidiaries and/or parent organization subsequently from work on this Project in any other capacity?</p> <p style="text-align: right;">Yes/No</p>
<p>1.8</p>	<p>Does the Applicant intend to borrow or hire temporarily, personnel from contractors, manufacturers or suppliers for performance of the Consulting Services?</p> <p style="text-align: right;">Yes/No</p> <p>If yes, does the Applicant agree that it will only be acceptable as Consultant, if those contractors, manufacturers and suppliers disqualify themselves from subsequent execution of work on this Project (including tendering relating to any goods or services for any other part of the Project) other than that of the Consultant?</p> <p style="text-align: right;">Yes/No</p> <p>If yes, have any undertakings been obtained (and annexed) from such contractors, manufacturers, etc. that they agree to disqualify themselves from subsequent execution of work on this Project and they agree to limit their role to that of consultant/ adviser for the Authority only?</p> <p style="text-align: right;">Yes/No</p> <p style="text-align: center;">(Signature, name and designation of the authorised signatory)</p> <p style="text-align: right;">For and on behalf of</p>

APPENDIX-I

Form-2B

Format of Joint Bidding Agreement

(in case the Applicant is a Consortium)

(To be executed on stamp paper of appropriate value)

THIS JOINT BIDDING AGREEMENT is entered into on this the day of 20... (hereinafter referred to as the “Agreement”)

AMONGST

1. [●], a company incorporated under the Companies Act, 1956/Companies Act, 2013 and having its registered office at (hereinafter referred to as the “First Part” which expression shall, unless repugnant to the context include its successors and permitted assigns)

AND

2. [●], a company incorporated under the Companies Act, 1956/Companies Act, 2013 and having its registered office at..... (hereinafter referred to as the “Second Part” which expression shall, unless repugnant to the context include its successors and permitted assigns)

AND

3. [●], a company incorporated under the Companies Act, 1956/ Companies Act, 2013 and having its registered office at..... (hereinafter referred to as the “Third Part” which expression shall, unless repugnant to the context include its successors and permitted assigns)}

The above-mentioned parties of the FIRST, SECOND AND THIRD PART are collectively referred to as the “Parties” and each is individually referred to as a “Party”

WHEREAS,

- (A) NITI Aayog, New Delhi (hereinafter referred to as the “**Authority**” which expression shall unless repugnant to the context or meaning thereof, include its administrators, successors and assigns) has invited proposals (the “**Applications**”), by its Request for Proposal No. dated..... (the “**RfP**”) for appointment of Technical Consultant for Preparation of Master Plan for Holistic Development of Great Nicobar Islands (the “**Consultancy**”).
- (B) The Parties are interested in jointly bidding for the Consultancy as members of a Consortium (the “**Members**”) and in accordance with the terms and conditions of the RfP and other bid documents in respect of the Consultancy, and
- (C) It is necessary condition under the Consultancy document that the members of the Consortium shall enter into this Joint Bidding Agreement and furnish a copy thereof with the Proposal.

NOW IT IS HEREBY AGREED as follows:

1. Definitions and Interpretations

In this Agreement, the capitalised terms shall, unless the context otherwise requires, have the meaning ascribed thereto under the RfP.

2. Consortium

- a. The Parties do hereby irrevocably constitute a consortium (the “**Consortium**”) for the purposes of jointly participating in the selection process for the Consultancy.
- b. The Parties hereby undertake to participate in the Bidding process only through this Consortium and not individually and/ or through any other consortium constituted for this Consultancy, either directly or indirectly or through any of their Affiliates

3. Covenants

The Parties hereby undertake that in the event the Consortium is declared the selected Consultant and awarded the Consultancy, the Parties shall enter into a contract for consultancy services (the “**Consultancy Agreement**”) with the Authority and for performing all obligations as the Consultant in terms of the Agreement for the Consultancy.

4. Role of the Parties

The Parties hereby undertake to perform the roles and responsibilities as described below:

- a. Party of the First Part shall be the Member in Charge/Lead Member of the Consortium and shall have the power of attorney from all Parties for conducting all business for and on behalf of the Consortium during the selection process for the Consultancy and until the satisfactory completion of services;
- b. Party of the Second Part shall be [●];and
- c. Party of the Third Part shall be [●].

5. Joint and Several Liability

The Parties do hereby undertake to be jointly and severally responsible for all obligations and liabilities relating to the Consultancy and in accordance with the terms of the RfP and the Consultancy Agreement, for the performance of the said Agreement.

6. Member in Charge or Lead Member

Without prejudice to the joint and several liabilities of all the Parties, each Party agrees that it shall exercise all rights and remedies under the Agreement through the Member in Charge / Lead Member, and the Authority shall be entitled to deal with such Lead Member as the representative of all Members. Each Party agrees and acknowledges that:

- a. Any decision (including without limitation, any waiver or consent), action, omission, communication or notice of the Lead Member on any matters related to the Consultancy Agreement shall be deemed to have been on its behalf and shall be binding on it. The Authority shall be entitled to rely upon any such action, decision or communication from the Lead Member;
- b. consolidated invoices for the services in relation to the Consultancy performed by all the Members shall be prepared and submitted by the Lead Member and the Authority shall have the right to release payments solely to the Lead Member and the Authority shall not in any manner be responsible or liable for the inter se allocation of payments, works etc. among the Members;

- c. any notice, communication, information or documents to be provided to the Consultant shall be delivered to the authorized representative of the Consultant (as designated pursuant to the Consultancy Agreement) and any such notice, communication, information or documents shall be deemed to have been delivered to all the Members.

7. Representation of the Parties

Each Party represents to the other Parties that as of the date of this Agreement:

- a. Such Party is duly organised, validly existing and in good standing under the laws of its incorporation and has all requisite power and authority to enter into this Agreement;
- b. The execution, delivery and performance by such Party of this Agreement has been authorised by all necessary and appropriate corporate or governmental action and a copy of the extract of the charter documents and board resolution/ power of attorney in favour of the person executing this Agreement for the delegation of power and authority to execute this Agreement on behalf of the Party is annexed to this Agreement, and will not, to the best of its knowledge:
 - (i) require any consent or approval not already obtained;
 - (ii) violate any Applicable Law presently in effect and having applicability to it;
 - (iii) violate the memorandum and articles of association, by-laws or other applicable organisational documents thereof;
 - (iv) violate any clearance, permit, concession, grant, license or other governmental authorisation, approval, judgement, order or decree or any mortgage agreement, indenture or any other instrument to which such Party is a party or by which such Party or any of its properties or assets are bound or that is otherwise applicable to such Party; or

- (v) create or impose any liens, mortgages, pledges, claims, security interests, charges or Encumbrances or obligations to create a lien, charge, pledge, security interest, encumbrances or mortgage in or on the property of such Party, except for encumbrances that would not, individually or in the aggregate, have a material adverse effect on the financial condition or prospects or business of such Party so as to prevent such Party from fulfilling its obligations under this Agreement;
- (vi) this Agreement is the legal and binding obligation of such Party, enforceable in accordance with its terms against it; and
- (vii) there is no litigation pending or, to the best of such Party's knowledge, threatened to which it or any of its Affiliates is a party that presently affects or which would have a material adverse effect on the financial condition or prospects or business of such Party in the fulfilment of its obligations under this Agreement, RfP and the Consultancy Agreement.

8. Termination

This Agreement shall be effective from the date hereof and shall continue in full force and effect until the satisfactory completion of services, in case the Consultancy is awarded to the Consortium. However, in case the Consortium is not selected for award of the Consultancy, the Agreement will stand terminated upon intimation by the Authority that it has not been selected and upon return of the Bid Security by the Authority.

9. Miscellaneous

- a. This Joint Bidding Agreement shall be governed by laws of India.
- b. The Parties acknowledge and accept that this Agreement shall not be amended by the Parties without the prior written consent of the Authority.

IN WITNESS WHEREOF THE PARTIES ABOVE NAMED HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

SIGNED, SEALED AND DELIVERED AND SIGNED, SEALED AND DELIVERED

For and on behalf of

MEMBER IN CHARGE BY: SECOND PART

(Signature)	(Signature)
(Name)	(Name)
(Designation)	(Designation)
(Address)	(Address)

SIGNED, SEALED AND DELIVERED

For and on behalf of

THIRD PART

(Signature)
(Name)
(Designation)
(Address)

In the presence of:

- 1.
- 2.

Notes :

1. The mode of the execution of the Joint Bidding Agreement should be in accordance with the procedure, if any, laid down by the Applicable Law and the charter documents of the executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.

APPENDIX-I

Form-3

Statement of Legal Capacity

(To be forwarded on the letter head of the Applicant)

Ref. Date:

To,

.....
.....
.....

Dear Sir,

Sub: RfP for Consultant: Project

I/We hereby confirm that we, the Applicant (along with other members in case of consortium, the constitution of which has been described in the Proposal^s), satisfy the terms and conditions laid down in the RfP document.

I/We have agreed that (insert Applicant's name) will act as the Lead Member of our consortium.

I/We have agreed that (insert individual's name) will act as our Authorised Representative/ will act as the Authorised Representative of the consortium on our behalf and has been duly authorized to submit our Proposal. Further, the authorised signatory is vested with requisite powers to furnish such proposal and all other documents, information or communication and authenticate the same.

Yours faithfully,

(Signature, name and designation of the authorised signatory)

For and on behalf of

^s Please strike out whichever is not applicable

APPENDIX-I

Form-4A

Power of Attorney

Know all men by these presents, we, (name of Firm and address of the registered office) do hereby constitute, nominate, appoint and authorise Mr / Ms..... son/daughter/wife and presently residing at, who is presently employed with us and holding the position of as our true and lawful attorney (hereinafter referred to as the “**Authorised Representative**”) to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of our Proposal for and selection as the Consultant for Preparation of Master Plan for the Holistic Development of Great Nicobar Island, proposed to be developed by the (the “**Authority**”) including but not limited to signing and submission of all applications, proposals and other documents and writings, participating in pre-bid and other conferences and providing information/ responses to the Authority, representing us in all matters before the Authority, signing and execution of all contracts and undertakings consequent to acceptance of our proposal and generally dealing with the Authority in all matters in connection with or relating to or arising out of our Proposal for the said Project and/or upon award thereof to us till the entering into of the Agreement with the Authority.

AND, we do hereby agree to ratify and confirm all acts, deeds and things lawfully done or caused to be done by our said Authorised Representative pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Authorised Representative in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us.

IN WITNESS WHEREOF WE, THE ABOVE NAMED PRINCIPAL HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS DAY OF, 20.....

For

(Signature, name, designation and address)

Witnesses:

1.

2.

Notarised

Accepted

.....

(Signature, name, designation and address of the Attorney)

Notes:

- *The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure. The Power of Attorney should be executed on a non-judicial stamp paper of Rs. 100 (hundred) and duly notarised by a notary public.*
- *Wherever required, the Applicant should submit for verification the extract of the charter documents and other documents such as a resolution/power of attorney in favour of the person executing this Power of Attorney for the delegation of power hereunder on behalf of the Applicant.*
- *For a Power of Attorney executed and issued overseas, the document will also have to be legalised by the Indian Embassy and notarised in the jurisdiction where the Power of Attorney is being issued. However, Applicants from countries that have signed the Hague Legislation Convention 1961 need not get their Power of Attorney legalised by the Indian Embassy if it carries a conforming Apostille certificate.*

APPENDIX-I

Form-4B

Power of Attorney for Lead Member (in case of Consortium)

(To be executed by all members of the Consortium)

Whereas NITI Aayog (the “Authority”) has invited proposals for selection of Technical Consultant for Preparation of Master Plan for holistic development of Great Nicobar Island.

Whereas, [name of Party] , [name of Party] and [name of Party] (collectively the “Consortium”) being Members of the Consortium are interested in bidding for the Consultancy in accordance with the terms and conditions of the Request for Proposal and other connected documents in respect of the Consultancy, and

Whereas, it is necessary for the Members of the Consortium to designate one of them as the Lead Member with all necessary power and authority to do for and on behalf of the Consortium, all acts, deeds and things as may be necessary in connection with the Consortium’s bid for the Consultancy and its execution.

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS,

We, [name of Party] having our registered office at [registered address], M/s. [name of Party], having our registered office at [registered address], and M/s. [name of Party], having our registered office at [registered address], (hereinafter collectively referred to as the “Principals”) do hereby irrevocably designate, nominate, constitute, appoint and authorise M/s [name of Lead Member], having its registered office at [registered address], being one of the Members of the Consortium, as the Lead Member and true and lawful attorney of the Consortium (hereinafter referred to as the “Attorney”) and hereby irrevocably authorise the Attorney (with power to sub- delegate to any person) to conduct all business for and on behalf of the Consortium and any one of us during the bidding process and, in the event the Consortium is awarded the Agreement, during the performance of the services related to the Consultancy, and in this regard, to do on our behalf and on behalf of the Consortium, all or any of such acts, deeds or things as are necessary or required or incidental to the submission of its bid for the Consultancy, including but not limited to signing and submission of all applications, bids and other documents and writings, accept the Letter of Acceptance, participate in bidders’ and other conferences, respond to queries, submit information/documents, sign and execute contracts and undertakings consequent to acceptance of the bid of the Consortium and generally to represent the Consortium in all its dealings with the Authority, and/or any other government agency or any person, in all matters in connection with or

relating to or arising out of the Consortium's bid for the Consultancy and/ or upon award thereof until the Agreement is entered into with the Authority.

AND hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us/ Consortium.

IN WITNESS WHEREOF WE THE PRINCIPALS ABOVE NAMED HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS [date in words] DAY OF [month] [year in 'yyyy' format].

SIGNED, SEALED & DELIVERED

For and on behalf of

LEAD MEMBER by:

[Signature]
[Name]
[Designation]
[Address]

SIGNED, SEALED & DELIVERED

For and on behalf of

SECOND PART by:

[Signature]
[Name]
[Designation]
[Address]

SIGNED, SEALED & DELIVERED

For and on behalf of THIRD PART by:

[Signature]
[Name]
[Designation]
[Address]

In presence of:

1. [Signature, name and address of witness]
2. [Signature, name and address of witness]

Notes:

1. The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal or official seal of all members.
2. Wherever required, the Applicant should submit for verification the extract of the charter documents and other documents such as a resolution/power of attorney in favour of the person executing this Power of Attorney for the delegation of power hereunder on behalf of the Applicant.

For a Power of Attorney executed and issued overseas, the document will also have to be legalised by the Indian Embassy and notarised in the jurisdiction where the Power of Attorney is being issued. However, the Power of Attorney provided by Applicants from countries that have signed The Hague Legislation Event, 1961 are not required to be legalised by the Indian Embassy if it carries a conforming Apostille certificate.

APPENDIX-I

Form-5

Financial Capacity of the Applicant

(Refer Clause 2.2.2 (B))

S. No.	Financial Year	Annual Revenue ^{\$\$} (Rs./US \$ in million)
1.		
2.		
3.		
<p style="text-align: center;">Certificate from the Statutory Auditor^s</p> <p>This is to certify that (name of the Applicant) has received the payments shown above against the respective years on account of professional fees.</p> <p>Name of the audit firm:</p> <p>Seal of the audit firm</p> <p>Date:</p>		

(Signature, name and designation of the authorised signatory)

^s In case the Applicant does not have a statutory auditor, it shall provide the certificate from its chartered accountant that ordinarily audits the annual accounts of the Applicant.

^{ss}The Applicant should provide details of its own Financial Capacity or of an Associate as specified in Clause 2.2.3 A

Note: Please do not attach any printed Annual Financial Statement.

APPENDIX-I

Form-6**Particulars of Key Personnel**

S. No.	Designation of Key Personnel	Name	Education al Qualification	Length of Professional Experience	Present Employment		No. of Eligible Assignments ^s
					Name of Firm	Employed Since	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1.	Team Leader						
2.	Project Manager/Urban Planner						
3.	Economic/Financial Expert						
4.	Environmental Expert						
5.	Water & Infrastructure Resources Expert						
6.	Integrated Port Planning Expert						
7.	Airport Planning Expert						

^sRefer Form 9 of Appendix I Experience of Key Personnel

APPENDIX-I

Form-7

Proposed Methodology and Work Plan

The proposed methodology and work plan shall be described as follows:

1. Understanding of TOR (not more than two pages)

The Applicant shall clearly state its understanding of the TOR and also highlight its important aspects. The Applicant may supplement various requirements of the TOR and also make precise suggestions if it considers this would bring more clarity and assist in achieving the Objectives laid down in the TOR.

2. Methodology and Work Plan (not more than three pages)

The Applicant will submit its methodology for carrying out this assignment, outlining its approach toward achieving the Objectives laid down in the TOR. The Applicant will submit a brief write up on its proposed team and organisation of personnel explaining how different areas of expertise needed for this assignment have been fully covered by its proposal. In case the Applicant is a consortium, it should specify how the expertise of each firm is proposed to be utilised for this assignment. The Applicant should specify the sequence and locations of important activities, and provide a quality assurance plan for carrying out the Consultancy Services.

Note: Marks will be deducted for writing lengthy and out of context responses.

APPENDIX-I

Form-8**Abstract of Eligible Assignments of the Applicant[§]**

(Refer Clause 3.1.4)

S.No	Name of Project	Name of Client	Estimated capital cost of Project (in Rs. crore/ US\$ million)	Payment ^{§§} of professional fees received by the Applicant (in Rs. crore)
(1) [£]	(2)	(3)	(4)	(5)
1				
2				
3				
4				

[§] The Applicant should provide details of only those projects that have been undertaken by it under its own name and/or by an Associate specified in Clause 2.2.3A of Instructions to applicants.

^{§§} Exchange rate for conversion of US \$ shall be as per Clause 1.7.1.

[£] The names and chronology of Eligible Projects included here should conform to the project-wise details submitted in Form-10 of Appendix-I.

Certificate from the Statutory Auditor^s

This is to certify that the information contained in Column 5 above is correct as per the accounts of the Applicant and/ or the clients.

Name of the audit firm:

Seal of the audit firm

Date:

(Signature, name and designation of the authorised signatory)

^s In case the Applicant does not have a statutory auditor, it shall provide the certificate from its chartered accountant that ordinarily audits the annual accounts of the Applicant.

Note: The Applicant may attach separate sheets to provide brief particulars of other relevant experience of the Applicant.

APPENDIX-I

Form-9**Abstract of Eligible Assignments of Key Personnel[§]**

(Refer Clause 3.1.4)

Name of Key Personnel:

Designation:

S.No	Name of Project [§]	Name	Estimated capital cost of project (in Rs. cr./ US\$ million)	Name of firm for which the Key Personnel worked	Designation of the Key Personnel on the assignment	Date of completion of the assignment	Man days spent
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1							
2							
3							

[§] Use separate Form for each Key Personnel.^{§§} The names and chronology of projects included here should conform to the project-wise details submitted in Form-11 of Appendix-I.**Note:** The Applicant may attach separate sheets to provide brief particulars of other relevant experience of the Key Personnel.

APPENDIX-I

Form-10**Eligible Assignments of Applicant**

(Refer Clause 3.1.4)

1.	Name of Applicant:	
2.	Name of the Project:	
3.	Area of the project or other particulars	
4.	Description of services performed by the Applicant Firm:	
5.	Name of client and Address: (indicate whether public or private)	
6.	Name and telephone no. of client's representative:	
7.	Estimated capital cost of the Project (in Rs crore or US\$ million):	
8.	Payment received by the Applicant (in Rs. crore):	
9.	Start date of the services (month/ year):	
10.	Finish date of the services (month/ year):	
11.	Whether credit is being taken for the Eligible Assignment of an Associate (Yes/No)	
12.	Brief description of the Project:	
<p>It is certified that the aforesaid information is true and correct to the best of my knowledge and belief.</p> <p style="text-align: right;">(Signature and name of Key Personnel)</p>		

Notes:

1. Use separate sheet for each Eligible Project.

2. The Applicant may attach separate sheets to provide brief particulars of other relevant experience of the Applicant.
3. Exchange rate for conversion of US \$ shall be as per Clause 1.7.1.

APPENDIX-I

Form-11**Eligible Assignments of Key Personnel**

(Refer Clause 3.1.4)

1.	Name of Key Personnel:	
2.	Designation of Key Personnel:	
3.	Name of the Project:	
4.	Area of the project or other particulars	
5.	Name of Consulting Firm where employed:	
6.	Description of services performed by the Key Personnel (including designation):	
7.	Name of client and Address: (indicate whether public or private)	
8.	Name and telephone no. of client's representative:	
9.	Estimated capital cost of the Project (in Rs crore or US\$ million):	
10.	Start date of the services (month/year):	
11.	Finish date of the services (month/year):	
12.	Brief description of the Project:	
It is certified that the aforesaid information is true and correct to the best of my knowledge and belief.		
(Signature and name of Key Personnel)		

Notes:

1. Use separate sheet for each Eligible Project.
2. The Applicant may attach separate sheets to provide brief particulars of other relevant experience of the Key Personnel.
3. Exchange rate for conversion of US \$ shall be as per Clause 1.7.1.

APPENDIX-I

Form-12

Curriculum Vitae (CV) of Key Personnel

1. Proposed Position:
2. Name of Personnel:
3. Date of Birth:
4. Nationality:
5. Educational Qualifications:
6. Employment Record:

(Starting with present position, list in reverse order every employment held.)

7. List of projects on which the Personnel has worked

Name of project

Description of responsibilities

8. Details of the current assignment and the time duration for which services are required for the current assignment.

Certification:

- 1 I am willing to work on the Project and I will be available for entire duration of the Project assignment as required.
- 2 I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications and my experience.

(Signature and name of the Key Personnel)

Place.....

(Signature and name of the authorised signatory of the Applicant)

Notes:

1. Use separate form for each Key Personnel
2. The names and chronology of assignments included here should conform to the project-wise details submitted in Form-9 of Appendix-I.
3. Each page of the CV shall be signed in ink and dated by both the Personnel concerned and by the Authorised Representative of the Applicant firm along with the seal of the firm. Photocopies will not be considered for evaluation.

Appendices

S.No.	Designation	Name	Man Days (MD)		Week Numbers																			
			At Project site/Project Office	Away from Project site/Project Office (specify)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Total Man days																								

APPENDIX-I

Form-14

Survey and Field Investigations

Item of Work/ Activity	To be carried out/ prepared by		Week																		
	Name	Designation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

APPENDIX-I

Form-15

Proposal for Sub-Consultant(s)

1. Details of the Firm				
Firm's Name, Address and Telephone				
Name and Telephone No. of the Contact Person				
Fields of Expertise				
No. of Years in business in the above Fields				
2. Services that are proposed to be sub contracted:				
3. Person who will lead the Sub- Consultant Name: Designation: Telephone No: Email:				
4. Details of Firm's previous experience				
Name of Work	Name, address and telephone no. of Client	Total Value of Services Performed	Duration of Services	Date of Completion of Services
1.				
2.				
3.				

(Signature and name of the authorised signatory)

Note:

1. The Proposal for Sub-Consultant(s) shall be accompanied by the details specified in Forms 12 and 13 of Appendix –I.
2. Use separate form for each Sub-Consultant

Appendix - I

Form-16

Format for Certificate from the Statutory Auditor/Company Secretary regarding Associate

In the event that credit is being taken for the eligible experience of an Associate as defined in Clause 2.2.3 A, the Applicant should also provide a certificate in the format below:

Certificate from the Statutory Auditor/Company Secretary regarding Associate[§]

Based on the authenticated record of the Company, this is to certify that more than 50% (fifty per cent) of the subscribed and paid up voting equity of(name of the Applicant/Associate) is held, directly or indirectly^{§§}, by(name of Associate/Applicant). By virtue of the aforesaid share-holding, the latter exercises control over the former, who is an Associate in terms of Clause 2.2.3 A of the RfP.

A brief description of the said equity held, directly or indirectly, is given below:

{Describe the shareholding of the Applicant and the Associate. In the event the Associate is under common control with the Applicant/Consortium, the relationship may be suitably described and similarly certified herein.}

Name of the audit firm:

Seal of the audit firm:

Date:

(Signature, name and designation of the authorised signatory)

[§] In the event that the Applicant exercises control over an Associate by operation of law or contract, this certificate may be suitably modified and copies of the relevant law/contract may be enclosed and referred to.

^{§§} In the case of indirect share-holding, the intervening companies in the chain of ownership should also be Associates, i.e., the share-holding in each such company should be more than 50% in order to establish that the chain of “control” is not broken.

APPENDIX-II

FINANCIAL PROPOSAL

Form-1

Covering Letter

(On Applicant's letter head)

(Date and Reference)

To,

.....

.....

.....

Dear Sir,

Subject: Appointment of Consultant for Preparation of Master Plan for the Holistic Development of Great Nicobar Island

I/We, (Applicant's name) herewith enclose the Financial Proposal for selection of my/our firm as Consultant for above.

I/We agree that this offer shall remain valid for a period of 90 (ninety) days from the Proposal Due Date or such further period as may be mutually agreed upon.

Yours faithfully,

(Signature, name and designation of the authorised signatory)

Note: The Financial Proposal is to be submitted strictly as per forms given in the RfP.

APPENDIX-II

(See Clause 2.1.3)

Form-2**Financial Proposal**

Item No.	Description	Amount (Rs.)
A.	RESIDENT PERSONNEL AND LOCAL COSTS	
I	Remuneration for Resident Professional Personnel (inclusive of all personal allowances)	
II	Remuneration for Resident Support Personnel (inclusive of all personal allowances)	
III	Office Rent	
IV	Office Consumables like stationery, communication etc.	
V	Office Furniture and Equipment (Rental)	
VI	Reports and Document Printing	
VII	Surveys & Investigations	
VIII	Miscellaneous Expenses	
	Sub-total Resident Personnel and Local Costs (A):	
B.	EXPATRIATE PERSONNEL	
I	Remuneration for Expatriate Personnel (inclusive of all personal allowances)	
	Subtotal Expatriate Personnel (B):	
	Total of Personnel and Local Costs (A+B):	
C.	POST REPORT CONSULTATIONS	
	2 man days each of:	
I	Team Leader	
II	Project Manager/Urban Planner	
III	Economic/Financial Expert	
IV	Environmental Expert	

V	Water & Infrastructure Resources Expert	
VI		
VII	Integrated Port Planning Expert Airport Planning Expert	
	Subtotal Post Report Consultations (C):	
D	SUBTOTAL OF A+B+C	
E	OVERHEAD EXPENSES @.....% of (D)	
F	GST	
G	TOTAL (including taxes) (D+E+F) (in Rs.) In Indian Rupees(in figures) (in words)	
H	ADDITIONAL COSTS (not included in evaluation)	
I	Domestic travel from firm's office to the Project Office (restricted to three return economy class air fares for each Personnel)	
II	International travel from firm's office to the Project Office (restricted to two return full fare economy class air fares for each Expatriate Personnel)	
III	Return journeys from Project Office to Authority's office to attend meetings held by the Authority (provide indicative amount for three return fares)	
	Total of Additional Costs (H)	
I	TOTAL COST OF THE CONSULTANCY (G+H) In Indian Rupees (in figures) (in words)	

Note:

1. The financial evaluation shall be based on the above Financial Proposal, excluding Additional Costs. The total in Item G shall, therefore, be the amount for purposes of evaluation. Additional Costs in Item H shall not be reckoned for purposes of financial evaluation.
2. Estimate of Costs for Item A I, A II and B I shall be as per Form-3.

3. Miscellaneous Expenses in Item A VIII shall not exceed 15% (fifteen per cent) of the total amount in Item D.
4. Domestic Air Fare in Item H I shall not be payable to the Consultant's Personnel who are normally stationed in New Delhi
5. All costs shall be reimbursed on production of a Statement of Expenses, duly certified by the Authorised Representative. However, no details of expenditures would be sought for overhead expenses, which will be reimbursed in proportion to the total expenses under Item D.
6. The reimbursement of expenses shall be limited to the amounts indicated above.
7. Savings of upto 20% (twenty per cent) under any head of expenditure specified in the summary of Financial Proposal may be reappropriated by the Consultant and added to any other head of expenditure, subject to a ceiling of 10% (ten per cent) in respect of the recipient head of expenditure. Upon Notification of such reappropriation to the Authority, the Financial Proposal shall be deemed to be amended, and payment shall be made accordingly.
8. No escalation on any account will be payable on the above amounts.
9. All other charges not shown here and all insurance premia are considered included in the man day rate/ overhead/ miscellaneous expenses.
10. The Authority may require the Key Personnel to visit the Project/ the Authority's offices for further consultations after their Report has been accepted. The cost (remuneration including personal allowances) of 2 (two) man days of each Key Personnel is included in the Financial Proposal. The Authority may require upto 12 (twelve) extra days of consultation with any or all Key Personnel on payment of additional charges. For any increase as compared to the aforesaid 2 (two) days, payment shall be computed solely on the basis of relevant man day rates specified in the Financial Proposal. In all cases, return full fare economy class airfare shall be reimbursed in addition, as per actuals.
11. The Authority may require Professional Personnel to visit the Project/the Authority's offices for further consultations or undertake desk work after the report has been accepted. The Additional Costs on this account shall be paid to the Consultant as per agreed man day rates and economy return airfare as per actuals shall also be reimbursed. However, the total number of additional man days requisitioned hereunder shall not exceed 120 (one hundred and twenty).
12. All payments shall be made in Indian Rupees and shall be subject to applicable Indian laws withholding taxes if any.

13. For the purposes hereof “**Statement of Expenses**” means a statement of the expenses incurred on each of the heads indicated in the Financial Proposal; provided that in relation to expenses on Personnel, the Statement of Expenses shall be accompanied by the particulars of Personnel and the man days spent on the Consultancy.

APPENDIX-II

Form-3**Estimate of Personnel Costs**

ID	Position	Name	Man day Rate (Rs.)	Total Man Days	Amount (Rs.)
A I. Remuneration for Resident Professional Personnel (including all personal allowances)					
Total					
A II. Remuneration for Resident Support Personnel (including all personal allowances)					
Total					
B I. Remuneration for Expatriate Personnel (including all personal allowances)					

Appendices

Total:					

APPENDIX - III

LIST OF BID-SPECIFIC PROVISIONS^{\$}

A. Clauses with currency-based footnotes

1. Introduction.
2. Clause 2.2.3: Conditions of Eligibility of Applicants.
3. Clause 2.11.3: Amendment of RfP.

Note: The above footnotes marked “\$” shall be retained in the RfP for guidance of the Applicants while submitting their respective Proposals.

B. Schedules with non-numeric footnotes

All non-numeric footnotes marked “\$” in the Schedules shall be retained in the respective Schedules for guidance of the Applicants while submitting their respective Proposals.

C. Appendices with non-numeric footnotes

All non-numeric footnotes in the Appendices shall be retained in the respective Appendices for guidance of the Applicants. These shall be omitted by the Applicants while submitting their respective Proposals.

D. Schedules and Appendices with blank spaces

All blank spaces in the Schedules and Appendices shall be retained in the RfP. These shall be filled up when the format of the respective Schedule or Appendix is used.

APPENDIX IV: DESCRIPTION OF GREAT NICOBAR ISLAND

S. No.	Attributes	Details	
1	State/UT	Andaman & Nicobar Islands	
2	Unique-ID		
3	Site/Island Name	Great Nicobar Island	
4	Island Group Name	Nicobar Islands	
5	Area (ha.)	90700	
6	Latitude	93.8083° E	
7	Longitude	7.2063° N	
8	Island Category		
9	About Island	The Great Nicobar Island is a large-sized island with an area of about 907.35 Sq.Km. and a forest cover of about 95% of the island. The topography of the island is largely hilly with the presence of the north south range of hills in the eastern part of the island.	
10	Inhabited	Yes	
11	Demography (2011 Census)	Population	8046
		Number of House Holds	2180
		Sex Ratio	665
		Total Population (0-6 Years)	936
		Sex Ratio (0-6 Years)	922

		Population Density	Density of Nicobar District -20
		Ethnicity/ST population	1214
12	Fresh Water Source and Water Supply		Several streams/rivers many of which are perennial in nature
13	Hydrological Data		
14	Climate-Rainfall, Wind		The island receives annual average rainfall of 2857 mm
15	Agriculture		Paddy, coconut, fruits and vegetables
16	Flora		The Island has over 2075 species of flora, out of which 158 species are endemic to Great Nicobar.
17	Fauna		There are 1800 recorded animal species, including the crab eating Macaque, Nicobar Tree Shrew, Dugong, Nicobari Megapode, Serpent Eagle, Salt water Crocodile, Marine Turtles and Reticulated Python, which are endemic/ endangered.
18	Herbs of Medicinal Value		-
19	Forest		
20	Sanctuary		
21	Protected Islands		-
22	Presence of Ecologically Sensitive Area (ESA)		-
23	Tourist Important Places		The major tourist spots in Great Nicobar include (i) B - Quarry Beach (ii) Joginder Nagar Beach (iii) Shastri Nagar Beach (iv) Great Nicobar Biosphere Reserve

		(v) Galathea wild life sanctuary(vi) Indira Point.
24	able tourist activities	Guest houses and hotels
25	structure	Boat service, Berthing, Passenger Boat Station, Helipad, Minor Port, Jetties, Lighted Beacon, Port Signal, Light House
26	Transport	Boat service, Roads
27	Commercial Activity	Fishing, Agriculture
28	Industries	-
29	Shortest Distance from mainland	-
30	Nearest airport	Present airport of the Indian Navy at Great Nicobar, INS Baaz at Campbell Bay Veer Savarkar International Airport, Port Blair
31	Nearest port	Port Blair
32	Distance to nearest airport (Km)	544 sq.km
33	Telecom/Internet Connectivity	Landline and Broadband
34	Terrestrial/Satellite Availability Television/Radio	-
35	Geospatial Layers available in the repository	-
36	Bathymetry Description	-
37	Hazards/Sensitivity to tides	-
38	Seismic Sensitivity	-
39	HFL/Tsunami Data	-
40	Proposed Development Activity	-
41	Remarks	-
Note- The data is subject to verification by the local administration/consultants.		

ANNEXURE 25

A-22011/1/2018-SP-IDA
Government of India
NITI Aayog
(NRE Vertical-Island Development)

Sansad Marg, New Delhi
Dated May 06th, 2021

To

Subject: RTI application o (Reg. No. PLCOM/R/E/21/00145
dated 29.03.2021.

Sir,

Kind reference is invited to RTI application (Reg. No. PLCOM/R/E/21/00145) dated 29.03.2021 received on 15.04.2021. The information is as furnished below:

S. NO.	Information Sought	Reply
1	Please share the Vision document for proposed development plans in Great Nicobar Island, A&N Island prepared by NITI Aayog	As far as NRE Vertical, NITI Aayog is concerned, no Vision Document has been prepared for proposed development plans in Great Nicobar Island, A&N Island.

2. The first appeal lies with the First Appellate Authority, Shri Avinash Mishra, Adviser (NRE), NITI Aayog, Sansad Marg, New Delhi – 110001 within 30 days of the receipt of this information.

Yours faithfully,



(L Gopinath)

SRO (NRE)

Tel: 011-23042602

Copy to:

1. SO (RTI), NITI Aayog

ANNEXURE 26

②

अण्डमान तथा निकोबार प्रशासन
ANDAMAN AND NICOBAR ADMINISTRATION
जनजाति कल्याण निदेशालय
DIRECTORATE OF TRIBAL WELFARE

4th
Port Blair dated the September, 2020


Order No. 198

In exercise of powers vested upon him under Section 3(1) of the A&N (Protection of Aboriginal Tribes) Regulation, 1956 to declare any area which is predominately inhabited by aboriginal tribes to be a reserved area and specify the limits of such area; and may, from time to time, in like manner alter such limits, the Hon'ble Lt. Governor, A&N Islands is pleased to constitute an Empowered Committee to examine the proposals of NITI Aayog regarding development of various projects in Little Andaman and Great Nicobar Islands applied by Andaman and Nicobar Islands Integrated Development Corporation Limited (ANIIDCO) which has been designated as Project Proponent vide Order No. 639 dated 28.7.2020 and 653 dated 3.8.2020.

The Empowered Committee shall comprise of the following:-

(i) Chief Secretary, A&N Administration	-Chairman
(ii) Representative of Ministry of Tribal Affairs	-Member
(iii) Director General of Police, ANP	-Member
(iv) Principal Secretary /Secretary (Revenue)	-Member
(v) Commissioner-cum-Secretary (E&F)/PCCF	-Member
(vi) Secretary (Tribal Welfare)	-Member
(vii) Secretary (Shipping)	-Member
(viii) Managing Director, ANIIDCO Ltd	-Member
(ix) Dy Commissioner (SA) for Little Andaman /Dy Commissioner (N) for Great Nicobar	-Member
(x) Director (ANTRJ)	-Member
(xi) Superintendent Anthropologist, Anthological Survey of India, Port Blair	-Member
(xii) Executive Secretary, AAJVS	-Member
(xiii) Director (TW)	-Member Secy

The Committee may co-opt any subject expert/ department/ organization for the purpose, as it may deemed fit,


(Vinay Kumar Jindal)
Director (Tribal Welfare)
F. No. 1-999/TW-2020/LAI/


Office Order Book

Copy to:-

- 1) The Secretary to the Govt of India, Ministry of Tribal Affairs, Govt of India. As per the Clause 6.3 of the notified Shompen Policy, 2015, consultation with Ministry of Tribal Affairs, Govt of India is necessary for large scale development proposals in Great Nicobar Island. In this regard, it is requested to kindly nominate any appropriate level officer to represent the Ministry of Tribal Affairs, Govt of India in the Empowered Committee. A copy of the Shompen Policy, 2015 is enclosed.
- 2) All officers concerned for kind information and necessary action

Copy for kind information to:-

- 1) Sr PS to Hon'ble Lt. Governor, A&N Islands
- 2) Sr PS to Chief Secretary, A&N Administration
- 3) PA to Secretary (TW), A&N Administration


Director (Tribal Welfare)

04/09/2020

ANNEXURE 27

Characteristics of a Leatherback Nesting Beach and Implications for Coastal Development

JOHN H. ROE^{1,2}, PATRICIA R. CLUNE¹, AND FRANK V. PALADINO¹

¹Indiana-Purdue University, Fort Wayne, Indiana 46805 USA [paladino@ipfw.edu];

²Present Address: University of North Carolina at Pembroke, Pembroke, North Carolina 28372 USA [john.roe@unp.edu]

ABSTRACT. – Coastal development can alter the natural dynamics of beach environments, with strong implications for associated biota. Sea turtles nest on oceanic beaches and often depend upon a specific range of conditions for successful nesting. In the case of the critically endangered leatherback turtle (*Dermochelys coriacea*), we know little regarding what features they select for nest sites, including how they respond to anthropogenic development. We examined relationships between leatherback nest frequency, beach environments, and tourism development at Playa Grande, Costa Rica, the location of the largest current nesting population in the eastern Pacific Ocean. Developed beach sections had shallower slopes, lower pH, and less air-filled pore space, but higher water content and salinity than undeveloped areas. Developed areas were also comprised of more sand in the smaller grain size classes relative to undeveloped sections. **Leatherback nesting was positively correlated with deepness of the offshore approach, beach slope and elevation, pH, and sand in intermediate size classes (0.025-mm diameter), but negatively correlated with sand in the smallest silt size class (< 0.0625-mm diameter). Leatherback nesting frequency was 3.4 times higher in undeveloped sections of the beach relative to developed areas, while nonnesting emergences were 2.6 times more likely in developed relative to undeveloped areas. It is apparent that coastal development has impacted beach environments with consequences for leatherback nest site distribution.** It is likely that additional development of the beach under mixed-management plans to support a growing tourist industry will further degrade the attractiveness and quality of the beach for leatherback nesting.

KEY WORDS. – Reptilia; Testudines; Dermochelyidae; *Dermochelys coriacea*; marine turtle; nest site selection; nesting behavior; beach erosion; tourism; Costa Rica

The selection of a nest site is a hierarchical process for a sea turtle. First, a female must choose a beach and offshore approach that she can safely access from the sea. Next, the turtle must select an emergence site, then move to a location that is not only suitable for digging a nest, but that also offers conditions favorable for embryo survival, development, hatchling emergence, and travel back to the sea. From an evolutionary perspective, nest site selection should reflect costs and benefits to both the female and her clutch—though sometimes behaviors favorable for the nesting female are costly to the clutch and vice versa, and a tradeoff may occur (Mortimer 1990; Bjorndal and Bolten 1992). Beaches and adjacent offshore areas vary naturally in several important environmental features that turtles can use as proximal cues of nest site quality. **Such factors include offshore bathymetry and obstructions (Mortimer 1982), slope and elevation of the beach (Wood and Bjorndal 2000; Kikukawa et al. 1999), beach vegetation (Hays et al. 1995; Karavas et al. 2005), and chemical and physical attributes of the sand (Stancyk and Ross 1978; Stoneburner and Richardson 1981; Mortimer 1990; Garmestani et al. 2000). Responses to such environmental cues can affect adult survival, clutch viability, and hatchling success (Wood and Bjorndal 2000; Kamel and Mrosovsky 2004).**

Anthropogenic development can introduce variation to the beach environment, with potential consequences for

turtle nesting. **The removal of natural vegetation and construction of jetties, seawalls, buildings, and other structures disrupts natural beach accretion and erosion cycles, ultimately leading to a reduction in beach width, slope, and elevation resulting from the loss of sand (Garcia and Servera 2003). Many turtles prefer to nest on wide or steeply sloping beaches, presumably because areas with reduced beach width and elevation are at a higher risk of flooding (Horrocks and Scott 1991; Garmestani et al. 2000; Wood and Bjorndal 2000). Sea turtles also tend to avoid nesting in areas with artificial lighting because hatchlings may become disoriented while travelling from the nest to the sea, or because adults themselves are disturbed by the light (Mortimer 1982; Witherington 1992; Salmon et al. 1995). Exposed pilings may also deter females from nesting (Bouchard et al. 1998). For these reasons and others, it is not surprising that many turtles either tend to avoid nesting on beaches near development or have experienced population declines as a consequence of development (Stancyk and Ross 1978; Mortimer 1982; Kikukawa et al. 1999).**

Leatherback turtles (*Dermochelys coriacea*) in the Pacific Ocean have declined precipitously in recent decades, in part as a consequence of fisheries bycatch, direct harvest, environmental pollution, and destruction and degradation of nesting beaches (Chan and Liew 1996;

Spotila et al. 2000; Sarti Martínez et al. 2007; Santidrián Tomillo et al. 2008). The leatherback is listed as Critically Endangered by the International Union for the Conservation of Nature (2009). Detailed information on leatherback nesting behavior could improve the protection and management of their few remaining nesting beaches, as well as identify restoration initiatives to improve the quality of degraded beaches.

Leatherbacks tend to nest on high-energy, dynamic beaches that are free of offshore obstructions, with steeply sloping shorelines and offshore depth profiles (Pritchard 1971; Mrosovsky 1983; Eckert 1987). However, the microsite characteristics that leatherbacks use to select nest sites are not well understood. Some have suggested that leatherbacks employ a “scatter nesting” approach in response to dynamic and unpredictable beach environments (Mrosovsky 1983; Eckert 1987), but leatherbacks exhibit some degree of nesting fidelity and avoidance of specific structures, suggesting that individuals are not nesting randomly but instead are able to assess environments and respond to environmental variation during the nesting process (Kamel and Mrosovsky 2004; Nordmoe et al. 2004; Hernández et al. 2007). We lack a detailed understanding of which specific environmental cues leatherbacks respond to on a consistent basis when selecting a nest site. Here, we examine how attributes of the offshore approach, beach slope profiles, and physical and chemical attributes of the sand vary along a beach, and assess whether any of these factors correlate with beachfront development and nesting in leatherbacks.

METHODS

Study Site. — Nesting behavior of leatherback turtles (*Dermochelys coriacea*) was studied from 2003 to 2005 at Playa Grande (10°20'N, 85°51'W), a beach within the Parque Nacional Marino Las Baulas (PNMB), located on the Pacific coast of Costa Rica (Fig. 1). The beach is bordered by a rocky headland at the north and an estuary at the south. Additionally, the northernmost 900 m and southernmost 700 m of the beach are bordered by several houses and hotels, while the central 2.1 km is undeveloped. Developed areas of the beach had buildings within 100 m of the open sand or vegetation ecotone, although in most cases development was much closer (< 50 m, Fig. 2).

Nest Census. — The beach was patrolled from 1 October to 15 February each year to locate nesting females, following the methods of Steyermark et al. (1996) and Reina et al. (2002). Teams of observers walked the beach nightly, concentrating efforts around the hours of high tide and surveying for turtles or turtle tracks, at which point the turtle was observed to confirm whether egg laying occurred. All turtle encounters were classified as either 1) resulting in egg laying, hereafter referred to as “nesting emergences”, or 2) emergences when eggs were not laid, including observations of false crawls, digging of



Figure 1. Map of Costa Rica and location of Parque Nacional Marino Las Baulas (lighter gray). Note that three nesting beaches are within the park, including Playa Ventanas, Playa Grande, and Playa Langosta. Playa Tamarindo is also shown, but is not part of the park.

the body pit only, or aborted nesting attempts, hereafter referred to as “nonnesting emergences.” To facilitate the recording of encounter locations, the 3.6-km-long beach was marked at 100-m intervals along the north-to-south coastal axis to demarcate 37 sections. Our observations of leatherbacks were undertaken in accordance with all applicable laws and under the approval of the Purdue University Animal Care and Use Committee.

Beach Characteristics. — Several physical and chemical characteristics of the beach were measured within each zone. At the beginning of each zone (i.e., every 100 m), the beach profile from the low tide line to the vegetation was determined using the method of Emery (1961). Additionally, sand cores were taken from five random locations in each zone between the high tide line and the vegetation, the area of the beach where the majority of nests are laid (Nordmoe et al. 2004). Sand cores were collected from 45 cm below the surface down to 1 m, which is within the range of typical nest depths for leatherbacks (Billes and Fretey 2001). Sand samples were immediately weighed, placed in plastic bottles, and sealed for later processing.

Water content of each sample was measured as the weight lost following 24 hrs in a drying oven at 105°C. We then mixed each dried sample with an equal volume of double deionized water, and measured pH and salinity after 24 hrs using a Horiba U-10 water quality checker. Organic content was determined gravimetrically by H₂O₂ oxidation (Carver 1971). For this procedure, 10% H₂O₂

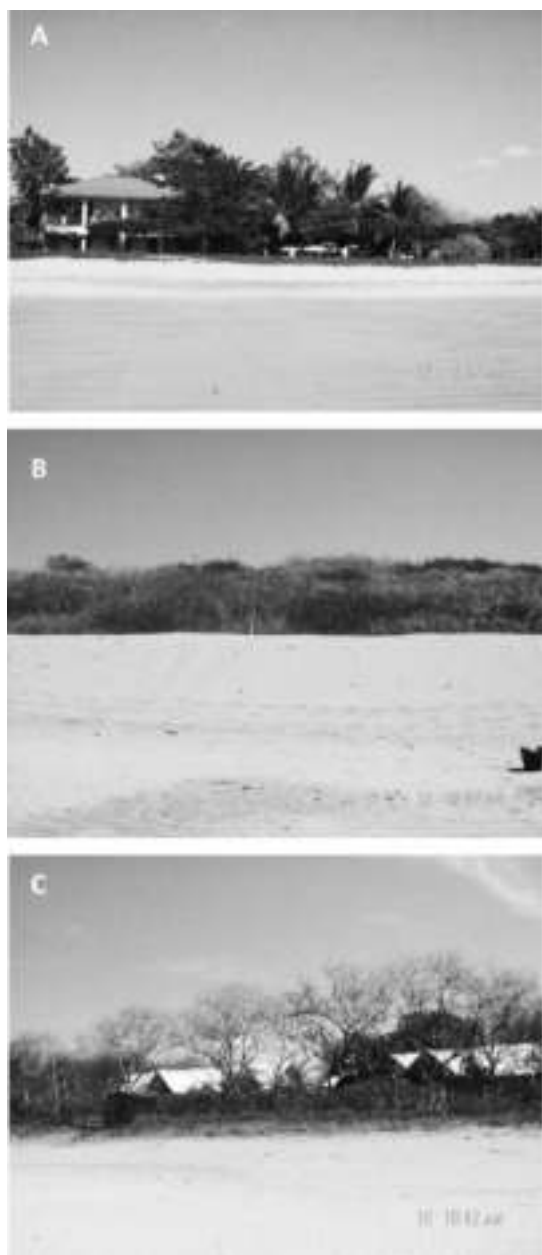


Figure 2. Images of the beach at (A) the north (0.2–0.3 km), (B) middle (2.0 km), and south (3.5 km) sections of Playa Grande, Costa Rica. Note the proximity of buildings to the beach and disruption of vegetation at the north and south ends of the beach, and the high elevation dune and uninterrupted backing vegetation in the middle section. Photos: Patricia Clune.

was added to 2 g of oven-dried and ground sand, and the mixture was heated until the reaction ceased. After any remaining H_2O_2 evaporated and the sand had cooled, the sand was reweighed and organic content determined. To determine carbonate content, 10 ml of 3 M HCl was added to a 1-g sample of sand with known water content, and the solution was swirled until a constant weight was

reached (Allison and Moodie 1965). Proportion carbonate content was calculated using the following equation:

$$\text{carbonate} = 0.2727 \left[\frac{\text{mass}_i - \text{mass}_f}{\text{mass}_i} \right] \quad [1]$$

Porosity and air-filled pore space were determined for 50-g samples of dry sand in accordance with methods of Vomocil (1965). Porosity (St) ($\% \text{ cm}^3$) is defined as the percentage of the bulk volume not occupied by solids and was calculated as

$$St = 100 \left[1 - \left(\frac{D_b}{\rho_p} \right) \right] \quad [2]$$

where D_b is the bulk density (mass of the oven-dried soil in bulk volume [g/cm^3]) and ρ_p is the particle density (density of solid particles collectively [g/cm^3]). For a detailed description of bulk and particle density calculations, refer to Blake (1965). Air-filled pore space (S) ($\% \text{ cm}^3$) for each sample was then calculated as

$$S = St - Pv \quad [3]$$

where Pv is the water content on a volume basis ($\text{g } H_2O / \text{cm}^3$), and assuming the density of water is 1 g/ml.

Sand particle size distribution was determined by pouring each sample through a series of sieves with mesh sizes of 2, 1, 0.5, 0.25, 0.125, and 0.0625 mm, corresponding to values of -1 (very coarse), 0 (coarse), 1 (medium), 2 (fine), 3 (very fine), and 4 (silt), respectively, on the Phi scale of particle size classification. Samples were shaken on a mechanical shaker for 5 min, and the remaining contents were weighed and expressed as a proportion of the total sample.

Bathymetry. — Water depth was determined along transects running from the shore to 2 km offshore using a boat and depth finder. Along each transect, we recorded depth (0.1 m) and associated coordinate positions. Location and depth data were then plotted using ArcGIS 9.3 (ESRI, Inc. Redlands, CA). A depth map was then created by applying kriging procedures that estimate values in areas for which we had no data.

Statistical Analyses. — Statistical analyses were performed with SPSS 17.0 (Chicago, IL). Statistical significance was accepted at the $\alpha \leq 0.05$ level except for multiple related comparisons, where the Dunn-Sidak method was applied to constrain the experiment-wide Type I error to 0.05.

To assess whether turtles nested randomly along the coastal axis of the beach, we used chi-square tests, with the null hypothesis that frequency of nesting emergence or nonnesting emergence is equal among sections. The sections were then classified as occurring in the developed or undeveloped regions of the beach. We then examined whether frequency of nesting emergences differed between developed and undeveloped beach sections using analysis of variance (ANOVA). Additionally, we assessed whether the proportion of nonnesting emergences from the total number of emergences differed between developed and undeveloped beach sections using

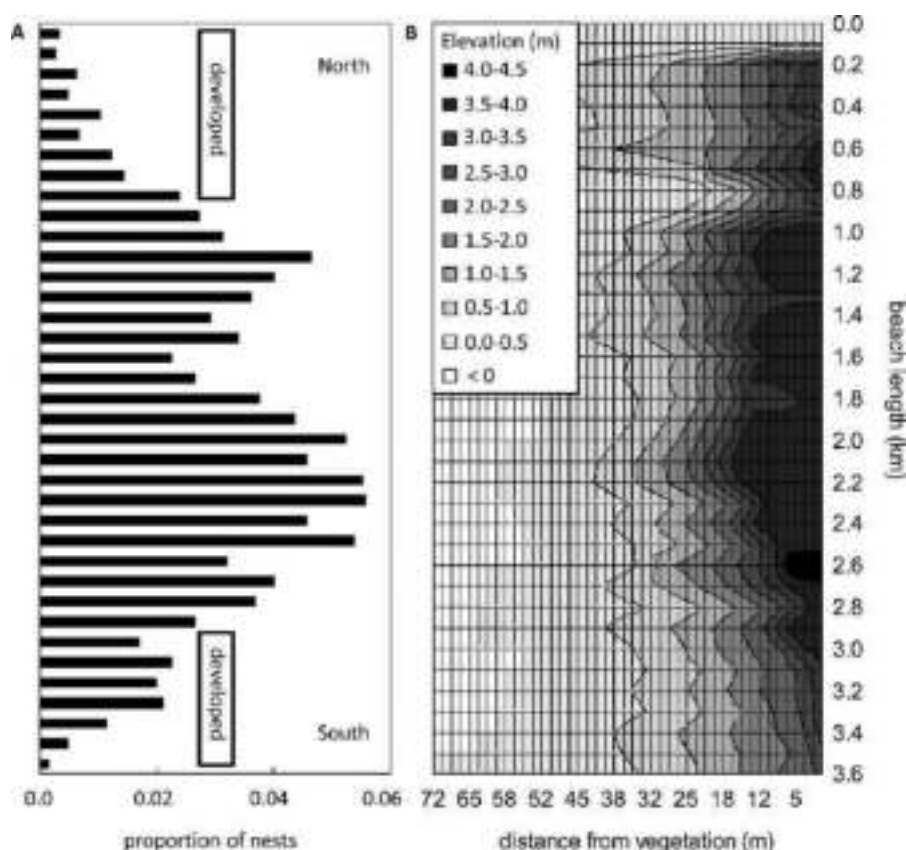


Figure 3. Frequency distribution of leatherback nests (A) relative to the beach elevation profile (B). Development occurs between 0.0 and 0.8 km and between 3.0 and 3.6 km.

ANOVA, using arc-sin transformed percentage of non-nesting emergences as the dependent variable.

To determine whether beach physical and chemical characteristics differed between developed and undeveloped sections, we used a multivariate analysis of variance (MANOVA) with slope, pH, porosity, water content, organic content, carbonate, air-filled pore space, and salinity as the dependent variables, and zone type (developed or undeveloped) as the independent variable. In the above analysis, all dependent variables were either \log_{10} - or arcsin-transformed to meet assumptions of normality and equality of variances.

We examined relationships between frequency of nesting emergences and beach and bathymetric characteristics using regression analyses. We used multiple stepwise linear regression to assess whether pH, porosity, water content, organic content, carbonate, air-filled pore space, or salinity were associated with the number of nests or the proportion of nonnesting emergences in a zone. We assessed relationships between beach profiles and frequency of nesting and proportion of nonnesting emergences using nonlinear regression. We used a series of linear regressions to assess relationships between nesting frequency or proportion of nonnesting emergences and amount of sand in the different particle size classes. Finally, correlations between

nesting frequency and water depths extending at 50-m intervals from each zone's midpoint perpendicular to the coastal axis were assessed using a series of linear regressions.

RESULTS

Spatial Distributions of Nesting and Nonnesting Emergences. — We identified 1470 leatherback nests over the 2 nesting seasons. Nest placements were not evenly distributed among sections along the north-to-south coastal axis ($\chi^2 = 533.9$, $p < 0.001$; Fig. 3). Nesting frequency was lowest at either end of the beach, generally corresponding to the areas of anthropogenic development (ANOVA: $F_{1,35} = 82.4$, $p < 0.001$). Nest frequency in developed areas was 17 ± 3 (mean \pm SE) compared with 57 ± 3 in the undeveloped sections.

We observed 310 nonnesting emergences, and these observations were not evenly distributed among beach sections ($\chi^2 = 66.9$, $p < 0.01$). A higher percentage of total emergences did not result in egg laying (i.e., a nonnesting emergence) in the developed sections of the beach (ANOVA: $F_{1,35} = 24.9$, $p < 0.001$; Fig. 4). Nonnesting emergences comprised $34.6\% \pm 3.8\%$ of total emergences in the developed beach sections, but only $13.1\% \pm 1.0\%$ in undeveloped sections.

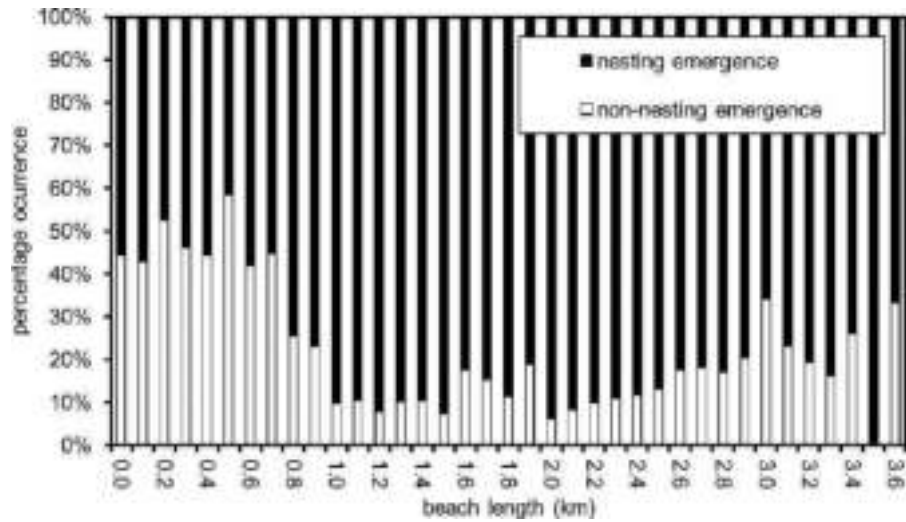


Figure 4. Percentage of leatherback nesting and nonnesting emergences along Playa Grande. Development occurs between 0.0 and 0.8 km and between 3.0 and 3.6 km.

Environmental Characteristics. — Sand characteristics differed between developed and undeveloped sections with respect to both chemical and physical attributes. Undeveloped areas had steeper slopes, higher pH, and more air-filled pore space, but lower water content and salinity than developed areas (MANOVA: Wilks' $\lambda = 0.37$, $F_{8,25} = 5.22$, $p = 0.001$; Table 1). Undeveloped areas had significantly higher proportions of sand particles in the medium and fine size classes than developed areas, while developed areas were comprised of more particles in the very fine and silt size classes relative to undeveloped areas (MANOVA: Wilks' $\lambda = 0.22$, $F_{6,27} = 15.90$, $p < 0.001$; Fig. 5).

Environmental Correlates of Nest Spatial Distribution. — Nest frequency was negatively correlated with sand salinity and positively correlated with pH, together explaining nearly 60% of the variation in our stepwise regression model ($F_{2,31} = 23.37$, $r^2 = 0.597$, $p < 0.001$). Nesting frequency was also positively correlated with beach slope ($F_{1,35} = 35.58$, $p < 0.001$; Figs. 3 and 6). Additionally, nest frequency was positively correlated with the amount of sand in the fine particle size class, but negatively correlated with the amount of particles in the silt size class (Table 2; Fig. 7). Percentage of nonnesting emergence was negatively correlated with beach slope ($F_{1,35} = 5.22$, $r^2 = 0.13$, $p < 0.029$) and pH ($F_{1,33} = 10.76$, $r^2 = 0.29$, $p < 0.007$), and

positively correlated with silt ($F_{1,34} = 25.88$, $r^2 = 0.44$, $p < 0.001$).

Nesting frequency was not significantly correlated with adjacent nearshore depth profiles within 0.4 km of the beach, but from 0.5 to 1 km nest frequency was positively correlated with water depth (Table 3; Fig. 8).

DISCUSSION

Nest Site Choice. — Leatherbacks at Playa Grande nested nonrandomly with respect to several environmental variables. Nest frequency was related to aspects of the offshore approach, beach slope along the water-to-vegetation axis, physical and chemical characteristics of the sand, and anthropogenic development. Because we were limited to examining correlations of nest frequency with environmental factors, we cannot conclusively demonstrate that turtles were exhibiting avoidance of or preference for any environmental feature. Nevertheless, we identified a suite of environmental variables that may serve as proximal cues for females when selecting nest sites. These findings, along with those of Kamel and Mrosovsky (2004) and Hernández et al. (2007) suggest that leatherbacks are able to assess and respond to some forms of spatial environmental variation during the nesting process.

Several of the environmental correlates of nest frequency likely serve as indicators of nest site quality.

Table 1. Comparison of sand physical and chemical characteristics between developed and undeveloped sections of the beach at Playa Grande, Costa Rica. Values are means \pm SE.

Zone	Slope (m)	pH	Water (%)	Salinity (ppt)	Air-filled pore space (% cm^3)	Carbonate (% CO-C)	Organic content (%)	Porosity (% cm^3)
Developed	0.041 \pm 0.004	8.4 \pm 0.1	0.11 \pm 0.02	0.13 \pm 0.02	0.58 \pm 0.01	0.13 \pm 0.01	0.034 \pm 0.003	0.68 \pm 0.01
Undeveloped	0.052 \pm 0.001	8.7 \pm 0.1	0.07 \pm 0.01	0.05 \pm 0.01	0.63 \pm 0.01	0.15 \pm 0.01	0.038 \pm 0.003	0.69 \pm 0.01

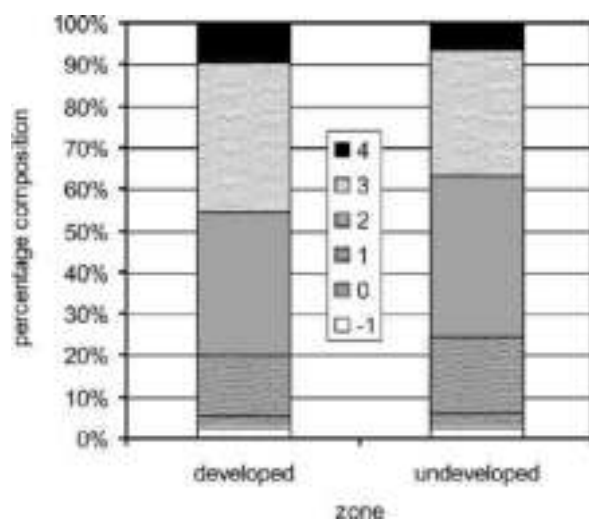


Figure 5. Percentage composition of sand particles in 6 size classes on developed and undeveloped beach sections of Playa Grande, Costa Rica. Particle classes correspond to the Phi scale, ranging from very coarse (Phi = -1, 2-mm diameter) to silt (Phi = 4, 0.0625-mm diameter).

For instance, emergence adjacent to areas with deeper water and limited shallow offshore obstructions (e.g., coral reefs, rocks, sandbars) presumably reduces the probability of injury and energy expenditure for such a large, soft-skinned, and pelagic animal during their approach to the beach (Pritchard 1971; Eckert 1987). By choosing a steeper littoral approach, a turtle may also position itself to emerge on a more steeply sloping section of beach. Such an emergence would minimize overland travel distance and time to access high elevation areas that are less prone to flooding from tides, storm surges, or groundwater (Hendrickson and Balasingham 1966; Pritchard 1971). Consistent with these explanations, leatherbacks at Playa Grande nested more frequently in beach sections with steeper slopes, higher elevation dunes, and deeper offshore areas, while nonnesting emergences were negatively correlated with beach slope. Hernández et al. (2007) also noted leatherbacks nesting in areas with steeper littoral slopes.

It is less clear to what extent correlations between sand attributes and nest frequency could reflect the quality of the nest environment. Physical characteristics of the substrate

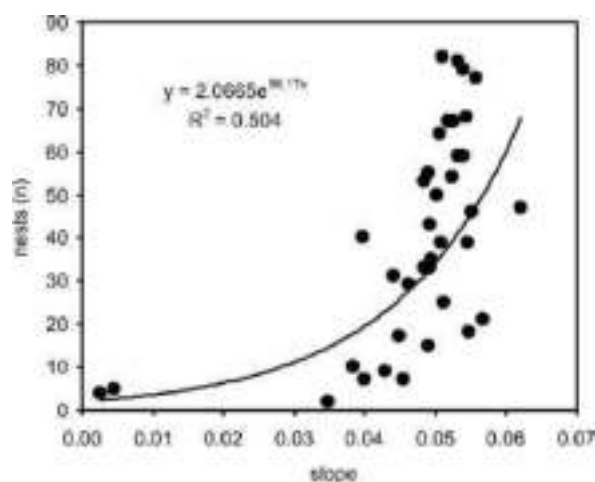


Figure 6. Relationship between leatherback nesting frequency and beach slope at Playa Grande, Costa Rica.

can influence respiratory gas diffusion, hydration, stability of the nest cavity, and in turn egg survival and performance of hatchlings (Kraemer and Bell 1980; McGhee 1990; Mortimer 1990; Ackerman 1997). Leatherbacks at Playa Grande nested in association with beach sections having proportionally more particles in the fine size classes and less silt. False crawls and aborted nesting attempts were also more common in areas with higher silt content. Nests in sand with large particle sizes can experience lower survivorship, though female green turtles (*Chelonia mydas*) do not select nest sites based on this attribute (Mortimer 1982, 1990). Loggerhead turtles (*Caretta caretta*) nest in areas with well-sorted sands in the medium to fine size classes, while avoiding smaller grain sizes prone to compaction (Karavas et al. 2005). Leatherbacks and other sea turtles often nest successfully on beaches with widely variable particle diameters (Carr and Ogren 1959; Hendrickson and Balasingam 1966, Pritchard 1971; Stancyk and Ross 1978; Mortimer 1982), suggesting sand particle size alone is not likely a cue to which nesting turtles are particularly responsive.

With respect to sand chemical properties, nest frequency was negatively correlated with salinity and positively correlated with pH, while nonnesting emer-

Table 2. Relationships between the number of leatherback nests and sand grain sizes along Playa Grande, Costa Rica.

Phi	Description	β	df	F	R^2	p^a
-1	Very coarse	0.244	1, 5	0.32	0.06	0.598
0	Coarse	-0.024	1, 5	0.00	0.00	0.959
1	Medium	0.681	1, 5	4.33	0.46	0.092
2	Fine	0.955	1, 5	51.28	0.91	0.001**
3	Very fine	-0.545	1, 5	2.11	0.30	0.206
4	Silt	-0.869	1, 5	15.40	0.76	0.011*

^a * Significant at $\alpha = 0.05$. ** Significant at $\alpha = 0.008$ after Dunn-Sidak adjustment.

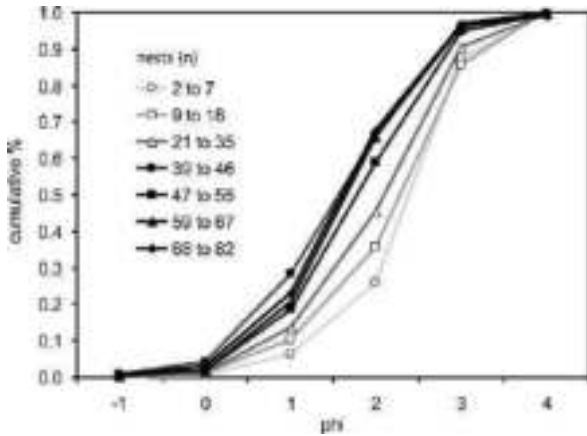


Figure 7. Comparison of cumulative sand particle size distributions among sections that differ in leatherback nesting frequency at Playa Grande, Costa Rica. Particle classes correspond to the Phi scale, ranging from very coarse (Phi = -1, 2-mm diameter) to silt (Phi = 4, 0.0625-mm diameter).

gences were negatively correlated with pH. Females of other sea turtles nest on beaches with low salinity or conductivity (Johannes and Rimmer 1984; Wood and Bjorndal 2000), and clutch survival can be negatively associated with sand salinity (Mortimer 1990). However, eggs of the freshwater alligator snapping turtle (*Macrochelys temminckii*) were not sensitive to variation in salinity of the incubation substrate (Rauschenberger et al. 2004), and embryos from slider turtles (*Trachemys scripta*) did not incorporate ions from highly conductive nest substrates during incubation (Nagle et al. 2001). Embryos would certainly be sensitive to extremes in the chemical and mineral constituents of the nest environment, but given 1) the relatively narrow ranges of pH (7.6–8.9) and salinity (0.01–0.25 ppt) detected along the beach, 2) our uncertainties of biological effects such limited variation would have on the clutch, and 3) questions as to the reliability of these cues or a female’s ability to sense such variation (Wood and Bjorndal 2000),

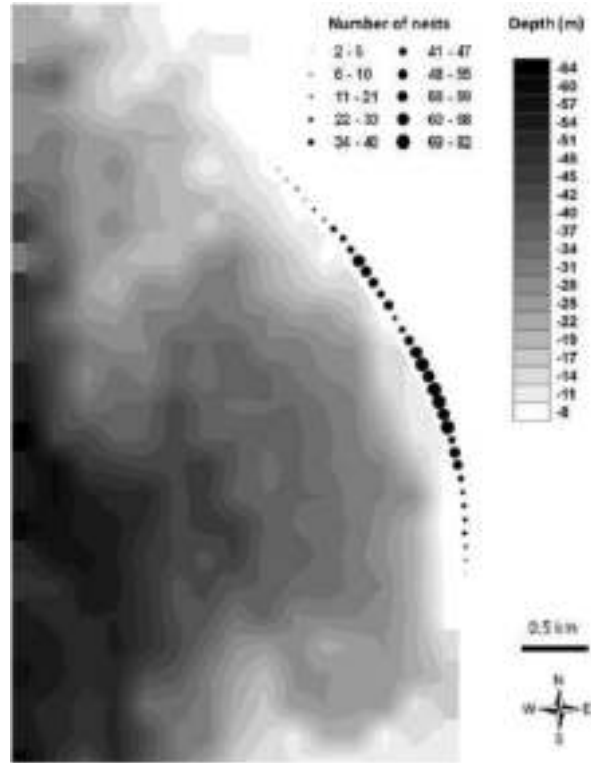


Figure 8. Spatial distribution of leatherback nesting frequency on Playa Grande, Costa Rica, relative to offshore bathymetry.

we are skeptical whether these correlations reflect female responses to these cues per se. Alternatively, these physical and chemical characteristics could be associated with other more critical cues to which turtles are responding during the nesting process.

Implications for Coastal Development. — Anthropogenic development is one such factor to which leatherbacks are potentially responding at Playa Grande. Nesting activity was consistently highest along sections of undeveloped beach, the only exception occurring around the 1.6–1.7-km segment, where storm activity and

Table 3. Relationships between number of leatherback nests per beach section and water depth at increasing intervals from shore at Playa Grande, Costa Rica.

Distance from low tide line (km)	df	β	F	R ²	p ^a
0.1	1, 35	0.246	2.25	0.06	0.143
0.2	1, 35	-0.053	0.10	0.00	0.756
0.3	1, 35	0.075	0.20	0.01	0.660
0.4	1, 35	0.324	4.10	0.11	0.050*
0.5	1, 35	0.472	10.01	0.22	0.003**
0.6	1, 35	0.524	13.22	0.27	0.001**
0.7	1, 35	0.482	10.56	0.23	0.003**
0.8	1, 35	0.475	10.17	0.23	0.003**
0.9	1, 35	0.538	14.29	0.29	0.001**
1.0	1, 35	0.579	17.62	0.34	< 0.001**

^a * Significant at $\alpha = 0.05$. ** Significant at $\alpha = 0.005$ after Dunn-Sidak adjustment.

floodwater discharge from the forest periodically wash out the beach dune, with additional anthropogenic disturbance by bulldozer to improve drainage in the recent past (Fig. 3; Nordmoe et al. 2004; F. Paladino, *pers. obs.*). It is also noteworthy that nonnesting emergences (as a proportion of total emergences) were nearly three times more likely in developed sections of the beach relative to undeveloped areas, suggesting some mismatch between cues used in the initial approach and those used to assess nest site quality on the beach following emergence. Apparent avoidance of developed areas has been observed previously at Playa Grande, Costa Rica (Steyermark et al. 1996; Nordmoe et al. 2004) and at Playa Paraguito, Venezuela (Hernández et al. 2007), but these studies did not specifically assess how beach environments varied according to proximity to development. Developed segments of the beach had shallower slopes, lower elevations, lower pH, higher salinity, and more silt than did undeveloped areas—all of which are chemical and physical factors to which leatherbacks respond when selecting a nest location. Nearly all of these environmental factors can also be linked to the impacts of erosion, which is a process typically accelerated by many forms of coastal development (Garcia and Servera 2003), especially that which displaces stabilizing vegetation (Levin et al. 2006). As beaches adjacent to developed areas erode, dune elevation decreases, subjecting a larger area to a higher frequency of seawater flooding, compaction, and further erosion from tides and storm surges (Meyer-Arendt 1991). We suggest that erosion may also bring about several associated chemical and physical alterations to the beach environment, such as higher water content and salinity (from increased frequency and duration of seawater flooding) and silt deposition.

While dune erosion is one plausible mechanism explaining leatherback nest distributions, we cannot discount other effects of anthropogenic development that can impact turtle nesting such as artificial light, silhouette of background, or other disturbances associated with human activity. In particular, given its importance to turtle nesting, future studies should explore variation in artificial light intensity along the beach and assess whether photopollution factors into adult nest site selection and hatchling success at PNMB (e.g., Witherington 1992; Salmon et al. 1995). It should also be noted that we cannot demonstrate that beach development alone has altered beach physical and chemical characteristics, nor has it necessarily caused the observed turtle nesting distribution—only that these factors were correlated with development. Such a link could be strengthened by demonstrating a change in spatial nest distribution under different stages of beach development, but unfortunately we lack data on nest distribution at Playa Grande prior to the establishment of the Tamarindo Wildlife Refuge in the late 1980s, and then as a national park in 1991 (Spotila and Paladino 2004). There has been little change to either

tourism development or leatherback nest distributions along the beach throughout our long-term monitoring (Steyermark et al. 1996; Nordmoe et al. 2004). Thus, it is plausible that natural processes could also account for the relationships observed in this study, but to examine such factors here without additional data would be speculative.

Despite the limitations, we argue that our findings have important implications for conservation and management of high quality nesting beaches. The recent collapse of the leatherback population at Playa Grande is most likely a consequence of increased fisheries bycatch and the residual effects from an earlier egg harvest industry (Santidrián Tomillo et al. 2008). However, beaches outside of the PNMB, such as nearby Playa Tamarindo and Playa Flamingo, once hosted nesting leatherbacks that soon disappeared following coastal development (Steyermark et al. 1996), implicating beachfront development as a contributor to leatherback declines and local extinctions in this region and perhaps others. Leatherbacks are known to shift to different nesting beaches in response to changing beach quality or for undetermined reasons (Girindot and Fretey 1997; Hilterman and Goverse 2007; Santidrián Tomillo et al. 2007), raising the possibility that a nesting beach may be vacated following disruption resulting from anthropogenic development as well.

With the inclusion of Playa Grande as part of a national park, rates of beachfront development have been slowed relative to other areas of Costa Rica (Spotila and Paladino 2004), yet protection of Playa Grande and its nesting leatherbacks remains tenuous. The Costa Rica Ministry of Environment and Energy must continually entertain proposals from developers to convert PNMB into a mixed-management park for sustainable development in support of coastal ecotourism (Spotila and Paladino 2004). Such opportunities could provide much needed resources for the park, but perhaps at the expense of the availability and quality of leatherback nesting sites. It remains to be seen whether or to what degree beaches can be developed “sustainably”—that is, in a manner that supports a growing tourist industry and associated infrastructure while maintaining high-quality and attractive nesting environments for leatherbacks.

ACKNOWLEDGMENTS

We would like to thank the Earthwatch volunteers and students that helped to collect data. This research was approved by the Purdue Animal Care and Use Committee (PACUC 86-213) and conducted in accordance with applicable laws of Costa Rica (MINAE permit 055-04-05, 030-06, and 031-05) and the United States (USFWS CITES Import Permit 03US814546/9). This research was supported by grants from Earthwatch to Purdue University at Fort Wayne, the Goldring Marine Station, the Schrey Chair Endowment of Indiana-Purdue University at Fort Wayne, and the Leatherback Trust.

LITERATURE CITED

- ACKERMAN, R.A. 1997. The nest environment and the embryonic development of sea turtles. In: Lutz, P.L. and Musick, J.A. (Eds.). *The Biology of Sea Turtles*. New York: CRC Press, pp. 83–106.
- ALLISON, L.E. AND MOODIE, C.D. 1965. Carbonate. In: Black, C.A. (Ed.). *Methods of soil analysis*. Part 2. Madison, WI: American Society of Agronomy, pp. 1379–1396.
- BILLES, A. AND FRETEY, J. 2001. Nest morphology in the leatherback turtle. *Marine Turtle Newsletter* 92:7–9.
- BJORNALD, K.A. AND BOLTEN, A.B. 1992. Spatial distribution of Green Turtle (*Chelonia mydas*) nests at Tortuguero, Costa Rica. *Copeia* 1992:45–53.
- BLAKE, G.R. 1965. Particle density and bulk density. In: Black, C.A. (Ed.). *Methods of soil analysis*. Part 1. Madison, WI: American Society of Agronomy, pp. 371–390.
- BOUCHARD, S., MORAN, K., TIWARI, M., WOOD, D., BOLTEN, A., ELIAZAR, P., AND BJORNALD, K. 1998. Effects of exposed pilings on sea turtle nesting activity at Melbourne Beach, Florida. *Journal of Coastal Research* 14:1343–1347.
- CARR, A. AND OGREN, L. 1959. The ecology and migrations of sea turtles, 3. *Dermochelys* in Costa Rica. *American Museum Novitates* 1958:1–29.
- CARVER, R.E. 1971. *Procedures in Sedimentary Petrology*. New York: Wiley Interscience.
- CHAN, E.H. AND LIEW, H.C. 1996. Decline of the leatherback population in Terengganu, Malaysia, 1956–1995. *Chelonian Conservation and Biology* 2:196–203.
- ECKERT, K.L. 1987. Environmental unpredictability and leatherback sea turtle (*Dermochelys coriacea*) nest loss. *Herpetologica* 43:315–323.
- EMERY, K.O. 1961. A simple measure of measuring beach profiles. *Limnology and Oceanography* 6:90–93.
- GARCIA, C. AND SERVERA, J. 2003. Impacts of tourism development on water demand and beach degradation on the island of Mallorca (Spain). *Geographiska Annaler* 85:287–300.
- GARMESTANI, A.S., PERCIVAL, H.F., PORTIER, K.M., AND RICE, K.G. 2000. Nest-site selection by the loggerhead sea turtle in Florida's Ten Thousand Islands. *Journal of Herpetology* 34:504–510.
- GRINDOT, M. AND FRETEY, J. 1997. Leatherback turtles, *Dermochelys coriacea*, nesting in French Guiana, 1978–1995. *Chelonian Conservation and Biology* 2:204–208.
- HAYS, G.C., MACKAY, A., ADAMS, C.R., MORTIMER, J.A., SPEAKMAN, J.R., AND BOEREMA, O. 1995. Nest site selection by sea turtles. *Journal of Marine Biology* 75:667–674.
- HENDRICKSON, J.R. AND BALASINGAM, E. 1966. Nesting beach preferences of Malaysian sea turtles. *Bulletin of the Natural Museum of Singapore* 33:69–76.
- HERNÁNDEZ, R., BUITRAGO, J., GUADA, H., HERNÁNDEZ-HAMÓN, H., AND LLANO, M. 2007. Nesting distribution and hatching success of the leatherback, *Dermochelys coriacea*, in relation to human pressures at Playa Parguito, Margarita Island, Venezuela. *Chelonian Conservation and Biology* 6:79–86.
- HILTERMAN, M.L. AND GOVERSE, E. 2007. Nesting and nest success of the leatherback turtle (*Dermochelys coriacea*) in Suriname, 1999–2005. *Chelonian Conservation and Biology* 6:87–100.
- HORROCKS, J.A. AND SCOTT, N.M. 1991. Nest site location and nest success in the hawksbill turtle (*Eretmochelys imbricate*) in Barbados, West Indies. *Marine Ecology Progress Series* 69:1–8.
- INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE (IUCN). 2009. IUCN Red List of Threatened Species. Version 2009.2. www.iucnredlist.org (4 March 2010).
- JOHANNES, R.E. AND RIMMER, D.W. 1984. Some distinguishing characteristics of nesting beaches of the green turtle, *Chelonia mydas*, on North West Cape, Western Australia. *Marine Biology* 83:149–154.
- KAMEL, S.J. AND MROSOVSKY, N. 2004. Nest site selection in leatherbacks, *Dermochelys coriacea*: individual patterns and their consequences. *Animal Behavior* 68:357–366.
- KARAVAS, N., GEORGHIOU, K., ARAINOUSOU, M., AND DIMOPOULOS, D. 2005. Vegetation and sand characteristics influencing nesting activity of *Caretta caretta* on Sekania beach. *Biological Conservation* 121:177–188.
- KIKUKAWA, A., KAMEZAKI, N., AND OTA, H. 1999. Factors affecting nesting beach selection by loggerhead turtles (*Caretta caretta*): a multiple regression approach. *Journal of Zoology London* 249:447–454.
- KRAEMER, J.E. AND BELL, R. 1980. Rain-induced mortality of eggs and hatchlings of loggerhead sea turtles (*Caretta caretta*) on the Georgia coast. *Herpetologica* 36:72–77.
- LEVIN, N., KIDRON, G.J., AND BEN-DOR, E. 2006. The spatial and temporal variability of sand erosion across a stabilizing coastal dune field. *Sedimentology* 53:697–715.
- MCGHEE, A.M. 1990. Effects of moisture on eggs and hatchlings of loggerhead sea turtles (*Caretta caretta*). *Herpetologica* 3: 251–258.
- MEYER-ARENDET, K.J. 1991. Tourism development on the north Yucatan coast: human response to shoreline erosion and hurricanes. *Geojournal* 23:327–336.
- MORTIMER, J.A. 1982. Factors influencing beach selection by nesting sea turtles. In: Bjornald, K.A. (Ed.). *Biology and Conservation of Sea Turtles*, Proceedings of the World Conference on Sea Turtle Conservation. Washington, DC: Smithsonian Institution Press, pp. 45–51.
- MORTIMER, J.E. 1990. The influence of beach sand characteristics on the nesting behavior and clutch survival of green turtles (*Chelonia mydas*). *Copeia* 1990:802–817.
- MROSOVSKY, N. 1983. Ecology and nest-site selection of leatherback turtles. *Biological Conservation* 26:47–56.
- NAGLE, R.D., ROWE, C.L., AND CONGDON, J.D. 2001. Accumulation and selective maternal transfer of contaminants in the turtle *Trachemys scripta* associated with coal ash deposition. *Archives of Environmental Contamination and Toxicology* 40:531–536.
- NORDMOE, E.D., SIEG, A.E., SOUTHERLAND, P.R., SPOTILA, J.R., PALADINO, F.V., AND REINA, R.D. 2004. Nest site fidelity of leatherback turtles at Playa Grande, Costa Rica. *Animal Behavior* 68:387–394.
- PRITCHARD, P. 1971. The leatherback or leathery turtle (*Dermochelys coriacea*). IUCN Monograph, Marine Turtle Series 1: 1–39.
- RAUSCHENBERGER, R.H., TRAUTH, S.E., AND FERRIS, J.L. 2004. Incubation of alligator snapping turtle (*Macrochelys temminckii*) eggs in natural and agricultural soils. *Applied Herpetology* 1:299–309.
- REINA, R.D., MAYOR, P.A., SPOTILA, J.R., PIEDRA, R., AND PALADINO, F.V. 2002. Nesting ecology of the leatherback turtle, *Dermochelys coriacea*, at Parque Nacional Marino Las Baulas, Costa Rica: 1988–1989 to 1999–2000. *Copeia* 2002: 653–664.
- SALMON, M.S., REINERS, R., LAVIN, C., AND WYNEKEN, J. 1995. Behavior of loggerhead sea turtles on an urban beach. I. Correlates of nest placement. *Journal of Herpetology* 29: 560–567.
- SANTIDIÁN TOMILLO, P., SABA, V., PIEDRA, R., PALADINO, F.V., AND SPOTILA, J.R. 2008. Effects of illegal harvest of eggs on the population decline of leatherback turtles in Las Baulas Marine

ANNEXURE 28

To: Inspector General (Wildlife)
ESZ Division, Ministry of Environment, Forest and Climate Change
Indira Paryavaran Bhavan, Jor Bhagh Road, Aliganj, New Delhi - 110003

14 June 2021

Sir/Madam,

Subject: In response to the proposed development plans for Little Andaman Island and Great Nicobar Island, and the threats to leatherback turtle nesting sites and the stability of ecological hotspots.

1. Key Leatherback nesting sites

Both Little Andaman Island and Great Nicobar Island host vital *and important nesting grounds for leatherback turtles*, being one of the few global hotspots and India's index leatherback nesting sites.

Within Little Andaman Island, there are two leatherback nesting beaches at **South bay** and **West bay**. Both the sites are part of the ongoing marine turtle research projects for the past **14 years**, set up in 2008 by the:

- Andaman Nicobar Environment Team (ANET),
- Dakshin Foundation, Bangalore
- Indian Institute of Science, Bangalore
- A&N Forest Department.

These long-term research projects provide evidence that the number of turtles nesting here is *significant*. This information paired with satellite telemetry research has revealed migration patterns of leatherback turtles travelling across the Indian ocean every year, making *these nesting sites globally significant and internationally important for marine ecological health and global leatherback numbers in the Indian Ocean and the Western Pacific Ocean*.

Besides Little Andaman Island, Great Nicobar Island holds one of the most important global leatherback nesting sites: **Galathea Bay**, within the Galathea Bay wildlife sanctuary. India's **National Marine Turtle Action Plan** released on February 1, 2021 has listed Galathea Bay as one of the '*Important Coastal and Marine Biodiversity Areas*' and '*Important Marine Turtle Habitats*' in the country and was classified as an Ecologically Sensitive Area (ESA) under the Coastal Regulation Zone one (CRZ)-I with *maximum protection*.

The new development plans for these sites pose a significant threat to all **these crucial nesting sites**.

In Little Andaman Island, two sites where key components of tourism are being planned are both leatherback nesting sites — South Bay along the southern coast of the island and West Bay along its western coast. These pristine beaches and nesting sites are *extremely sensitive to external change* and the habitat and ecological parameters will be at risk.

The **Galathea Bay wildlife sanctuary**, while being recognized as an important ecological hotspot by the *scientific community and by government decree* has been **denotified** by the **Standing Committee of the National Board for Wildlife**, at its 60th meeting on January 5 under the chairmanship of the Environment Minister, for the “*construction as well as operational phases of the International Shipment Project*”. The scale of the project and the investment proposed could signal the *end of a crucial leatherback nesting site*, and the ecological richness of the last remnants of untouched tropical forests and marine ecosystems in India.

2. Ecological costs of the proposed developmental plans

On January 18, an **Environment Ministry expert committee** approved a “**zero extent**” Ecologically Sensitive Zone (ESZ) for the Galathea NP to allow use of land in the south-eastern and south-western part of the island for the developmental plan proposed. However, the October 2020 draft notification for this zero extent ESZ has, in juxtaposition, *listed out and acknowledged in great detail the park’s ecological uniqueness* – that it is a part of a UNESCO World Heritage Site, houses a range of forest types, has one of the best preserved tropical rainforests in the world, is home to **648** species of flora and hosts **330** species of fauna including rare and endemic ones such as the *Nicobar wild pig*, *Nicobar tree shrew*, the *Great Nicobar crested serpent eagle*, *Nicobar paradise flycatcher* and the *Nicobar megapode*. It also notes that the park is home to the indigenous *Shompen community*. Actions taken, thus, seem to be *in contrast to the existing scientific knowledge base and evidence on the ecological wealth* and importance of the bay and surrounding ecosystems.

The scale of ecological change, and the scale of proposed *damages* resulting from these changes can have an *impact on the ecological wellbeing of the beaches and forests as a whole*. In Great Nicobar Island, the proposed extent of the island to be worked on amounts to nearly **18%** of the 910 sq. km. island, and will cover nearly a **quarter of its coastline**. The overall plan envisages the use of about **244 sq. km.** – *a major portion being pristine forest and coastal systems*. In Little Andaman Island the proposed 'sustainable development of Little Andaman' of this virtually untouched island, has sought the de-reservation of over **200 sq km** of pristine rainforest and also of about **140 sq km** of the **Onge Tribal Reserve**.

In a note dated September 26, 2020, the **Divisional Forest Officer**, Little Andaman Island, raised serious *concerns* about this vision on grounds of *ecological fragility*, indigenous rights and *vulnerability* to earthquakes and tsunamis. The note said such large diversion of forest land would cause obvious *environmental loss* leading to **irreversible damage** (more than **2 million trees** stand in the forest land sought for these projects), and that habitats of various wild animals including endangered sea turtles would be affected.

The islands and the coastlines of the Andaman and Nicobar Islands have *global significance* for the health of leatherback populations and to the incredible diversity found within the pristine biomes on its protected shores. The *wealth and the pivotal ecological role of these islands cannot be overstated*. Moreover, in a time of *global ecological destruction*, **ethically** it is in our hands to protect and conserve what little treasures remain, especially when the *value of these islands and beaches have been recognized for decades by both the government and by science*.

The proposed changes suggested by NITI Aayog's vision documents, and the steps taken towards a phased growth plan, run the risk of *destabilizing* and *disintegrating* these crucial and sensitive ecological zones.

Thus, in this pivotal time of a pandemic, resource scarcity, and a climate crisis, we turtle conservation organizations from around India strongly appeal to you to reconsider the proposed plans for now and for the future. Furthermore, we urge that the formerly protected Galathea wildlife sanctuary be reinstated with the original levels of protection, and be protected and safe guarded for the future of humanity and all life on this planet.

Sincerely,

Adhith Swaminathan, Senior Research Assistant, Dakshin Foundation, Bangalore

Akila Balu, Founder Trustee, Student's Sea Turtle Conservation Network (SSTCN), Chennai

Arun V, Founder Trustee, Student's Sea Turtle Conservation Network (SSTCN), Chennai

Ashis Senapati, Freelancer, Project Swarajya; Adviser of Gahirmatha Marine Turtles and Mangrove Conservation Society

Prof.(Retd) B.C.Choudhury, Member IUCN SSC MTSG Member And Vice Chair for South Asia Region

Bijaya Kumar Kabi, Director, Action for Protection of Wild Animals (APOWA), Odisha

Dineshgiri D. Goswami, President, Prakruti nature club, Gujarat

James NJ, Executive Director, Green Habitat, Kerala

Jignesh M. Gohil, Vice President, Prakruti nature club, Gujarat

Kartik Shanker, Professor, Centre for Ecological Sciences, Indian Institute of Science (IISc), Bangalore

Mangaraj Panda, Secretary, UAA ODISHA

M.Ramesh Babu, Ujwla (NGO), Vizianagaram

Muralidharan.M, Field Director, Dakshin Foundation, Bangalore

Naveen Namboothri, Director, Dakshin Foundation, Bangalore

Pradeep Kumar Nath, Founder/President, Visakha Society for Protection and Care of Animals,
Visakhapatnam

Romulus Earl Whitaker, Founder, Madras Crocodile Bank Trust, Chennai

Sudheerkumar P V, Neithal Kadalama Samrakshana Sanghatana, Neeleswaram, Kerala

Venkatesh Charloo, Founder Trustee, Coastal Impact

Copied to:

1. Secretary, Ministry of Environment, Forests and Climate Change
Indira Paryavaran Bhavan, Jor Bhagh Road, Aliganj, New Delhi - 110003
2. Special/Additional Secretary
ESZ Division, Ministry of Environment, Forest and Climate Change
Indira Paryavaran Bhavan, Jor Bhagh Road Aliganj, New Delhi - 110003
3. Adviser (in charge of ESZ)
Ministry of Environment, Forest and Climate Change
Indira Paryavaran Bhavan, Jor Bhagh Road, Aliganj, New Delhi - 110003
4. Director, Ministry of Environment Forest and Climate Change
Indira Paryavaran Bhavan, Jor Bhagh Road, Aliganj, New Delhi - 110003
5. Vice Chairman, NITI-AYOG,
Sansad Marg, Sansad Marg Area, New Delhi, Delhi 110001.
6. Lieutenant Governor,
Lt. Governor's Secretariat, Rajniwas, Port Blair - 744101
Andaman & Nicobar Islands
7. Chief Secretary
O/o Secretary (GA), Andaman and Nicobar administration, Secretariat,
Port Blair - 744101, Andaman & Nicobar Islands
8. Principal Chief Conservator of Forests & Chief Wildlife Warden
Office of The Principal Chief Conservator of Forest
Van Sadan, P.O Haddo, Port Blair - 744102, Andaman & Nicobar Islands
9. The Chairperson,
Environmental Appraisal Committee (EAC), MoEFCC,
Indira Paryavaran Bhawan, Jorbagh Road, New Delhi - 110 003

ANNEXURE 29



No. WII/RTI/CPIO/2021-22 (Qtr-I)/12

Date: 7th June, 2021

To,

Sub.: Information under RTI Act, 2005-reg.

Ref.: Your Online RTI No. WLIOI/R/E/21/00038 dated 26/05/2021

Madam,

Please refer to your application cited above under RTI Act, 2005. In this context, point-wise response to your queries is given below:

Information Sought under RTI	Reply
a) Copy of the comments of the Director, WII sought by MoEF & CC on denotification of Galathea Sanctuary, Andaman and Nicobar Islands.	Copy of the Comments of the Director, WII sought by MoEF&CC on denotification of Galathea Bay Sanctuary is attached herewith as Annexure-I
b) List of scientific studies conducted by the WII on leatherback turtles of Andaman and Nicobar Islands.	So far, WII did not conduct any study exclusively on Leatherback turtles of ANI. However, the following study has observed the nesting of leatherback in Nicobar group of islands. Sivakumar, K., 2021. An assessment of the environmental sensitiveness of sea turtle nesting beaches of the Great Nicobar Island, Wildlife Institute of India, 30 pp.
c) List of scientific collaboration of WII with other Governmental or non-Governmental institutions/organisations to study leatherback turtles of Andaman and Nicobar Islands.	WII did not conduct any study on Leatherback with collaboration of other institutions.

If you are not satisfied with the aforesaid reply, you may appeal to the Appellate Authority i.e. "Director, Wildlife Institute of India, Post Box 18, Chandrabani, Dehradun – 248 001, Ph. 0135-2640910".

Thanking you,

Yours faithfully,

NO & CPIO (RTI)

Encl.: as above.

Comments on proposal of 'De-notification of Galathea Bay Wildlife Sanctuary (intention of which was notified)' from the Chief Wildlife Warden, Government of Andaman & Nicobar Islands

1. Five of the seven species of marine turtles found worldwide are reported to occur in Indian coastal waters, of these, four species nests along the coastline of Andaman and Nicobar islands. Andaman and Nicobar Islands have some of the best nesting beaches and foraging grounds for marine turtles in India. A proportion of world's Leatherback turtle population migrates every winter to the off coast of Little Andaman and Great Nicobar islands. They nest on the beaches of Galathea, Dagmar and Alexandria in Great Nicobar Island as well as on the beaches of Little Andaman. The Leatherback turtle nesting population in Andaman and Nicobar islands forms one of the four large colonies in Indo-Pacific region. Leatherback turtles that nest on the beaches of Andaman Nicobar Islands migrate up to Australia and Africa on either side.
2. Increased egg predation by domestic and feral dogs, hunting and incidental capture of turtles and fishery related mortality have been reported in the islands. Therefore, the Forest Department has already identified all-important sea turtles nesting beaches of islands and continuously monitoring these beaches with a Special Sea Turtle Monitoring and Protection Force (STPF). Andaman administration has also banned sand mining in all turtle nesting beaches in the region. Feral dogs, which pose a great risk to the survival of turtles, were also monitored and regulated. The use of Turtle Excluder Device needs to be made mandatory in shark and gills nets. Artificial hatcheries have been established at several nesting sites to protect turtle eggs

INFORMATION PROVIDED
UNDER RTI

predation to enhance nesting success. Further, the department is successful in getting support of communities and other stakeholders in conservation of sea turtles and their habitats in islands. Department has prepared a 'Turtle Conservation Plan cum Status Report' that is going to be a road map for the long term conservation of turtles of the islands.

3. Beaches of Galathea Bay is one of the two important nesting sites of Leatherback turtles in Andaman and Nicobar Islands, other one being at Little Andaman. About 150 to 480 Leatherback turtles nest at Galathea Bay every year. In 1997, the Department of Environment and Forest, ANI had declared its intention to constitute an area of 11.44 sq.km of South Bay, Great Nicobar comprising 8.4 sq.km area of bay water and 3.1 sq.km area of adjoining coastal lands as the Galathea Bay Wildlife Sanctuary to protect and propagate the Giant Leatherback turtles. As per the CWLW's Agenda Note, the area could not finally notified as a Sanctuary till now owing to non-settlement of rights.
4. In Great Nicobar Island, beaches around the mouths of Alexandria and Dagmar rivers have also reported with sporadic nesting of Leatherback turtles. The 2004 tsunami has adversely affected this species and its nesting areas. But after few years, the species could bounce back, which indicates that this species has a good resilience and adaptability for the changes, provided their habitats are protected.
5. The Government's vision for holistic development of Great Nicobar Island, which *inter alia* envisages the sustainable development of Great Nicobar Island, including development of a deep berth port.
6. In this context, The Government of Andaman and Nicobar Islands and the Government of India plan to develop the area in and around the South Bay for the International Transshipment Terminal as it is of national importance owing to strategic and economic reasons.

Housing activities based around the transshipment terminal, comprising three zones, of which Port Logistics area fall around the Galathea Bay.

7. As per the CWLW's Agenda Note, it was stated that the validity of earlier notification as 'Galathea Bay Wildlife Sanctuary' has now been legally questionable while the Leatherback turtles continue to nest on the beaches of Galathea Bay.
8. In this context, if the Government would like to 'De-notify the Galathea Bay WLS' then it is strongly urged that the concerned authorities develop and implement a mitigation plan to facilitate leatherback and other turtles to continuously nest for which the connectivity between the Galathea River and the Bay should be ensured. The mitigation plan needs to be developed through a detailed study so that marine turtles to continue to nest on the beaches near the Galathea Bay during both construction as well as operational phases of the International Shipment Project.
9. Further, as mentioned in the CWLW's Agenda Note, the preservation and conservation of the Leatherback turtle habitat will not be compromised even if the area is de-notified. As also suggested by the Chief Wildlife Warden that the provision of CRZ should be rigidly enforced in the area being in ICRZ-1A category, to ensure the continuance of Leatherback turtles nesting on this traditional nesting beach. Further, we urge the concerned authorities to secure and conserve all other important turtles nesting areas of Andaman and Nicobar islands with enhanced protection/conservation measures through appropriate legal/administrative means and through a Management Plan.

ATTESTED


CPIO, Wild Life Institute of India, Dehradun

ANNEXURE 30

Conservation genetics of marine turtles on the mainland coast of India and offshore island

A WII Grant-in-Aid Project Report



Kartik Shanker & B. C. Choudhury

Wildlife Institute of India, Dehradun

Ramesh K. Aggarwal

Center for Cellular & Molecular Biology, Hyderabad

October 2011

Citation

Shanker, K., B.C. Choudhury and RK. Aggarwal. 2011. Conservation genetics of marine turtles on the mainland coast of India and offshore islands. Final Project Report. Wildlife Institute of India, Dehradun and Centre for Cellular and Molecular Biology, Hyderabad.

Project title

Conservation genetics of marine turtles on the mainland coast of India and offshore islands, using mitochondrial DNA sequencing analysis and microsatellite analysis to assess the phylogeography and population structure at various rookeries on the coast

Investigators

Ramesh Aggarwal

Center for Cellular & Molecular Biology, Hyderabad

B.C. Choudhury and Kartik Shanker[#]

Wildlife Institute of India, Dehradun

[#] - currently Indian Institute of Science, Bangalore

Researchers

A. Pavani Sowjanya, Albert Lalremruata, M. Udaykumar, T.P. Velavan

Center for Cellular & Molecular Biology, Hyderabad.

Shyamoli Mehta, Gopi G.V.

Wildlife Insitute of India, Dehradun

Cover photo: Sumer Verma (mating olive ridleys) and Kartik Shanker (leatherback turtle)

EXECUTIVE SUMMARY

There are seven species of marine turtles, of which five have global distributions, namely leatherback (*Dermochelys coriacea*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*) and olive ridley turtles (*Lepidochelys olivacea*). All five are found in Indian waters. Two other species, the flatback (*Natator depressus*) and the Kemp's ridley (*Lepidochelys kempii*) are restricted to Northern Australia and the Atlantic coast of Mexico, respectively. Four species of sea turtles nest on various parts of the Indian mainland coast and offshore islands. Of these, olive ridley turtles are the most abundant with mass nesting beaches in Gahirmatha, Rushikulya and Devi River mouth in Orissa on the east coast of India. This is one of the few sites in the world where mass nesting (*arribada*) occurs, along with locations on the Pacific coast of Mexico and central America. Our earlier studies demonstrated that olive ridley turtles along the east coast of India represent one large population with no sub-structuring along the coast. More importantly, this population is most closely related to the sister species, the Kemp's ridley and represents a possible ancestral source population for contemporary global populations of olive ridleys both in the Pacific and the Atlantic oceans. The significance of these results led to a more comprehensive effort to ascertain the phylogeography and population genetics of olive ridleys and other marine turtles in Indian waters.

Olive ridley turtles from three nesting sites in Orissa and one in Tamil Nadu (sampled as part of the earlier WII funded CCMB-WII collaborative project), were analyzed using a number of microsatellite markers. The analysis revealed moderate to high level of polymorphism; all the samples exhibited heterozygosity for at least one microsatellite locus analyzed in the study. The allelic diversity data suggests that there is a considerable amount of genetic variation in the population. However, allelic diversity at microsatellite loci as well as the mitochondrial haplotypes were found randomly distributed across the samples, suggesting that there is no genetic differentiation between the populations from different nesting sites and that these represent a single large population along the east coast of India. These observations are concordant with field data that show that olive ridley turtles routinely use more than one nesting beach in Orissa.

For the microsatellite analysis, we initially used cross-species microsatellite markers. Later, novel olive ridley specific microsatellite markers were developed at CCMB using a Pre-cloning SSR-enrichment approach of genomic library construction (developed indigenously in CCMB). The efforts led to development of a number of highly informative olive-ridley specific microsatellite markers for the first time in this species.

More than 300 samples belonging to four species of marine turtles (olive ridley, leatherback, green and hawksbill turtles) were collected from different locations throughout India from 2001 to 2004. Olive ridley turtles were sampled along the east and west coasts of India, and both offshore island groups, and green turtles along the Gujarat and Tamil Nadu coasts, and Lakshadweep Islands. Hawksbill turtles were sampled opportunistically at Lakshadweep. Leatherback turtles were sampled extensively at Great Nicobar Island, at a beach which was washed away during the December 2004 tsunami. This population is one of the largest leatherback populations in the south Asian region.

The samples were processed and total genomic DNA was isolated for mitochondrial DNA sequence analysis. The analysis of the mitochondrial D-loop region of olive ridley turtles revealed that the most basal haplotype K and its derivatives, which are diagnostic of the Orissa olive ridley population, were also found in relatively high proportion in samples from locations along the Indian mainland, but these were not seen in samples from the Islands. Olive ridley samples from the Andaman and Nicobar islands, in contrast to the mainland population, comprised 2 other haplotypes and their derivatives. This is not surprising as the Andaman and Nicobar Islands constitute a different biogeographic region. Many new haplotypes were identified for olive ridleys as well as 3 other marine turtle species; leatherback haplotypes were principally similar to those found in the Indo-Pacific region in previous studies.

Mainly, these findings confirm that the east (and possibly west) coast of India represents the ancestral population of olive ridley turtles. A finer resolution is required to unravel the population genetics of other species of marine turtles in Indian waters. However, the mitochondrial DNA sequence database can serve to identify sea turtles killed in fisheries, and contribute to future studies on population genetics, stock analysis, and mixed stock analysis at foraging grounds.

INTRODUCTION

Sea turtles have been widely studied for over fifty years, but much of the work has remained restricted to the brief period in their life cycle when they come ashore to nest. In recent years, molecular genetic techniques have been used successfully to answer questions in taxonomy and ecology, which conventional field methods had failed to answer (Awise 1989; Awise 1992). Molecular sequence analysis has been used extensively to study marine turtle biology to answer questions regarding their evolution and phylogeny (Awise et al. 1992; Bowen et al. 1993; Fitzsimmons et al. 1995; Dutton et al. 1996; Naro-Maciel et al. 2008).

In particular, mitochondrial DNA analysis has been used to study the global population structure and phylogeography of different species (Bowen et al. 1992a; Bowen et al. 1994; Bowen et al. 1998; Dutton et al. 1999; Bowen and Karl 2007) as well as regional population structure and phylogeography (Bass et al. 1996; Encelada et al. 1996; Encelada et al. 1998; Shanker et al., 2004a; Bjorndal et al. 2005; Dethmers et al., 2006; Bjorndal et al. 2006; Formia et al. 2006; Bourjea et al., 2007). It has also been used to determine the origin, dispersal and migratory routes of populations (Bowen et al. 1995; Bass et al. 1998; Bolten et al. 1998; Naro-Maciel et al. 2007; Godley et al. 2010), stock analyses of feeding areas (Bowen et al. 1992b; Lahanas et al. 1998, Luke et al. 2004; Dutton et al, 2008) and to confirm the natal homing hypotheses for green turtles (*Chelonia mydas*) (Meylan et al. 1990; Allard et al. 1994; Lee et al. 2007).

The comparison of mitochondrial and nuclear gene polymorphisms have helped to identify male biased gene-flow in green turtle populations (Fitzsimmons et al. 1997a, 1997b; Roberts et al. 2004) and the study of microsatellites has been widely used in the analysis of multiple paternity in sea turtle species (Fitzsimmons 1998; Kichler et al. 1999; Zbinden et al. 2007).

Several studies have looked specifically at the conservation implications of genetic data (Chassin-Noria et al. 2004; Shanker et al. 2004a; Bowen et al. 2005; Rivalan et al. 2006). It is in this context that conservation genetic studies were initiated on marine turtles in India. The study species and their distributions are described briefly below.

Olive ridley turtles

Olive ridley turtles (*Lepidochelys olivacea*) are a widely distributed species, and are unique (along with the Kemp's ridley, *Lepidochelys kempfi*) in the phenomenon of mass nesting. While Kemp's ridleys consist of a single nesting population (Carr 1963; Marquez 1994), olive ridleys are considered the most abundant of the sea turtles (Reichert 1993). Nesting aggregates of over 100,000 females have been reported from Pacific Mexico, Pacific Costa Rica and Orissa on the east coast of India (Marquez et al. 1976; Pandav et al. 1994). Molecular genetic studies have shown that olive ridleys on the east coast of India are ancestral to populations in the Atlantic and Pacific Oceans (Shanker et al. 2004a). Despite their abundance and wide distributions, many populations have been greatly depleted by human activities (Ross 1982; Pandav et al. 1998).

Along the Indian coast, the major mass nesting beaches of olive ridleys are Gahirmatha, Devi mouth and Rushikulya on the Orissa coast, of which only Gahirmatha is legally protected (Pandav et al., 1998). However, sporadic nesting has been reported throughout the east coast of India as well as on the west coast and the Andaman and Nicobar Islands (Kar & Bhaskar 1982). All populations are threatened by coastal development, habitat destruction and fishery related mortality, particularly in Orissa, where over 100,000 turtles have been counted dead in the last decade (Shanker & Choudhury 2006). Much of this mortality is attributed to drowning in trawl fishing nets (Pandav 2000). Little is known about the population structure of these marine turtles, nor till recently was there information on the migratory routes or origin of these large nesting populations.

Leatherback turtles

There have been many sightings and strandings of leatherback turtles on the east and west coasts of India, but little, if any nesting is known to occur on these beaches (Shanker and Choudhury 2006). Though once reported to nest in small numbers on the Indian mainland coast, no confirmed nests have been recorded in the last four decades or so. A small number of leatherback turtles nest in southern Sri Lanka (Ekanayake et al.

2002), representing the only significant nesting population in the South Asian region.

The Andaman and Nicobar Islands have the best nesting beaches for leatherback turtles in the region (Andrews and Shanker 2002). Though many populations in the Andamans have declined in the last few decades (Andrews et al. 2006a), there are small nesting populations at West Bay and South Bay of Little Andaman Island which are currently being monitored.

There largest nesting populations occur in the Nicobar group across several nesting beaches on both Great and Little Nicobar Islands (Andrews et al. 2006a). These include Galathea on the east coast of Great Nicobar and Alexandria and Dagmar on the West Coast of Great Nicobar, which received 400 to 500 nests per season before the December 2004 tsunami (Andrews et al. 2006a). Similarly, beaches in Little Nicobar likely received more than a hundred nests each (Manish Chandi pers. Comm.). All the beaches in the Nicobar were destroyed by the December 2004 tsunami (Andrews et al. 2006b), but the beaches have been gradually forming again, and nesting has been reported (Naveen Namboothri, pers. comm.).

Hawksbill and green turtles

A few juvenile hawksbill and green turtles have been sighted on the mainland coast of India. Hawksbill nesting occurs primarily in the Andaman Islands (Bhaskar 1996) and foraging areas occur in the Lakshadweep as well as Andaman and Nicobar Islands (Tripathy et al. 2006; Andrews et al. 2006a). Green turtles nest in Gujarat (Sunderraj et al. 2006), Lakshadweep (Tripathy et al. 2006) and Andaman and Nicobar Islands (Andrews et al. 2006a), and forage extensively in both island groups. In particular, large numbers of green turtles are known to forage in the lagoons of some islands in the Lakshadweep (Tripathy et al. 2006; Lal et al. 2010). In these islands, green turtle densities have been found to substantially alter seagrass meadows, leading to conflict with local fisher communities (Lal et al. 2010). Few, if any, loggerheads are seen in Indian waters, and many records may represent misidentification (Frazier 1985; Tripathy 2005).

Threats

Sea turtles are affected by a variety of anthropogenic threats including direct threats such as fishery related mortality, depredation of eggs by humans and animals, predation of hatchlings by feral animals, and take of adults for consumption in a few areas (see Shanker and Choudhury, 2006 for an account of threats in different parts of the country). Sea turtle populations are also affected by a range of indirect threats such as coastal development and exotic plantations, climate change and pollution. Coastal development can affect sea turtle populations by destroying nesting habitat, beach lighting which disorients hatchlings (Karnad et al. 2009) and by changing thermal profiles. Since hatchling sex is determined by temperature (Mrosovsky and Pieau 1991), changes in thermal profiles due to development or climate change can significantly impact populations. On the east coast of India, fishery related mortality has been a significant threat over the last two decades with over 100,000 – 150,000 dead turtles washed ashore during the last 15 years of documented record (Shanker et al, 2004b; Wright and Mohanty, 2006; B. Mohanty, unpubl. Data).

Molecular genetic studies

It is necessary to understand the population structure and behavioural ecology of these turtles in order to frame appropriate conservation strategies and devise plans for the management of populations. Molecular genetic analysis can often complement information obtained by intensive long-term field studies to achieve the objectives of effective conservation and management. Our earlier studies have suggested that the olive ridleys along the east coast of India represent: a) one large population with non-significant sub-structuring along the coast, and more importantly, b) a possible ancestral source population for re-colonization of contemporary global populations of olive ridleys both in the Pacific and the Atlantic oceans. The significance of these results justified a more comprehensive effort to ascertain the phylogeography and population genetics of olive ridley turtles and other marine turtle species in Indian waters. To this end, this study was initiated with samples from all along the Indian coastline including the Lakshadweep, and Andaman and Nicobar Islands.

OBJECTIVES

The objectives of the study were:

- Study of the phylogeography of marine turtles in Indian waters using mitochondrial DNA sequencing analysis
- Study of the population genetics of the olive ridley turtles the mainland coast of India and offshore islands using microsatellite analysis
- Study of multiple paternity of olive ridley turtles on the east coast using microsatellite analysis

METHODS

Study Area

Olive ridleys are found all along the Indian coastline, but nest mainly along the east coast of India and on the Andaman and Nicobar islands. While nesting is sporadic along most of the coast, there are at least three major mass nesting beaches in Orissa on the east coast, i.e., Gahirmatha (located near Dhamra, 21°N - 87° E, part of the Bhitarkanika Wildlife sanctuary at the mouth of the river Maipura), Devi river Mouth (20°N - 86°E, located north of Puri) and Rushikulya (19°N - 85°E, southern most mass nesting rookery). In addition, sporadic nesting occurs along the east coast in Andhra Pradesh, Tamil Nadu, as well as in the Andaman and Nicobar islands. Lower density nesting occurs along the entire west coast of India, as well as the Lakshadweep Islands.

For the study, the samples comprised the samples collected under the earlier WII supported CCMB-WII collaborative study (concluded in 2000), and a large number of new samples that were collected from the mainland coast of India (Tamil Nadu, Andhra Pradesh, Gujarat), as well as the offshore islands (of Andamans & Nicobars, and Lakshadweep).

More than 300 samples belonging to four species of marine turtles (olive ridley, leatherback, green and hawksbill turtles) were collected from different locations throughout India from 2001 to 2004. Olive ridley turtles were sampled along the east west coasts of India, and both offshore island groups, and green turtles along the Gujarat and Tamil Nadu coasts on the mainland, and Lakshadweep Islands. Hawksbill turtles were sampled opportunistically at Lakshadweep. Leatherback turtles were sampled extensively at Great Nicobar Island, at a beach which was washed away during the December 2004 tsunami. This population is one of the largest leatherback populations in the south Asian region. Details of the samples analysed in the study (belonging to 4 marine turtle species), alongwith the locations in Indian waters from where the same were collected are shown in Figure-1 and Table-1, 2.

Field sampling

Permits were obtained for sampling from the Ministry of Environment and Forests, and State Forest Departments. Field sampling was carried out on the mainland coast by visiting various sites in Gujarat, Tamil Nadu and Andhra Pradesh. In the Lakshadweep, sampling was carried out during field visits, and as part of an ongoing WII project on status survey of sea turtles.

For the Andaman and Nicobar Islands, a camp was established on Great Nicobar Island at Galathea beach by the Andaman and Nicobar Environmental Team, as part of a long term monitoring programme. Samples were collected at this beach from November 2001 to March 2002. In addition, leatherback samples were also collected from Koppen Heat on the west coast of Great Nicobar Island. These nesting beaches were destroyed during the December 2004 tsunami, but may currently be recovering.



Figure 1: Map showing the locations in Indian waters from where the samples (belonging to 4 marine turtle species) were collected.

Table 1: Details of samples of olive ridley turtles used for microsatellite studies to infer population genetics/structure (collected off the east coast of Orissa, India during the earlier WII funded CCMB-WII project concluded successfully in 2000).

Sample sites	Sample type	Sample size	DNA
Gahirmatha	Mating pair - male	13	10
	Mating pair - female	12	9
Gahirmatha - Nasi 1	Nesting female	19	10
Gahirmatha -Nasi 2	Nesting female	32	25
Devi River mouth	Nesting female	14	14
Rushikulya	Nesting female	17	17
Chennai	Hatchling	51	15

Table 2: Details of samples related to four martine turtle species collected during the project period from different locations off the maincoast of India and offshore islands (used for d-loop haplotyping).

Turtle Species	Samples collected	No. of samples used for DNA isolation	No. of bad samples [PCR negative]	No. of working samples	Collection site
November 2001 to March 2002					
Leatherback	139	139	25	114	GN
Olive ridley	71	71	1	70	GN, LK, TN
Green turtle	39	37	3	34	LK, TN, GJ
Hawksbill	8	7	2	5	LK
January - March 2003					
Multiple species	51	51	15	36	AN, AP
	AN59b-AN 69b; AN 198-218; AN 247-266; AN 350; AP 01-04				
JanuaryFebruary 2004					
Olive ridley	47	31 (16 of 31 hatchlings belonging to the same clutch)	13	18	Goa; Kerala
Green turtle	45	30 (26 hatchlings belonging to 2 clutches+ 4 adults)	nil	30	G; TN
Total	400	366	59	307	
AN: Andaman& Nicobar Islands; GN: GreatNicobar; LK: Lakshadweep; GJ: Gujarat; TN: Tamil Nadu; AP: Andhra Pradesh					

Collection and storage of samples

Details of the samples collected from the coast of Orissa (offshore Gahirmatha) are provided in the earlier project report of WII, Dehradun (Shanker et al 2000). In addition to these, new samples were collected from different locations during 2001-2004. A small aliquot of blood and/or soft tissue was collected from each animal, as detailed below.

Blood was collected from the cervical sinus of adults and hatchlings (Owens and Ruiz, 1980). In general, 0.5 to 1ml of blood was collected from adults using a 2ml disposable syringe with a 22-gauge needle. A few drops of blood were collected from hatchlings using a disposable insulin syringe (plate 2b). Blood samples were stored in lysis buffer (Bowen et al., 1992) comprising 100 mM Tris-HCl (pH 8.0), 100 mM EDTA (pH 8.0), 10 mM NaCl, 1-2 % SDS. The dilution of blood to buffer was 1: 1 for adults, and approximately 1: 20 for hatchlings.

Tissue samples (skin and muscle) were collected from the shoulder of adults and hatchlings and stored in 75 - 90% ethanol and/or more preferably in a NaCl saturated buffer solution SED (saturated NaCl salt, 250 mM EDTA, pH 7.5, and 20% DMSO). This solution is inexpensive, non-flammable, and nontoxic, and thus has lots of advantages over alcohol. Blood and tissue samples were brought to CCMB at room temperature, and later used for isolation of DNA and molecular analysis.

Molecular genetic analysis

All samples were processed for DNA isolation. The DNA samples from the Orissa coast, representing the three main nesting sites, were used for microsatellite analysis to elucidate the population structure using published as well as CCMB developed markers. Samples collected from all other locations were used for mitochondrial d-loop haplotyping (by amplification followed by DNA sequencing) to provide insights about the phylogeography of the marine turtles in Indian waters. In addition, to carry out the microsatellite analysis, CCMB supported the development of olive ridley specific microsatellite markers; to this end, a few olive ridley samples were also used to prepare a small-insert, partial SSR-enriched genomic library.

DNA Isolation

Standard laboratory techniques were followed (Maniatis et al., 1982). DNA was extracted from tissue samples using the proteinase-K digestion approach. For this purpose, tissue samples were transferred into a clean conical flask and washed with saline for 2-3 hours with constant stirring. Then these tissues were transferred on a clean tissue paper and all moisture was removed. This step was essential for samples that were stored in ethanol. Tissues were transferred to a petri dish, minced with a clean razor blade (to 2 mm or less in cross section), and ground in liquid nitrogen into fine powder. The powdered tissue samples were mixed with 150 μ l of lysis buffer (500 mM Tris, 20 mM EDTA, 10 mM NaCl, pH 9.0) and 10 μ l of 2 % SDS in 1.5-ml centrifuge tubes. To each of the homogenates, 5 μ l of 20 mg/ml of proteinase K was added, and the tubes were kept for digestion at 37° C. After every six hours, the homogenates were supplemented with additional (5 μ l of 20 mg/ml) proteinase K to ensure complete protein digestion. Afterwards, an equal volume of phenol (Tris saturated) was added to each sample. The tubes were inverted several times to mix and then centrifuged at 10,000 rpm for 10 minutes. The aqueous phase from each sample was removed with pipette and placed in clean 1.5 ml tubes. The organic extraction of digested protein impurities was repeated twice again with equal volumes of Phenol-Chloroform-Isoamyl alcohol (25:24:1), each time separating the aqueous phase from the centrifuged extract by pipette into a clean 1.5 ml tube. A final extraction of the aqueous phase was made with one volume of chloroform and centrifuged as before. The aqueous phase from each sample was transferred to a new tube and 1/10 volume of 3 M sodium acetate (pH 5.5) solution added.

The DNA was precipitated from the purified aqueous phase by adding two volumes of absolute alcohol and by keeping at - 20 °C overnight. Each sample was centrifuged at 5,000 rpm for 10 minutes and the supernatant carefully poured off, leaving a DNA pellet. The pellets were washed twice with 80 % ethanol and air-dried. The pellets were resuspended in 0.1 x TE solution (10 mM Tris-HCl, 0.1 mM EDTA, pH 7.2). The DNA samples thus prepared were treated with RNase (final concentration of 20 μ g/ml) at room temperature for 1 hour; DNA was once again extracted with equal volume of chloroform Isoamyl alcohol (24:1) followed by centrifugation at 10000 rpm for 10 minutes. The

aqueous phase of the solution was collected carefully and directly stored at -20°C as stock DNA solution. The stock DNA was manually quantified on a 0.8 % agarose gel. Depending on the quantity of the stock, further dilutions were carried out for a working stock (with DNA concentration in the range of 5 ng/ μl) and stored at 4°C till further use.

In order to isolate DNA from blood samples, blood was washed out of the storage vials with an equal volume of lysis buffer and SDS (final concentration of 1-2 %) into a glass homogenizer. The homogenate was incubated at 37°C for 4 h in presence of 150 $\mu\text{g}/\text{ml}$ of proteinase K and 2% SDS. After incubation, lysate was extracted first with Tris-HCl saturated phenol, followed by two extractions with phenol: chloroform: isoamyl alcohol (25: 24: 1), and finally with chloroform. The separated aqueous phase was then collected and the DNA was precipitated with 1/10 vol of 3M sodium acetate (pH 5.5) and 0.8 - 1.0 vol of ice-chilled iso-propanol or 2.0 vol of ethanol. Precipitated DNA was then washed twice with 80% ethanol, air-dried and finally dissolved in TE buffer (10mM Tris-HCl, 1mM EDTA, pH 7.2).

Development of new olive-ridley specific microsatellite markers

For the above, an SSR-enriched genomic library was constructed following a modified protocol based on the methods of Bloor et al. (2001) and Edwards et al. (2000). Approximately 10 mg of total genomic DNA of olive ridley, isolated from blood, was digested with *Rsa*I and *Hae*III restriction endonucleases and fractionated on a 1.5 % agarose gel. Fragments of 0.5 - 1.5 kb were gel-eluted and ligated with *Mlu*I adaptors (Edwards et al. 2000). The adaptor-ligated SSR-rich DNA fragments were selected by hybridization to biotinylated oligonucleotides [(GA)₁₅, (CA)₁₅, (AGA)₁₀, (CAA)₁₀] and capturing with streptavidin conjugated magnetic beads (Dynabeads, DYNAL, Netherlands). SSR-enriched DNA fragments were cloned into pMOS vector and transformed into competent *E. coli* DH5a cells. Plasmids were isolated from 50 random clones using alkaline-lysis method (Sambrook et al. 1989). Cloned inserts were amplified and sequenced using M13 universal primers and Bigdye terminator sequencing kit on ABI-PRISM 3700 automated DNA sequencer (Applied Biosystems, USA) for both strands. Sequences having SSR motifs were identified and primers were designed and synthesized from sequences

that had >18 bp long repeat regions, using the program GENETOOL version 1.0 (<http://www.doubletwist.com>) and DNA/RNA Synthesizer-394 (Applied Biosystems, USA). All primer pairs were used to standardize the PCR-amplification conditions and the utility of the working pairs as genetic microsatellite markers was tested on a panel of olive ridley turtle samples and a few on the three other marine turtle species (leatherback, green and hawksbill turtles).

Microsatellite analysis

A total of 22 unmapped microsatellite loci, eight from the published literature and fourteen newly developed markers, were employed for ascertaining the allelic diversity in the populations samples representing the nesting sites on the Orissa coast. All the primers were synthesized CCMB on the DNA oligosynthesizer-384 (Applied Biosystems, USA). For the fluorescence-based detection of SSR polymorphisms, the 5' end of each of the forward primers was labelled with one of the flurophore FAM, TERT or HEX (Applied Biosystems, USA).

The microsatellite allelic diversity was detected by cyclic amplifications (PCR) of target motifs using SSR-specific primer-pairs on the thermocycler model PE9600 (Perkin Elmer, USA). Each PCR reaction was carried out using 5 ng of template DNA in 15 μ L volume, and it comprised: 1 x PCR-buffer-II, 100 mM dNTP (equimolar mixture of the four deoxy- γ -nucleotides), 2 mM MgCl₂, 2 pM of each of the forward and reverse primers and 1 U of AmpliTaq Gold polymerase (Perkin-Elmer, USA). The thremocycling conditions were: 95 °C/ 10 min, 94 °C/ 1 min, 55 °C/ 45 sec, 72 °C/ 2 min, for 30 cycles, and a final extension at 72 °C for 5 min. From the amplified product, 1 μ L for each sample was saved in a separate tube for the GeneScan analysis and the rest was mixed with the loading dye and electrophoresed on 2.5 percent tris-acetate agarose gels to check for the success of amplification and also to visualize the SSLP at a gross level. When found satisfactory, the saved samples were treated with de-ionized formamide, loading dye containing the fluorescent internal molecular marker standard TAMRA 500 (PE-AB, USA) and loaded on to six percent denaturing long-ranger polyacrylamide gel as per the instructions in the

documentation of the GeneScan ABI Prism 370 (Applied Biosystems, USA). The microsatellite electrophoretograms were acquired and analyzed by the GeneScan software version 3.1 (Applied Biosystems, USA) and the size of the individual bands determined using the Genotyper version 2.1 (Applied Biosystems, USA).

The intra- and inter-location genetic variability coefficients were calculated over all the primer-pairs, based on the presence/absence (1/0) matrix. The resulting similarity matrix was used for phenetic clustering using the 'unweighted pair group based on arithmetic averages (UPGMA)' method, as well as, the principal component analysis (PCA) using the software NTSYS-pc version 2.02j (Applied Biostatics Inc., USA) and PHYLIP version 3.6 (Felsenstein 1989). The principal component analysis (PCA) was performed using the EIGEN option of ORDINATION routine (NTSYS-pc) and graphed employing the Statistica V 4.0 software. The matrix based on size of the alleles across the samples was subjected to genetic analysis using the software ARLEQUIN ver3.01 (<http://cmpg.unibe.ch/software/arlequin3>; Schneider et al. 2000) that implements a model-based clustering method for inferring population genetics/structure using genotypic data. Arlequin can be used to extract information on genetic and demographic features of a population (F-statistics, observed/expected heterozygosity, deviations from Hardy-Weinberg Equilibrium, Linkage Disequilibrium, Gene flow etc.).

Mitochondrial D-loop haplotyping/ DNA sequencing analysis

Approximately 350 bp sequence of the mitochondrial d-loop region was amplified and then sequenced using turtle specific primers (Allard 1994; Norman et al., 1994) for all the samples. In each case, the target mitochondrial sequence was PCR amplified using standard protocols on PE9600 thermocycler. The PCR reactions were set using approximately 5 ng of template genomic DNA in 20 µl reaction volume containing: 2 pico-moles of each primer, 150 µM dNTP, 1.5 mM MgCl₂, 0.1 M KCl, 20 mM Tris-HCl, and 0.5 to 1.0 U of AmpliTaq Gold polymerase (Perkin Elmer). In general, PCR profile comprised an initial denaturation of 5 min at 95°C, followed by 35 cycles of: 94°C for 1 min., 50°C for 1 min., 72°C for 1 min.; and 72°C for 7 min. The PCR products were quantified on 1.5% agarose gel.

The amplified PCR products (~100 ng) were sequenced for both strands using the fluorescence-labelled BigDye Terminator ready reaction chemistry (Perkin Elmer) on the ABI-3700 Automated DNA sequencer. In order to be confident about the sequences, about 10 % of the samples were sequenced more than 3 to 4 times. Sequencing PCR cycle conditions were: 30 cycles of 96°C for 10 sec, 50°C for 5 sec and 60°C for 4 min. Extended products were purified by alcohol precipitation followed by washing with 70 % ethanol. The processed samples were then dissolved in loading dye and sequenced using automated DNA sequencer ABI Prism3700. Sequences were edited using the auto-assembler software package.

The EMBL-Genbank database (<http://www.ncbi.nlm.nih.gov>) was searched for reference turtle d-loop sequences for use in comparative analysis. Initially, the sequences of the samples analyzed in the study, were aligned using the CLUSTAL-X program (Thompson et al., 1994) alongwith the retrieved reference d-loop turtle sequences. The alignment was checked manually for gaps, and flushed at the ends to avoid missing information for any compared reference entries. The resulting alignment were used to infer phylogenetic relationships using the neighbor-joining method (Saitou and Nei, 1987) with analytical routines available in the software packages PHYLIP 3.6 (Felsenstein, 1989) (<http://evolution.genetics.washington.edu/phylip.html>) and/or MEGA2 (Kumar et al., 2001), and median-joining network trees using the program NETWORK (http://www.fluxus-engineering.com/netin_ie2.htm).

RESULTS

Isolation of DNA

All the new samples were processed for DNA isolation, and DNA was extracted from 366 samples. Fifty-nine of these samples were found to be of poor quality, as they either did not amplify or resulted in poor quality/erratic results (Table-2). Therefore, these were not considered for further analysis. The remaining 309 samples, along with 83 samples from nesting populations on the Orissa coast (collected as part of the previous WII-CCMB study), were used for further molecular genetic analysis.

Development of new olive ridley specific microsatellite markers

The small-insert partial SSR-enriched genomic DNA library of the olive ridley turtle comprised ~350 recombinant clones. The amplification/sequencing of about 100 randomly selected clones revealed a large number of SSR-positive non-redundant sequences of which 24 sequences with >18 bp long repeat regions were used to design the primer pairs. Fourteen of these 24 primer pairs were validated as highly polymorphic and informative microsatellite markers useful for genetic studies on olive ridley turtles as well as other marine turtle species tested in the study. The details of six of these new markers – locus designation, repeat motifs, primer sequences, allele attributes, PIC estimates and Genbank accession numbers – are summarized in Table 3. Cross-species amplification is shown in Table 4. Interestingly, some markers such as OR-3 that were monomorphic in olive ridley turtles were found to be highly polymorphic in other sea turtle species.

In this study, these fourteen markers were used, along with eight other cross-species markers from published literature, to ascertain the genetic diversity across 83 individuals representing different nesting populations of olive ridley turtles along east coast of India to gain insights about their population structure.

Microsatellite analysis of olive ridley populations on the east coast of Orissa

The conservation of olive ridley turtles (*Lepidochelys olivacea*) on the east coast of India, particularly Orissa, where the major mass nesting sites are found, has been a matter of great concern due to large scale mortality of sea turtles, and the possible decline of these populations (Shanker et al, 2004b; Shanker and Choudhury 2006).

As part of this project, the genetic structure of the turtle populations along the east coast of India was studied. Olive ridley sea turtles were sampled as part of our earlier collaborative project from four major nesting sites, three in Orissa and one in Tamil Nadu. These were analysed using a total of 22 markers that comprised fourteen newly developed olive ridley specific markers, and eight cross-species microsatellite markers (Table-5).

Out of the 22 markers tested, ten markers (five newly developed olive ridley specific markers and five cross-species markers) were found to be monomorphic/fixated in the analysed samples. A moderate to very high level of polymorphism was observed for the remaining 12 markers among the 80+ individuals from four sites. All the samples exhibited heterozygosity for at least one microsatellite locus analysed in the study.

For the polymorphic markers, the number of alleles varied from 3 to 35. A maximum of 35 alleles was observed for the marker Ei8, followed by 18- 25 alleles for the new markers OR-1, OR-4, OR-11, and OR-14. A minimum of four alleles was seen for the cross-species marker KLK-315. Representative profiles of microsatellite allelic diversity/distribution pattern observed across olive ridley samples from the four nesting populations are shown for one such marker in Figure 2.

The observed microsatellite diversity was further analysed to ascertain different genetic estimates of population differentiation. Significantly, all such estimates including population average pair-wise differences (Table 6), genetic distance coefficients (Table 7), and Hardy-Weinberg Equilibrium (Table 8) show that the allelic diversity at microsatellite loci was randomly distributed across the samples. These results strongly suggest that there is no genetic differentiation between the populations from different nesting sites.

Microsatellite analysis for ascertaining multiple paternity

We also attempted microsatellite analysis of some samples to address the issue of multiple paternity. To this end, samples of related hatchlings from 5 different clutches belonging to olive ridley, green and leatherback turtles were analysed using the six most polymorphic microsatellite markers. Data analysis has not been completed.

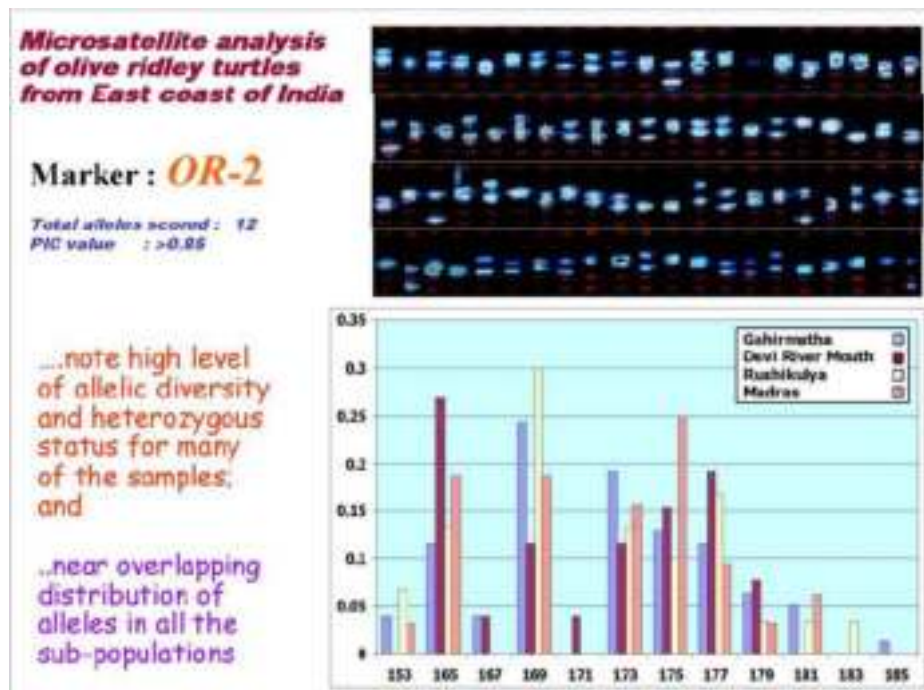


Figure 2: Microsatellite allelic diversity seen at the locus OR-2 for olive ridley samples from the four nesting sites off east coast of India

Table 3: Details of the microsatellite markers developed in the study

Locus	Repeat motif	Primer sequence(5' - 3')	Taga	Ta (°C)	Size range (bp)b	N	NA	Ho	He	PIC	GenBank Accession
OR-1	(CAAA) ₁₆	F: CCCCTTGTGTTCTGAAATCCTATGA R: CAGGCATAGGGAAAATCAGAGGTA	FAM	55	150-202 [160, 162]	83	24	0.71	0.94	0.92	AY325422
OR-2	(GT) ₈ GCC(GT) ₅	F: GCTCCTGCATCACTATTTCCTGTT R: TGCTGCCCCACACCTCTG	FAM	55	153-185 [169]	83	12	0.86	0.85	0.84	AY325423
OR-3*	(TC) ₉ (AC) ₆ GC(AC) ₂	F: TTGTTTTATTTTATTGGTCATTTTCAG R: GCACCTTTTCACGTTGTCACATGT	FAM	55	146	83	1	0	0		AY325424
OR-4	(TG) ₉ ..(TG) ₂₃	F: AGGCACACTAACAGAGAACTTGG R: GGGACCCTAAAATACCACAAGACA	HEX	52	123-172 [128, 157]	83	18	0.72	0.91	0.92	AY325425
OR-7	(GT) ₆ (GA) ₇	F: GGGTTAGATATAGGAGGTGCTTGATGT R: TCAGGATTAGCCAACAAGAGCAAAA	FAM	55	185-219 [187]	83	16	0.68	0.85	0.84	AY325427
OR-8	(TC) ₂₃	F: GCACTGGTGGGAAAATATTGTTGT R: GCTGGGCTAATAAAATGTTGTGCA	FAM	55	148-166 [148, 154]	83	8	0.93	0.78	0.76	AY325428

^a:Flourescencelabel at 5'-end; Ta:Locus specific annealing temperature; Size range - Figures in paraentthesis are the most frequent allele(s); N: Number of samples analyzed; NA : Number of alleles; Ho: Observedheterozygosity; He:Expectedheterozygosity

* : Loci was foundto be polymorphic with Green turtle, Leatherback and Hawksbill turtle species

Table 4: Cross-species amplification status of olive ridley turtle specific microsatellite markers developed in the study.

Turtle Species	<i>Dermochelys coriacea</i> (Leatherback)			<i>Chelonia mydas</i> (Green Turtle)			<i>Eretmochelys imbricata</i> (Hawksbill)		
	(N = 6)	NA	Ta / Mg ⁺⁺	(N = 6)	NA	Ta / Mg ⁺⁺	(N = 6)	NA	Ta / Mg ⁺⁺
OR-1	±		±	Monomorphic		550C / 2 mM	Monomorphic		570C / 2 mM
OR-2	Polymorphic	3	550C / 1.5 mM	Polymorphic	7	550C / 2 mM	Polymorphic	5	550C / 1.5 mM
OR-3	Monomorphic	1	550C / 1.5 mM	Polymorphic	4	550C / 2 mM	Polymorphic	3	550C / 1.5 mM
OR-4	±		±	Polymorphic	3	520C / 2 mM	Polymorphic	2	520C / 2 mM
OR-7	Monomorphic	1	570C / 2 mM	Polymorphic	3	550C / 2 mM	Polymorphic	4	570C / 1.5 mM
OR-8	Polymorphic	6	550C / 1.5 mM	Polymorphic	5	550C / 2 mM	Polymorphic	6	570C / 1.5 mM

N : Number of samples analyzed NA : Number of alleles Ta : Locus specific annealing temperature Mg⁺⁺ : Magnesium concentration in the PCR reaction

Table 5:Details of the microsatellite markers used for ascertaining allelic diversity in olive ridleys sampled from the east coast of India off the Orissa coast.

S.No	STR marker	Source turtle Species	Repeat motif	Tm (°C)	MgCl2 (mM)	Allele Size (bp)	Polymorphism status	Source
1	OR-1	<i>L. olivaceae</i>	(CAA)17	55	1.5	186	Polymorphic	CCMB
2	OR-2	<i>L. olivaceae</i>	(GT)8 GC (GT)5	55	1.5	165	Polymorphic	CCMB
3	OR-3	<i>L. olivaceae</i>	(TC)9 (AC)6 GC (AC)2	55	1.5	146	Monomorphic	CCMB
4	OR-4	<i>L. olivaceae</i>	(TG)9 ----- (TG)23	52	1.5	140	Polymorphic	CCMB
5	OR-6	<i>L. olivaceae</i>	(GT)5 GA (GT)7 (GA)7	55	1.5	120	Monomorphic	CCMB
6	OR-7	<i>L. olivaceae</i>	(GT)5(GA)7	55	1.5	187	Polymorphic	CCMB
7	OR-8	<i>L. olivaceae</i>	(TC)23	55	1.5	162	Polymorphic	CCMB
8	OR-9	<i>L. olivaceae</i>	(GA)16	55	2	150-174	Polymorphic	CCMB
9	OR-10	<i>L. olivaceae</i>	(GA)5GT(GA)5	55	2	160	Monomorphic	CCMB
10	OR-11	<i>L. olivaceae</i>	(GA)22	55	2	194-242	Polymorphic	CCMB
11	OR-12	<i>L. olivaceae</i>	(GT)8(GA)5GC(GA)5GC (GA)4	55	2	100	Monomorphic	CCMB
12	OR-14	<i>L. olivaceae</i>	(GT)5....(GT)14(GA)12	55	2	147-201	Polymorphic	CCMB
13	OR-16	<i>L. olivaceae</i>	(GT)5(GA)7	55	2	220-252	Polymorphic	CCMB
14	OR-17	<i>L. olivaceae</i>	(CA)7C(CA)6	55	2	234	Monomorphic	CCMB
15	Nigra32			55	1.8		Monomorphic	
16	Klk315	<i>Lepidochelyskempi</i>		55	2.5	135	Polymorphic	Kilc h e r e t a l (1999)
17	Pe344	<i>Podocnemis expansa</i>	(AG)13	50	2	144-208	Monomorphic	Va l e n z u e l a (2000)
18	Cc176	<i>Carettacaretta</i>		55	1.5		Polymorphic	M o o r e e t a l (2002)
19	Ccm2	<i>Caretta caretta</i>		55	2		Monomorphic	M o o r e e t a l (2002)
20	Cm84	<i>Chelonia mydas</i>	(CA)15	55	2.5	348-354	Polymorphic	Fitzs i m m o n s e t a l (1995)
21	Cm3	<i>Chelonia mydas</i>	(CA)13	55	1.5	169-187	Polymorphic	As above
22	Ei8	<i>Eretmochelys imbricata</i>	(CA)19	55	1.5	192-254	Polymorphic	As above

Table 6: Inter-/intra- Population average pair-wise differences between the four nesting sites off the east coast of India based on the observed microsatellite diversity.

	1	2	3	4
Above diagonal : Average number of pairwise differences between populations (PiXjY)				
Diagonal elements : Average number of pairwise differences within population (PiX)				
Below diagonal : Corrected average pairwise difference (PiXjY - (PiX + PiY) / 2)				
Gahirmatha	10.06886	9.98389	10.02342	9.87247
Devi River mouth	0.04176	9.81538	9.82179	9.82091
Rushikulya	0.12577	0.05088	9.72644	9.83750
Madras	0.01344	0.08862	0.14968	9.64919

Table 7: Inter-/intra- genetic estimates (F-statistics) for the four nesting sites off the east coast of India based on the observed microsatellite diversity

(Kimura 2-P distance estimates)

	1	2	3	4
Gahirmatha	0.00000			
Devi River Mouth	0.00384	0.00000		
Rushikulya	0.01212	-0.00521	0.00000	
Madras	0.00097	0.00909	0.01523	0.00000
FST P values				
Number of permutations : 1023				
	1	2	3	4
Gahirmatha	*			
Devi River Mouth	0.20721+-0.0490	*		
Rushikulya	0.00000+-0.0000	0.18018+-0.0359	*	
Madras	0.38739+-0.0408	0.09009+-0.0303	0.02763+-0.0194	*

Table 8: Inter-/intra- Population HWE estimates for the four nesting sites off the east coast of India based on the observed microsatellite diversity.

Locus/Site	Gahirmatha		Devi River		Rushikulya		Madras		Overall sites	
	Obs	Exp	Obs	Exp	Obs	Exp	Obs	Exp	Obs	Exp
	Het	Het	Het	Het	Het	Het	Het	Het	Het	Het
OR-1	0.783	0.929	0.615	0.914	0.533	0.938	0.750	0.927	0.711	0.935
OR-2	0.891	0.863	0.769	0.865	1.000	0.857	0.750	0.859	0.855	0.858
OR-3	0.846	0.870	0.462	0.892	0.467	0.834	0.688	0.881	0.687	0.852
OR-4	0.729	0.920	0.846	0.923	0.666	0.935	0.687	0.933	0.732	0.927
OR-7	0.837	0.868	0.461	0.892	0.466	0.834	0.687	0.881	0.612	0.868
OR-8	0.891	0.825	1.000	0.720	1.000	0.737	0.937	0.806	0.957	0.772
OR-9	0.297	0.727	0.307	0.800	0.400	0.905	0.187	0.709	0.297	0.785
OR-11	0.918	0.947	0.916	0.956	0.666	0.928	0.187	0.935	0.671	0.941
OR-14	0.756	0.947	0.692	0.907	0.785	0.960	0.666	0.940	0.724	0.938
OR-16	0.783	0.869	0.500	0.902	0.733	0.834	0.800	0.836	0.704	0.860
Ei-8	0.810	0.921	1.000	0.929	0.667	0.855	0.750	0.827	0.807	0.893
CM-84	0.513	0.745	0.308	0.803	0.400	0.724	0.625	0.863	0.470	0.752
KLK-315	0.594	0.577	0.769	0.640	0.333	0.543	0.500	0.516	0.554	0.565

Phylogeography of marine turtles in Indian waters as revealed by d-loop haplotype analysis

In our earlier study, based on the mitochondrial DNA haplotype analysis, we showed that the olive ridley population on the east coast of India is panmictic, but distinct from all other populations including Sri Lanka (Shanker et al 2004a). About 96 % of the Indian population consisted of a distinct 'K' clade with many new haplotypes not found in any other population. Nested clade analysis and conventional analysis both supported range expansions and/or long distance colonisation from the Indian Ocean clades to other oceanic basins, which suggested that these are the ancestral source for contemporary global populations of olive ridley turtles. These data support the distinctiveness of the Indian Ocean ridleys, suggesting that conservation prioritization should be based on appropriate data and not solely on species designations (Shanker et al 2004a).

In the current study, we extended the analysis of olive ridley turtles to the rest of the Indian coast including the offshore islands. In total, 119 additional samples were used for d-loop haplotype analysis. Significantly, the analysis revealed that olive ridleys all along the mainland coast of India share the same haplotypes (K and K derivatives), whereas, in the Andaman and Nicobar islands, a large proportion of samples show the haplotype J (which is most basal, after haplotype K, to olive ridley haplotypes across other global basins) or its variants (Figure 3). Further, a large number of new haplotypes were documented, all immediate derived variants of haplotype J. Thus, our data suggest that while the east (and perhaps west) coast of India represents the ancestral population of ridleys, the diversification and dispersal of ridleys contributing to the global populations might include Indian Ocean waters including Sri Lanka and the Andaman and Nicobar Islands.

Similarly, d-loop analysis was carried out for 62 samples of green turtles collected from three locations (Tamil Nadu, Gujarat, Lakshadweep), 131 samples of leatherback turtles (Figure 4) and four samples of hawksbill turtle collected from the Lakshadweep Islands. The preliminary analysis of these data revealed a few new unreported haplotypes, but no significant differences from populations known in adjoining global waters. All leatherback haplotypes were either global haplotypes or were previously found in the Indo-Pacific region.

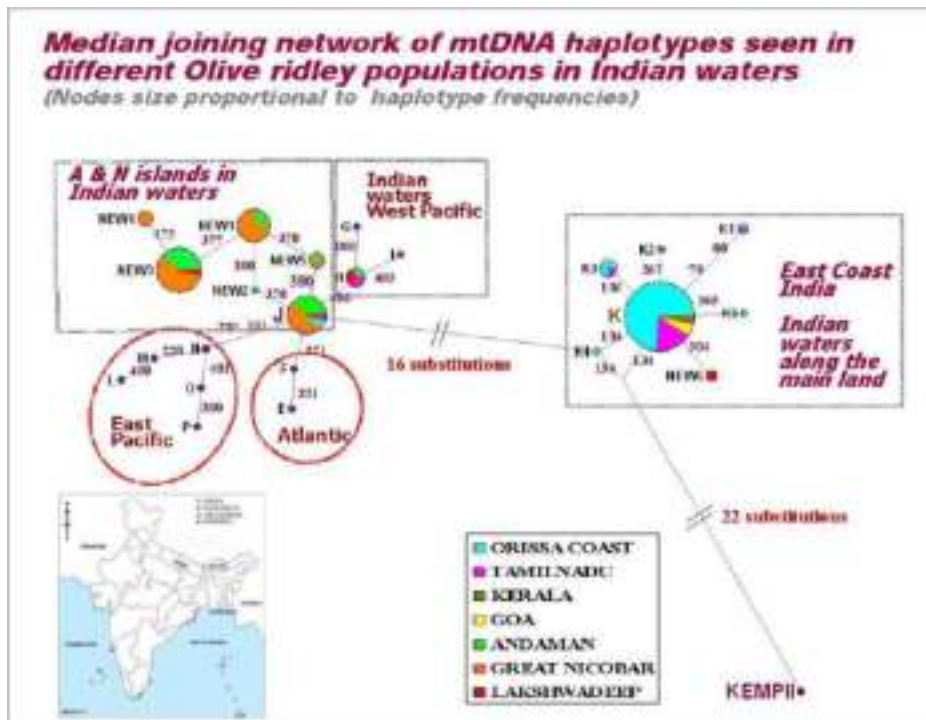


Figure 3: Median-joining network of mitochondrial d-loop haplotypes seen in olive ridley populations in Indian waters.

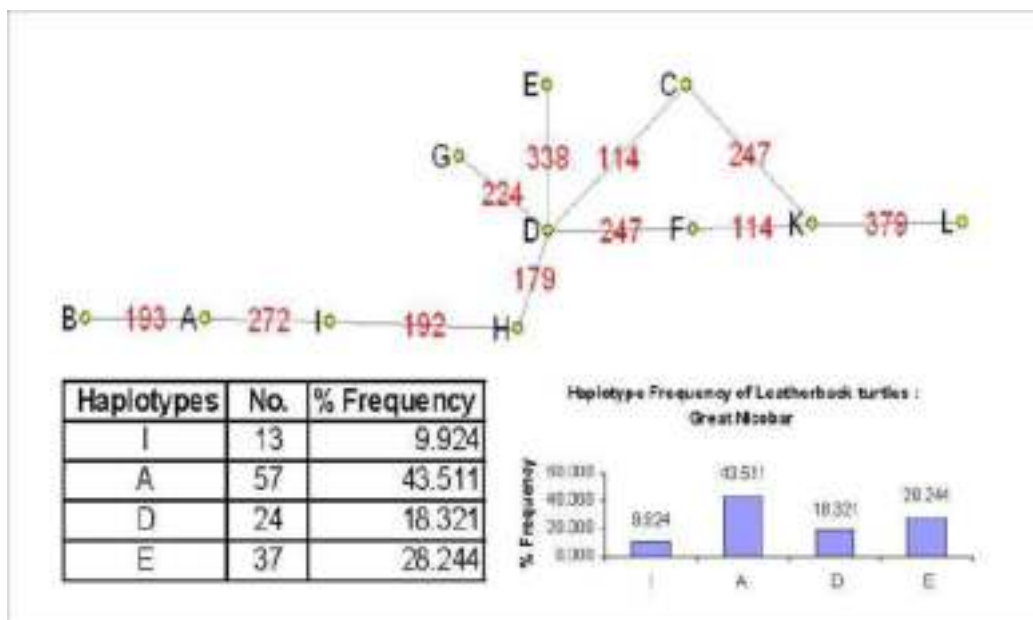


Figure 4: Median-joining network, and frequency distribution of mitochondrial d-loop haplotypes seen in leatherback turtles in Indian waters.

DISCUSSION

Olive ridley turtles

While olive ridley turtles nest on both coasts of the Indian mainland, the larger nesting populations are on the east coast, with major mass nesting sites in Orissa. Since the late 1990s, mass nesting has occurred primarily at Gahirmatha and Rushikulya (Shanker et al., 2004b). Results from both mitochondrial DNA as well as microsatellite analysis showed no population structure suggesting that these probably represent a single large population along the east coast of India. These results provide support to field data that olive ridley turtles routinely use more than one nesting beach in Orissa. Moreover, the results suggest that natal homing may not be as precise or significant as it is in some other sea turtle species and populations. The latter inference has important implications in the management of ridley populations on the Indian coast and elsewhere.

However, the results also show that the populations along the east and west coasts are not differentiated. This bears further enquiry as the two coasts represent different marine systems with different current patterns, and interchange between these two areas (but not Sri Lanka) presents an interesting biogeographic challenge.

Recent results from satellite telemetry studies of olive ridley turtles on the Orissa coast show that these turtles primarily use the offshore waters of Orissa, while some migrate southwards to feed in the Gulf of Mannar region and offshore waters of Sri Lanka (WII, unpubl. Data). Hence, the populations on the east coast appear to represent an ecological and management unit for conservation. The current data show that the Andaman and Nicobar ridley populations are distinct and need to be managed as a separate unit, likely along with other populations of olive ridleys in Southeast Asia.

Given that the threats along the east coast are very distinct (mainly fisheries related mortality and coastal development), strategies can be framed for this population as a management unit. On the other hand, the Andaman and Nicobar populations need to be managed for loss of nesting beaches and possible mortality in feeding areas.

Leatherback turtles

The leatherback turtle populations in the Andaman and Nicobar Islands are the most significant in the region. The leatherback nesting season commences in the islands in November each year and goes on till April of the following year. Prior to the 2004 tsunami, the total number of nests in Galathea beach for each of the 4 seasons recorded was 424 in 2000-2001, 297 in 2001-02, 164 in 2002-03 and 592 in 2003-04 (K. Shanker et al. in prep.; Madras Crocodile Bank Trust, unpubl. Data). Since 2007, monitoring has been carried out in Little Andaman Island by the Andaman Nicobar Environmental Team and the Centre for Ecological Sciences, Indian Institute of Science, Bangalore (Swaminathan et al. 2011). While nesting is fairly low on South Bay, results from brief surveys in previous years and monitoring in 2011 reveal that about 100 nests are laid each season on West Nau (Swaminathan et al. 2011). Satellite tracking of three adult females showed that the turtles moved in a southeasterly direction along the coast of Sumatra and towards Australian waters (K. Shanker et al. unpubl. Data). A brief survey of Great Nicobar Island showed that the nesting beach at Galathea had formed again, and over 200 tracks were counted (N. Namboothri unpubl. Data).

The leatherback turtle populations on Little Andaman and Little and Great Nicobar Islands are clearly significant populations for the region. While they do not show genetic divergence from the Indo-Pacific clade, they represent a large part of the Indian Ocean populations. Located on remote beaches, some of these populations may be easiest to conserve and manage in the long-term, if appropriate policy is designed and implemented.

Green and Hawksbill turtles

Few samples of hawksbill turtles were collected, and were not sufficient to gain insights into the population genetics or phylogeography of the species. Green turtle haplotypes from Gujarat were similar to those from the northern Indian Ocean region, and those from Lakshadweep were insufficient to carry out a mixed stock analysis.

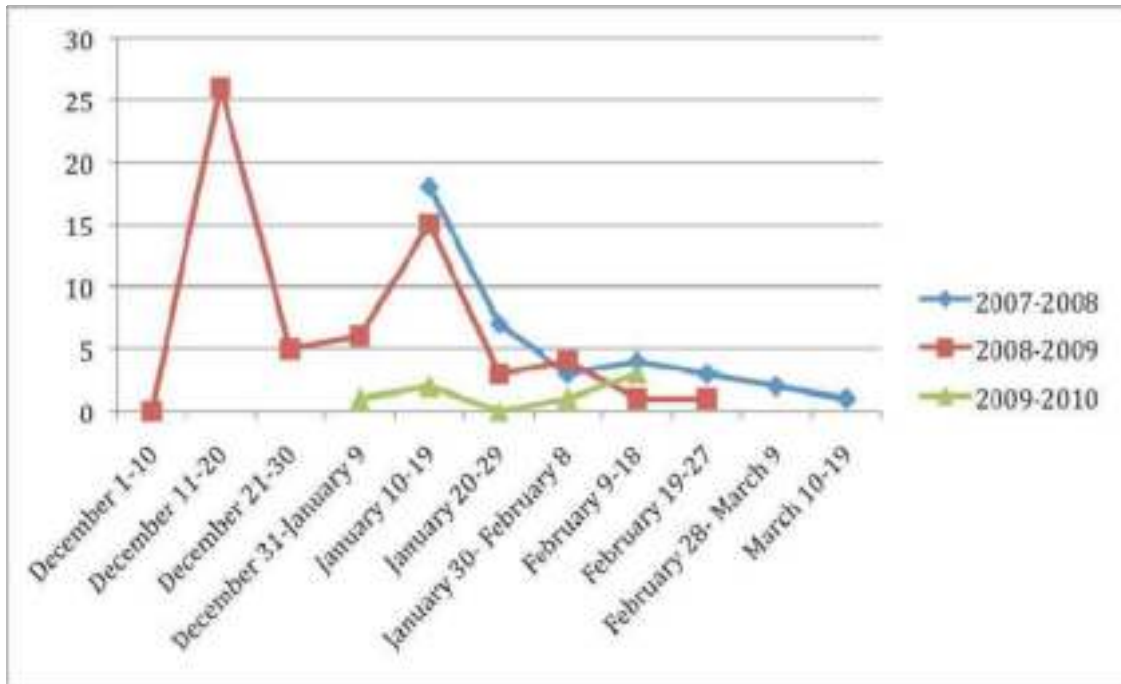


Figure 5a. Leatherback turtle nesting patterns (December-March) in Little Andaman Island, Andaman and Nicobar Islands

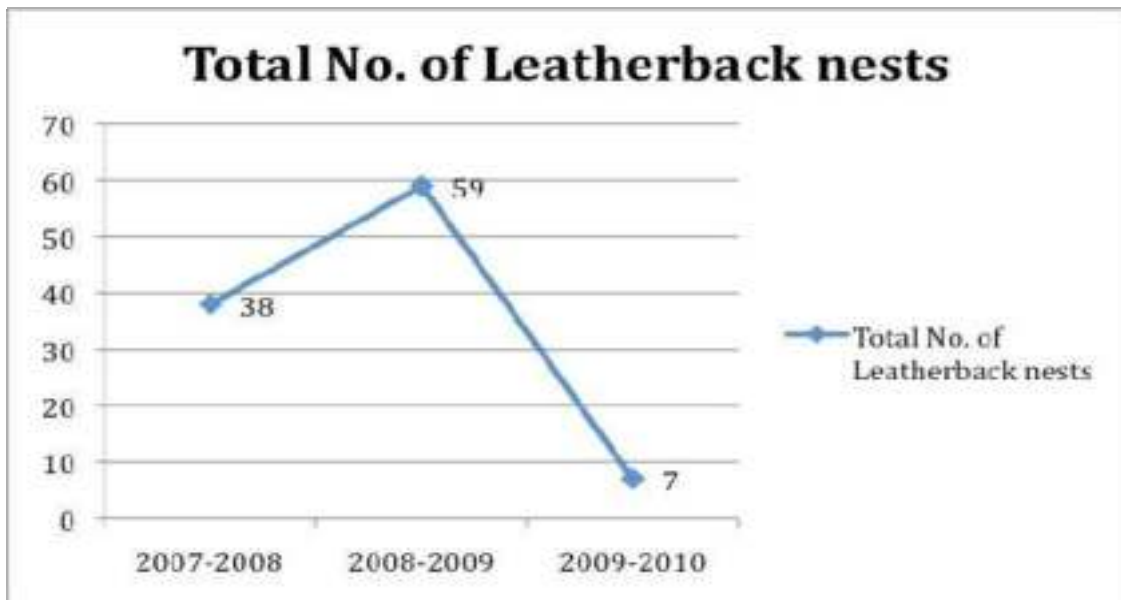


Fig. 5b. Nesting trend of leatherback turtles over the three years of observation at South Bay, Little Andaman Island, Andaman and Nicobar Islands

CONSERVATION IMPLICATIONS AND RECOMMENDATIONS

1. The conservation of olive ridley turtles on the east coast of India, particularly Orissa, is one of the key conservation challenges. In recent years, nesting appears to be shifting from Gahirmatha to Rushikulya, This needs to be monitored both for research and management, particularly because of the climate change and possibly related beach erosion and other coastal geomorphological changes. Since these sites have been shown to be part of the same large nesting populations, it is possible that nesting beaches act as patches in a metapopulation with periodic extinctions and colonisations. In such a framework, it is critical that a large number of patches must remain suitable for possible future colonization. What this means for sea turtles is that beaches that are currently not used (for nesting or mass nesting eg. Devi) must not be abandoned to coastal development for these represent future nesting sites for ridley turtles.

Samples should also be collected from feeding populations in the Gulf of Mannar and Sri Lanka to confirm if these populations are derived from the east coast of India alone or whether there are other nesting beaches from which they derive. This would help frame management strategies as well as as trans-boundary initiatives for conservation.

2. Leatherback turtles in the Andaman and Nicobar Islands are not genetically distinct, but represent a significant part of the Indian Ocean population. Since the beaches in the Nicobars have formed after the tsunami, it is necessary to undertake a comparison of the current and pre-tsunami nesting population. This can be carried out with a more detailed population genetic analysis of pre-tsunami samples with current samples.

Detailed population genetic analysis with new methods and markers needs to be carried out to identify unique molecular markers for these populations, in order to connect them to areas where they may feed or are threatened by fisheries interactions. Given that leatherback turtles may forage in distant locations, where fishing on the high seas occurs, this information could valuable for management in the future.

3. Lakshadweep is a significant foraging area for green turtles. These populations have a significant impact on the sea grass meadows in some islands, and modify these ecosystems substantially. Local fishers believe that these turtle deplete the sea grass leading to a reduction in their fish catch. Large densities of green turtles also result in direct impacts such as the damage of fishing nets. Over the years, this has evolved into conflict between turtles and fisher communities.

A mixed stock analysis needs to be carried out to determine the nesting beaches that this foraging population is derived from. This would provide insights into the increase in green turtle populations on some islands and whether these increases are caused by internal movement or by recruitment from nesting beaches.

4. Future conservation genetic studies can address ecological and evolutionary questions including finer resolution population genetic analysis and mixed stock analysis. A range of behavioural questions relating to dispersal, homing, migration and multiple paternity can also be addressed. These questions can now be addressed using a range of new tools such as mitogenomics and single nucleotide polymorphisms (SNPs).

With an increasing emphasis on development, as well as the ever pervasive threat of climate change and its impacts on both rising sea levels (and consequent impact on nesting habitat) as well as its impact on incubation temperatures, sea turtle populations are going to need carefully designed conservation and management plans. While much of the anthropogenic impact may need to be addressed by social change and policy, a knowledge of stocks, connectivity, migratory routes, and movement can only improve decision making. Tools such as genetics and satellite telemetry also have the capacity to provide information in a form that is appealing and can attract public interest and participation in conservation. A combination of scientific techniques (field observations, tagging, genetics, stable isotope analysis and satellite telemetry) is required to fully understand the biology of these animals and provide the knowledge and involvement that is required for their long term conservation.

REFERENCES

- Aggarwal RK, Velavan TP, Udaykumar D, Hendre PS, Shanker K, Singh L (2004) Development and characterization of novel microsatellite markers from the olive ridley sea turtle (*Lepidochelys olivacea*). *Molecular Ecology Notes* 4: 77-79.
- Allard MW, Miyamoto MM, Bjorndal KA, Bolten AB, Bowen BW (1994) Support for natal homing in green turtles from mitochondrial DNA sequences. *Copeia* 1: 34-41.
- Andrews HV, Shanker K (2002) A significant population of leatherback turtles in the Indian Ocean. *Kachhapa* 6: 17.
- Andrews HV, Krishnan S, Biswas P (2006a) Distribution and status of marine turtles in the Andaman and Nicobar Islands. In: *Marine Turtles of the Indian Subcontinent* (eds. K Shanker & BC Choudhury), pp. 33-57. Universities Press, Hyderabad. India.
- Andrews HV, Chandi M, Vaughan A, Aungthong J, Agu S, Johnny S, John S, Naveen S (2006b) Marine turtle status and distribution in the Andaman and Nicobar Islands after the 2004 M 9 quake and tsunami. *Indian Ocean Turtle Newsletter* 4: 3-11.
- Avise JC (1989) A role for Molecular Genetics in the Recognition and Conservation of Endangered Species. *Trends in Ecology and Evolution* 4: 279-281.
- Avise JC (1992a) Molecular population structure and the biogeographic history of a regional fauna, a case history with lessons for conservation biology. *Oikos* 63: 62-76.
- Avise JC, Bowen BW, Lamb T, Meylan AB, Bermingham E (1992) Mitochondrial DNA evolution at a turtle's pace: evidence for low genetic variability and reduced microevolutionary rate in the Testudines. *Molecular Biology and Evolution* 9: 457 - 473.
- Bass A, Good DA, Bjorndal KA, Richardson JI, Hillis ZM, Horrocks JA, Bowen BW (1996) Testing models of female reproductive migratory behaviour and population structure in the Caribbean hawksbill turtle (*Eretmochelys imbricata*) *Molecular Ecology* 5: 321-328.
- Bass AL, Lagueux CJ, Bowen BW (1998) Origin of Green turtles, *Chelonia mydas*, at

- "Sleeping Rocks", off the Northeast coast of Nicaragua. *Copeia* 4: 1064-1069.
- Bhaskar S (1993) *The status and ecology of sea turtles in the Andaman and Nicobar Islands*. ST 1/93. Centre for Herpetology, Madras Crocodile Bank Trust, Tamil Nadu, India.
- Bhaskar S (1996) Re-nesting intervals of the hawksbill turtle (*Eretmochelys imbricata*) on south Reef Island, Andaman Islands, India. *Hamadryad* 21: 19-22.
- Bloor PA, Barker FS, Watts PC, Noyes HA, Kemp SJ (2001) Microsatellite libraries by enrichment. <http://www.genomics.liv.ac.uk/animal/research/MicrosatelliteEnrichment.pdf>.
- Bjorndal KA, Bolten AB, Moreira L, Bellini C, Marcovaldi MA (2006) Population Structure and Diversity of Brazilian Green Turtle Rookeries Based on Mitochondrial DNA Sequences. *Chelonian Conservation and Biology* 5: 262-268.
- Bjorndal, KA, Bolten AB, Troëng S (2005) Population structure and genetic diversity in green turtles nesting at Tortuguero, Costa Rica, based on mitochondrial DNA control region sequences. *Marine Biology* 147: 1449-1457.
- Bolten AB, Bjorndal KA, Martins HR, Dellinger T, Biscoito MJ, Encalada SE, Bowen BW (1998) Transatlantic developmental migrations of loggerhead sea turtles demonstrated by mtDNA sequence analysis. *Ecological Applications* 8: 1-7.
- Bourjea J, Lapègue S, Gagnevin L, Broderick D, Mortimer JA, Ciccione S, Roos D, Taquet C, Grizel H (2007) Phylogeography of the green turtle, *Chelonia mydas*, in the Southwest Indian Ocean. *Molecular Ecology* 16: 175-186.
- Bowen BW, Abreu-Grobois FA, Balazs GH, Kamezaki N, Limpus CJ, Ferl RJ (1995) Trans-pacific migration of the loggerhead sea turtle demonstrated with mitochondrial DNA markers. *Proceedings of the National Academy of Sciences USA* 92: 3731-3734.
- Bowen BW, Bass AL, Garcia-Rodrigues A, Diez CE, Van Dam R, Bolten AB, Bjorndal KA, Miyamoto MM, Ferl RJ (1992b) Origin of hawksbill turtle in a caribbean feeding area as indicated by genetic markers. *Ecological Applications* 6: 566-572.

- Bowen BW, Bass AL, Soares L, Toonen RJ (2005) Conservation implications of complex population structure: lessons from the loggerhead turtle (*Caretta caretta*). *Molecular Ecology* 14: 2389-2402.
- Bowen BW, Clark AM, Abreu-Grobois FA, Chaves A, Reichert HA, Ferl RJ (1998) Global Phylogeography of the ridley sea turtles (*Lepidochelys* spp) as inferred from mitochondrial DNA sequences. *Genetica* 101: 179-189.
- Bowen BW, Nelson WS, Avise, JC (1993) A molecular phylogeny for turtles: trait mapping, rate assessment and conservation relevance. *Proceedings of the National Academy of Sciences USA* 90: 5574-5577.
- Bowen BW, Kamezaki N, Limpus CJ, Hughes GR, Meylan AB, Avise JC (1994) Global phylogeography of the loggerhead turtle (*Caretta caretta*) as indicated by mitochondrial DNA haplotypes. *Evolution* 48: 1820-1828.
- Bowen BW, Karl SA (2007) Population genetics and phylogeography of sea turtles. *Molecular Ecology* 16: 4886-4907.
- Bowen BW, Meylan AB, Ross JP, Limpus CJ, Balazs GH, Avise JC (1992a) Global population structure and natural history of the green turtle (*Chelonia mydas*) in terms of matriarchal phylogeny. *Evolution* 46: 865-881.
- Carr, AF (1963) Panspecific reproductive convergence in *Lepidochelys kempfi*. *Ergebn. Biology* 26: 298-303.
- Chassin-Noria O, Abreu-Grobois A, Dutton PH, Oyama K (2004) Conservation genetics of the east Pacific green turtle (*Chelonia mydas*) in Michoacan, Mexico. *Genetica* 121: 195-206.
- Dethmers KEM, Broderick D, Moritz C, Fitzsimmons NN, Limpus CJ, Lavery S, Whiting S, Guinea M, Prince RIT, Kennett R (2006) The genetic structure of Australasian green turtles (*Chelonia mydas*): exploring the geographical scale of genetic exchange. *Molecular Ecology* 15: 3931-3946.
- Dimond MT, Mohanty-Hejmadi P (1983) Incubation temperature and sex differentiation in a sea turtle. *American Zoologist* 23: 1017.

- Dutton PH, Bowen BW, Owens DW, Barragan A, Davis SK (1999) Global phylogeography of the leatherback turtle (*Dermochelys coriacea*) *Journal of Zoology (Lond)* 248: 397-409.
- Dutton PH, Davis SK, Guerra T, Owens DW (1996) Molecular phylogeny for marine turtles based on sequences of the ND4-Leucine tRNA and control regions of the mitochondrial DNA. *Molecular Phylogenetics and Evolution* 5: 511-521.
- Dutton PH, Balazs GH, LeRoux RA, Murakawa SKK, Zarate P, Martinez LS (2008) Composition of Hawaiian green turtle foraging aggregations: mtDNA evidence for a distinct regional population. *Endangered Species Research* 5: 37-44.
- Edwards KJ, Barker JHA, Daly A, Jones C, Karp A (1996) Microsatellite libraries enriched for several microsatellite sequences in plants. *Biotechniques* 20: 758-760.
- Encalada SE, Lahanas PN, Bjorndal KA, Bolten AB, Miyamoto MM, Bowen BW (1996) Phylogeography and population structure of the Atlantic and Mediterranean green turtle *Chelonia mydas*: a mitochondrial DNA control region sequence assessment. *Molecular Ecology* 5: 473-483.
- Encalada SE, Bjorndal KA, Bolten AB, Zurita JC, Schroeder B, Possardt E, Sears CJ, Bowen BW (1998) Population structure of loggerhead sea turtle (*Caretta caretta*) nesting colonies in the Atlantic and Mediterranean regions as inferred from mt DNA control region sequence. *Marine Biology* 130: 567-575.
- Felsenstein J (1989) PHYLIP: Phylogeny Inference Package (Version 3.2). *Cladistics* 5: 164--166.
- Fitzsimmons NN (1998) Single paternity of clutches and sperm storage in the promiscuous green turtle (*Chelonia mydas*). *Molecular Ecology* 7: 575-584.
- Fitzsimmons NN, Limpus CJ, Norman JA, Goldizen AR, Miller JD, Moritz C (1997a) Philopatry of male marine turtles inferred from mitochondrial DNA markers. *Proceedings of the National Academy of Sciences USA* 94: 8912-8917.
- Fitzsimmons NN, Moritz C, Limpus CJ, Pope L, Prince R (1997b) Geographical structure of mitochondrial and nuclear gene polymorphisms in Australian Green turtle

- populations and male biased gene flow. *Genetics* 147: 1843-1854.
- FitzSimmons NN, Moritz C, Moore SS (1995) Conservation and dynamics of microsatellite loci over 300 million years of marine turtle evolution. *Molecular Biology and Evolution* 12: 432-440.
- Formia A, Godley BJ, Dontaine JF, Bruford MW (2006) Mitochondrial DNA diversity and phylogeography of endangered green turtle (*Chelonia mydas*) populations in Africa. *Conservation Genetics* 7: 353-369.
- Frazier J (1985) Misidentification of marine turtles: *Caretta caretta* and *Lepidochelys olivacea* in the East Pacific. *Journal of Herpetology* 19(1): 111.
- Godley BJ, Barbosa C, Bruford M, Broderick AC, Catry P, Coyne MS, Formia A, Hays GC, Witt MJ (2010) Unravelling migratory connectivity in marine turtles using multiple methods. *Journal of Applied Ecology* 47: 769-778.
- Hamann, M et al. (including K Shanker) (2010) Priorities for research to inform effective sea turtle conservation. *Endangered Species Research* 11:245-269.
- Hoekert WEJ, Neufeglise H, Schouten AD, Menken SBJ (2002) Multiple paternity and female-biased mutation at a microsatellite locus in the olive ridley sea turtle (*Lepidochelys olivacea*). *Heredity* 89: 107-113.
- Jensen MP, Abreu-Grobois FA, Frydenberg J, Loeschcke V (2006) Microsatellites provide insight into contrasting mating patterns in arribada vs. non-arribada olive ridley sea turtle rookeries. *Molecular Ecology* 15: 2567-2575.
- Kar CS, Bhaskar S (1982) Status of sea turtles in the eastern Indian ocean. In: *Biology and Conservation of sea turtles* (Ed. KA Bjorndal). Smithsonian Institution Press, 365 - 372.
- Karnad D, Isvaran K, Kar CS, Shanker K (2009) Lighting the way: reducing the impact of light on misorientation of olive ridley turtle hatchlings at Rushikulya, India. *Biological Conservation* 142: 2083-2088.
- Kichler KH, Holder MT, Davis SK, Marquez-M R, Owens DW (1999) Detection of multiple paternity in the Kemp's ridley sea turtle with limited sampling. *Molecular Ecology* 8:

819-830.

- Kumar S, Tamura K, Jakobsen IB, Nei M (2001) MEGA2: molecular evolutionary genetics analysis software. *Bioinformatics* 17(12): 1244-1245.
- Lahanas PN, Bjorndal KA, Bolten AB, Encalada SE, Miyamoto MM, Valverde RA, Bowen BW (1998) Genetic composition of a green turtle (*Chelonia mydas*) feeding ground population: evidence for multiple origins. *Marine Biology* 130: 345-352.
- Lal A, Arthur R, Marbà N, Lill AWT, Alcoverro T (2010) Implications of conserving an ecosystem modifier: Increasing green turtle (*Chelonia mydas*) densities substantially alters seagrass meadows. *Biological Conservation*, 143: 2730-2738.
- Lee PLM, Luschi P, Hays GC (2007) Detecting female precise natal philopatry in green turtles using assignment methods. *Molecular Ecology* 16: 61-74.
- Luke K, Horrocks JA, LeRoux RA, Dutton PH (2004) Origins of green turtle (*Chelonia mydas*) feeding aggregations around Barbados, West Indies. *Marine Biology* 144: 799-805.
- Maniatis T, Fritsch E, Sambrook J (1982) *Molecular cloning: a Laboratory manual*. Cold Spring Harbor, Cold Spring Harbor Laboratory Press, USA.
- Marquez R (1994) *Synopsis of the biological data on the Kemp's Ridley turtle, Lepidochelys kempi (Garman 1880)*. NOAA Tech. Memo. NMFS-SEFSC 343, National Technical Information Service, Springfield, USA.
- Marquez R, Villaneuva O, Penaflores C (1976) *Sinopsis de datos biológicos sobre la tortuga golfina Lepidochelys olivacea (Eschscholtz, 1829)*. INP Sinopsis Pesca No. 2, SIC-SP-INP (Mexico).
- Meylan AB, Bowen BW, Avise JC (1990) A genetic test of the natal homing versus social facilitation models for green turtle migration. *Science* 248: 724-727.
- Mrosovsky N, Pieau C (1991) Transitional range of temperature. pivotal temperatures and thermosensitive stages for sex determination in reptiles. *Amphibia-Reptilia* 12: 169-179.

- Naro-Maciel E, Becker JH, Lima EHS, Marcovaldi MÂ, DeSalle R (2007) Testing Dispersal Hypotheses in Foraging Green Sea Turtles (*Chelonia mydas*) of Brazil. *Journal of Heredity* 98: 29 -39.
- Naro-Maciel E, Le M, FitzSimmons NN, Amato G (2008) Evolutionary relationships of marine turtles: A molecular phylogeny based on nuclear and mitochondrial genes. *Molecular Phylogenetics and Evolution* 49: 659-662.
- Norman JA, Moritz C, Limpus CJ (1994) Mitochondrial DNA control region polymorphisms: genetic markers for ecological studies of marine turtles. *Molecular Ecology* 3: 363-373.
- Owens DW, Ruiz GJ (1980) New methods of obtaining blood and cerebrospinal fluid from marine turtles. *Herpetologica* 36: 17-20.
- Pandav B (2000) *Conservation and management of olive ridley sea turtles on the Orissa coast*. PhD Thesis Utkal University, Bhubaneswar India
- Pandav B, Choudhury BC (1999) An Update On Mortality Of Olive Ridley Sea Turtle In Orissa, India. *Marine Turtle Newsletter* 83: 10-12.
- Pandav B, Choudhury BC, Kar CS (1994) *A status survey of the Olive Ridley Sea Turtle (Lepidochelys olivacea) and their nesting beaches along the Orissa coast, India*. Wildlife Institute of India, Dehradun.
- Pandav B, Choudhury BC, Shanker K (1998) The Olive Ridley sea turtle (*Lepidochelys olivacea*) in Orissa: an urgent call for an intensive and integrated conservation programme. *Current Science* 75: 1323-1328.
- Reichert HA (1993) *Synopsis of the biological data on the Olive Ridley sea turtle Lepidochelys olivacea (Eschscholtz, 1829) in the western Atlantic*. NOAA Tech. Memo. NMFS-SEFSC 336, National Technical Information Service, Springfield, USA.
- Rivalan P, Dutton PH, Baudry E, Roden SE, Girondot M (2006) Demographic scenario inferred from genetic data in leatherback turtles nesting in French Guiana and Suriname. *Biological Conservation* 130: 1-9.

- Roberts MA, Schwartz TS, Karl SA (2004) Global population genetic structure and male-mediated gene flow in the green sea turtle (*Chelonia mydas*): analysis of microsatellite loci. *Genetics* 166: 1857-1870.
- Ross JP (1982) Historical decline of the loggerhead, ridley and leatherback sea turtles, pp 189-195. In: *Biology and Conservation of sea turtles* (Ed KA Bjorndal). Smithsonian Institution Press, Washington D.C.,
- Saitou N, Nei M (1987) The neighbor-joining method: A new method for reconstructing phylogenetic trees. *Molecular Biology and Evolution* 4:406-425.
- Sambrook J, Fritsch EF, Maniatis T (1989) *Molecular Cloning: a Laboratory Manual*. 2nd edn. Cold Spring Harbor Press, New York.
- Schneider S, Roessli D, Excoffier L (2000) *Arlequin ver. 2.000: A software for population genetics data analysis*. Genetics and Biometry Laboratory, University of Geneva, Switzerland.
- Shanker K, Aggarwal RK, Choudhury BC, Singh L (2000) *Conservation genetics of the Olive Ridley (Lepidochelys olivacea) on the Orissa coast*. Wildlife Institute of India, Dehradun, India.
- Shanker K, Rama Devi J, Choudhury BC, Singh L, Aggarwal RK (2004a) Phylogeography of olive ridley turtles (*Lepidochelys olivacea*) on the east coast of India: implications for conservation theory. *Molecular Ecology* 13: 1899-1909.
- Shanker K, Pandav B, Choudhury BC (2004b) An assessment of the olive ridley turtles (*Lepidochelys olivacea*) nesting population in Orissa, India. *Biological Conservation* 115: 149 - 160.
- Shanker K, Choudhury BC (2006) (Editors) *Marine turtles of the Indian subcontinent*. Universities Press, Hyderabad. India.
- Sunderraj SFW, Joshua J, Vijaya Kumar V (2006) Sea Turtles and their Nesting Habitats in Gujarat. In: *Marine Turtles of the Indian Subcontinent* (eds. K Shanker & BC Choudhury), pp. 156-169. Universities Press, Hyderabad. India.

- Swaminathan A, Namboothri N, Shanker, K (2011) Post-tsunami status of leatherback turtles on Little Andaman Island. *Indian Ocean Turtle Newsletter* 14: 6-9.
- Tripathy, B. (2005) Status of the loggerhead turtle in India. *Current Science* 4: 535-536.
- Tripathy B, Shanker K, Choudhury BC (2006) The status of sea turtles and their habitats in the Lakshadweep Archipelago, India. *Journal of the Bombay Natural History Society* 103(1): 33-43.
- Thompson JD, Higgins DG, Gibson TJ (1994). CLUSTAL W: improving the sensitivity of progressive multiple sequence alignment through sequence weighting, position-specific gap penalties and weight matrix choice. *Nucleic Acids Research* 22: 4673-4680.
- Wright B, Mohanty B (2006) Operation Kachhapa: an NGO initiative for sea turtle conservation in Orissa. In: *Marine Turtles of the Indian Subcontinent* (eds. K Shanker & BC Choudhury), pp. 290-303. Universities Press, Hyderabad. India.
- Zbinden JA, Largiadèr CR, Leippert F, Margaritoulis D, Arlettaz R (2007) High frequency of multiple paternity in the largest rookery of Mediterranean loggerhead sea turtles. *Molecular Ecology* 16: 3703-3711.

A MONUMENTAL FOLLY

NITI Aayog's Development Plans for
GREAT NICOBAR ISLAND

(An evolving archive of reports, information and documents)

