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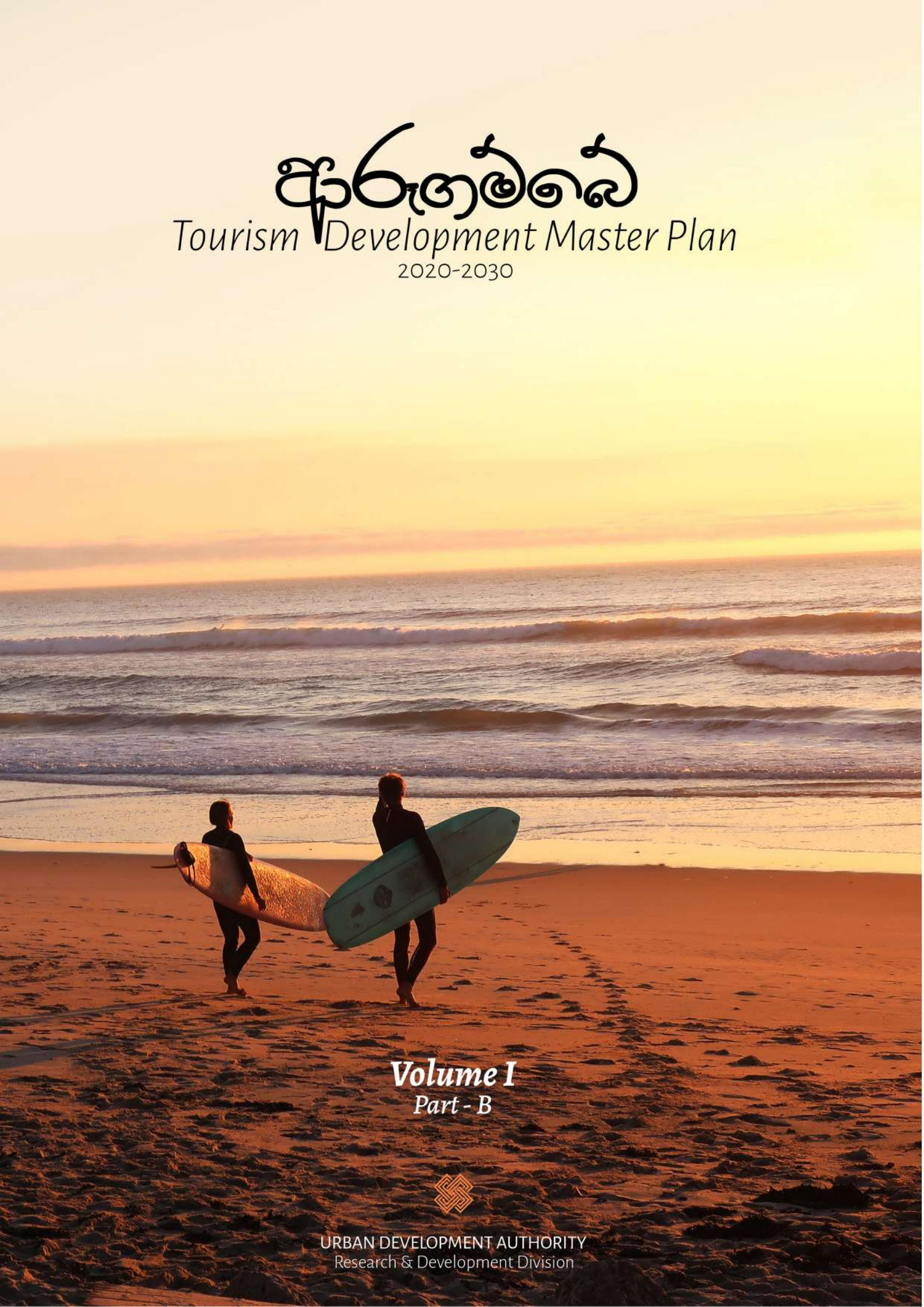
Tourism Development Master Plan

2020-2030



Volume I

Part - B

URBAN DEVELOPMENT AUTHORITY
Research & Development Division

Arugam Bay

Tourism Development Master Plan

2020-2030

Consultancy Assignment on Preparation of Tourism Development Master Plans for Seven Tourism Areas Identified by Sri Lanka Tourism Development Authority

June 2020

Submitted by:

Urban Development Authority

Sri Lanka

Arugam Bay Tourism Development Master Plan

2020-2030 Final Report

Consultancy Assignment	Preparation of Tourism Development Master Plans for Seven Tourism Areas Identified by Sri Lanka Tourism Development Authority
Client	Sri Lanka Tourism Development Authority
Consultant	Urban Development Authority of Sri Lanka
Project No. 02	Preparation of Arugam Bay Tourism Development Master Plan
Submission	Final Report
Submission Date	23rd June, 2020

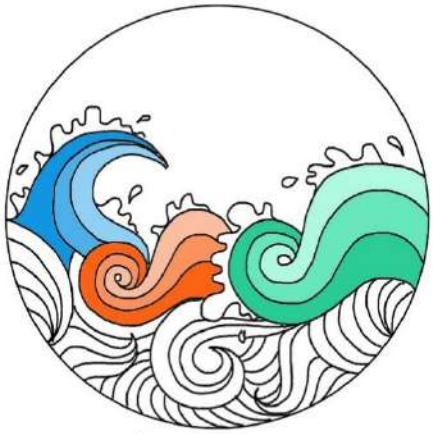
Planning Team

Overall Supervision by:
Plnr. D.M.B. Ranathunga ***Additional Director General - UDA***
Plnr. M.P. Ranathunga ***Deputy Director General (Planning) – UDA***

Team Leader – Plnr. Janak Ranaweera ***Director (Southern Province) – UDA***
Deputy Team Leader - Plnr. L.J. Liyanage ***Director (Eastern Province) – UDA***
Plnr. Lalith Wijayarathne – ***Former Director (Eastern Province) - UDA***

Plnr. Priyani Nawarathna ***Director (Research and Development) – UDA***
Plnr. Nirmala Kulatunga ***Deputy Director (Research and Development) – UDA***
Plnr Thushani De Alwis – ***Real Estate Consultant - Director (Strategic Planning) – UDA***
Prof. Jagath Manathunga - ***Environment & Infrastructure Consultant***
Dr. Rangajeewa Rathnayake - ***Socio-economic Consultant***
Eng. R.A. Sudath - ***Transport Consultant***
Mr. M.N.L. Lantra - ***Tourism Consultant***
Plnr. I.S. Biyanwila - ***Town Planner***
Archt. Sampath Jayaweera - ***Architect***

Junior Town Planners/ GIS Assistants
Mr. G.K. Karunaratne – ***Enforcement Planner, Ampara District Office***, Plnr. M.M. Musthaq – ***Town Planner, Ampara District Office***, Plnr. Nishamani Abeyrathna – ***Assistant Director (Planning), Kandy District Office***, Plnr. Lakshan Dissanayaka – ***Town Planner (R&D Division)***, Plnr. Sukhitha Ranasinghe - ***Town Planner - R&D Division***, Plnr. Madhuka Thamarasi - ***Town Planner - R&D Division***, Plnr. M.M. Riswan - ***Town Planner - R&D Division***, Plnr. Nadeesha Karunasena - ***Town Planner - R&D Division***, Mr. Vichithra Sampath – ***Land Manager - R&D Division***, Plnr. Chulesha Geeganage - ***Town Planner - R&D Division,*** Ms. Sathya Meepagala - ***Town Planner - R&D Division***, Ms. Monali Rupasinghe - ***Town Planner - R&D Division***, Ms. Aloka Fraser - ***Enforcement Planner - R&D Division***, Mr. Kasun Chathuranga - ***Town Planner - R&D Division***, Plnr. Uditha Jayampath - ***Town Planner – Strategic Planning Division***, Ms. Maheshi Nanayakkara - ***Town Planner - CMR Division***, *Ms. Shanika Sumanapala* - ***Town Planner - CMR Division***



Akaw! Arugam Bay

Surfers' Hidden Paradise

Acknowledgment

The Arugam Bay Tourism Development Master Plan (Arugam Bay TDMP) was completed as a part of the Consultancy Assignment; Preparation of Tourism Development Master Plans for Seven Tourism Areas identified by the Sri Lanka Tourism Development Authority. It was prepared under the supervision and encouragement of many individuals and institutions.

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1.1 Vision

Akaw! Arugam Bay

Surfers' Hidden Paradise

Arugam Bay to be a clandestine surfing destination amidst wilderness of east horizon of Sri Lanka, having to offer diverse tourism experiences throughout the year with secluded lagoons, sparkling beaches, green forests, wavy sand dunes and inherent culture.

Fascination of surfing is undeniable. Arugam Bay is a destination which allows anyone to experience the unique sensation of surfing and become a part of the surfing lifestyle as perfect waves are certainly found there. Moreover, this bliss on earth is capable to offer the surfer an unparalleled experience which no other place could offer with virgin surfing points hidden in wilderness. Arugam Bay has significant untapped potential as it is furnished with some of the premier destinations in the country. The lagoons, beaches, forests and sand dunes in this area form a unique environmental setting. On the other hand, the heritage sites dating back over 2,000 years and the inherent culture each village holds within the planning boundaries manifests the pride and glory of a magnificent past. Thus, as for the vision, Arugam Bay is truly crowned as the paradise of Eastern Province. Thus, it is capable to bring people together and improve economies.

Accordingly, the vision of Arugam Bay Tourism Development Master Plan is set to create a fascinating tourist destination in order to offer a once in life time experience to its visitors along with strong emphasis on the unique and sensitive environmental settings which will not be compromised during implementation.

1.2 Goals

Goal 01

The premier surfing destination in the world which offers most varied surfing sites and experiences

Goal 02

Most diversified year around tourism destination in Asia complemented with virgin ecosystems and mysterical aroma of last village of eastern Sri Lanka

Goal 03

A sustainable tourism economy within a smooth, sensed and responsible tourism space in east coast of Sri Lanka

1.3 Objectives

Goal 01 - *The premier surfing destination in the world which offers most varied surfing sites and experiences*

1. To promote and maintain 11 no. of surfing points with 05 different experiences; nature based mysterious, nature based adventurous, vibrant, extravagant, exclusively extravagant and serene.
2. To maintain 02 categories of surfing points; 06 attraction points and 05 destination points.
3. To promote 11 surfing points for different skill levels; 05 for all skill levels, 03 for beginners and 03 for advanced surfers.
4. To provide basic tourist facilities covering all surfing sites and functional beaches.
5. To enhance accessibility to each surfing point while maintaining 100% safety and zero disturbance to its natural setting and unique characters.

Goal 02– *Most diversified year around tourism destination in Asia complemented with virgin ecosystems and mystical aroma of last village of eastern Sri Lanka*

1. To fully conserve 863 km^2 forest reserves, 623 km^2 of national parks, 73 km^2 of sanctuaries, 12.5 km^2 of lagoons, 3.4 km^2 sand dunes and 66 km length of coastal belt falling within the boundary limits of Arugam Bay Tourism Area.
2. To fully conserve 13 no. of archeological sites in Arugam Bay Tourism Area while maintaining three exposure levels based on their sensitivity
3. To promote intangible heritage unique to Arugam Bay and Panama as tourism products in Arugam Bay.
4. To fully protect bird and wildlife species at Arugam Bay Tourism Area.
5. To maintain 05 tourism destination clusters with 05 different experiences; fully vibrant, mix of vibrancy and extravagancy, fully extravagant, serene and mysterious.
6. To promote 03 lagoon safari trails, 03 wildlife safari trails, 03 sand dune safaris and 04 360° view points as main nature tourism experience points in Arugam Bay Tourism Area
7. To promote 09 camping sites with 05 different experiences.

Goal 03 – *A Sustainable Tourism Economy within a smooth, Sensed and Responsible Tourism Space in east coast of Sri Lanka*

1. To improve convenient accessibility within Arugam Bay with zero disturbance to its natural setting and unique characters
2. To introduce three choices of transportation to access Arugam Bay
3. To ensure 100% water and electricity supply within Arugam Bay
4. To manage waste water and solid waste in Arugam Bay with zero discharge and disturbance to the environment

5. To ensure Arugam Bay is fully resilient against natural disasters including floods, tsunami and wildlife attacks.
6. To maintain a chain of tourist facilitation centres including 03 large scale facilities, 02 mini-facility centres and 24 site facility centres covering all surfing points and beaches and all archeological sites.
7. To maintain a unique signage system that can fully guide an independent traveler throughout Arugam Bay tourism area
8. To ensure the complete safety of every tourist visiting Arugam Bay
9. To introduce nearly 10 no. of methods which local community can engage with the Arugam Bay tourism industry

1.4 Concept Plan

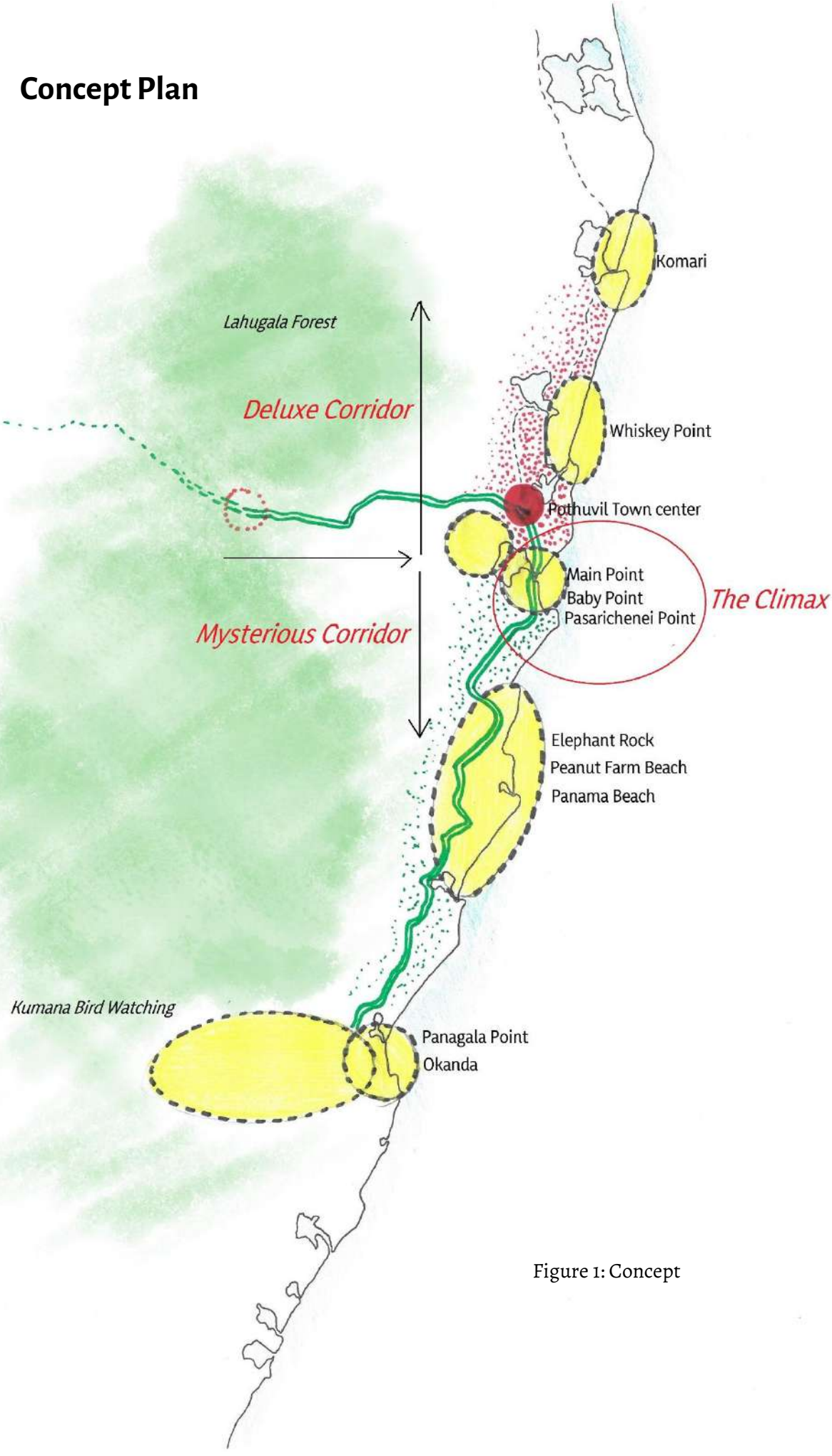


Figure 1: Concept

Gateways of Arugam Bay; the Surfers' Hidden Paradise

As per the concept plan, Arugam Bay; the Surfers' Hidden Paradise is accessible via two Green Gateways such as Lahugala from West and Komari from North. For those who enter Arugam Bay from west through the Colombo – Battocaloa Highway via Moneragala, Lahugala will be the main Gateway. Lahugala Gateway is a green gateway which is also the entry point to Lahugala National Park. Thus it will also be an elephant view point. Lahugala will be a welcoming tourist service point where the long travelled tourists can pause for a while to first feel the aroma of this mysterious tourism destination.

For those who enter from the northern side from Battocaloa via Colombo – Battocaloa Highway, Komari will be the main gateway which will also serve as a service point just as Lahugala Gateway.

Pottuvil as the last town at the southern edge of east coast

The true surfers' paradise is actually the 54 km long coastal stretch where a number of surfing breaks are placed hidden beside either the dense jungles, wavy sand dunes or sparkling lagoons. The green corridor which runs towards the coast from Lahugala Gateway intersects the coastal belt of Arugam Bay at the small town named Pottuvil. Pottuvil is the last town at the southern edge of east coast thus it is the last service town where any tourist taking a right turn and travel towards south can buy the main supplies required for the rest of the stay at Arugam Bay.

Mysterical Corridor of Arugam Bay

Towards the south from Pottuvil Town is the Mysterical Corridor of Arugam Bay. When someone travels further south more he or she will encounter the mysteriousness of Arugam Bay. At the south edge of the Mysterical Corridor will be the last inhabited village of south-east which is located next to the Yala Forest Reserve. The road running from Pottuvil via Arugam Bay to the south ends at the small yet legendary village named Panama. Panama has its own secrets inherited by its long history and deep rooted culture. Panama will be one of the three tourist destinations within Arugam Bay where tourists are given the choices of accommodation such as camping amidst the jungle or homestay in the village. Tourists who choose their accomodation at the south edge of Mysterical Corridor of Arugam Bay will be able to experience and explore quite a lot of mysteries carried by villagers in the form of cultural and religious events such as 'An Keliya', 'Paththini Pooja' and Okanda Dewalaya Perahara. In addition, the tourists will also be able to explore a number of heritage sites hidden amidst the dark jungles of Kumana, Kudumbigala and Yala Forests such as Kudumbigala Monastery, Okanda Dewalaya, Nagapabbatha Monastery in Bambaragasthalawa and Bowattegala Monastery.

As the mysteriousness increases southwards along the Mysterical Corridor starting from Pottuvil, the vibrancy of the corridor increases northwards from Panama to Arugam Bay as the activity diversity and intensity rapidly increases when heading towards Arugam Bay from Panama.

Deluxe Corridor of Arugam Bay

Deluxe Corridor of Arugam Bay which spans northwards from Pottuvil Town will carry an entirely different character with compared to the Mysterical Corridor. Towards the north, the extravagance character of the corridor will increases making Komari one of the exclusive and high-end accommodation destination of Arugam Bay. When travelling towards north from Pottuvil Town will be attractions such as Kottukal Lagoon, Whiskey Point and Sangaman Kanda which provide comparatively high-end accommodation facilities. While the extravagance character increases towards Komari from Pottuvil Town, the vibrancy of the corridor increases from Komari to Pottuvil Town.

The Climax; Arugam Bay Main Tourism Strip

The zenith of the Surfers' Hidden Paradise is the Arugam Bay Main Tourism Strip which spans approximately 1km towards Pottuvil Town starting from the Main Point. Arugam Bay Main Point will be the main surfing point in future as well and it will be the place to host large scale surfing competitions, festivals and will be the most vibrant place of Arugam Bay; the Surfers' Hidden Paradise.

ENVIRONMENT MANAGEMENT STRATEGY

'Respecting the inherited assets of Arugam Bay'

Natural Environment Conservation Strategies
Heritage Conservation Strategies
Wildlife Protection Strategies
Disaster Management Strategies

Respecting the Nature of Arugam Bay

Arugam Bay is blessed with...

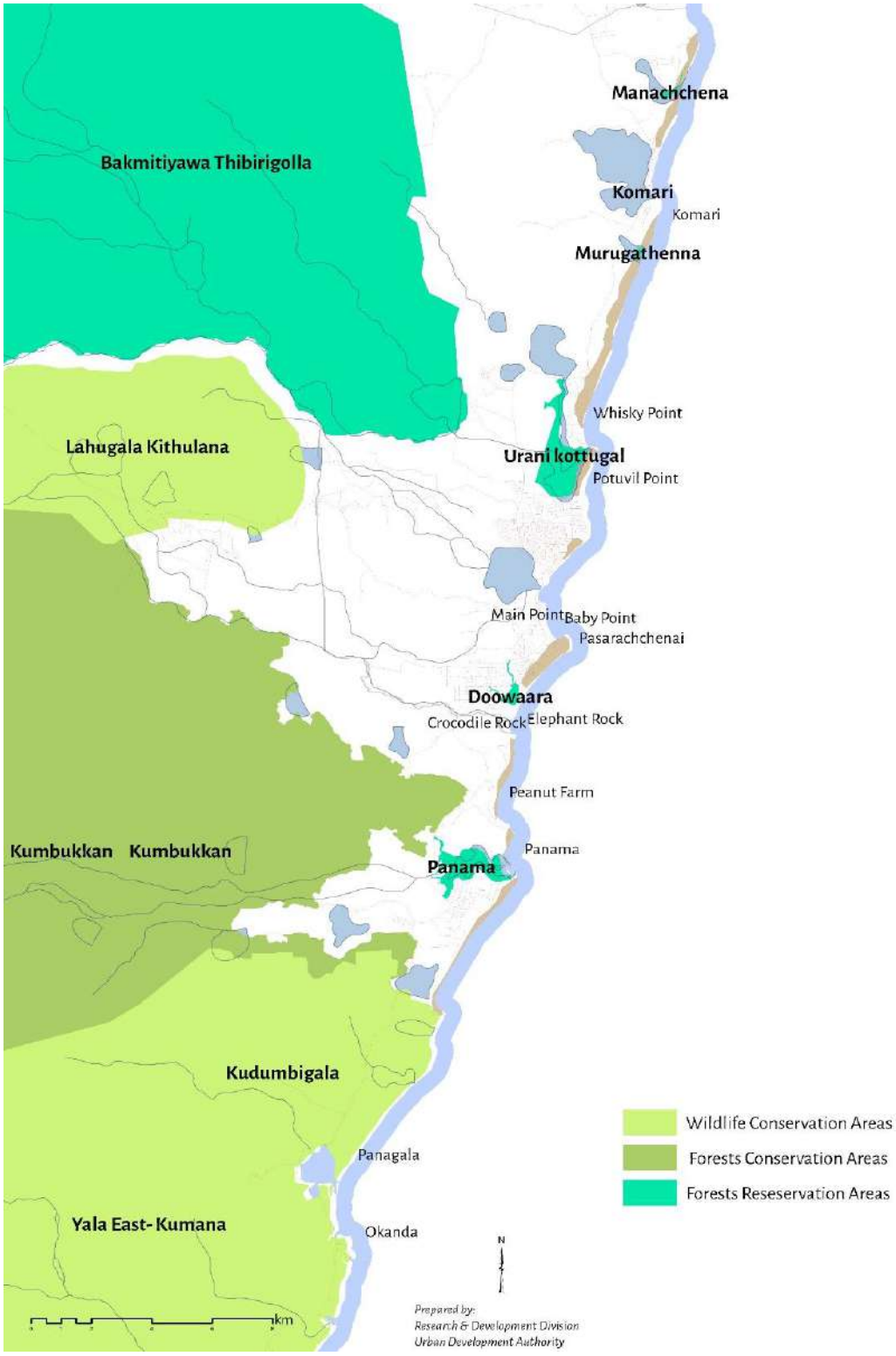
- *66 km stretch of total beach strip of which*
- *3.4 km^2 of sand dunes in 05 locations*
- *03 no. of national parks including Yala Ruhuna, Lahugala *Kithulana, Yala East-Kumana . 1 Sanctuary name as *Kudumbigala and 1 Strict Natural Reserve like Yala*
- *25 km stretch of Heda Oya*
- *12.5 km^2 of inland water bodies*
- *130 ha of paddy lands& we are determined to safeguard all of them.*

These natural features and their reservations are fragile and sensitive.

Thus, we request you to behave gently upon them.

2.1 Natural Environment Conservation Strategies (Project Code – EN-1)

2.1.1 Declaring the existing natural features as special protection areas

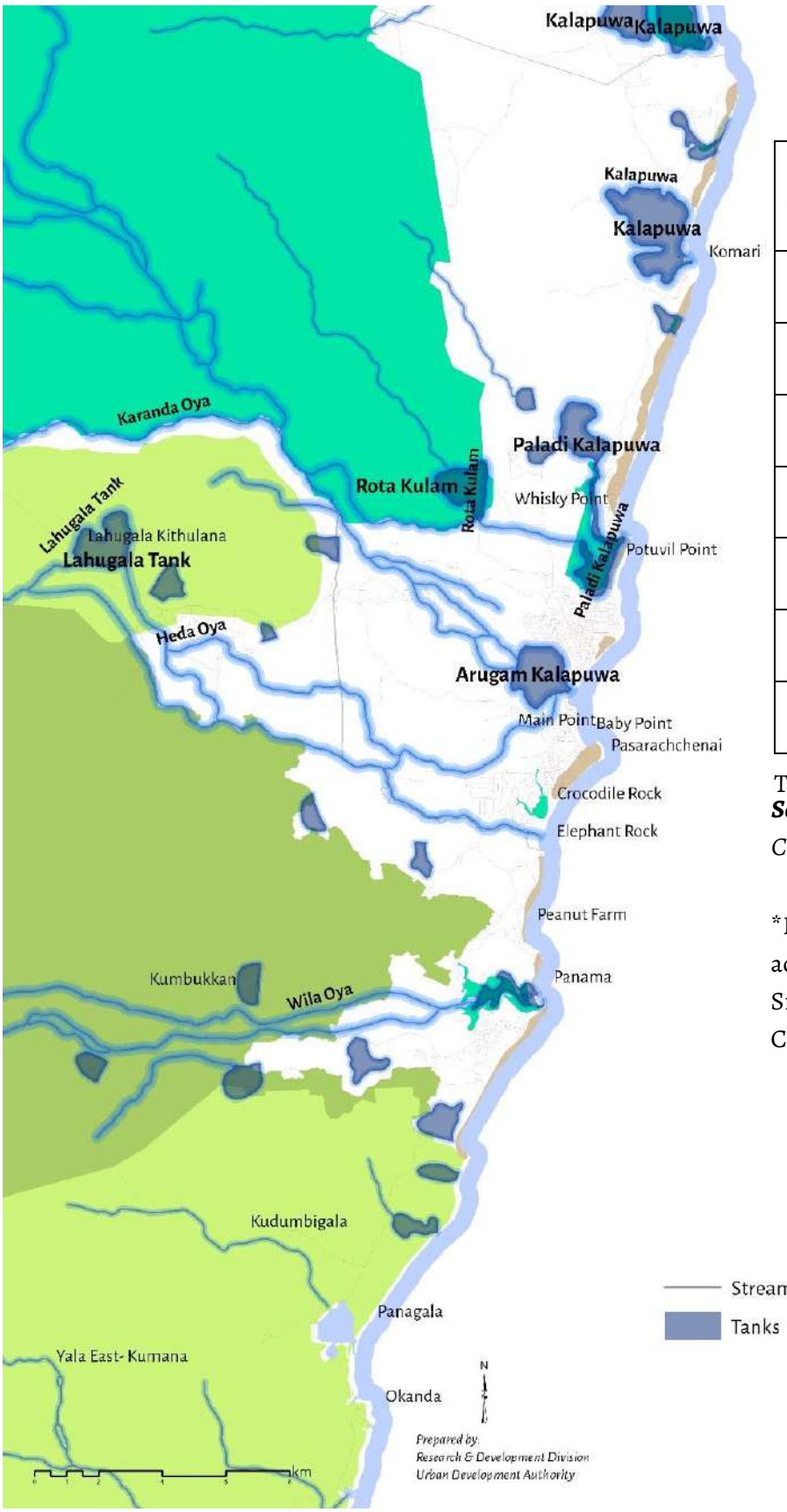


Map 1: Natural features identified as special protection areas

Type of Natural Asset	Name	Extent falling within Arugam Bay Tourism Area	Relevant Governing Acts/ Laws and Agencies
Conserve Forest	Kumbukkan Forest	383.59 km^2	Forest Department
Reserve Forest	Bakmitiyawa Thibirigolla	471.27 km^2	Forest Department
	Murugathena	8.75 km^2	Forest Department
National Parks	Lahugala-Kithulana National Park	52km^2	Department of Wildlife Conservation
	Kumana / Yala East National Park	570.89 km^2	
Sanctuary	Kudumbigala Sancturary	66 km^2	
	Sangamam Sancturary	7.45 km^2	
Lagoons	Panama	2.10 km^2	Forest Department
	Ureni	0.7km^2	Forest Department
	Komari	0.47km^2	Forest Department
	Pottuvil	2.05 km^2	Coast Conservation Department
	Arugam	2.4 km^2	Coast Conservation Department
	Okanda	0.8 km^2	Coast Conservation Department
Sand Dunes	Arugam Bay	0.91 km^2	Coast Conservation Department
	Panama	1.68 km^2	
	Pothuvil	0.58 km^2	
	Jalaldeen Squre	0.07 km^2	
	Sinna Pudukuduiruppu	0.15 km^2	
Streams			Land Development Ordinance
Coastal Belt		66km	Coast Conservation Department

Table 1: Natural features identified as special protection areas

2.1.2 Declaring and maintaining the reservations of different natural assets



Map 2: Main water bodies and reservations

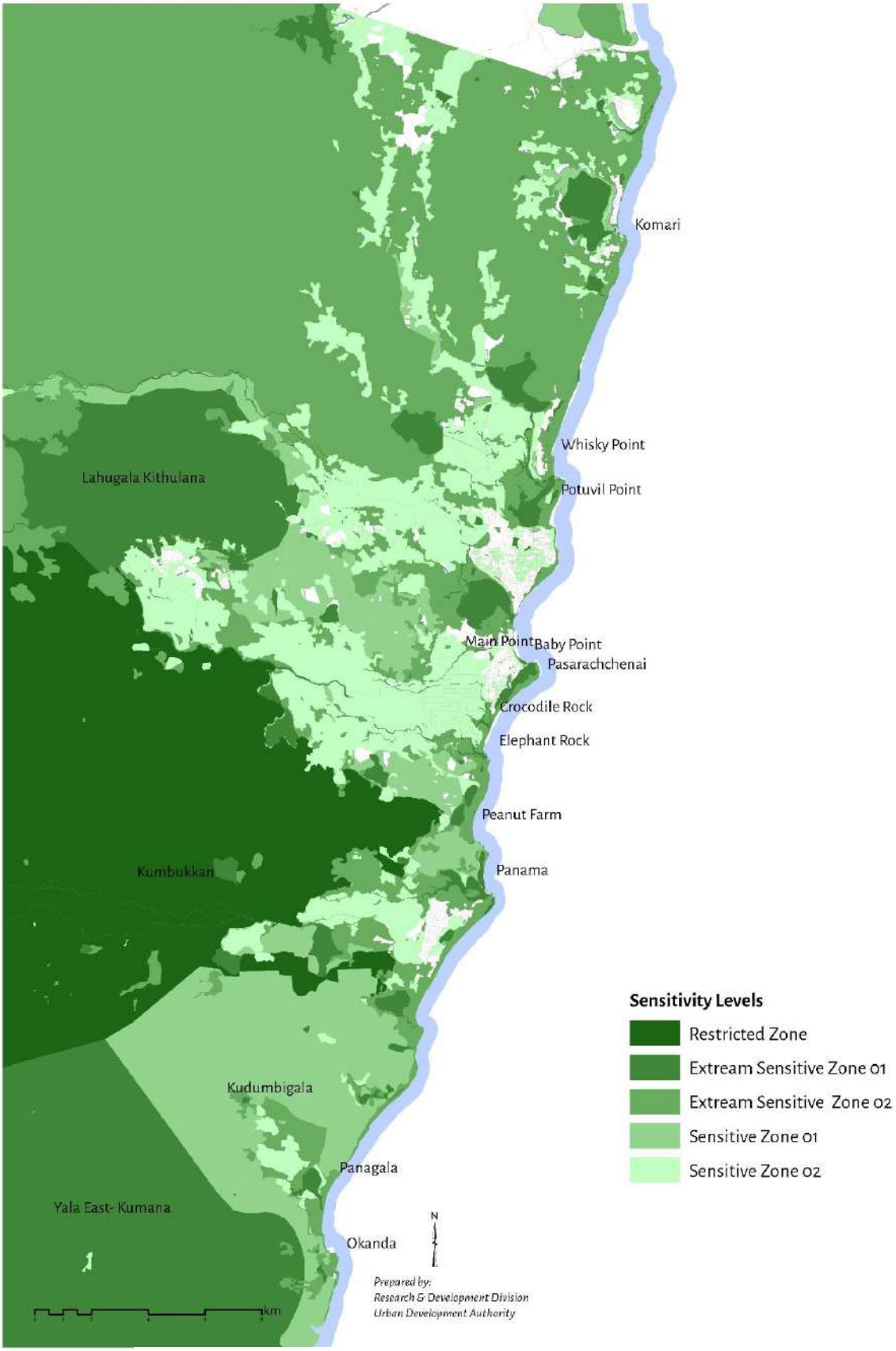
River Width (m)	Reservations (m)	
	Open Canal	Closed Canal
1.0 - 1.1	1.0	0.3
1.3 - 3.0	2.0	1.0
3.1 - 4.5	2.75	1.0
4.6 - 6.0	3.5	1.5
6.1 - 9.0	4.5	1.5
9.1 above	6.5	2.0

Table 2: Main water bodies and reservations
Source: *Sri Lanka Land Reclamation & Development Corporation*

*For streams, reservations should be made according to the regulations and guidelines of Sri Lanka Land Reclamation & Development Corporation.

The regulatory guidelines for maintenance of canal reservations, which have been introduced by the Sri Lanka Land Reclamation & Development Corporation are enacted by the Gazette Notification No. 1662/17 dated 14th July 2010. As per the Gazette Notification, the specified reservations based on canal surface widths are as above.

2.1.3 Demarcation of conservation zones based on sensitivity levels



Map 3: Conservation zones based on sensitivity level

Type of Conservation Zone	Sensitivity Level	Total Extent (km^2)	Included Natural features	Accessibility	Permitted Uses
Restricted Zone	Extreme Sensitivity	383 km^2	Conserve Forest Kumbukkan Forest	No accessibility without permission	According to Forest Management Plan done by Forest Department
Extreme Sensitive Zone 01	Extreme Sensitivity	626.3 km^2	Kumana / Yala East National Park Lahugala-Kithulana National Park Sand Dunes	Limited accessibility granted with approval and under strict observations predetermined routes Limited accessibility granted with defined access ways	Observation, studying and camping purposes with Special Rules and Regulations. No human activity is allowed except walking, Camping
Extreme Sensitive Zone 02	Extreme Sensitivity	519.7 km^2	Reserve Forests - Bakmitiyawa Thibirigolla - Murugathena - Panama Lagoon - Doowara Lagoon - Urani Kottugal Lagoon - Komari Lagoon	Limited accessibility granted	Walking, Observation and users allowed by Forest Department
sensitive zone 01	Moderate Sensitivity	73.5 km^2	Kudumbigala Sancturary Sangamam Sanctuary	Accessibility granted	Human activities allowed while protecting the habitat.
sensitive zone 02		5.3 km^2	Lagoons - Arugam - Pottuvil - Okanda		Forest conservation ordinance

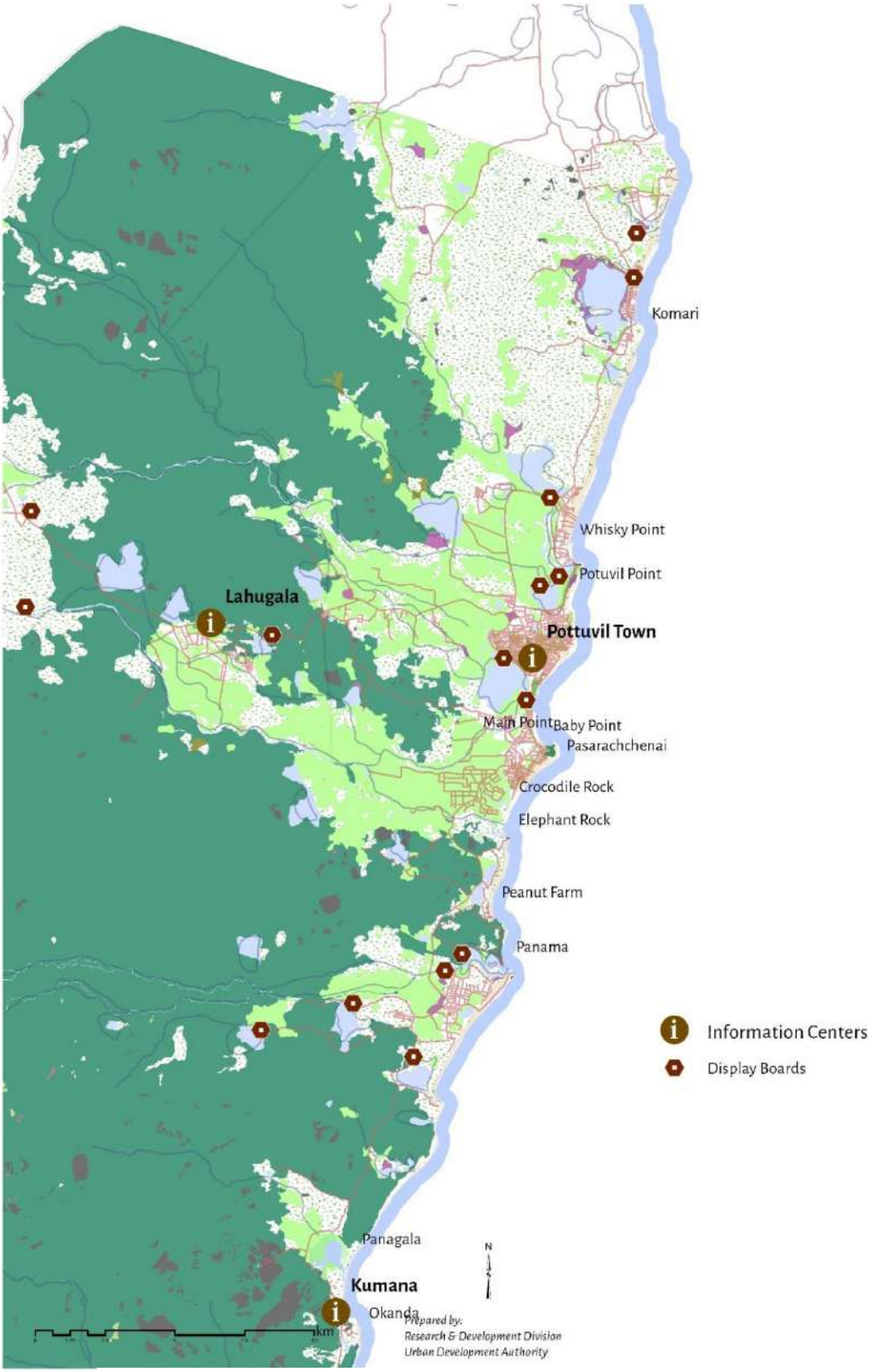
Table 3: Conservation zones based on sensitivity level

2.1.4 Demarcating the physical boundaries of selected protected zones and conservation zones and their reservations – (Project Code – EN-1-1)

Protected zone/ conservation zone	Boundary to be physically demarcated	The type of demarcation	Project Code
Forests/National Parks/Sanctuary	Kumbukkan Forest	Erection of boundary posts	EN-1-1-1
	Bakmitiyawa Thibirigolla	Erection of boundary posts	
	Murugathena	Erection of boundary posts declaration gazette No	
	Lahugala-Kithulana National Park	Boundary posts and electrified fences	
	Kumana / Yala East National Park		
	Kudumbigala Sancturary		
	Sangamam Sancturary		
Lagoons	Panama	Green Belt	EN-1-1-2
	Ureni	Green Belt	
	Komari	Green Belt	
	Pottuvil	Construction of a road/ foot path running along the boundary	
	Arugam	Construction of a road/ foot path running along the boundary	
	Okanda	Construction of a road/ foot path running along the boundary	
Oya	Hada Oya	Green Belt	EN-1-1-3
Sand Dunes	Arugam Bay	Foot Path fence plantation	EN-1-1-4
	Panama	Foot Path	
	Pothuvil	Foot Path	
	Jalaldeen Squre	Foot Path	
	Sinna Pudukuduiruppu	Foot Path	

Table 4: Recommended physical boundaries for different protected/ conservation zones

2.1.5 Installation of information display boards and information centers to aware tourists on special environment conservation measures in Arugam Bay in overall and at each natural site – (Project Code – EN-1-2)



Map 4: Places to locate environment information centres and display boards

Information to be displayed/ disseminated through the display boards and information centers.

- The type of protected zone and the conservation zone
- The level of sensitivity
- The type of accessibility
- Permissible activities
- Information on the value of the protected zone/ natural asset
- General information on the particular natural asset
- Motivational quotes on conservation of natural assets

Zero Waste Arugam Bay

We are not the sole inheritors of this precious paradise as our children also inherit equal rights to enjoy it in future. Our intention is to enjoy this beautiful paradise while ensuring that it remains astonishing in future too so that our children will also be amazed by it and will also express 'Akaw! Arugam Bay!.

In order to make it a reality, it is our responsibility to ensure that this precious environment would not be compromised during the mission for tourism promotion due to any of its negative consequences.

We have witnessed that solid waste is one of the major negative consequences resulted in many of tourism destinations. However, it is our intention to ensure sustainable waste management with the theme 'Zero Waste Arugam Bay'.

To make it a realistic and achievable theme in action, we have introduced several solid waste management measures for which we indeed require your genuine cooperation.

*One of the main principles we follow to ensure sustainable waste management is the **3R concept; Reduce-Reuse-Recycling**. Accordingly, we expect each of you to act individually to adopt the concept as much as possible.*

2.1.6 Implementing Zero Waste Arugam Bay Program throughout Arugam Bay Tourism Area (Project Code – EN–1-2)

With the objective of ensuring sustainable tourism development in Arugam Bay, it has been proposed to introduce Zero Waste Arugam Bay Program based on the 3R Concept. Following the 3R Concept, Reduce – Reuse – Recycling, the below mentioned sub strategies and projects are proposed.

A. Reducing waste at source

The main intention of this strategy is to reduce the bulk waste collected as much as possible with the management of waste at the source. One of the key components of this strategy is the source separation.

The following key categories of waste are proposed for waste separation as they can be principally managed as given mechanisms.

No.	Type of Waste	Principle waste, management mechanism
01	Bio-degradable waste	Composting
02	Paper/ cardboard	Recycling
03	Plastics & Polythene	Reuse & Recycling
04	Metal & Glass	Reuse & Recycling

Table 5: Waste Management Mechanism

2.1.6.1 Introducing attractively designed waste bins at tourist attraction sites and other tourist frequent areas (Project Code - EN-1-2-1)

In order to encourage source separation especially at tourist attraction areas, it is proposed to introduce waste bins for different types of waste at all tourist attraction sites and tourist frequent areas. In addition, it is proposed to use attractively designed waste bins which match with the unique characteristics of Arugam Bay in order to draw the attention of a large crowd of tourists and public for the proposed program.

Further, it is proposed to have a sound awareness program on the correct waste separation. It is proposed to introduce awareness boards and posters at appropriate locations

Information on correct waste separation could be adapted to create an easily un derstandable "waste guide" for tourists. Level of implementation: "Waste guides " for tourists etc. could be part of the information package tourists receive in thei r accommodation establishment.

2.1.6.2 Promoting individual, site and community level composting of bio-degradable waste (Project Code - EN-1-2-2)

It is proposed to conduct an awareness program to encourage especially the hoteliers and restaurant owners to separate food waste and other bio-degradable waste and carryout individual, site or community level composting. It is proposed to form special Community Based Organizations to implement such initiatives in a sustainable manner.

Onsite composting could be implemented at hotel level and for other establishments providing food and beverage to tourists to manage the organic waste produced by tourists. Information campaigns on composting as well as the provision of technical composters could be carry out targeting bigger accommodation establishments where the compost could be later used for hotel garden as fertilizer.

2.1.6.3 Establishing operation units of Zero Waste Arugam Bay Program both at Lahugala and Komari Entrance Gateways (Project Code – EN-1-2-3)

- Establishing an exhibition & awareness unit of Zero Waste Arugambay Program to aware tourists on the special waste management system in Arugambay
- Establishing a main polythene & plastic collection center

B. Promoting Re-use of Items

2.1.6.4 Promoting re-usable items as substitutes for items made out of polythene and plastics (Project Code – EN-1-2-4)

It is proposed to introduce cloth bags, gunny bags, paper bags and other eco-friendly bags in replace of regular polythene and plastic bags as an alternative strategy proposed to minimize the plastics and polythene waste generated within Arugam Bay.

It is also proposed to mainly promote the use of refillable glass bottles in replace of PET bottles.

In addition, it is also proposed to introduce other similar types of substitute eco-friendly items in replace of plastics and polythene products.

2.1.6.5 Promoting 'Pinthaliya Concept' to encourage refill of water bottles instead of one time use PET bottles (Project Code – EN-1-2-5)

It is proposed to introduce public drinking water filling centres, promoted as 'Pinthaliyas' in replace of one time use PET bottles. It is proposed to implement this project in collaboration with the National Water Supply & Drainage Board and relevant local authorities. It is recommended to follow standard methods and to have a sound management mechanism to ensure the water quality and proper management of the drinking water supply system.

C. Promoting Recycling opportunities

2.1.6.6 Encouraging different types of waste recycling ventures operating within Arugam Bay tourism area (Project Code – EN-1-2-6)

There are a certain number of waste collection and recycling ventures currently in operation within Arugam Bay tourism area. Most of the time, these ventures are recognized and promoted as tourist attractions because of their creativity and link to the special innovative and bohemian ambience of the area. Therefore, it is proposed to encourage such existing and proposed initiatives led by the private sector and local community by linking them with relevant agencies and investors.

2.1.6.7 Establishing a community led recyclable waste collection system within Arugam Bay Tourism Area (Project Code – EN-1-2-7)

It is proposed to encourage recycling of polythene and plastics waste generated within Arugam Bay Tourism Area by introducing a properly managed collection system. In this regard, it is proposed to engage the local community through established Community Based Organizations and provide them also to have economic benefits through the project.

D. Other innovative programs for sustainable waste management

2.1.6.8 Organizing a series of eco events to aware and encourage tourists and public on sustainable waste management (Project Code – EN-1-2-8)

Arugam Bay is a place where a large events and parties are held especially during the tourist season. However, if not well-organized these events can result a large

amount of waste which would ultimately be a burden to the natural landscape of the area. In that case, it is proposed to promote eco-event concept within Arugam Bay and encourage the tourists and all other parties engaged in the industry to adopt the eco-event/ green event concept in all types of events they conduct and take part in.

Waste of bigger events like sport or music events attracting thousands of tourist s can be highly influenced by green events, but also small events, even meetings, can be oriented according the green event concept. Bigger Green Events could be implemented at municipal level, while conferences or seminars can be organise d as green events on hotel level.

On the other hand, it is also proposed to organize special eco-events such as environment cleaning programs with the participation of tourists and other interest parties in Arugam Bay.

2.1.6.9 Introducing eco-label programs and similar environment certificates for tourism related businesses and ventures in Arugam Bay (Project Code – EN-1-2-9)

It is proposed to introduce eco-label pro programs and similar environment certificates for tourism related businesses and ventures in Arugam Bay. It is recommended that Sri Lanka Tourism Development Authority may provide certificates or credits for hotels based on the usage of ecofriendly products, which can be helpful for the Eco eco-friendly product promotion within the area. Based on the eco-friendly product usage interested tourists also can be given the opportunity to earn credits or certificates.

Respecting the Heritage of Arugam Bay

Arugam Bay inherits a proud history and following are the reminiscence of its long antiquity.

Mudu Maha Viharaya -
Kudhakali Ruins -
Darampanawa Ruins -
Sengamuwa Ruins -
Kotavehera Arch.Site -
Namaluwa -
Habassa Ruins -
Sangamankanda Ruins -
Kudumbigala Monastry -
Okanda Hindu Temple -
Sangaman Kanda Point -
Neelagiriseya -
Tharulengala -
Magul Maha Viharaya -

We believe that these monuments reflect the past glory of Arugam Bay and Panampattuwa and we do our best to conserve them for our future generations.

2.2 Heritage Conservation Strategies (Project Code – EN-2)

Heritage Conservation Strategies focus on two categories of heritage; tangible and intangible, whereas tangible heritage refers to physical archeological monuments and ruins and intangible heritage refers to traditional customs, cultural events, folk art, traditional food, traditional architecture and farming practices etc.

Cultural Heritage

Intangible Heritage

- Handicrafts and visual arts demonstrating Traditional craftsmanship
- Gastronomy and culinary practices
- Social practices, rituals & festive events
- Music and the performing arts
- Knowledge and practices concerning nature and the universe

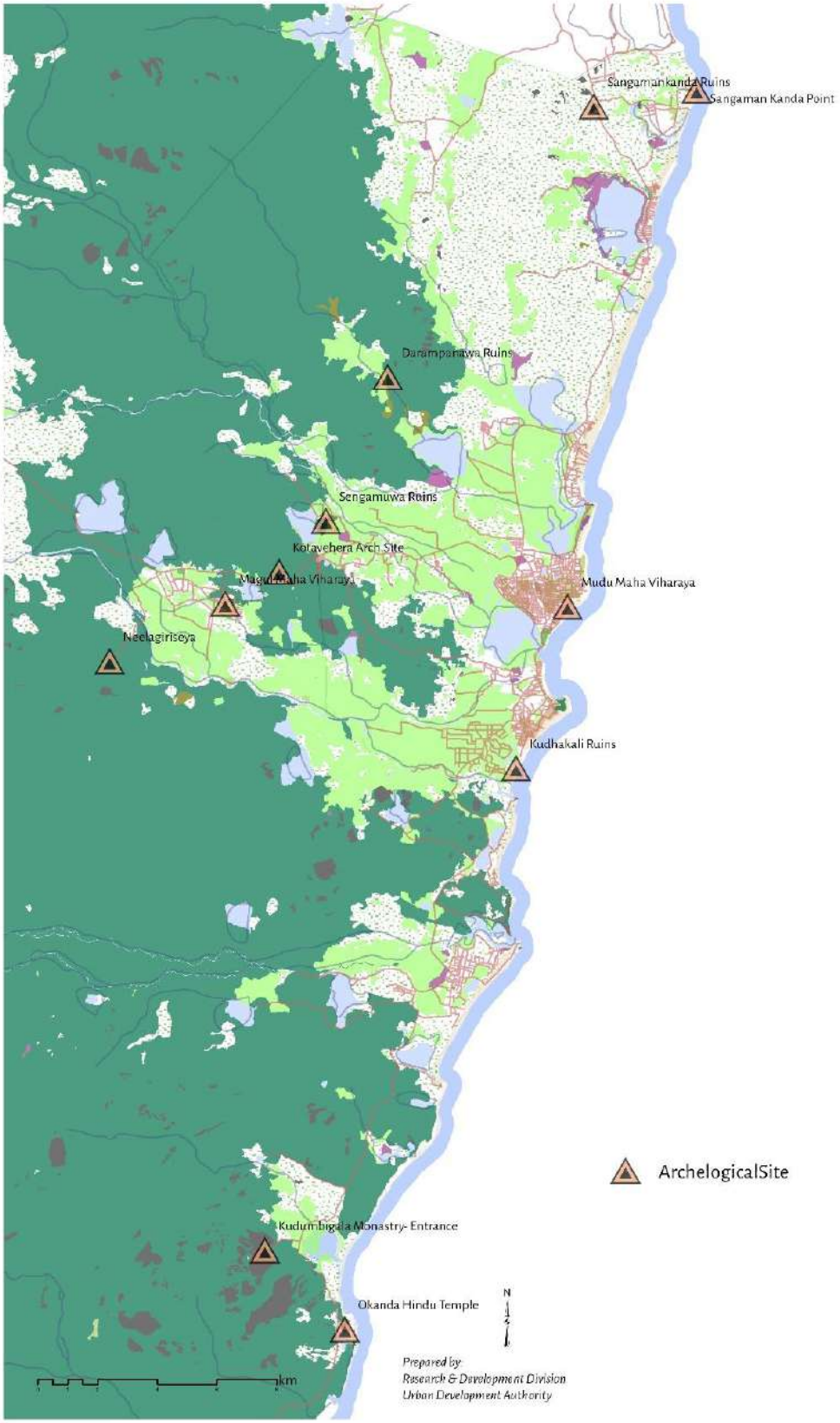
Tangible Heritage

- Declared Archeological sites



Tangible Heritage

2.2.1 Designating 13 no. of archeological sites and monuments in Arugam Bay as special conservation sites/ monuments



Map 5: Designated 14 no. of archeological sites/ monuments in Arugam Bay

No	Site Name	Location	Grama Niladari Division	Registered Date	Description
1	Mudu Maha Viharaya	Pothuvil	Pothuvil		
2	Kudhakali Ruins	Kudakele	Sinnaulla	10 October 2014	Rock boulder called Kudakalli with ancient buildings and stairways situated near Kudakalli lagoon (latitude 06° 49' 11 N and longitude 081° 49' 22.3 E)
3	Darampanawa Ruins	Darampanawa	Pothuvil	10 October 2014	Darampanawa archaeological site with pre historic art, cave inscriptions and all the drip edged caves, ruins of buildings, hillock covering chaitya, ponds and other archaeological evidence (latitude 06° 56' 10 *N and longitude* 081° 47' 09 E)
4	Sengamuwa Ruins	Sengamuwa	Victor estate	10 October 2014	Rock plain with stairways, signs of chisel holing and other archaeological evidences (latitude 6° 53' 37 *N and longitude 81° 46 00' E)*
5	Kotavehera Arch.Site	Thambiluwil	Thambiluwil	10 October 2014	Hillock covering Chaitya and Rock plain with evidences of stairway and building ruins
6	Namaluwa	Muwangala	Muwangala	10 October 2014	Sites with ruins of buildings with ancient stone pillars and other archaeological evidences in the part "Grama 02" (latitude 07° 26221' N and longitude 081° 66587' E)

7	Sangamankanda Ruins	Sambunagar	Addalachchenei	10 October 2014	Hillock covering ancient Chaithya
8	Kudumbigala Monastry	Panama South	Lahugala	10 October 2014	
9	Okanda Hindu Temple	Okanda		31 December 1999	Rock with archaeological evidences at Okanda Dewalaya premises (latitude 06° 65089′ N and longitude 081° 72000′ E)
10	Sangaman Kanda Point	Sangaman Kanda	Sangaman Kanda	10 October 2014	Rock plain with ruins of buildings near Sangaman Kanda Kattupillayar Kovil
11	Neelagiriseya	Perani Lahugala	Lahugala	10 October 2014	Neelagiri dagaba and the adjoining premises with buildings with stone pillars in inscriptions and sites with archaeological ruins, cave complex with cave inscriptions and pre historical arts
12	Tharulengala	Hulannuge	Hulannuge	26 December 2014	Karandahela amountain range with cave inscriptions of Tharulengala Aranya Senasana, cave complex with ancient art and drip ledged caves, building site with stone pillars, inscriptions, hillock covering dagoba and stairways and other archaeological evidences (latitude 06° 92763′ N and longitude 081° 65491′ E)
13	Magul Maha Viharaya	Lahugala	Lahugala	26 March 1954	

**NOTE – The boundaries and reservation areas of each archeological site or monument will be enacted as defined by the Archeological Department of Sri Lanka.*

Table 6: Designated 14 no. of archeological sites/ monuments in Arugam Bay

Source: Explore Ampara – A Comprehensive Guide, Ministry of Economic Development

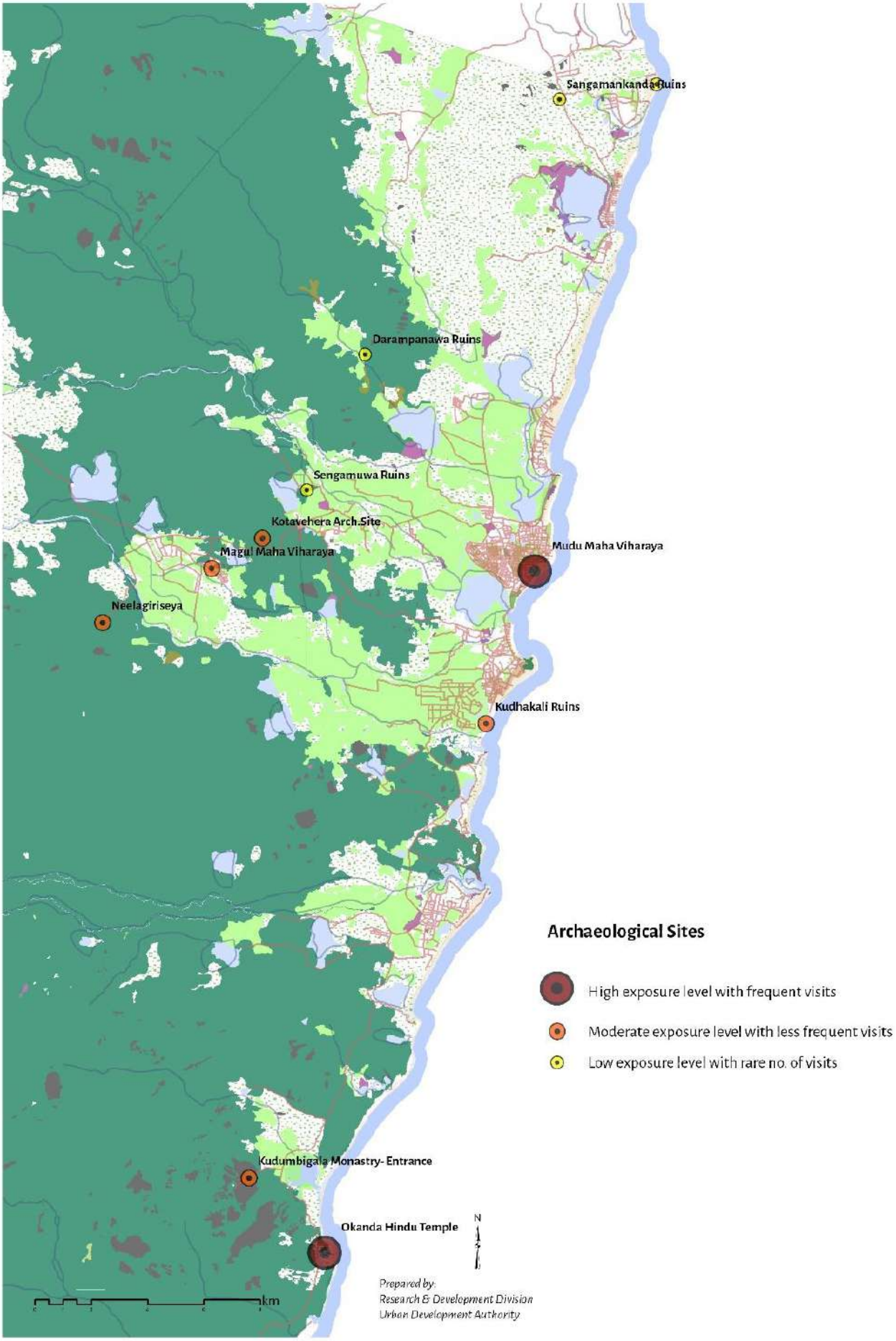
2.2.2 Applying suitable conservation measures and techniques at each archeological site in collaboration with the Department of Archeology (Project Code – EN-2-1)

It is recommended to conduct Archeological Impact Assessment (AIA) for any developments carried out at archeological sites exceeding the extent of 0.025 ha under the supervision of Archeological Department.

2.2.3 Promoting and facilitating identified archeological sites as tourism attractions of three different exposure levels (Project Code – EN-2-2)

Category	Character	Archeological Sites
Category 01	High exposure level with frequent visits	Magul maha Viharaya, Okanda Hindu Temple
Category 02	Moderate exposure level with less frequent visits	Kudhakali RuinsKotavehera Arch.Site, Kudumbigala Monastry-Entrance, Neelagiriseya, Tharulengala, Magul Maha Viharaya
Category 03	Low exposure level with rare no. of visits	Darampanawa RuinsSengamuwa Ruins , Namaluwa, Sangamankanda Ruins, Sangaman Kanda Point

Table 7: Different exposure levels of archeological sites in Arugam Bay



Map 6: Different exposure levels of archeological sites in Arugam Bay

a) Facilitating Category 01 archeological attraction sites (Project Code – EN-2-2-1)

1. Providing washroom complexes, drinking water facilities and other required facilities at each site
2. Providing parking spaces with required capacity (Reference: Section 4.2.1)
3. Landscaping the surrounding and providing seating areas
4. Displaying designed information boards elaborating the importance and historical details of the site/ monument (Project Code – TP-2-2-2-1/ Section 3.2.2.2)
5. Improving the accessibility to the sites and maintaining defined access ways (Reference: Section 4.2.1)
6. Facilitating and providing spaces for local vendors

b) Facilitating Category 02 archeological sites (Project Code – EN-2-2-2)

1. Providing washroom complexes, drinking water facilities, parking spaces and other required facilities at a considerable distance from the archeological site
2. Providing parking spaces with required capacity. (Reference: Section 4.2.1)
3. Improving the accessibility from the main road to the parking space and maintaining a walking trail from the parking space to the attraction site (Reference: Section 4.2.1)
4. Displaying information boards without being visual disturbances (Project Code – TP-2-2-2-2/ Section 3.2.2.2)

c) Facilitating Category 03 archeological sites (Project Code – EN-2-2-3)

1. Defining the access way towards the archeological site and maintaining it as a jeep/ cart trail (safari trail) within the forest
2. Maintaining sign boards (blending with nature) through the trail to guide tourists (Project Code – TP-2-2-2-3/ Section 3.2.2.2)
3. Enhancing the security of the site and safari trail by erecting elephant defense lines and other appropriate security measures

Intangible Heritage

2.2.4 Conservation of identified intangible heritage in Arugam Bay and promoting them among tourists by creating a platform to share local heritage and cultural values (Project Code – EN-2-3)

Remaining as the last village in the east coast of Sri Lanka, Panama and the Panampattuwa region inherit different types of intangible heritage unique to the locality. In addition, a variety of Sri Lankan village traditional customs and practices also exist in Panampattuwa. In a context where unpolluted villages such as Panama are progressively becoming rare, it is important to conserve such intangible heritages for the future generations and create an opportunity to experience it by a larger audience.

Below mentioned are the different types of intangible heritages to be conserved in Arugam Bay Tourism Area.

- Handicrafts and visual arts that demonstrate traditional craftsmanship
- Gastronomy and culinary practices
- Social practices, rituals and festive events
- Music and the performing arts
- Knowledge and practices concerning nature and the universe
- Handicrafts and visual arts that demonstrate traditional craftsmanship

Types of crafts in Sri Lanka

- Art & Sculpture traditional
- Lacquer and Sesath
- Batik
- Mask and Muppet
- Cane and Bamboo
- Metal based crafts
- Carving Masks
- Miscellaneous Handicrafts
- Clay Work
- Musical Instruments
- Coconut kithul, palmyrah based crafts
- Stone Based Handicrafts
- Fiber, Leaf and grass work
- Textile and Textile based crafts
- Jewellery
- Wooden Based Handicrafts
- Lace
- Leather items

- Unique food items in Sri Lanka
  - *Main Dishes* *Rice and Curry*
    Kiribath
    Koththu
    Hoppers
    String Hoppers
    Lamprais
    Pittu
    Roti
  - *Sweets*
  - *Short eats*
  - *Beverages*

- Social practices, rituals and festive events
  - *Seasonal ceremonies - Okanda Devalaya Festival*
  - *Family Ceremonies - Wedding , Arams Giving*
  - *Holidays and festivals - Wesak. Deepavali*

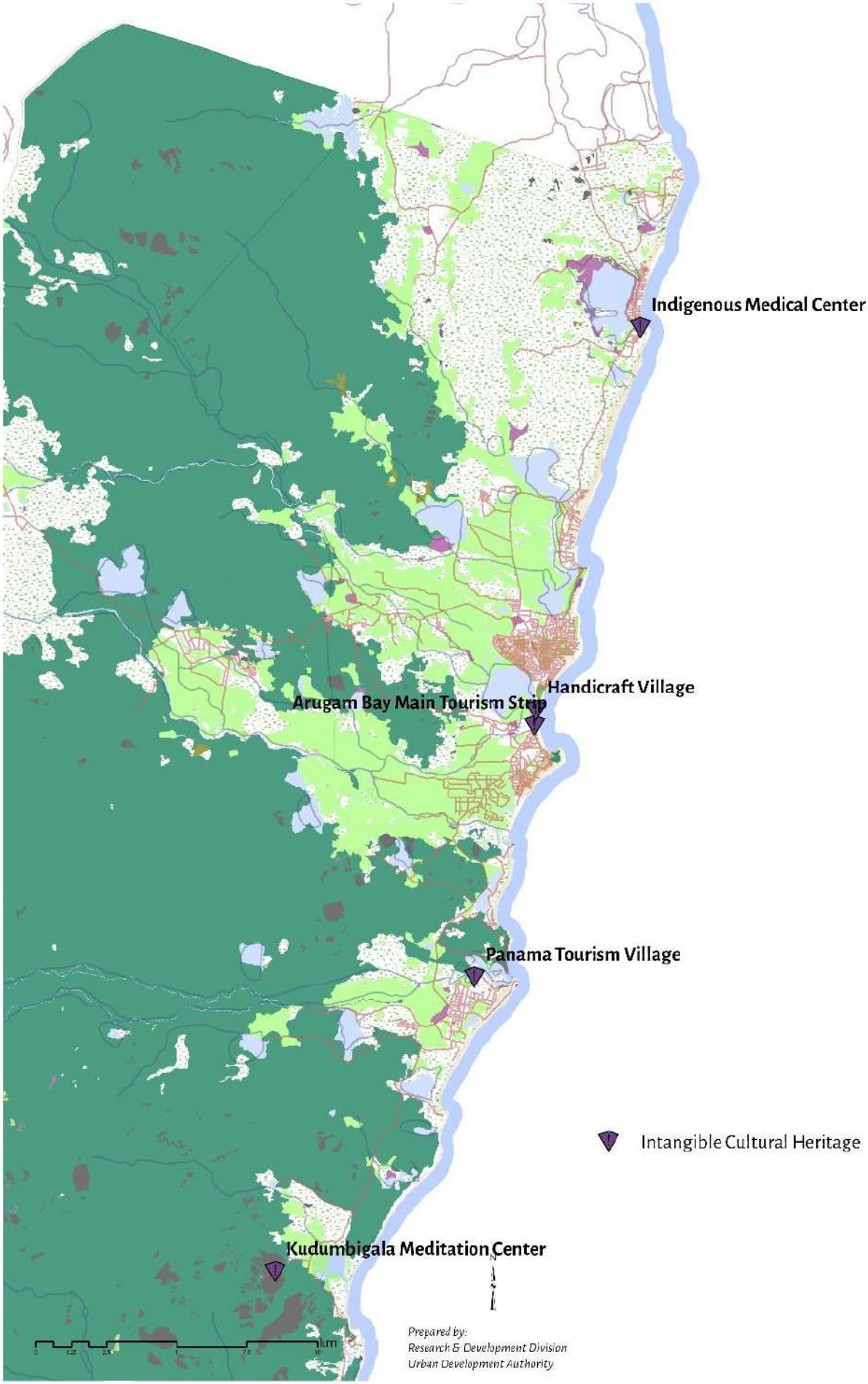
- Music and the performing arts
  - *Folk Music & Dance*
  - *Traditional Music & Dance*
  - *Nadagam, Street Drama*
  - *Kolam and other folk theatrical events*

- Knowledge and practices concerning nature and the universe
  - *Meditation*
  - *Traditional medicine*
  - *Cultural & spiritual events such as shanthikarma*

A. Promote five (05) number of places as special experience points of local intangible heritages.

	Experience Point	Type of Intangible Heritage	Project Code
1	Panama Tourism Village	Handicrafts and visual arts & Gastronomy and culinary practices	TP-1-4-1
2	Arugam Bay Main Tourism Strip	Music and the performing arts & Gastronomy and culinary practices	TP-1-1-5
3	Handicraft Village	Handicrafts and visual arts	TP-1-1-1-3
4	Indigenous Medical Center	Oral traditions and expressions & Knowledge and practices concerning nature	EN-2-3-1
5	Kudumbigala Meditation Center	Knowledge and practices concerning nature	EN-2-3-2

Table 8: Experience points of local intangible heritage



Map 7: Experience points of local intangible heritage

i. Panama Tourism Village (Project Code – TP-1-4-1)

Panama Tourism Village is one of the major initiative to conserve and promote local village culture among tourists. At Panama Tourism Village, a tourist is given the opportunity to live the life of a typical village man and experience local culture and traditions.

Panama Tourism Village Project will be elaborated in section 3.1.4.1 under Tourism Promotion Strategy.

ii. Arugam Bay Main Tourism Strip (Project Code – TP-1-1-5)

Arugam Bay Main Tourism Strip will be promoted as another local culture experience point. It will be a main platform to experience the local foods and food practices including cooking methods and to attend cooking classes. Mainly, the alleyways connecting the Main Street and the beach will be promoted for this special street food experience.

It is proposed to implement this program mainly as a special tourism promotion program by the Sri Lanka Tourism Development Authority in collaboration with Agriculture Department and Sri Lanka Hotel Corporation.

Further, it is envisaged that these food streets will also be a platform to promote local music, street dancing and street drama and it is proposed to link the cultural centres and groups within the area with the proposed program.






iii. Handicraft Village (Project Code – TP-1-1-1-3)

Handicraft Village proposed at the Arugam Bay Main Bridge will be one of the major experience points to share the local traditional craftsmanship and visual arts.

Handicraft Village Project will be elaborated in section 3.1.1.1 (d) under Tourism Promotion Strategy.

iv. Indigenous Medical Center at Komari (Project Code – EN-2-3-1)

It is proposed to establish an Indigenous Medical Centre at the Komari tourism cluster as a special tourist attraction in the area. It is envisaged that this medical centre will be a luxury range service centre which suits the anticipated exclusive character of Komari Tourism cluster. It is proposed to make this place also an exhibition centre of the indigenous medicine unique to Sri Lanka and to grant the management and monitoring responsibilities of this place to the Department of Ayurveda.


v. Kudumbigala Meditation Center (Project Code – EN-2-3-2)

A Meditation Centre is proposed to be establish at a suitable location hidden within the Kudumbigala Sanctuary. The intention of this meditation centre is to promote the mysteriousness tourism cluster at Panagala & Okanda. Through this meditation centre the tourists are given the opportunity to reach their spiritual expectations amidst the calm forest environment. It is recommended that this meditation centre to be implemented and managed by a qualified meditation and yoga instructors under the supervision of relevant regulatory bodies.



B. Adopting appropriate marketing tools and collaborating with relevant agencies for promotion of different types of intangible heritages.

Type of Intangible Heritage	Promoting Items	Locations	Marketing Tools	Collaborating Agencies
Handicrafts and visual arts that demonstrate traditional craftsmanship	As mentioned in Section 2.2.4	Panama Tourism Village Handicraft Village	Craft Exhibition Centre, E-commerce	Small Industries Department, Laksala, The National Crafts Council (NCC), National Design Centre, and the Sri Lanka Handicrafts Board
Gastronomy and culinary practices	As mentioned in Section 2.2.4	Panama Tourism Village Handicraft Village	Traditional Restaurant, Food Walk, Fruit Tasting Tour With Market Visit, Cooking Class Sri Lanka With Market Visit, Sri Lankan Baking Experience	Local Authorities', Agriculture Department Sri Lanka, Sri Lanka Hotel Corporation, Sri Lanka Tourism Development Authority
Social practices, rituals and festive events		Panama Tourism Village Okanda Dewalaya Handicraft Village	Festival/ event marketing	Subject Ministries of Religious and cultural affairs, Sri Lanka Hotel Corporation
Music and the performing arts	Folk Music & Dance, Traditional Music & Dance, Nadagam, Street Drama, Kolam and other folk theatrical events	Panama Tourism Village Handicraft Village	Traditional Performing Art Centers & Cultural Centres	Subject Ministries of Religious and cultural affairs, Town Hall Association, Folk Music & Cultural Groups

Knowledge and practices concerning nature and the universe	Meditation, traditional medicine, cultural & spiritual events such as shanthikarma	Kudumbigala Meditation Center Panama Tourism Village Handicraft Village	Ayurveda Hospitals, Spa, Meditation Camps	Subject Ministries of Religious and cultural affairs, Subject Ministry of Ayurveda Medicine

Table 9: Different types intangible heritages and marketing tools

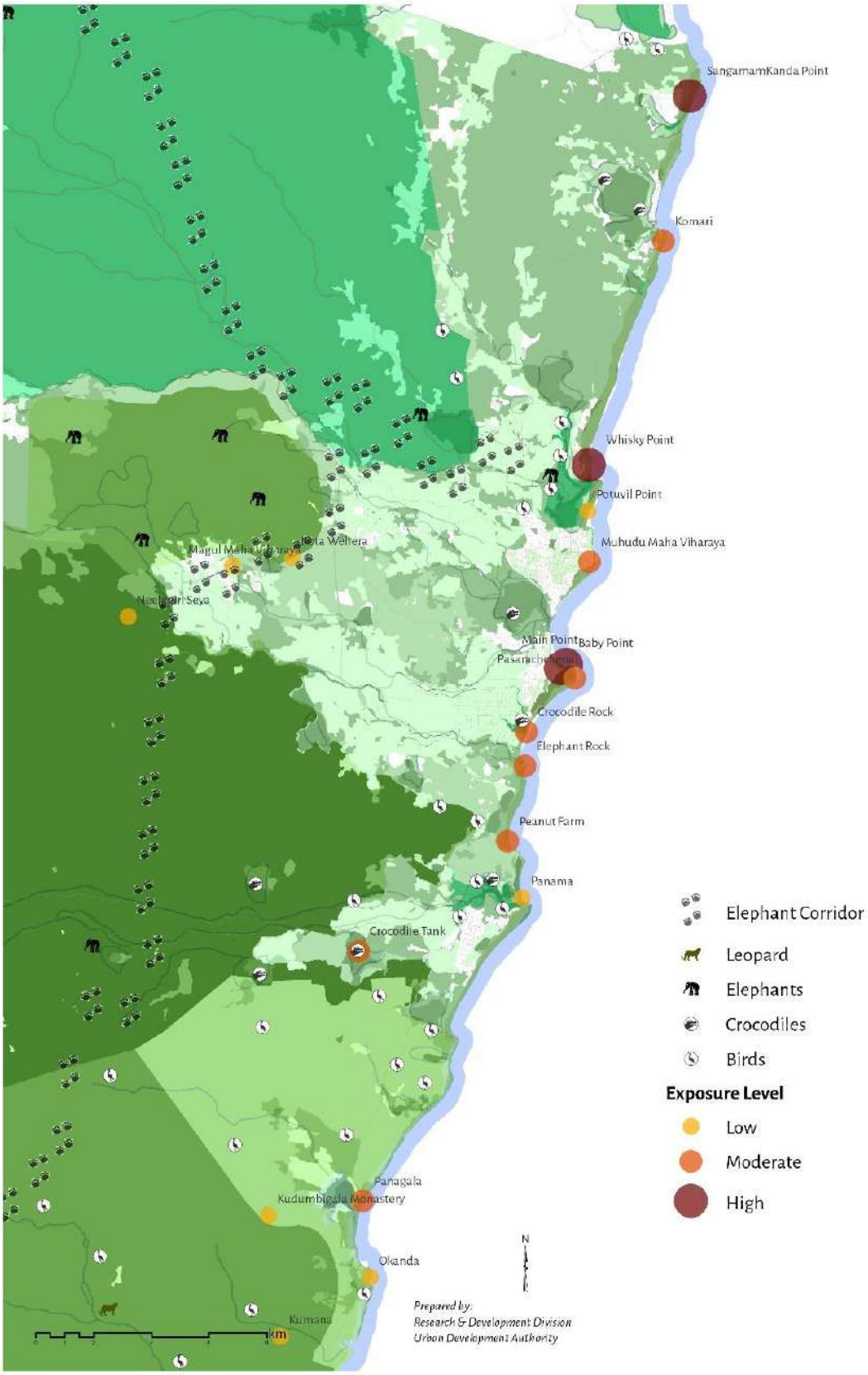
Caring for Wildlife of Arugam Bay

Arugam Bay is originally a sanctuary of wild animals thus they are the real inheritors of this mystery land. There are a variety of both endemic and non-endemic animal and bird species and among them, elephants, crocodiles and peacocks are frequent within the area.

We believe that Arugam Bay is their home and that both you and we are just visitors who should respect their lifestyles and territory.

2.3 Wildlife Protection Strategies (Project Code – EN-3)

2.3.1 Maintaining a low exposure level at tourism attraction sites located within and in close proximity to identified elephant corridors and other wildlife & bird frequent areas



Map 8: Identified elephant corridors and other wildlife & bird frequent areas

Exposure Level	Tourist Attraction Site
Low	Kumana National Park Lahugala National Park Okanda Kudumbigala Monastry Magul Maha Viharaya Neelagiri Seya Kora Wehera Pottuvil Lagoon
Moderate	Komari Peanut Farm Elephant Rock Crocodile Rock Pasalachenai Muhudu Maha Viharaya Panagala Crocodile Tank Panama
High	Sangamam Kanda Point Whiskey Point Main Point/ Baby Point

Table 10: Different exposure levels of tourist attractions with reference to wildlife frequent areas

2.3.2 Introducing special guidelines for developments adjacent to or in close proximity to elephant corridors or wildlife & bird frequent areas

A. Natural Fencing Mechanism for developments adjacent to elephant corridors and wildlife frequent areas ("Tree Canopy & understory")

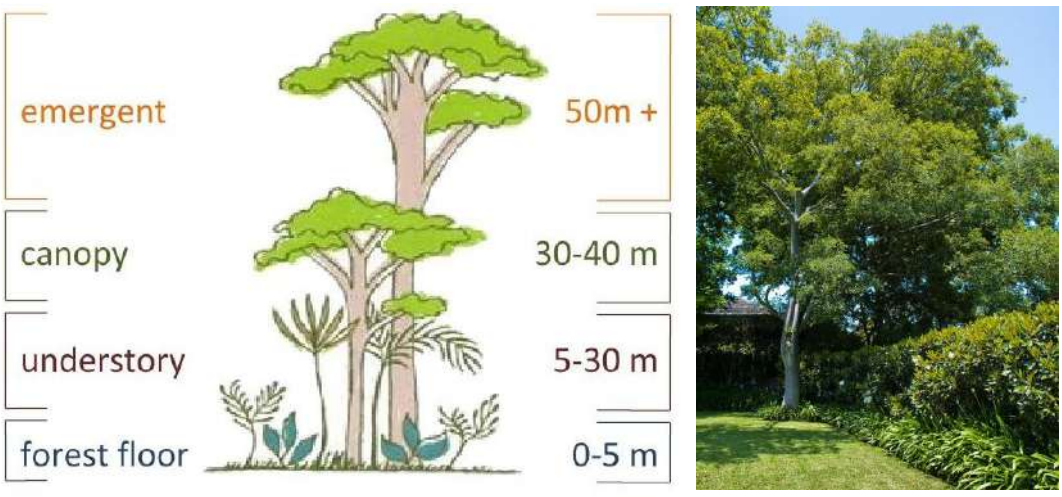


Figure 2: Recommended canopy heights for natural fences along elephant corridors

B. Designating a part of development plots as wild or bird life friendly
    - Provide nesting sites
    - Use indigenous plants in landscaping wherever possible.
    - Maintain existing fresh water resources as drinking areas for birds and wildlife and provide new ponds/ drinking areas.
    - Manage litter, and especially food waste and plastic bags, with care

2.3.3 Displaying sign boards and maps to aware tourists about the existence of different wildlife and bird species (Project Code – EN-3-1)

- Information to be displayed/ disseminated through the display boards and information centers.

    - Type of wildlife and birdlife available
    - Information on available species

- Making aware of the uncommon species of the region by using eco-friendly materials.
  Ex: timber billboards maps peacock
- Risk Awareness on deadly creatures where there is a threat using symbols and billboards.

Disaster Resilient Arugam Bay

Arugam Bay is located in a relatively low risk area, however we have ensured that Arugam Bay will be resilient in a case of potential disaster risk.

In case of tsunami, we have identified evacuation routes to reach the safe places and we request you to be informed about them and follow the special evacuation sign system to reach a safe place in a possible tsunami event.

2.4 Disaster Management Strategies (Project Code – EN-4)

2.4.1 Tsunami Disaster Management Strategies (EN-4-1)

A. Identification of evacuation centers and arranging and facilitating them to accommodate a large crowd of people in case of Tsunami disaster (Project Code – EN-4-1-1)

Two types of Evacuation Centers are identified within Arugam Bay Tourism Area namely;

- Immediate Relief Evacuation Centers
- Distantly located Evacuation Centers

The above two types of evacuation centers were identified considering the following criteria.

- The topography of the area (contour lines)
- Tsunami hazard risk level (previous Tsunami wave heights)
- Total number of residents and visitors in the area
- Number of vulnerable populations and their sizes
- Age and construction type of the building stock
- Wave heights, length and distribution pattern of 2004 tsunami

The two types of evacuation centers will be facilitated as mentioned below.

I. Immediate Relief Evacuation Centers

Immediate Relief Evacuation Centers will be constructed as multi storied buildings and towers with rooftops designed as helipads for immediate evacuation of people in a possible Tsunami situation. These relief buildings are proposed to be multi-purpose buildings where ground and first stories can be allocated for public and commercial uses. The height of the towers will be determined based on simulated wave heights as recommended by the Disaster Management Centre. Following facilities will be provided at all proposed Immediate Relief Evacuation centers.

- First aid & emergency medical assistance equipment.
- Drinking water and washroom facilities.

II. Distantly located Evacuation centers

Distantly located Evacuation centers will be designed to accommodate a large crowd of people for a longer period. Following facilities will be provided at all proposed distantly located Evacuation centers.

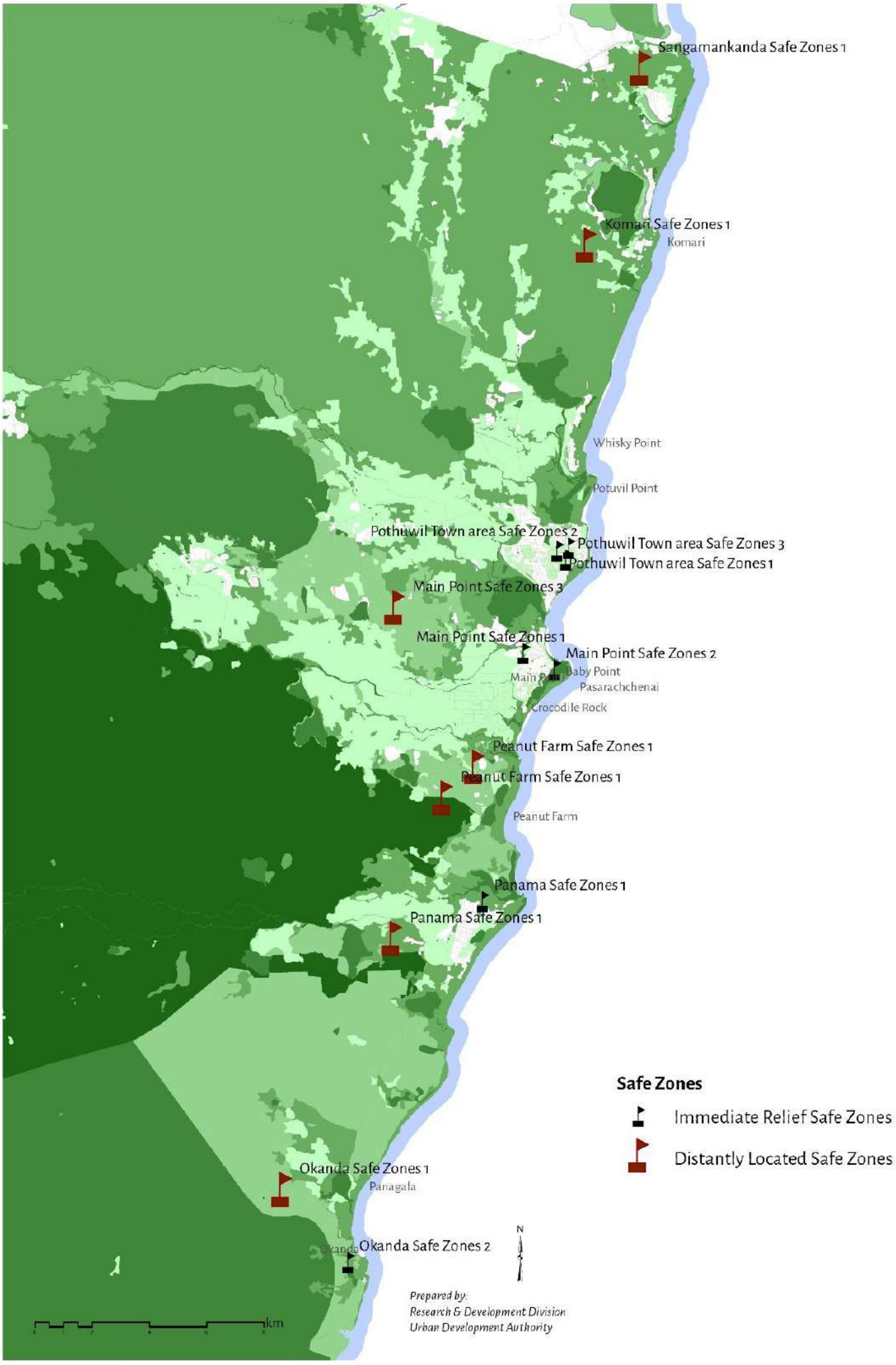
- First aid & emergency medical assistance equipment
- Drinking water and washroom facilities
- Tents, sleeping bags etc.

Id	Name	Level	Distance from the coastal line/ (km)	Location height from MSL/ (m)	Responsible agency for maintenance
1	Panama Safe Zones 1	Immediate Relief Safe Zones	1	20	Disaster Management Centers & Local Authority
2	Main Point Safe Zones 1	Immediate Relief Safe Zones	1.8	10	Disaster Management Centers & Local Authority
3	Pothuwil Town area Safe Zones 1	Immediate Relief Safe Zones	1.2	10	Disaster Management Centers & Local Authority
4	Pothuwil Town area Safe Zones 2	Immediate Relief Safe Zones	0.7	10	Disaster Management Centers & Local Authority
5	Pothuwil Town area Safe Zones 3	Immediate Relief Safe Zones	0.7	10	Disaster Management Centers & Local Authority
6	Okanda Safe Zones 2	Immediate Relief Safe Zones	0.6	10	Disaster Management Centers & Local Authority
7	Main Point Safe Zones 2	Immediate Relief Safe Zones	0.6	20	Disaster Management Centers & Local Authority
8	Peanut Farm Safe Zones 1	Distantly Located Safe Zones	1.2	25	Disaster Management Centers & Local Authority
9	Komari Safe Zones 1	Distantly Located Safe Zones	1.6	10	Disaster Management Centers & Local Authority
10	Sangamankanda Safe Zones 1	Distantly Located Safe Zones	1.5	20	Disaster Management Centers & Local Authority

11	Okanda Safe Zones 1	Distantly Located Safe Zones	2.4	5	Disaster Management Centers & Local Authority
12	Panama Safe Zones 1	Distantly Located Safe Zones	2.8	15	Disaster Management Centers & Local Authority
13	Peanut Farm Safe Zones 1	Distantly Located Safe Zones	2.1	25	Disaster Management Centers & Local Authority
14	Main Point Safe Zones 3	Distantly Located Safe Zones	5.5	35	Disaster Management Centers & Local Authority

*NOTE - Distance is measured from the vegetation line of the coast

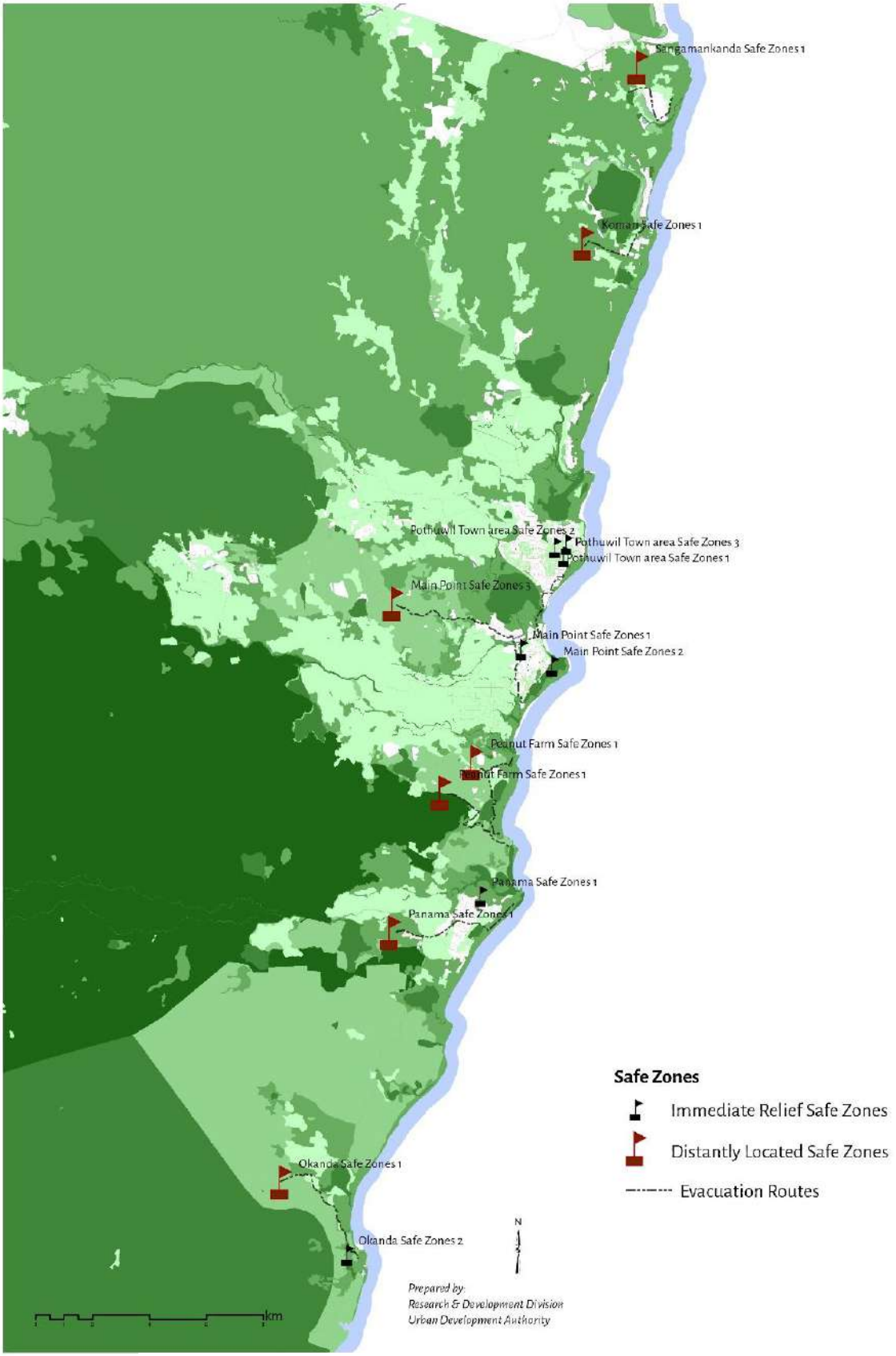
Table 11: Identified tsunami evacuation centres in Arugam Bay



Map 9: Identified tsunami evacuation centres in Arugam Bay

B. Identification of evacuation routes which lead to selected evacuation centres and installing navigation signs to direct the crowd in case of tsunami disaster (Project Code – EN-4-1-2)

The tsunami evacuation routes have been identified considering the connectivity of proposed road network of Arugam Bay Tourism Area.



Map 10: Identified tsunami evacuation routes in Arugam Bay

C. Re-strengthening/ Introducing Tsunami Warning System in collaboration with the DMC. (Project Code – EN-4-1-3)
D. Introducing tsunami resilient building codes for different types of buildings located in tsunami risk areas in collaboration with relevant agencies such as Construction Industry Development Authority, National Building Research Organization and Disaster Management Centre etc. (Project Code – EN-4-1-4)

Following risk reduction methods can be incorporated in developing tsunami resilient building codes.

a) Construct the buildings high enough above high tide and local inundation level
b) Install strong pillars or posts for the building
c) Design for static and dynamic water pressure on the structural and nonstructural walls
d) Consider Impact load of debris left by tsunami's attack
e) Apply proper Details and joints in the structure
f) Anchor buildings to foundations
g) Strengthen and reinforce existing buildings
h) Apply reinforced concrete or heavy steel structure rather than using wooden skeleton
i) Use Seawalls to protect the main structure of buildings
j) Select proper forms to resist a tsunami while not blocking it entirely
k) Provide adequate openings in the ground floor of buildings to allow the waves to pass through
l) Position bearing or structural walls perpendicular to water flow.
m) Refrain from having vital and important equipment and facilities on ground levels lower than the inundation level

E. Carrying out sand dune protection project in collaboration with Coast Conservation Department (Project Code – EN-4-1-5)

Sand dunes play a significant role in reducing the tsunami risk. There are 07 number of large sand dunes located within Arugam Bay Tourism Area and following conservatory measures are recommended to be applied based on applicability in collaboration with the Coast Conservation Department.

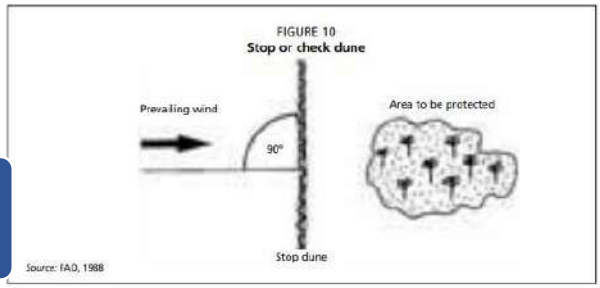
Recommended sand dune fixation techniques

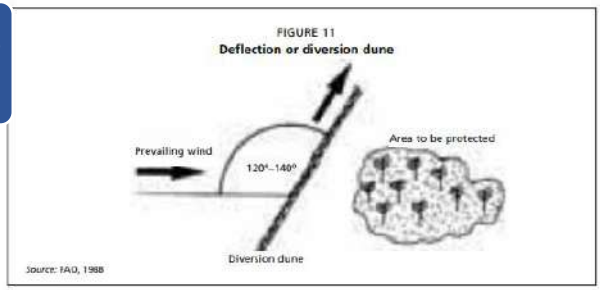
A. Option 01

Primary Fixation

Mulch or protective scree

Mechanical dune stabilization





Grid made of extruded polystyrene

B. Option 02

Biological Fixation

Planting techniques

**NOTE - The choice of species depends on climatic and ecological conditions. Species selected for planting should meet the special criteria*

2.4.2 Urban Flood Management Strategies (Project Code – EN-4-2)

2.4.2.1 Maintaining the natural stream order of Arugam Bay by connecting missing links of its natural drainage system (Project Code – EN-4-2-1)

2.4.2.2 Improving the storm water drainage system of the area (Project Code – EN-4-2-2)

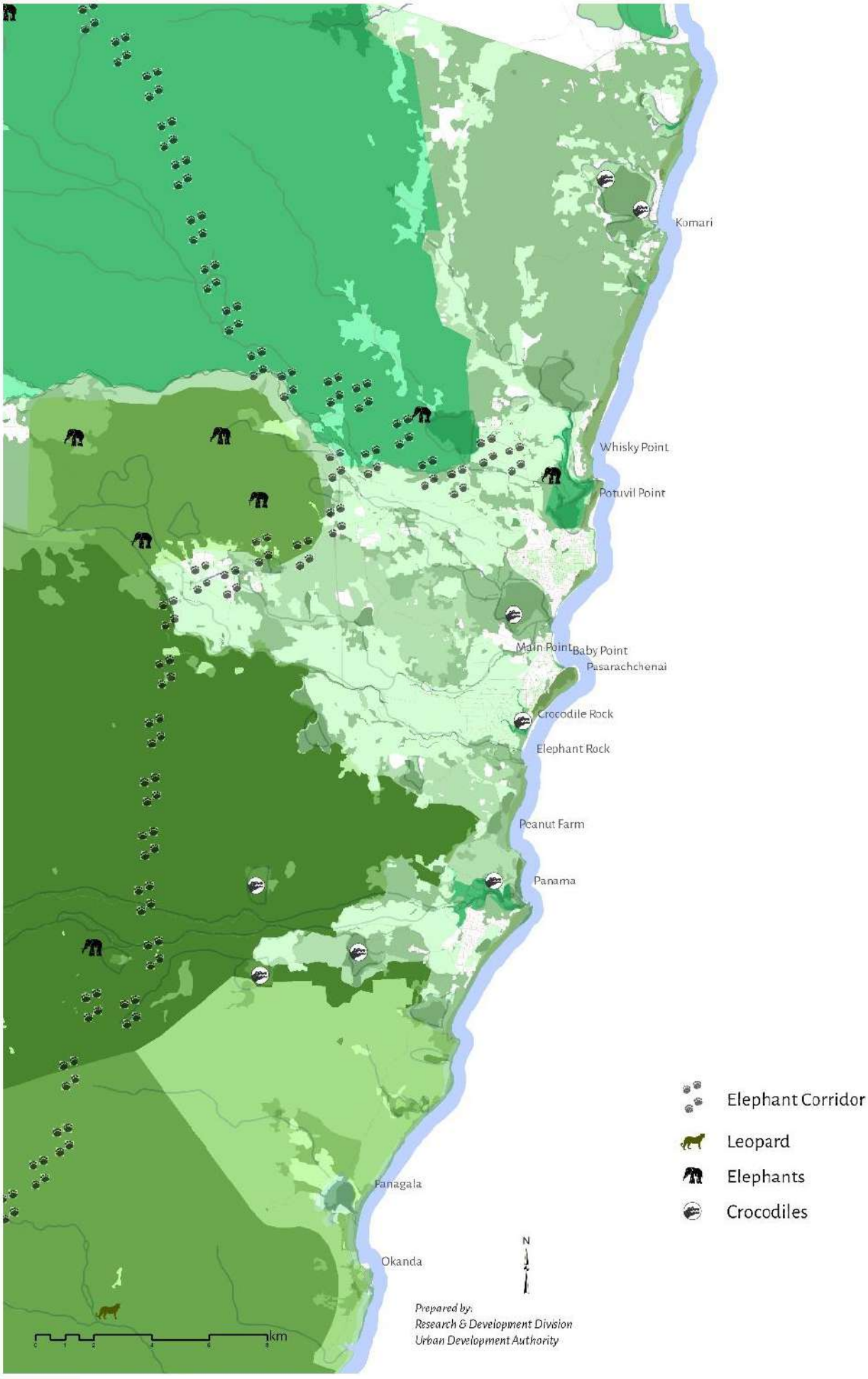
(a) Construction of open drains in local sub roads and alley ways

(b) Rehabilitation of natural retention ponds and lakes

2.4.3 Wildlife Attacks Management Strategies (Project Code – EN-4-2-3)

2.4.3.1 Identification of places vulnerable for wildlife attacks and carrying out an awareness program to aware tourists on danger points and their danger levels (Project Code – EN-4-2-3-1)

2.4.3.2 Erecting security fences along selected edges of elephant corridors which intersect with human activity zones (Project Code – EN-4-2-3-2)



Map 11: Places vulnerable for wildlife attacks

TOURISM PROMOTION STRATEGIES

'ENHANCING TOURISM ATTRACTION OF ARUGAM BAY'

Tourism Cluster Development Strategy -
Tourist Facilitation Strategies -
Tourism Activity Diversification Strategies -

Five Tourist Nests in Arugam Bay

Arugam Bay; the surfers' hidden paradise offers you a variety of accommodation choices to make your stay at Arugam Bay an unforgettable one. All these five accommodation choices are located along the coast of Arugam Bay, thus every one of them enable you to enjoy the warm waves and sea breeze.

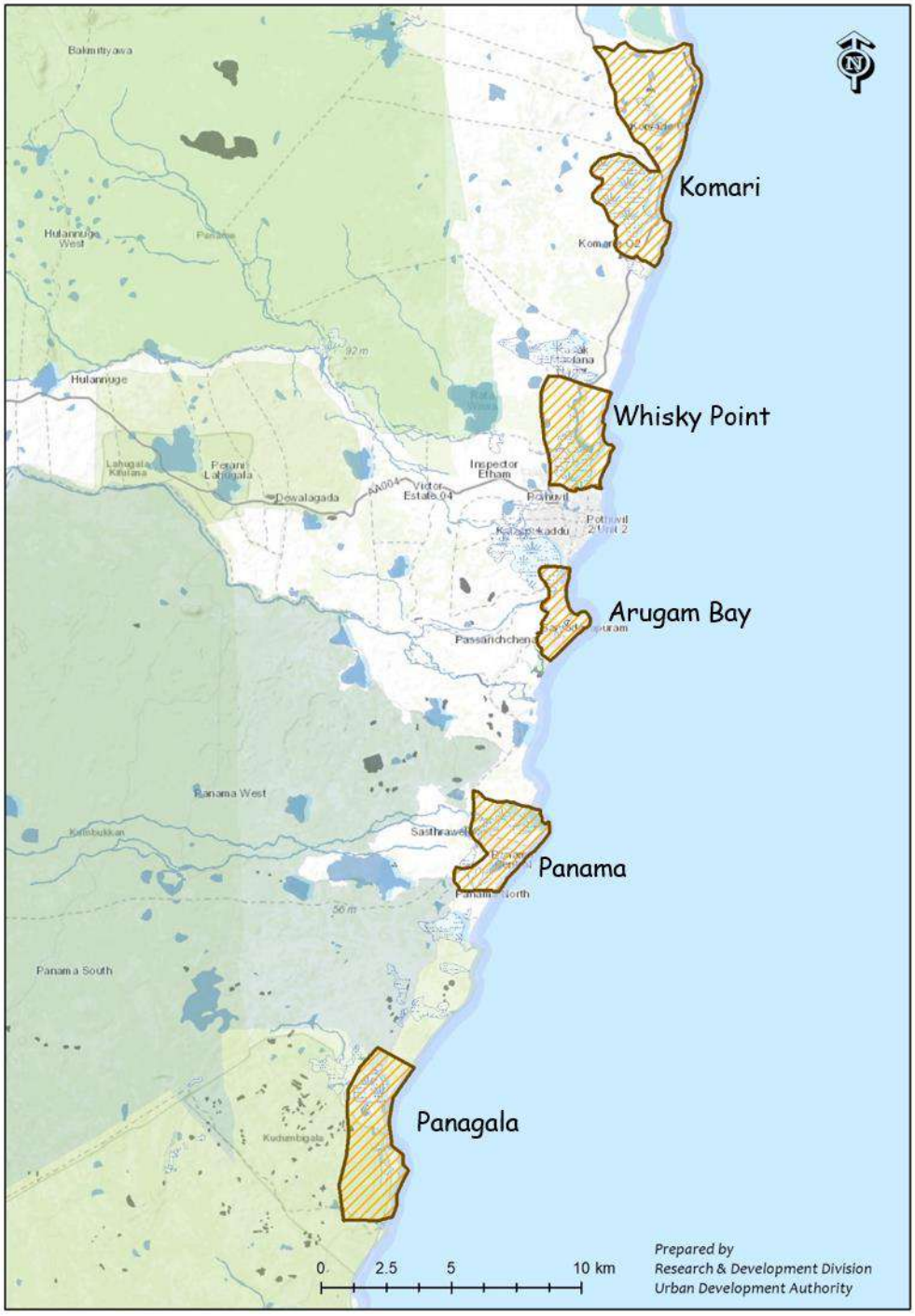
Arugam Bay; the main tourism strip is the most vibrant destination and it never is second to any of the other four destinations in terms of vibrancy, attraction and popularity for surfing and its unique bohemian ambience.

There are two corridors which extend southward and northward of Arugam Bay to Panama; the last village of east coast of Sri Lanka, and Komari; the north entrance gateway of Arugam Bay. Southward corridor is a mysterious corridor where the mysteriousness increases southwards making Panama and Okanda the most mysterious destination in Arugam Bay. Northward corridor is a deluxe corridor where the extravagance increases northwards making Komari the most extravagant destination in Arugam Bay.

There are two extravagant nests placed along the deluxe corridor namely Whiskey Point and Komari. Panama and Panagala & Okanda are the mysterious nests placed along the mysterious corridor.

3.1 Tourism Cluster Development Strategy (Project Code – TP-1)

Promoting Arugam Bay, Whiskey Point, Komari, Panama and Panagala & Okanda as five major destinations in Arugam Bay Tourism area.



Map 12: Proposed Five Tourism Clusters in Arugam Bay

Arugam Bay; the main tourism strip as the most sought & most vibrant destination

Arugam Bay; the main tourism strip is the pinnacle which reflects the vibrancy of Arugam Bay. This is the ideal nest for those who wish to surf at the Arugam Bay Main Point, Baby Point and Pasarichenai and who like to interact with large crowds of tourists while enjoying the special tourism ambience blended with surfing culture, bohemian character and vernacular architecture.

3.1.1 Promoting Arugam Bay as the most vibrant climax destination in Arugam Bay offering a variety of experiences and accommodation options (Project Code – TP-1-1)

Figure 3: The proposed layout of Arugam Bay Main Strip

3.1.1.1 Promoting Arugam Bay Bridge and the lagoon banks as a high functional tourist attraction serving as the grand entrance to Arugam Bay (Project Code – TP-1-1-1)

Figure 4: The proposed layout of Arugam Bay Bridge and the surrounding banks

a) ***Redesign of Arugam Bay bridge as to reflect the special surfing associated culture in Arugam Bay (Project Code – TP-1-1-1-1)***

Figure 5: An exemplary image of Lille langebro bridge, Copenhagen showing the recommended design improvement applicable for existing Arugam Bay Main Bridge

b) Redevelopment of the sea-plane landing deck and provide required facilities at the left bank of Pottuvil lagoon (Project Code – TP-1-1-1-2)
   - Providing direct access to the sea-plane landing deck from the main road

c) Establishing a mini tourist facilitation centre consisting with information centre (a sub-centre of the main information centres located at Lahugala and Komari), washrooms, refreshing areas, seating facilities and food/ snacks stalls (Project Code – TP-2-1-2)

d) Promoting a local handicraft village at the right bank of Arugam Bay lagoon close to the main road (Project Code – TP-1-1-1-3)
   - Construction of elevated (about 5-6 ft.) mud house huts and promoting them as the trade and exhibition stalls of the handicraft village

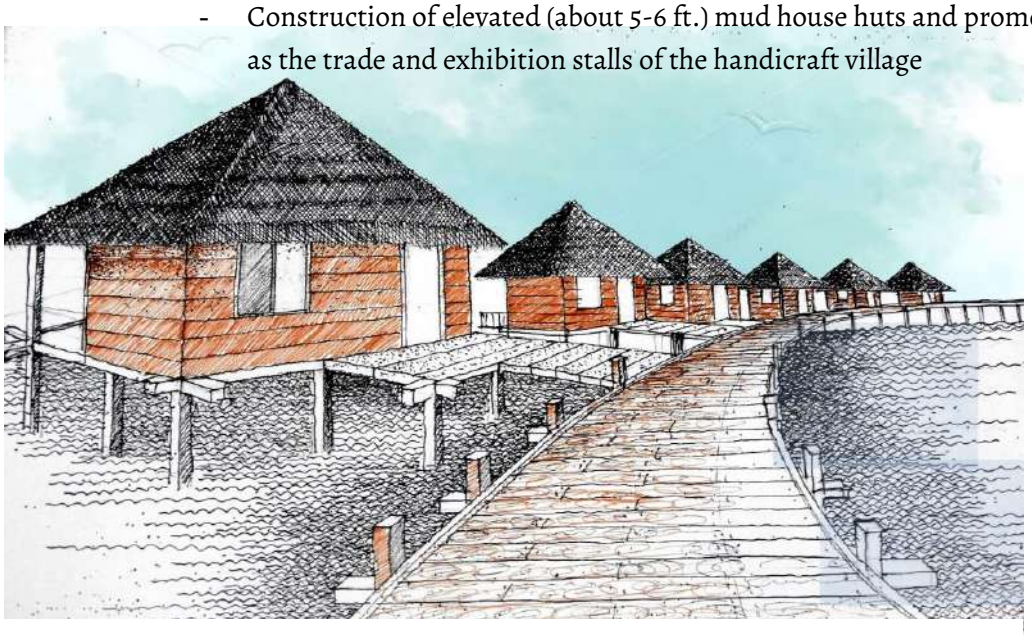


Figure 6: A conceptual image of recommended elevated mud house designs for the proposed Handicraft Village

- Landscaping and designing the entire handicraft village site as to reflect the village character of the area
- Providing on-site parking at the handicraft village premises
- Establishing a community based organization and a sustainable mechanism led by the community to run the handicraft village
- Providing the community with necessary technical expertise and training
- Providing required basic equipment and materials for the community engaged with the handicraft village
- Facilitating the handicraft with required basic amenities (access ways, wash-rooms, drinking water, electricity, waste management mechanism & etc.)
- Introducing loan facilities

Handicraft items which can be promoted

local timber crafts
arts & paintings
batik clothing products
recycling products (plastics, polythene and paper)
designed clothes
pottery items
jewelry made out of sea-shells and other natural items and etc.

Figure 7: Envisaged local craft promotional activities at the proposed Handicraft Village

e) Establishing a sub centre of proposed intra-city transportation program alongside the proposed handicraft village and parking area with provisions to hire motor – bikes, dirt – bikes, three wheels and bicycles (Project Code – TP-2-3-2/ Section 3.2.3)

f) Promoting the lagoon bank parallel to the main road as a sun set viewing gallery (Project Code – TP-1-1-1-4)
   - Placing wooden benches along the lagoon bank
   - Constructing a few snack huts at the sloped terrain in between the bridge and the lagoon bank

g) Promoting the right bank corner of the Arugam Bay lagoon as an experience point of lagoon fishing (Project Code – TP-1-1-1-5)
   - Promoting a selected stretch of lagoon bank as a launching deck for selected number of lagoon fishing boats
   - Establishing two/ three lagoon fishing huts at the sloped terrain in between the bridge and the lagoon bank to facilitate the fishermen and to store the equipment
   - Establishing a program for tourists to experience the lagoon fishing in collaboration with the local fishing community
     Providing required safety equipment
     Providing attractively designed non-motorized boats
     Providing required training for tourists handling

Figure 8: Promoting lagoon fishing tourism at Arugam Bay lagoon

3.1.1.2 Reorganizing Arugam Bay main tourism strip with urban design approach to make it the most vibrant destination of Arugam Bay (Project Code – TP-1-1-2)

a) Developing a 10.6 km length new by-pass road from Lahugala to Ulla in order to divert the heavy traffic in Arugam Bay Main Street (Project Code – TR-3-2/ Following Reference: Section 4.3.2 in Transport Development Strategy)

b) Promoting Arugam Bay Main Street as a pedestrian and non-motorized vehicle dominated street with 2.5 m non-motorized lane for pedestrians and cyclists at either side

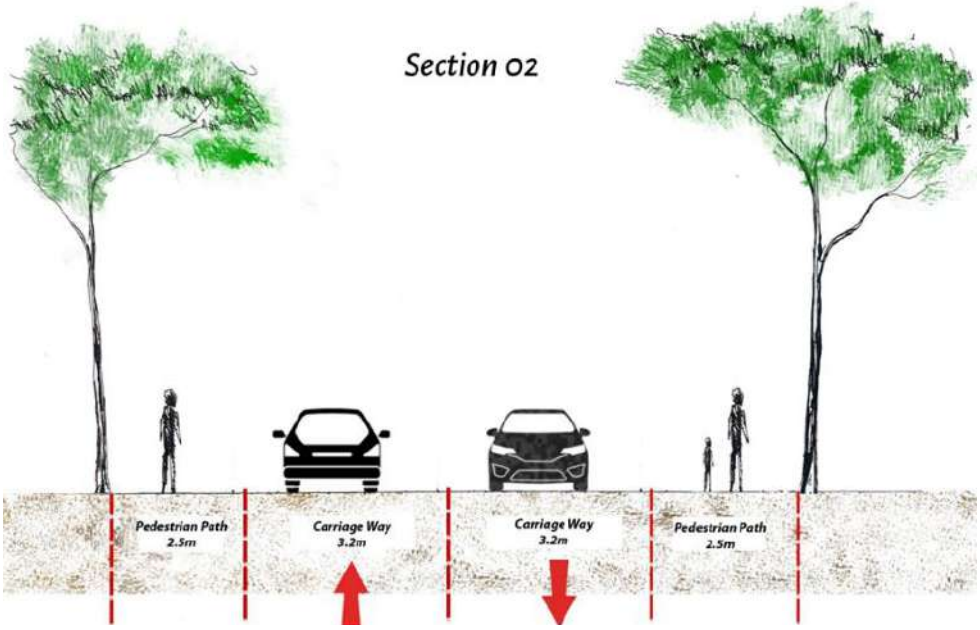


Figure 9: Proposed cross-section of the Arugam Bay Main Street as a pedestrian dominated street

c) Development of cross-roads connecting Arugam Bay main street and the proposed new by-pass road

d) Enhancing the attractiveness of the alley ways which connect the Arugam Bay main street with the beach by using deign interventions (Project Code – TP-1-1-2-1)

- Introducing different design and paintings for street paving
- Decorating the existing blind walls facing the alleyways with street arts & surf arts

Installing traditional street lighting at either side of alleyways

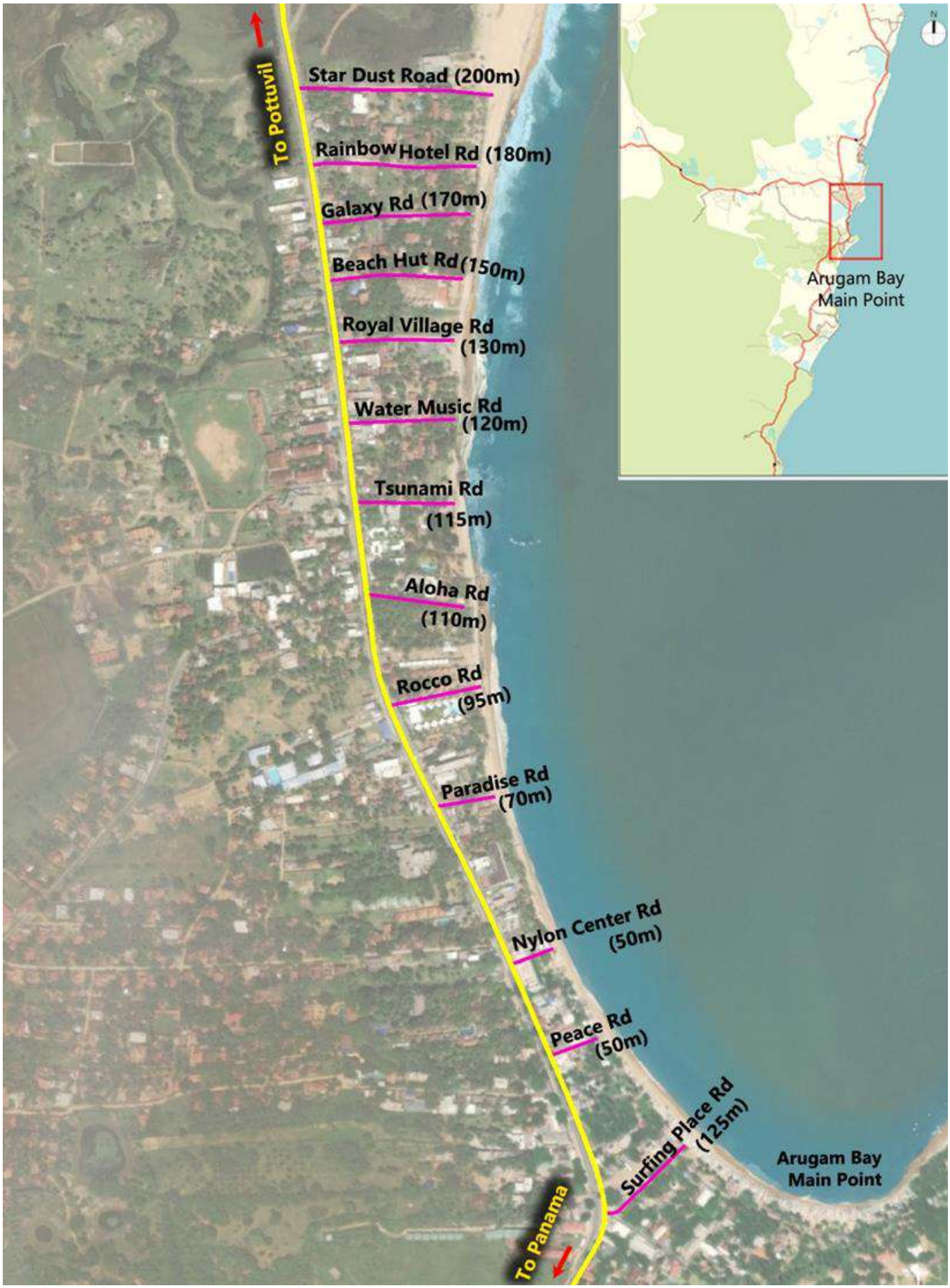


Figure 10: Alley ways connecting the Arugam Bay Main Street and the Beach

Figure 11: Anticipated character of alley ways connecting Arugam Bay Main Street with the beach

e) Redesigning the Arugam Bay main streetscape from the Arugam Bay Bridge to proposed Tourist Facilitation Centre close to Main Point as to promote its existing vernacular architectural bohemian character linked with surfing culture (Project Code – TP-1-1-2-2)

- Designing the Arugambay main street as a boulevard road
- Decorating the 2.5 m width pedestrian pathways with floor paintings at either side of the road
- Installing designed, smart, solar street lights
- Installing designed street furniture such as benches, litterbins, navigation signs, information display boards, bus stop shelters, which reflect the vernacular design character and bohemian tourism ambience blended with surfing culture
- Introducing street art boards at selected locations which can be used for surf art paintings by tourists

f) Conserving & Promoting existing vernacular architectural character unique to Arugam Bay main tourism strip through building codes & guidelines

I. Buildings facing the main street

No.	Guide Lines	Specifications
01	Building architecture and facade	Recommended to adapt features of local Vernacular Architecture (use of local materials, local technologies and workmanship of local people)
02	Other	- No digital flex allowed in the building façade or the front space - Only eco-friendly landscape materials are allowed - Site frontage should be lit during the night time* (recommended to have solar panels & other effective energy sources & technologies)

Night time*- the time between evening and morning; the time of darkness

Table 12: Recommended building codes & guidelines for Buildings facing the main street

II. Buildings facing/ accessible by alley ways connecting the main street and the beach

No.	Guide Lines	Specifications
02	Building line	1m from the edge of the alley way
03	Boundary walls	Only the Edging/ Border flower plants or Flowerly walls/fences* are allowed
04	Building architecture and facade	Recommended to adapt features of local Vernacular Architecture (use of local materials, local technologies and workmanship of local people)
05	Other	- No digital flex allowed in the building façade or the front space - Only eco-friendly landscape materials are allowed - Site frontage should be lit during the night time* (recommended to have solar panels & other effective energy sources & technologies)

Flowerly walls/ fences* - Walls or fences entirely covered or mounted by natural flower plants contributing to create flowerly alley ways.

Night time*- the time between evening and morning; the time of darkness

Table 13: Recommended building codes & guidelines for Buildings facing/ accessible by alley ways connecting the main street and the beach

III. Buildings facing the beach

No.	Guide Lines	Specifications
01	Maximum building height	6m
02	Building Limit from sea	Should maintain the Coastal reservation*
03	Boundary walls	Only the wooden fences are allowed
04	Building architecture and facade	-Recommended to have innovative enhancements of architectural features of a typical Sri Lankan beach hut - Recommended to use eco-friendly materials for the construction
05	Other	- No digital flex allowed in the building façade or the front space - Only eco-friendly landscape materials are allowed - Beach frontage of the site should be lit during the night time* (recommended to have solar panels & other effective energy sources & technologies)

Coastal reservation*- As per the Coast Conservation and Coastal Resource Management Act, No. 57 of 1981 as amended by the act, No. 49 of 2011

Night time*- the time between evening and morning; the time of darkness

Table 14: Recommended building codes & guidelines for Buildings facing the beach

3.1.1.3 Promoting Arugam Bay Main Point, Baby Point and Pasarichenai beach as the most functional chain of surfing points in Arugam Bay (Project Code – TP-1-1-3)

a) Providing following tourist facilities both at Main Point and Pasarichenai beach (Project Code – TP-1-1-3-1/ Following Reference: Section 3.1.1.5 –(a))
   - Locker rooms
   - Water refilling center
   - Coast guard towers
   - First-aid centres
   - Fresh water bathing facilities

b) Establishing a surfing facilitation centre along with surf board renting and repairing facilities and surf instructor consultation facilities to serve both Main Point and Pasarichenai beach (Project Code – TP-1-1-3-2)

c) Promoting Pasarichenai beach strip for surfing camps (Project Code – TP-1-1-3-3)

d) Connecting the four surfing points; Baby Point, Main Point, Pasarichenai Beach and Crocodile Point with an approximately 2.5km long and 2m wide wooden deck trail (Project Code – TP-1-1-3-4/ Following Reference: Section 3.1.1.4)

Figure 12: Proposed wooden deck trail connecting Baby Point, Main Point and Pasarichenai Beach

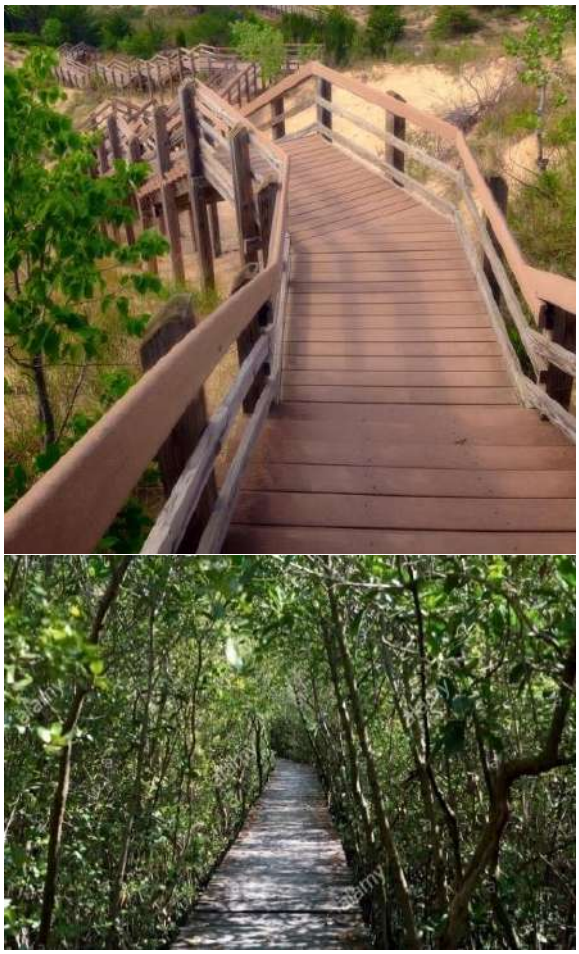


Figure 13: The envisaged characteristics of proposed wooden deck connecting Baby Point, Main Point and Pasarichenai Beach

3.1.1.4 Promoting Arugam Bay Main Point and Pasarichenai as diverse beach strips enjoyable by both surfers and non-surfers of all ages (Project Code – TP-1-1-4)

a) Complementing selected points of Arugam Bay Main Point and Pasarichenai beach with beach furniture such as beach canopies, sun tanning beds, decks, swinging chairs, tree-house viewing decks and chairs & tables which are designed to match with the vernacular architecture unique to Arugam Bay (Project Code – TP-1-1-4-1)
b) Constructing a few number of stalls for local vendors (Project Code – TP-1-1-4-2)
c) Constructing a local tourists facilitating hut including seating area and family dining places at a selected point close to Main Point (Project Code – TP-1-1-4-3)
d) Designing kids play area at Pasarichenai beach strip (Project Code – TP-1-1-4-4)
e) Promoting Pasarichenai beach strip for beach sports activities (Project Code – TP-1-1-4-5)
f) Promoting the proposed wooden deck trail connecting Main Point and Pasarichenai beach for surf-art paintings (Project Code – TP-1-1-4-6
g) Placing timber boards and short walls at selected points in Pasarichenai beach and promoting them for arts and paintings (Project Code – TP-1-1-4-7)
h) Promoting a bicycle trail at the proposed wooden deck trail connecting main point and Pasarichenai beach (Project Code – TP-1-1-3-4/ Previous Reference: Section 3.1.1.3)

Figure 14: The envisaged characteristics Arugam Bay Main Point & Pasarichenai Beach

3.1.1.5 Promoting the alley ways of Arugam Bay which connect the Main Street and the beach for special experience points of local foods and food practices. (Project Code – TP-1-1-5)

This strategy will be elaborated in the section 2.2.4 A (ii) under Environment Management Strategy.

3.1.1.6 Establishing a tourist facilitation centre at the existing car park land (approx. extent – 2400 m²) close to Arugam Bay Main Point (Project Code – TP-1-1-6)

a) Housing the surfing facilities serving the Arugam Bay Main Point and Baby Point at this particular tourist facilitation centre (Project Code – TP-1-1-3-1/ Previous Reference: Section 3.1.1.3 –(a))
b) Establishing a sub-centre of the main information centres located at Lahugala and Komari (Project Code – TP-1-1-6-1)
c) Providing wash-room facilities and refreshing areas (Project Code – TP-1-1-6-2)
d) Allocating spaces for local stalls, mini-market, medical centre and other required tourist facilities (Project Code – TP-1-1-6-3)
e) Operating a sub centre of proposed intra-city transportation program with provisions to hire motor – bikes, dirt – bikes, three wheels and bicycles (Following Reference: Section4.4.2)

Figure 15: The location of proposed tourist facilitation centre close to Arugam Bay Main Point

3.1.1.7 Allocating 0.1 ha of land located adjoining the Arugam Bay – Panama road, approximately .....m from the Main Point for vehicle parking (Project Code – TP-1-1-7)

Figure 16: The location of proposed vehicle parking site at Arugam Bay

3.1.1.8 Re-habilitation of the fisheries settlements located along the Arugam Bay Main beach with design interventions to make them an attractive feature harmonizing with the tourism industry of Arugam Bay (Project Code – TP-1-1-8)

- Reconstruction of fisheries houses and facilities huts which are in dilapidated or structurally unstable status
- Refurnishing the exterior of all fisheries settlement buildings to reflect a homogeneous character unique to the traditional fisheries settlements of the area (eg: the character of the mud-houses and wadiya)
- Color washing the exterior of the fishing settlement buildings to reflect a designed character
- Landscaping the front yards and sides spaces of the settlement buildings appropriate furniture such as benches, light poles, fishermen equipment etc.
- Color washing the fishermen boats as to reflect a designed character

Figure 17: The fisheries settlements at Arugam Bay Main Point proposed for

Figure 18: The recommended design interventions for rehabilitation of fisheries settlements at the Arugam Bay Main Point

3.1.1.9 Promoting the fishermen's lifestyle and fishing activities as one of the major tourist attractions of Arugam Bay (Project Code – TP-1-1-9)

a) Promoting Arugam Bay main beach strip as a local fishermen lifestyle experience point by providing the tourists an opportunity to watch and engage the fishing activities (Project Code – TP-1-1-9-1)
   - Making tourists aware on the local fishing times and usual boat landing times
   - Allowing the tourists to engage in local fishing activities such as beach net fishing, rides in fishing boats

b) Conducting awareness programs and training programs for local fishermen to educate them on the benefits of linking with the tourism industry and to train them on tourists facilitation management (Project Code – TP-1-1-9-2)

Deluxe Corridor

Whiskey Point as a destination which offers a mix of extravagance and vibrancy

Whiskey point is moderately extravagant and less exclusive than Komari. The vibrancy level of Whiskey Point is intermediate compared to the most vibrant Arugam Bay the main strip and serene Komari. Whiskey Point offers you to enjoy the tranquility of virgin landscapes including Pottuvil and Kottukal lagoons and Pottuvil sand dune. You can experience lagoon and sand dune safaris and interact with other tourists and locals at the Whiskey Point beach while enjoying a beer. The beautiful Whiskey Point beach will also be an ideal destination wedding location, with flocks of couples flying there to have their dream weddings.

3.1.2 Promoting Whiskey Point as a moderately extravagant and vibrant tourism destination with a majority of high-end (three star & above) cabana type accommodation facilities (Project Code – TP-1-2)

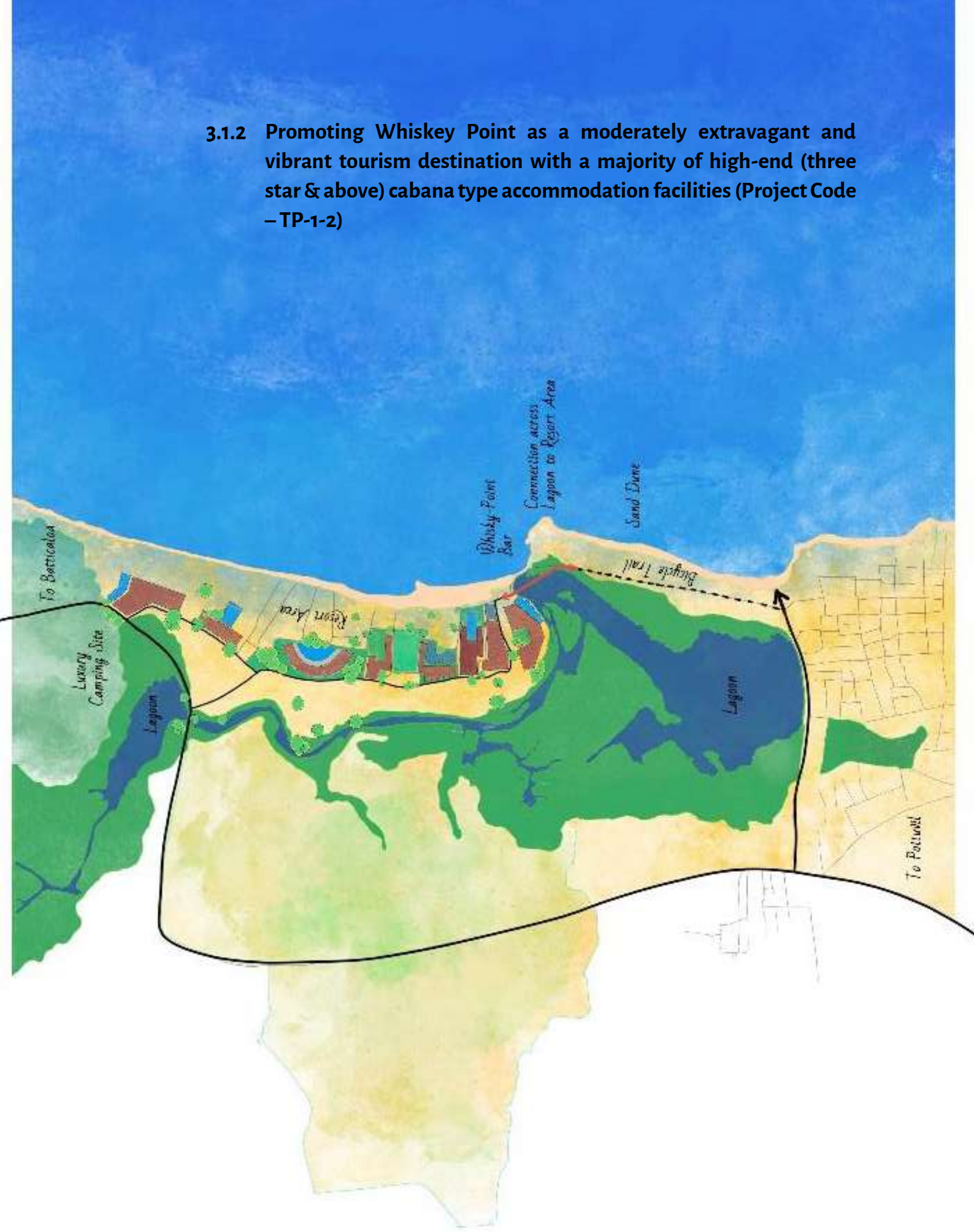


Figure 19: The proposed layout of Whiskey Point Tourism Cluster

3.1.2.1 Development of a high-end (three star & above) cabana type resort at Whiskey Point adopting following guidelines and features and facilitating it with required infrastructure facilities (Project Code – TP-1-2-1)

a) Special features within the resort

- Amusement Park

b) Guidelines to conserve the anticipated character of Whiskey Point Cabana Resort

No.	Guide Lines	Specifications
02	Plot Coverage	65 %
03	Minimum Plot size	40 Perch
04	Boundary Walls	No boundary walls allowed. Only live fences or Bio fences shall allow.
05	Form of the Buildings (Facade/Color)	Cabana Type*
06	Other special Building Components	Recommended to have innovative enhancements of architectural features of a typical Sri Lankan beach hut
07	Maximum Building Height	6 m
08	Other	- 50% of remaining open spaces should be permeable without any paving - Should plant and maintain minimum two (02) or more native plants within the premises

Cabana Type* - An accommodation type offering high-end amenities with a beach-hut experience

Table 15: Recommended building codes & guidelines for developments within Whiskey Point Cabana Resort

c) Facilitating Infrastructure

- Supplying 3 phase electricity line
- Providing pipe borne water system
- Constructing and maintaining a sewer and waste water system
- Constructing and maintaining a storm water management system

Figure 20 The proposed conceptual layout of the Whiskey Point Cabana Resort

3.1.2.2 Enhancing the accessibility within Whiskey Point tourism cluster (Project Code – TR-2-2-3)

Figure 21: The proposed road network within Whiskey Point tourism cluster

3.1.2.3 Promoting Whiskey Point as a destination surfing point (Project Code – TP-1-2-2)

Main Components:

- Locker rooms
- Wash rooms & changing rooms
- Fresh water bathing places
- Water refilling center
- Coast guard towers
- First-aid centres

Figure 22: A conceptual image of fresh water bathing facilities at Whiskey Point

a) Promoting Whiskey Point for surfing camps (Project Code – TP-1-2-2-1)
b) Establishing a surfing facilitation centre with surf board renting and repairing facilities and surf instructor consultation facilities (Project Code – TP-1-2-2-2)

3.1.2.4 Promoting Whiskey Point beach strip as a vibrant destination beach strip (Project Code – TP-1-2-3)

a) Establishing a restaurant and pub at Whiskey Point beach strip along with a beer garden and promoting it for evening gatherings/ functions (Project Code – TP-1-2-3-1)
b) Constructing a timber deck at the Whiskey Point beach and promoting it for destination beach weddings (Project Code – TP-1-2-3-2)
c) Promoting Whiskey Point beach for beach sports and link such activities with the proposed amusement park at Whiskey Point (Project Code – TP-1-2-3-3)
d) Facilitating Whiskey Point beach with beach furniture such as beach canopies, sun tanning beds, decks, walking trails, swinging chairs, tree-house viewing decks and chairs & tables which are designed to match with the vernacular architecture unique to Arugam Bay (Project Code – TP-1-2-3-4)

Figure 23: Envisaged character of Whiskey Point

3.1.2.5 Promoting a sand dune and lagoon safari trail (approx. 3.5km) from Pottuvil town to Whiskey Point via Pottuvil sand dune and Pottuvil lagoon (Project Code – TP-1-2-4)

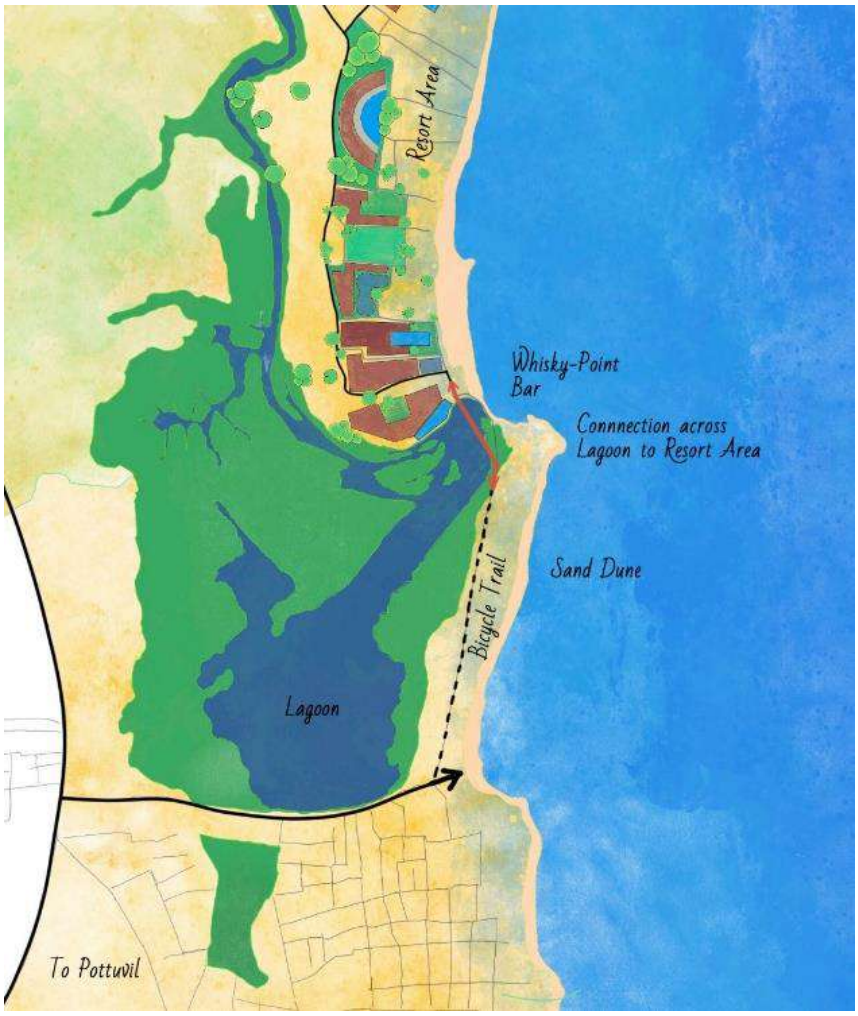


Figure 24: Proposed lagoon and sand dune safari trail

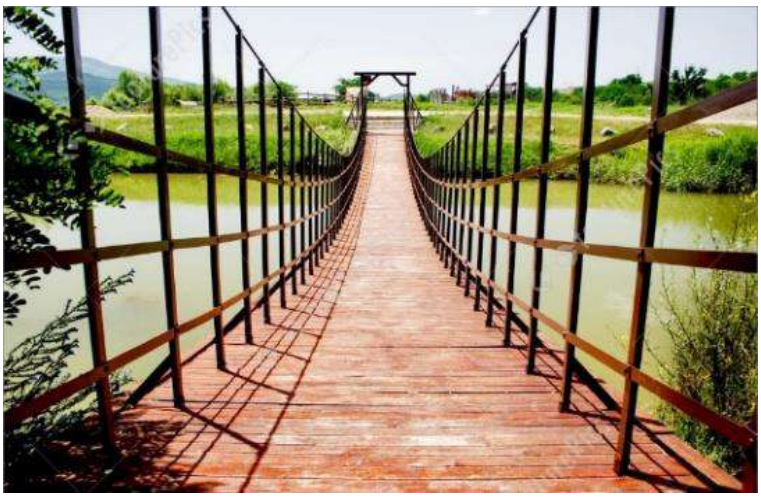


Figure 25: The envisaged character of the proposed sand dune trail and the wooden bridge crossing the Pottuvil lagoon

a) Promoting a bicycle trail along the existing jeep track through the Pottuvil sand dune (Project Code – TP-1-2-4-1)
b) Construction of a wooden bridge/ swing bridge/ rafting boat crossing the Pottuvil lagoon mouth connecting Pottuvil Point and Whiskey Point (Project Code – TP-1-2-4-2)
c) Establishing a lagoon safari launching deck at the south edge of Pottuvil lagoon close to Pottuil Point and facilitating it with required facilities and equipment (Project Code – TP-1-2-4-3)
    - Lagoon safari boats of different attractive shapes and sizes (wooden boats and wooden rafting boats etc.) which ensures safety
    - Providing life jackets, rafting equipment, first-aid items
    - Strengthening the existing community-based lagoon safari program

3.1.2.6 Promoting Pottuvil lagoon and its environs as a main nature tourism destination in Arugam Bay (Project Code – TP-1-2-5)

a) Establishing a lagoon eco-systems information and exhibition centre close to the lagoon safari launching deck at Pottuvil lagoon (Project Code – TP-1-2-5-1)
b) Establishing bird watching decks and elevated platforms in selected locations at the perimeter of the Pottuvil lagoon (Project Code – TP-1-2-5-2)

3.1.2.7 Promoting Pottuvil Point as an Attraction Surfing Point (Project Code – TP-1-2-6)

Main Components:

- Locker rooms
- Wash rooms & changing rooms
- Fresh water bathing places
- Water refilling center
- Coast guard towers
- First-aid centres

Komari as the most extravagant tourism destination in Arugam Bay

Komari is the most extravagant destination in Arugam Bay. Komari is an exclusive location catering high-end tourism. It is designed for those who seek tranquility and private freedom little away from large crowds. Komari will be less vibrant and more serene, yet much more extravagant. Komari consists of a group of high-end up-class villa type accommodation facilities and camping options. During your stay at Komari, you will be able to enjoy surfing at Light house surf point and the virgin landscapes including Komari beach and its surrounding lagoons and sand dunes.

3.1.3 Promoting Komari as an extravagant, calming tourism destination with high-end (three star & above) villa type accommodation facilities (Project Code - TP-1-3)

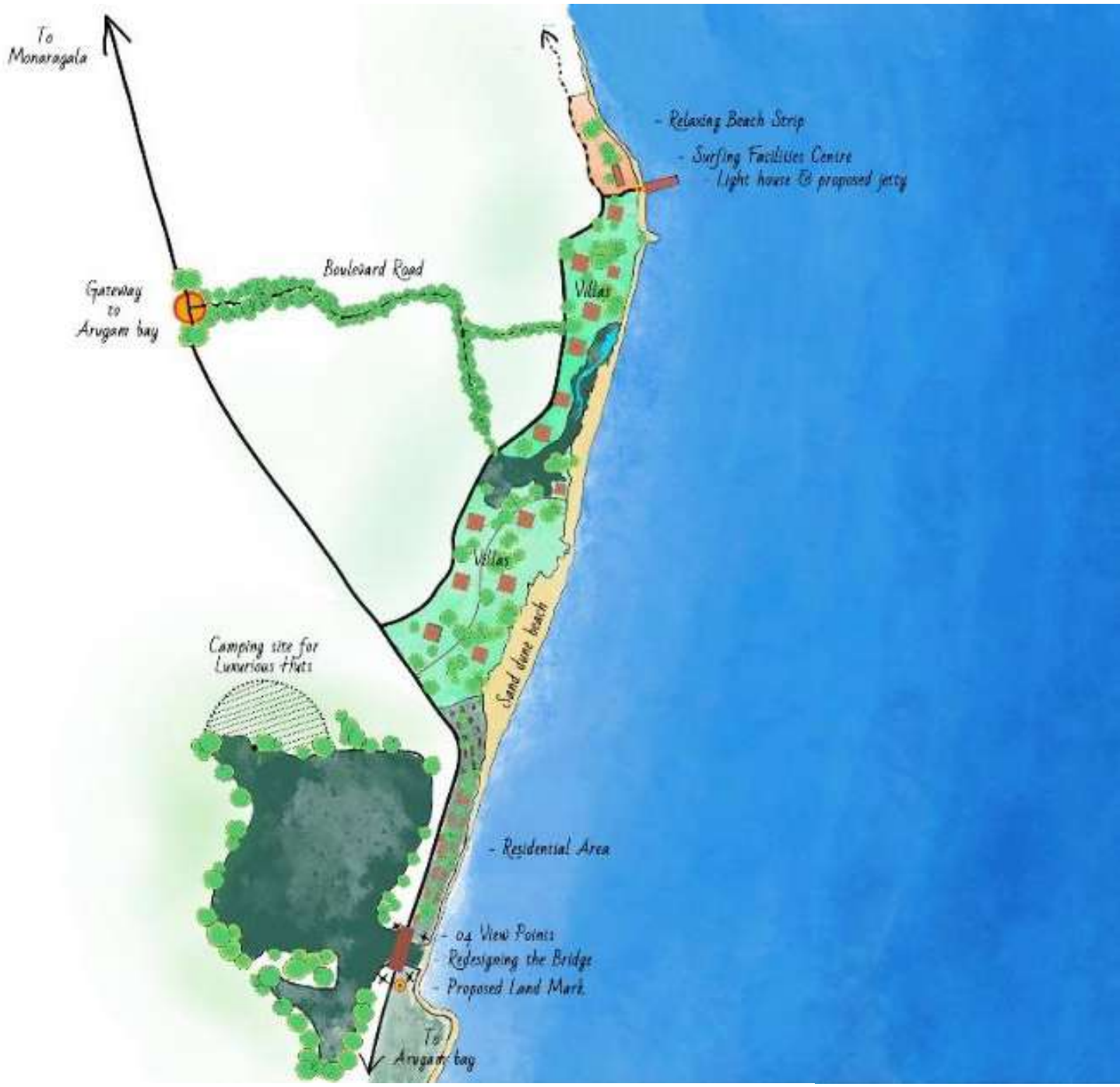


Figure 26: Proposed conceptual layout of Komari Tourism Cluster

3.1.3.1 Development of a high-end (three star & above) villa type resort at Komari adopting following guidelines and features and facilitating it with required infrastructure facilities (Project Code - TP-1-3-1)

a) Special features within the resort

- Indigenous Medical spa

b) Guidelines to conserve the anticipated character of Komari Villa Resort

No.	Guide Lines	Specifications
01	Maximum building height	10m
03	Boundary walls	No boundary walls allowed. Only live fences or wooden fences shall be allowed
04	Building architecture and facade	Modern Villa architecture featured with Sri Lankan vernacular architectural characteristics
05	Other	- 20 % of open space should be allocated for organic cultivation - Only eco-friendly landscape materials are allowed - Should plant and maintain minimum five (05) or more native plants within the premises

Villa * - A house, often larger and more expensive than average, in the countryside or on the coast, often used as a retreat.

Table 16: Recommended building codes & guidelines for developments within Komari Villa Resort

c) Facilitating Infrastructure

- Supplying 3 phase electricity line
- Providing pipe borne water system
- Providing and maintaining a sewer and waste water system
- Constructing and maintaining a storm water management system

Figure 27: Proposed conceptual layout of Komari Villa Resort

3.1.3.2 Enhancing the accessibility within Komari tourism cluster (Project Code – TR-2-2-4)

- Enhancing the accessibility to and within proposed Komari high-end villa resort
- Enhancing the accessibility to the beach
- Widening & reconstructing the Manalchenai road
- Providing a direct access to Komari north gate

Figure 28: Proposed road network in Komari Tourism Cluster

3.1.3.3 Promoting Sangamankanda point and light house as destination surfing point (Project Code – TP-1-3-2)

Main Components:

- Locker rooms
- Wash rooms & changing rooms
- Fresh water bathing places
- Water refilling center
- Coast guard towers
- First-aid centres

Establishing a surfing facilitation centre along with surf board renting and repairing facilities and surf instructor consultation facilities

3.1.3.4 Promoting selected points at Komari beach and lagoon front as tranquil relaxing points (Project Code – TP-1-3-3)

a) Placing sun tanning beds and cabins
b) Establishing small scale boutique restaurants at selected tranquil relaxing points

Figure 29: Envisaged character of Komari Tourism Cluster

3.1.3.5 Promoting Komari bridge and the surrounding lagoon and beach front as a main tourist attraction (Project Code - TP-1-3-4)

Figure 30: Conceptual layout of proposed tourism development at Komari Bridge

- Landscaping the lagoon front at either side of beach at the Komari bridge
- Providing parking facilities
- Establishing restaurant/s near the Komari bridge
- Introducing lagoon safari in the Komari lagoon and making Komari bridge the main launching point
  landmark

3.1.3.6 Promoting luxury camping at the north lagoon front of Komari (Project Code - TP-1-3-5)

Figure 31: Envisaged luxury camping at the north lagoon front of Komari

Mysterious Corridor

Panama as a serene tourist nest blended with the virgin village landscape

Panama which is renowned as the last village of east-coast of Sri Lanka is a serene tourist nest blended within the virgin village landscape. Accommodation choices available in Panama are homestay, camping, tree houses, mud-houses and traditional village houses. Panama will mainly be an agro-based tourism destination, where the tourists will be given the opportunity to experience a variety of Sri Lankan folk cultural traditions and customs by living a village lifestyle for one or few days. The key attractions located within Panama are Panama lagoon, Panama sand dune, Panama village, crocodile lake and Panama surfing point.

3.1.4 Promoting Panama as an agro based tourism destination hidden within village landscape (Project Code - TP-1-4)

Figure 32: Conceptual layout of the Panama agro based tourism cluster

3.1.4.1 Promoting a model tourism village at Panama village enabling tourists to experience the village life without disturbing the serenity of the village (Project Code - TP-1-4-1)

a) Components of the model tourism village

- 15 number of mud houses (with 05 double, 05 triple and 05 family accommodation capacities
- 05 number of tree houses (with 03 double and 02 family accommodation capacities)
- Fencing of each mud house

- Rice storage unit (v-bissa)
- A restaurant located as a Mahagedara
- Kamatha as a common gathering place to hold functions
- Washrooms attached to the mud houses as internal components (for the convenience of the tourists)

b) Special functions

- Traditional cooking classes
- Traditional food restaurant
- Paddy and chena farming experience packages of different durations
- Lagoon fishing experience
- Traditional folk games (Eluwan kema, pora-pol gaseema, batta paneema, pancha keleema, olinda keliya etc.)
- Traditional arts and crafts such as pottery & clay works, paintings, sculpturing etc.
- Cultural shows including the performances of traditional dance, drama and functions such as shanthikarma, nadagam, thovil etc.
- Traditional dance, music and instrument (traditional drums & flutes) teaching classes

Figure 33: Envisaged character and activities in proposed Model Tourism Village at Panama

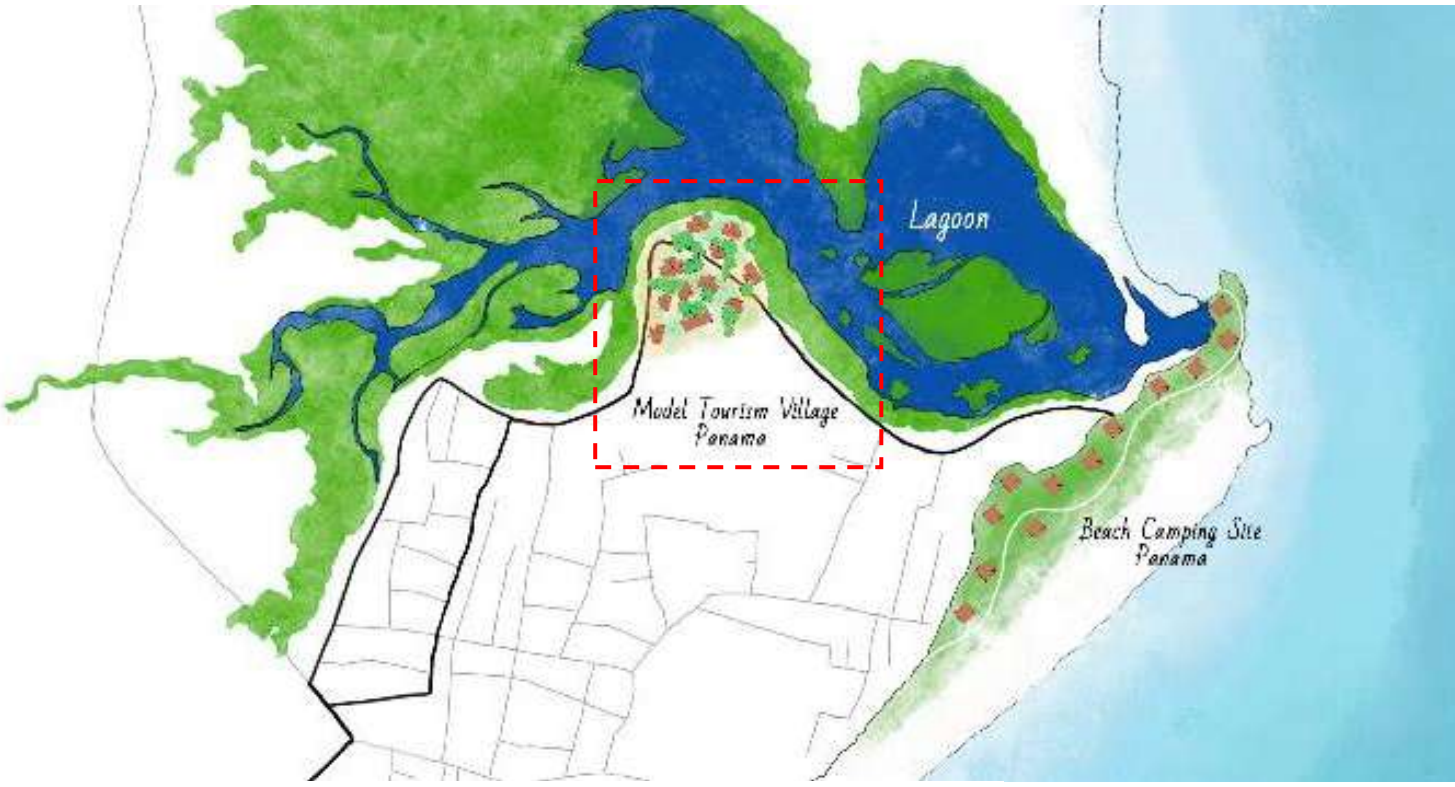


Figure 34: Conceptual layout of the proposed Model Tourism Village at Panama

3.1.4.2 Promoting community driven Panama lagoon safari (Project Code - TP-1-4-2)

Establishing a lagoon safari launching deck at Panama lagoon and facilitating it with required facilities and equipment

- Lagoon safari boats of different attractive shapes and sizes (wooden boats and wooden rafting boats etc.) which ensures safety
- Providing life jackets, rafting equipment, first-aid items

Strengthening the existing community-based lagoon safari program

Figure 35: Envisaged lagoon safari in Panama lagoon

3.1.4.3 Promoting bird watching at Panama lagoon (Project Code - TP-1-4-3)

a) Constructing bird watching towers and decks at selected points at the edge of Panama lagoon (Project Code - TP-1-4-3-1)
b) Establishing information / exhibitory boards at such observation points explaining the existing bird/ animal species and their importance (Project Code - TP-1-4-3-2)

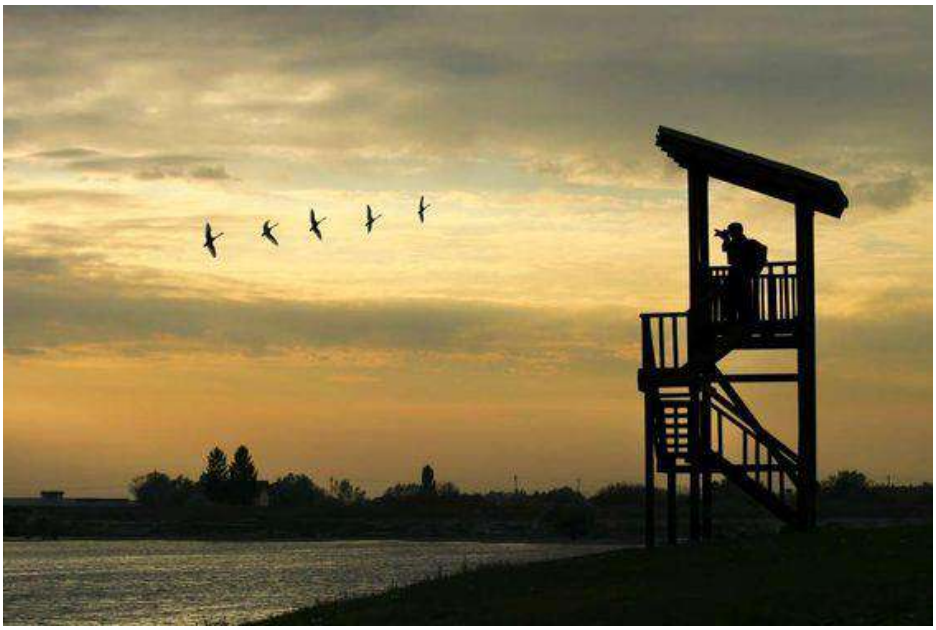


Figure 36: Envisaged bird watching towers at selected points of Panama Lagoon

3.1.4.4 Promoting a sand dune walking trail at a selected route through the Panama sand dune and a safari trail via the existing jeep route leading to the beach (Project Code - TP-1-4-4)

3.1.4.5 Promoting a bullock cart village tour on a selected route through the village (Project Code - TP-1-4-5)

Interesting attractions covered by the tour

- Village houses and roads
- Large acres of paddy lands
- Forest patches
- Panama lagoon
- Panama village centre (kadamandiya)
- Panama temple
- Panama Crocodile Lake

3.1.4.6 Promoting Panama Crocodile Lake as a major tourist attraction of Arugam Bay (Project Code – TP-1-4-6)

- Development of a small junction (kadamandiya) at the edge of Panama Crocodile lake and having a small coffee shop (Kopee kade) there
- Locating a crocodile related souvenir shop with a new branding related to 'Panama Crocodiles'
- Constructing crocodile watching decks/ platform with safety measures
- Information display to aware the tourists on different types of crocodile species existing at the lake and the overall danger level and safety measures

3.1.4.7 Promoting Panama beach as a virgin beach strip renowned for serene beach camping (Project Code – TP-1-4-7)

- Promoting Panama beach strip as a beach camping site and facilitating it with standard camping facilities

3.1.4.8 Promoting Panama Surfing Point as a destination Surfing Point (Project Code - TP-1-4-8)

The following facilities to be constructed in close proximity to Panama Surfing Point without being visual disturbances to the virgin natural landscapes of the area.

a. Locker rooms
b. Wash rooms & changing rooms
c. Fresh water bathing places
d. Water refilling center
e. Coast guard towers
f. First-aid centres

Panagala – Okanda as a mysterious tourist nest hidden in the wilderness

Panagala - Okanda will be the last tourism nest in the east coast of Sri Lanka and it will be the most mysterious destination in Arugam Bay. Panagala & Okanda is free from human settlements thus it will be an ideal getaway for those who want to enjoy the pure nature and wilderness. Panagala & Okanda together offer tourists an adventurous experience amidst wilderness.

3.1.5 Promoting Panagala - Okanda as a mysterious tourism destination hidden within wilderness (Project Code - TP-1-5)

3.1.5.1 Promoting Okanda surfing point as a mysterious attraction surfing point (Project Code - TP-1-5-1)

The following facilities to be constructed in close proximity to Okanda Surfing Point (close to Okanda Dewalaya) without being visual disturbances to the virgin natural landscapes of the area.

- Locker rooms
- Wash rooms & changing rooms
- Fresh water bathing places
- Water refilling center
- Coast guard towers (Not to be highlighted or too visually exposed, yet to be placed for immediate actions)
- First-aid centres

3.1.5.2 Promoting Panagala & Okanda beach strips as low exposed attraction beach strips (Project Code - TP-1-5-2)

- Conserving the virgin character of the Panagala and Okanda beach strip by making it a less frequently visited attraction by;
  - Limiting its accessibility

- Making Panagala and Okanda accessible through a jeep track fallen through the Kumana Sanctuary and limiting the no. of jeep rides to 01 jeep per two hour during the peak tourist season

- Making Panagala and Okanda accessible from the jeep parking place by a half hour trekking through the forest

3.1.5.3 Promoting forest camping at selected points in and around Kudumbigala Sanctuary

It is proposed to conduct proposed forest camping at Kudumbigala Sanctuary with extra care on environment protection. It is recommended to carryout the proposed camping activities under the direct supervision of Department of Forest, Department of Wildlife and SLTDA.

Figure 37: Envisaged forest camping at selected point in and around Kudumbigala Sanctuary

3.1.5.4 Establishing a Meditation Centre hidden within the Kudumbigala Sanctuary (Project Code - EN-2-3-1)

A Meditation Centre is proposed to be establish at a suitable location hidden within the Kudumbigala Sanctuary. This strategy is elaborated in the section 2.2.4. A. (iv) under Environment Management Strategy.

3.2 Tourist Facilitation Strategies (Project Code - TP-2)

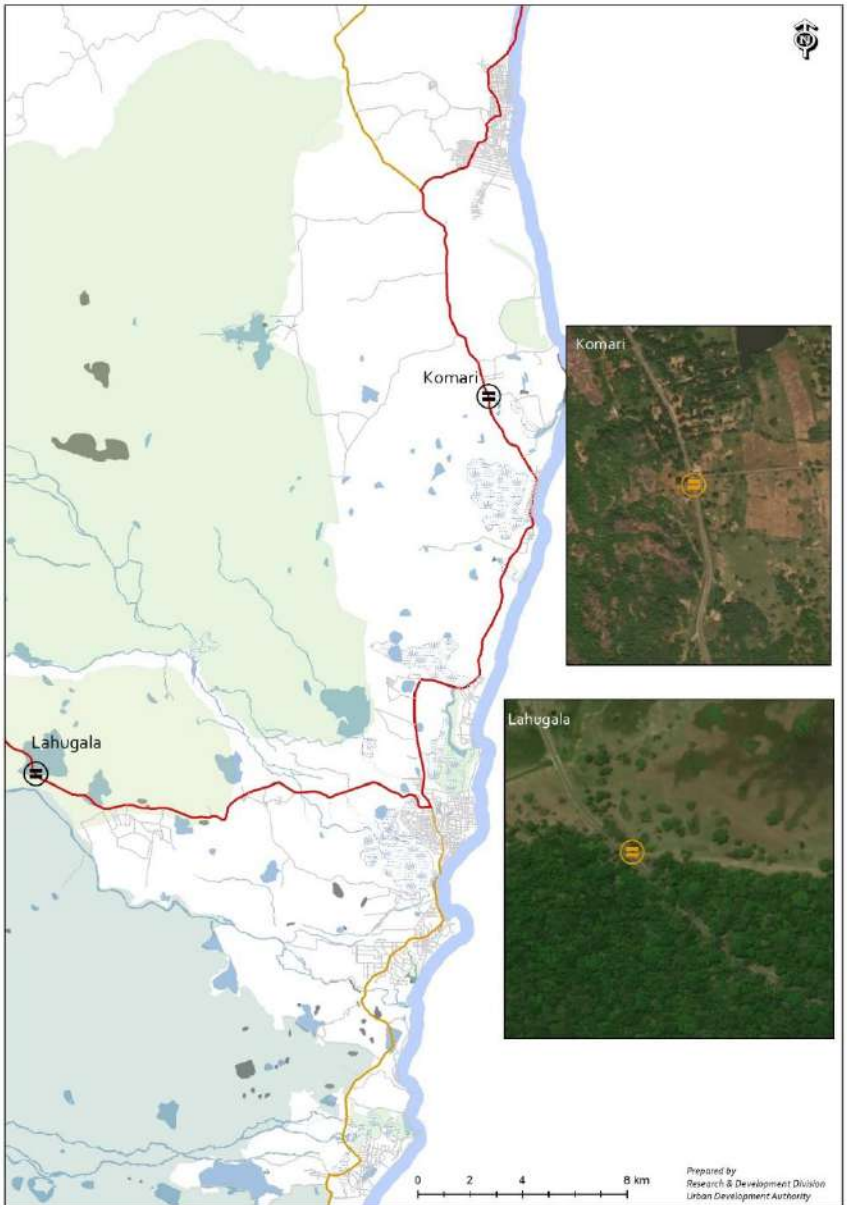
Two welcoming gateways

There are two gateways to Surfers' Hidden Paradise, Arugam Bay; one placed at Komari and the other at Lahugala. You meet Lahugala; the west gateway, when you travel towards Arugam Bay on Colombo – Battiacaloa Road (A 004) via Wellawaya and Komari; the north gateway, when you travel towards Arugam Bay on same road via Ampara.

These two welcoming gateways will receive you with open arms and will serve you with a warm cup of Ceylon Tea. It will enable you to be relaxed enjoying the cordial ambience of these designed spaces blended with the nature. You will be able to grasp the glimpse of Arugam Bay's special character and it's all types of attractions.

Further, you will be well informed about dos and don'ts in Arugam Bay and everything you should know about Arugam Bay to effectively plan your stay in order to make it a memorable one.

3.2.1 Constructing a Gateway along with a Tourist Facility Centre both at Lahugala and Komari (Project Code - TP-2-1)



Map 13: The locations of proposed welcoming gateways at Lahugala and Komari

Figure 38: The locations of proposed welcoming gateways at Lahugala and Komari

3.2.1.1 Constructing a designed entrance gateway which symbolizes the unique characteristics & main attractions of Arugam Bay (Project Code - TP-2-1-1)

Characteristics:
Mysteriousness, wilderness, virgin, bohemian
Attractions:
Surfing, wildlife, nature, sand dunes, lagoons, heritage

3.2.1.2 Establishing a Tourist Information Center with smart facilities (Project Code - TP-2-1-2)

- Smart information display screens
- Interactive visitor kiosk which provides;
    - Accommodation & restaurant booking facilities
    - Tourist guides, surfing instructors information and consultation facilities
    - Registration with available Arugam Bay special tour packages
    - Consultation for self-guided tours
- Information on special signage systems
- Awareness on sensitive areas, secured areas & danger zones
- Details on available attractions experiences & activities

3.2.1.3 Providing tourism facilities including washrooms, refreshing areas, restaurants and free Wi-Fi facilities (Project Code - TP-2-1-3)

3.2.1.4 Introducing a sound security system in collaboration with Sri Lanka Tourist Police Division to ensure the safety of tourists and establishing operation units at the proposed Tourist Facility Centres to register the tourists entering Arugam Bay (Project Code - TP-2-1-4)

3.2.1.5 Operating Lahugala and Komari as main destinations of proposed intra city transportation system (TP-4-1)

- Introducing a shuttle service linking Lahugala – Arugambay and Komari – Arugambay
- Motor – bikes, dirt – bikes, three wheel renting packages
- Introducing caravan renting system

3.2.1.6 Establishing operation units of Zero Waste Arugam Bay Program both at Lahugala and Komari Entrance Gateways (Project Code – EN-1-1-7)

- Establishing an exhibition & awareness unit of Zero Waste Arugambay Program to aware tourists on the special waste management system in Arugambay
- Establishing a main polythene & plastic collection center

3.2.1.7 Designing the entire site of Tourist Facilities Centre and the Entrance Gateway adopting vernacular architecture and design concepts (Project Code - TP-2-1-5)

A unique set of signage to guide you

A unique signage system specifically designed for Arugam Bay will guide you through out your journey within the area.

We request you to follow standard road signage and special way-finding signage specific to Arugam Bay to navigate easily and safely within this special tourism area. Also, we request you to strictly obey the road signs and rules to ensure your safety.

We have displayed special signage to aware you of any possible presence of different wildlife species such as elephants, birds and crocodiles to ensure both your safety and the safety of wildlife.

The information signage on natural and archeological attractions are placed for your education purpose thus we hope that they will enhance your knowledge on the specific natural and archeological importance of the area.

3.2.2 Introducing a unique signage system which harmonizes with the unique character of Arugam Bay (Project Code – TP-2-2)

It is expected to regulate and guide following two categories of signage in Arugam Bay.

Signage Category	Type of Signage	Relevant Strategy	Project Code
Navigation Signage	Road signage	As per the RDA standards/ guidelines	
	Way-finding signage for tourists	Tourism Promotion Strategy – 2.1.2.1	TP-2-2-1
Information Display Signage	Information signage on natural environment sensitive areas and attractions	Environment Management Strategy, Natural Environment Conservation Strategies – 2.1.5	EN-1-1
	Information signage on heritage sites & monuments	Heritage Conservation Strategy – 2.1.2.2	TP-2-2-2
	Information display boards and maps at entrance gateways, information centres and other tourist service areas	Tourism Promotion Strategy – 3.2.1	TP-2-2-3
	Information display boards and maps on different wildlife and bird species and their frequent locations	Environment Management Strategy, Wildlife Conservation Strategy – 2.3.3	EN-3-1
	Disaster management signage including navigation & information signs at evacuation routes and safe places	Environment Management Strategy, Disaster Management Startegy – 2.4.1. (B)	EN-4-1-2

Table 17: The different types of signage proposed within Arugam Bay Tourism Area

3.2.2.1 Introducing a unique Way-finding Signage System in Arugam Bay (Project Code – TP-2-2-1)

The proposed unique Way-finding Signage System will help the tourists to easily navigate across Arugam Bay tourism area from one attraction to the other. It is proposed to design the way-finding signage system in such a way that it blends with the unique character of Arugam Bay without disturbing its natural setting. The proposed way-finding signage will have to be designed, developed and installed under a separate project with the project code – TP-1-2-1. It is recommended to follow international standards on signage while reflecting on the unique character of Arugam Bay.

3.2.2.2 Introducing a unique signage system for information display at archeological sites & monuments (Project Code – TP-2-2-2)

Three types of signage are proposed to be introduced for the three types of archeological sites & monuments at Arugam Bay as elaborated in the following table.

Archeological Attraction Category	**Character of signage & the strategy**	**Project Code**
Category 01 - High exposure level with frequent visits	Displaying designed information boards elaborating the importance and historical details of the Category 01 archeological site/ monument	TP-2-2-2-1
Category 02 - Moderate exposure level with less frequent visits	Displaying information boards without being visual disturbances at the Category 02 archeological site/ monument	TP-2-2-2-2
Category 03 - Low exposure level with rare no. of visits	Maintaining sign boards (blending with nature) through the trails leading to Category 02 archeological site/ monument	TP-2-2-2-3

Table 18: The types of signage proposed for three categories of archeological sites/ monuments within Arugam Bay

3.2.2.3 Installation of information display boards and maps at entrance gateways, information centres and other tourist service areas (Project Code – TP-2-2-3)

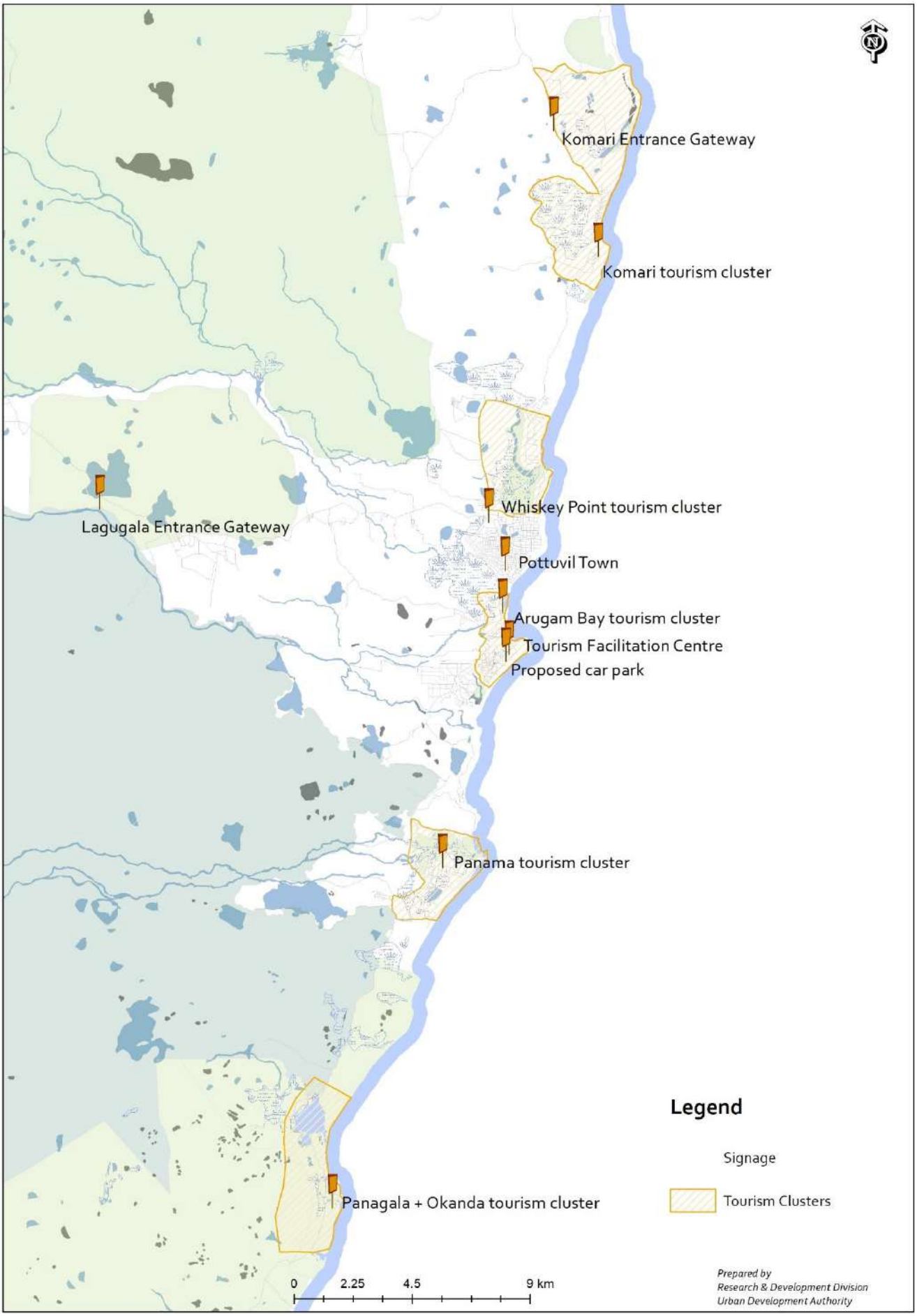
Arugam Bay Tourism Area Maps are to be displayed in following locations.

- Lagugala Entrance Gateway
- Komari Entrance Gateway
- Pottuvil Town (At the Bus Terminal)
- Arugam Bay Main Bridge

Site Maps are to be displayed focusing on each tourism cluster (tourist nest) at following locations.

Tourism Cluster	**Location**
Komari tourism cluster	Komari Bridge & Komari Entrance Gateway
Whiskey Point tourism cluster	Whiskey Point, Pottuvil Point and the starting point of the Pottuvil sand dune trail
Arugam Bay tourism cluster	Arugam Bay Main Bridge, Tourism Facilitation Centre close to Main Point and at the proposed car park
Panama tourism cluster	Panama village centre, proposed model tourism village and at the crocodile lake
Panagala + Okanda tourism cluster	Okanda Dewalaya site

Table 19: The locations identified for installation of Site Maps of each tourism cluster



Map 14: The locations identified for installation of Navigation Maps

A Chain of Tourist Facilitation Centres

A chain of Tourist Facilitation Centres will be there to facilitate your journey within Arugam Bay.

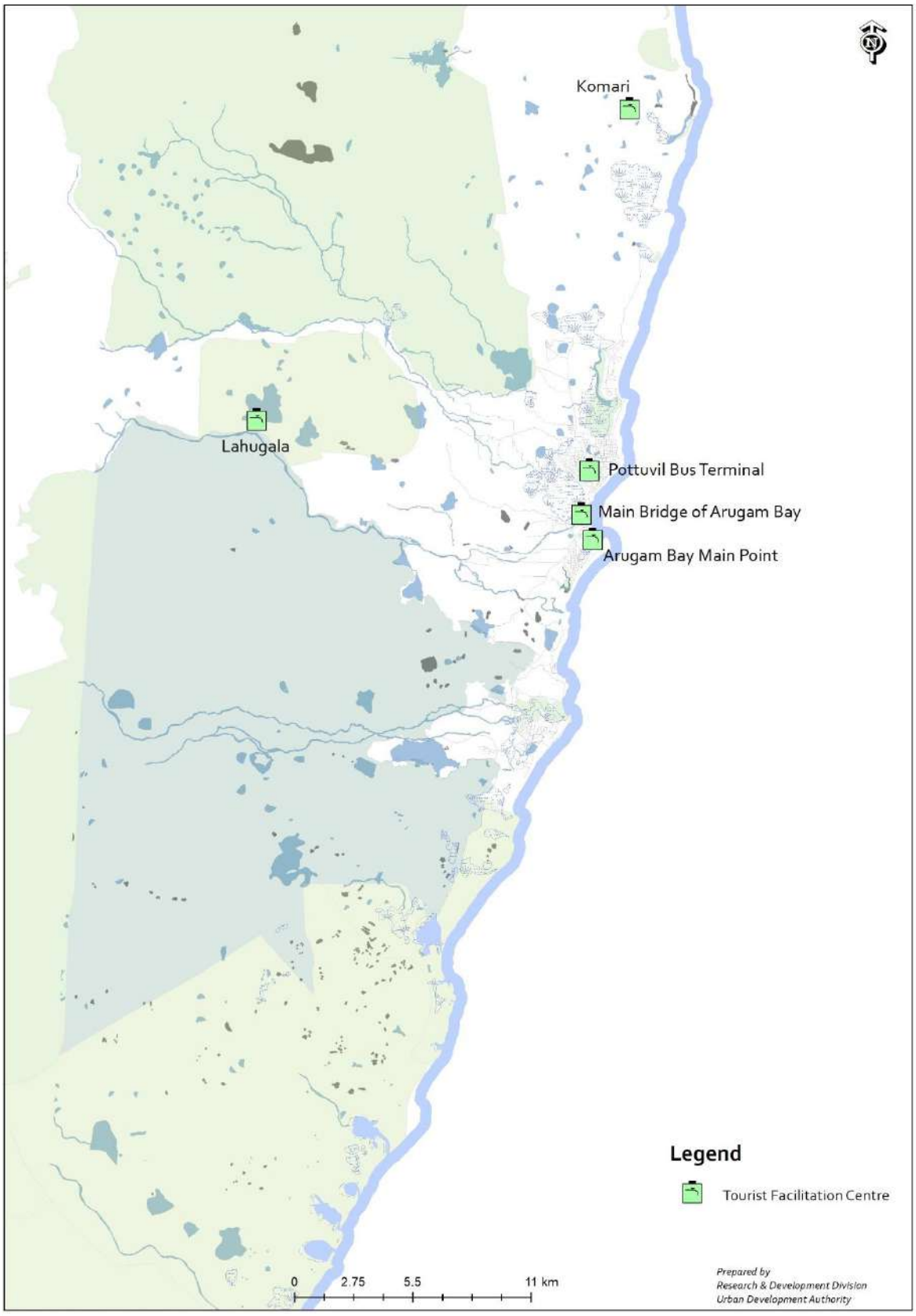
Two welcoming gateways at Lahugala and Komari will be the main tourist facilitation centres that you will meet when entering the Arugam Bay Tourism Area. Another main tourist facilitation centre will be located at the Arugam Bay Main Tourism Strip in close proximity to Arugam Bay Main Point.

In addition, there will be two Mini Tourist Facilitation Centres located at the main bus terminal at Pottuvil Town and at the Main Bridge of Arugam Bay linked with the sea-plane landing deck and the handicraft village.

3.2.3 Establishing a chain of Tourist Facilities Centres along with Tourist Information Centres within the main tourism clusters of Arugam Bay (Project Code – TP-2-3)

	Tourist Facilitation Centre	**Project Code**	**Remarks**
01	Tourist Facilitation Centre at the Lahugala Welcoming Gateway	TP-2-1-2	Elaborated in the section 3.2.1.2
02	Tourist Facilitation Centre at the Komari Welcoming Gateway	TP-2-1-2	Elaborated in the section 3.2.1.2
03	Tourist Facilitation Centre in close proximity to Arugam Bay Main Point	TP-1-1-6	Elaborated in the section 3.1.1.6
04	Mini Tourist Facilitation Centre at the Pottuvil Bus Terminal	TP-2-3-1	
05	Mini Tourist Facilitation Centre at the Main Bridge of Arugam Bay	TP-2-3-2	

Table 20: The locations of proposed Tourist Facilities Centres



Map 15: The locations of proposed Tourist Facilities Centres

3.2.4 Providing common tourist facilities at identified different types of tourist attractions within Arugam Bay (Project Code – TP-2-4)

3.2.4.1 Providing facilities at surfing points & functional beaches (Project Code – TP-2-4-1)

Type of Facility	Destination Surfing Points					Attraction Surfing Points					
	Sangaman Kanda	Whiskey Point	Main Point/ Baby Point	Pasarichenai	Panama	Pottuvil Point	Crocodile Rock	Elephnat Rock	Peanut Farm	Panagala	Okanda
Drinking water facilities	√	√	√	√	√	√	√	√	√	√	√
Washrooms & bathing Facilities	√	√	√	√	√	√	√	√	√	√	√
Locker facility	√	√	√	√	√	√	√	√	√	√	√
Surfing equipment providing centers	√	√	√	√	√						
Street lighting and other Common Electricity facilities	√	√	√	√	√						
Medical Facilities (First aid)	√	√	√	√	√	√	√	√	√	√	√
Cafeteria/ Food stalls	√	√	√	√	√						
Sunbathing chairs & Beach Umbrellas	√	√	√	√	√						
Mini huts	√	√	√	√	√						

Table 21: Facilities provided at surfing points & functional beaches

3.2.4.2 Providing facilities at Archeological Attraction Sites (Project Code – TP-2-4-2/ Previous Reference: Section 2.2.3)

Type of Facility	**Archeological Attraction Category**		
	Category 01	**Category 02**	**Category 03**
	High exposure level with frequent visits (EN-2-2-1)	**Moderate exposure level with less frequent visits (EN-2-2-2)**	**Low exposure level with rare no. of visits (EN-2-2-3)**
Drinking water facilities	√	√	√
Washrooms	√	√	
Parking facilities	√	√ (limited)	
Seating Areas	√	√ (limited)	
Cafeteria/ Food stalls	√		
Religious Item shops	√		

Table 22: Facilities provided at archeological attraction sites

Ensuring your safety

Your safety is one of our first priorities. We are committed to maintain a well-managed security system in Arugam Bay tourism area in collaboration with the Sri Lanka Tourist Police Division.

3.2.5 Introducing a sound security system within Arugam Bay tourism area in collaboration with relevant stakeholders. (Project Code – TP-2-5)

3.2.5.1 Introducing a registration system to register all types of tourism facilitators and tourist service providers. (Project Code – TP-2-5-1)

It is proposed to establish a registration system to register all types of tourism facilitators and tourist service providers and make their details available online for tourists to conveniently link with them. It is also proposed to make these details available at all proposed Tourist Information and Facilitation Centres in Arugam Bay.

The identified tourism facilitators and tourist service providers to register with the system are as follows.

No	Service Category	Service Provider/ Tourism Facilitator
01	Accommodation	All types of Hotels
		All types of Guest Houses, Rest Houses, Hostels
		Camping sites
		Home stay accommodations
02	Food & Beverages	Restaurants
		Bars
03	Transport	Three wheel drivers
		Bicycles, motor bikes, dirt bikes renting places
		Safari jeep renting places
04	Pleasure & Entertainment	Yoga instructors
		Meditation centres
		Ayurvedic spas
		Pubs & clubs
05	Tourism Facilitators	Tourist Guides
		Safari Guides
		Surfing Instructors

Table 23: Tourism facilitators & service providers identified to be registered

3.2.5.2 Introducing a tourist registration system in Arugam Bay (Project Code – TP-2-5-2)

It is proposed to introduce an online system to register tourists entering Arugam Bay tourism area. The objective of this proposed registration system is to enhanced the security of tourists. However, it is strictly recommended to secure privacy of tourists registration details and use them only for the purpose of ensuring the tourists' security in an emergency situation.

The registration of tourists can also be done at the two welcoming gateways proposed at Lahugala and Komari. (Previous Reference – section 3.2.1.4 and project code - TP-2-1-4)

3.2.5.3 Strengthening the security of the area in collaboration with the Sri Lanka Tourist Police. (Project Code – TP-2-5-3)

3.2.5.4 Introducing emergency ambulance service within Arugam Bay Tourism Area in collaboration with the Ministry of Health (Project Code – TP-2-5-4)

3.2.5.5 Establishing a special Tourism Activities Monitoring and Regulation Unit (Project Code – TP-2-5-5)

It is proposed to establish a special Tourism Activities Monitoring and Regulation Unit at Arugam Bay by the Sri Lanka Tourism Development Authority in collaboration with Sri Lanka Hotel Corporation and relevant authorities to monitor and regulate the quality standards of the accommodation, food & services, transport, pleasure & entertainment activities in the ARugam Bay area.

It is also proposed to conduct awareness and training programs on particular service standards and global practices for relevant agencies and groups of people engaged in tourism in Arugam Bay.

Arugam Bay as a diversified tourism destination

Even though Arugam Bay is renowned as a sought after surfing destination, it is blessed with numerous natural and archeological attractions which make it a diversified tourism destination.

In Arugam Bay, you can experience sparkling aqua waves of moonlit lagoons, mythical sound waves of hidden jungles, amiable smile waves of diverse communities, mouth-watering smell waves of flavorful dishes & sensational vibe waves of enchanted voyagers

3.3 Tourism Activity Diversification Strategies (Project Code – TP-3)

3.3.1 Promoting 11 number of surfing points while maintaining their diverse characteristics (Project Code – TP-3-1)

Mainly there are two type of surfing points namely destination surfing points and attraction surfing points.

- **Destination surfing points** – *The surfing points which are located in relatively low sensitive areas and within or in close proximity to a proposed tourism clusters are promoted as destination surfing points. Destination surfing points will be facilitated in such a way that they are often visited by relatively large number of tourists and perceived as destinations with accommodation facilities rather than mere visit places.*

- **Attraction surfing points** - *The surfing points which are located in relatively high sensitive areas and distant from proposed tourism clusters are promoted as attraction surfing points. Attraction point are meant only for short visits and not promoted as destinations with accommodation facilities.*

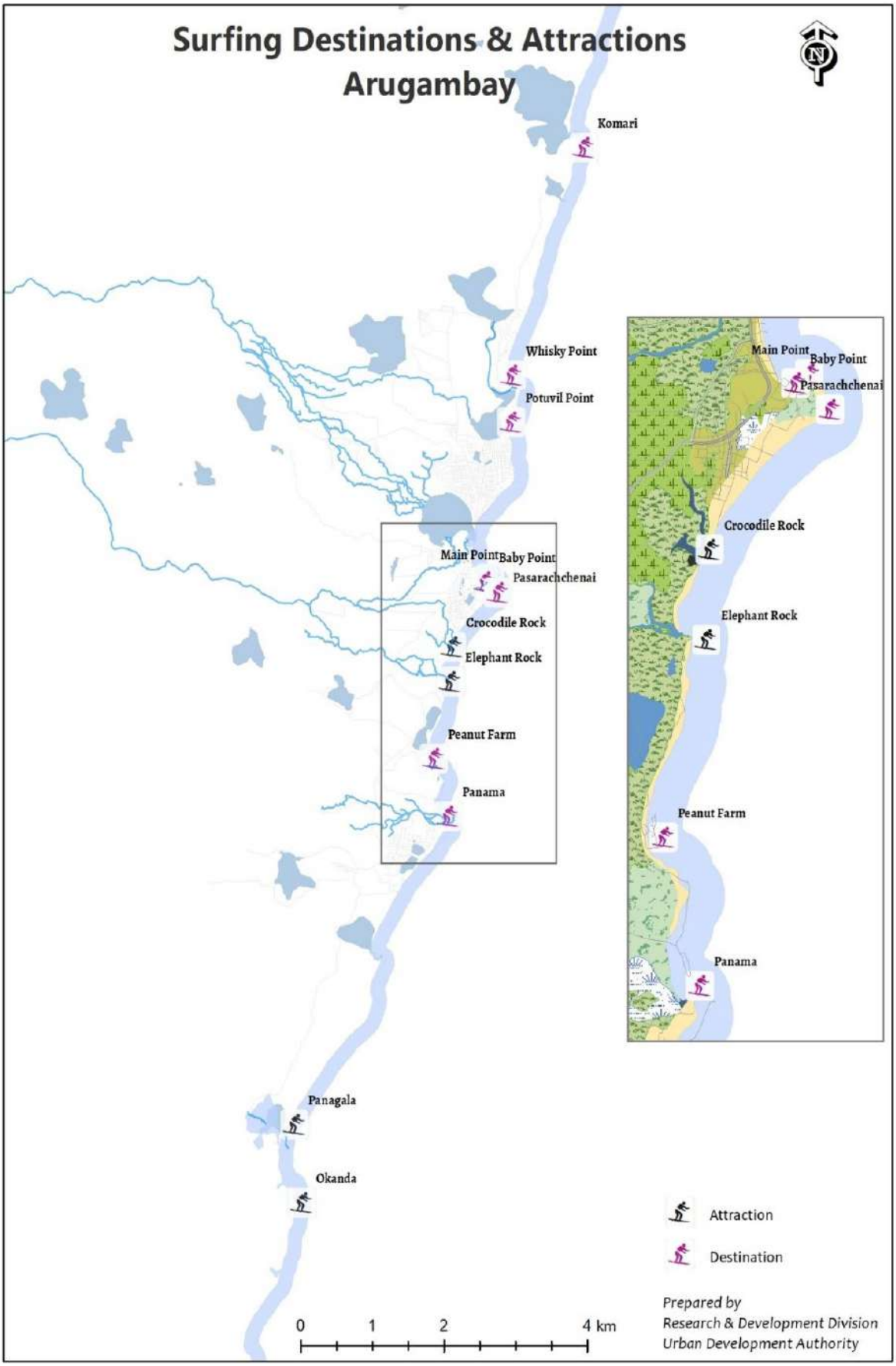
In addition, all these 11 surfing points will reflect its unique character specific to its location in the two corridors; deluxe corridor and mysterious corridor. In addition, these 11 surfing points will also be promoted based on the suitable skill level based on the wave technicalities.

Type of Surfing Point	**Name of the Surfing Point**	**Character**	**Skill level**	**Reference Project Code**
Destination surfing points	Sangaman Kanda Point	• Extremely extravagant and exclusive and calming • Accommodating only limited crowd	All skill levels	TP-1-3-2 Section 3.1.3.3
	Whiskey Point	• Extravagant yet moderately vibrant • Accommodating large crowd	Ideal for Beginners	TP-1-2-2 Section 3.1.2.3

	Baby Point & Main Point	• Most vibrant surfing point • Accommodating large crowd	Baby Point – Ideal for Beginners Main Point – Advanced surfers	TP-1-1-3 Section 3.1.1.3
	Pasarichenai	• Most vibrant surfing point • Accommodating large crowd	Advanced surfers	TP-1-1-3 Section 3.1.1.3
	Panama	• Mysterious and calming • Accommodating only limited crowd	All skill levels	TP-1-4-8 Section 3.1.4.8
Attraction surfing points	Pottuvil Point	• Exclusive and moderately vibrant	All skill levels	TP-1-2-6 Section 3.1.2.6
	Crocodile Rock Point	• Nature based and adventurous • Moderately vibrant	Ideal or Beginners	TP-3-1-1 Section 3.3.1.1
	Elephant Rock Point	• Nature based and adventurous & calming	Ideal for Beginners	
	Peanut Farm	• Nature based mysterious & calming	All skill levels	
	Panagala	• Nature based mysterious & adventurous	All skill levels	
	Okanda	• Nature based mysterious & adventurous	Advanced surfers	TP-1-5-1 Section 3.1.5.1

Table 24: Different characters and suitable skill levels of surfing points

Facilitation of these identified 11 number of surfing points with common facilities have been elaborated in the 3.2.4.1 under the Project Code – TP-2-4-1.



Map 16: Destination and Attraction Surfing Points in Arugam Bay

3.3.1.1 Facilitation of Crocodile Point to be moderately vibrant, nature based adventurous Surfing Point (Project Code – TP-3-1-1)

Crocodile Point is located in a unique natural setting along with lagoon environment and rocky outcrops. There is a large beach stretch which can be promoted for beach tourism activities along with surfing. Hence, this place will be facilitated and promoted for following activities. However, these activities will only be allowed within the defined area as per the proposed zoning plan.

- Restaurants not exceeding the height limit of 4m
- Ayurvedic spa
- Bicycles and tuk-tuk parking spaces

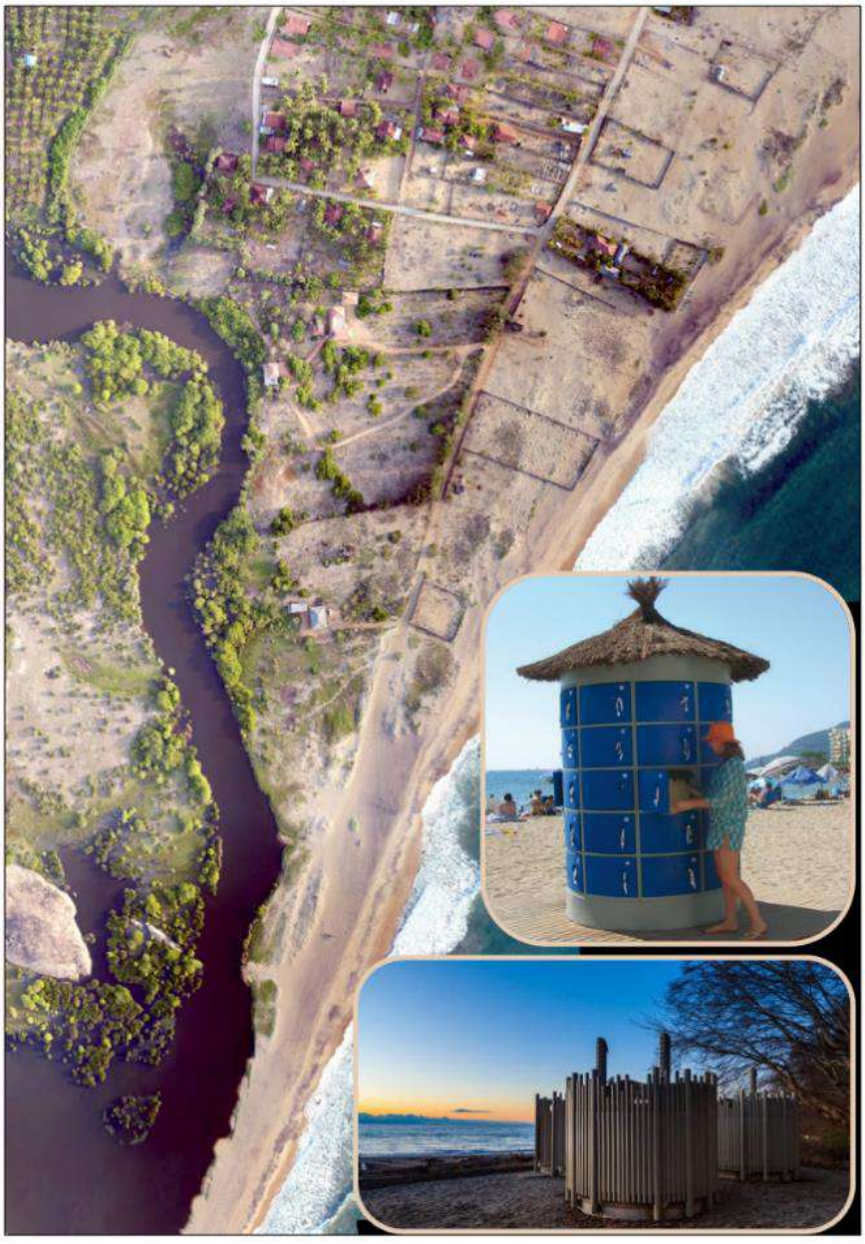


Figure 39: The location of Crocodile Point and envisaged common tourist facilities

3.3.1.2 Defining the access ways to surfing points based on their promotional category; destination or attraction

It is proposed to enhance the accessibility to destination surfing points anticipated to have higher level of vibrancy while demoting the access to attraction surfing points which are much adventurous and mysterious. The intention of this strategy is to ensure that vibrant destination surfing points are easily accessible by large crowds of people while the attraction surfing points remain mysterious and adventurous blended with their natural settings.

The access ways of different surfing points will be elaborated in the section 4.2.2 under Transport Development Strategy.

3.3.2 Promoting inland water activities such as lagoon safari and crocodile & bird watching at lagoon environs in Arugam Bay (Project Code - TP-3-2)

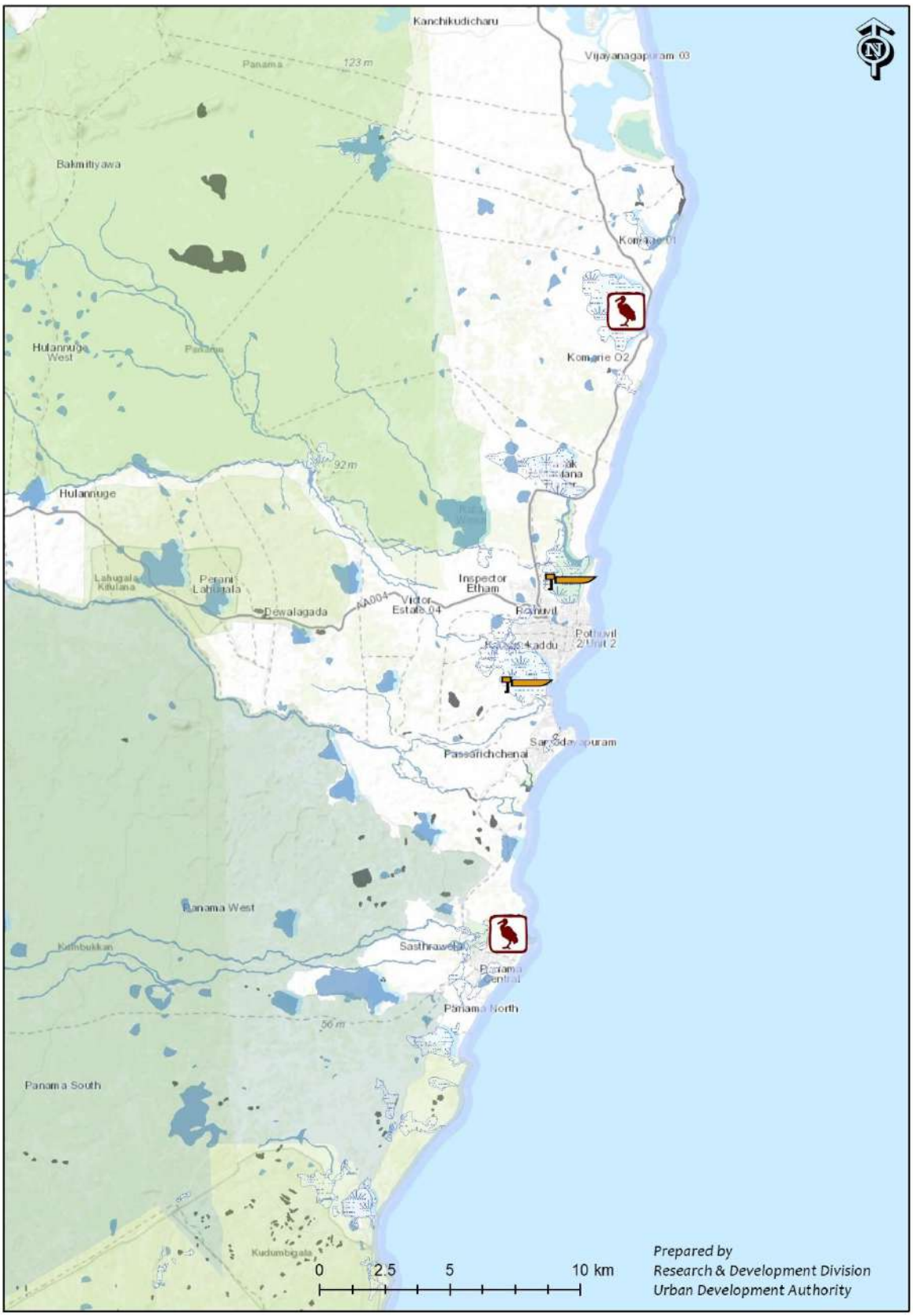
Arugam Bay Tourism Planning Area consists of a chain of lagoons located along the coast of Arugam Bay. These lagoons are gifts of nature which are home to a variety of flora and fauna and also sources of local economy. At the same time, they are also major attractions which offer unique tourism experience.

3.3.2.1 Promoting lagoon safaris in Pottuvil (Kottukal) – Urani, Panama and Komari lagoons.

The interventions made to promote lagoon safaris at the said three lagoons have been elaborated in section 3.1 under the tourism promotional strategies of the respective cluster as mentioned below. Further, it is recommended to strengthen the community led lagoon safari program introduced by the community based project 'Participatory Coastal Zone Restoration and Sustainable Management in Eastern Province of Post Tsunami Sri Lanka' conducted by the Department of Coast Conservation & Coastal Resources Management.

No	Name of the lagoon	Respective tourism cluster	Strategy	Reference Project Code
01	Pottuvil (Kottukal) – Urani lagoons	Whiskey Point Tourism Cluster	Promoting a sand dune and lagoon safari trail (approx. 3.5km) from Pottuvil town to Whiskey Point via Pottuvil sand dune and Pottuvil lagoon	TP-1-2-4 Section 3.1.2.5
			Establishing a lagoon safari launching deck at the south edge of Pottuvil lagoon close to Pottuil Point and facilitating it with required facilities and equipment	TP-1-2-4-3
02	Panama lagoon	Panama Tourism Cluster	Promoting community driven Panama lagoon safari	TP-1-4-2 Section 3.1.4.2
			Establishing a lagoon safari launching deck at Panama lagoon and facilitating it with required facilities and equipment	
03	Komari Lagoon	Komari Tourism Cluster	Introducing lagoon safari in the Komari lagoon and making Komari bridge the main launching point	TP-1-3-4-5 Section 3.1.3.5 (e)

Table 25: Lagoons identified for promoting lagoon safaris



Map 17: Lagoon safari tours in Arugam Bay

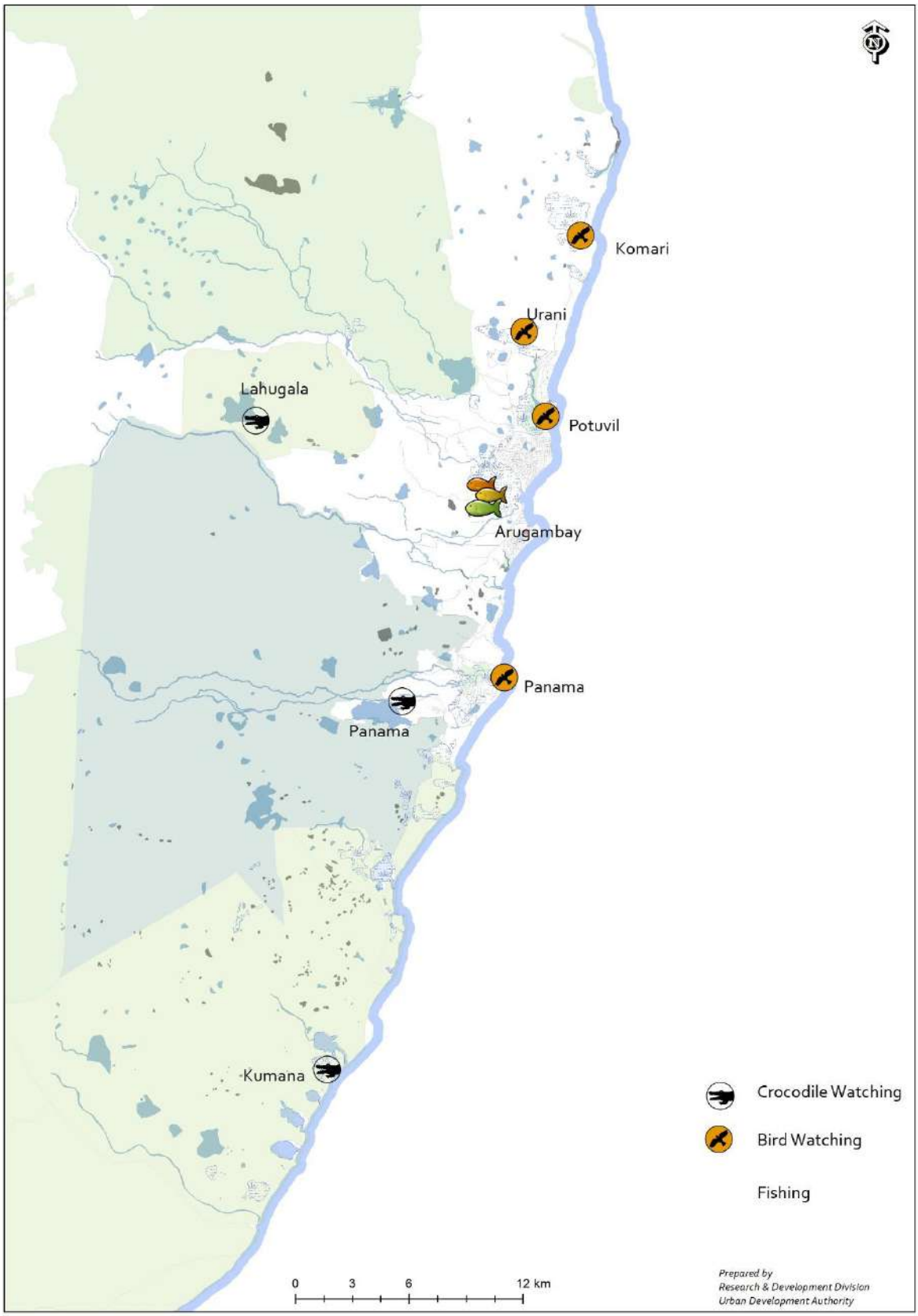
3.3.2.2 Promoting nature tourism, bird and wildlife watching and lagoon fishing at lagoon environs in Arugam Bay

The interventions made to promote nature tourism and bird and wildlife watching at different lagoon environs in Arugam Bay have been elaborated in section 3.1 under the tourism promotional strategies of the respective cluster as mentioned below.

Promotional inland water activity	**Lagoon & the respective tourism cluster**	**Strategy**	**Reference Project Code**
Bird watching	Pottuvil (Kottukal) lagoon at Whiskey Point Tourism Cluster	Establishing bird watching decks and elevated platforms in selected locations at the perimeter of the Pottuvil lagoon	TP-1-2-5-2 Section 3.1.2.6 (b)
	Panama lagoon at Panama Tourism Cluster	Promoting bird watching at Panama lagoon	TP-1-4-3 Section 3.1.4.3
Crocodile watching	Panama Crocodile Lake at Panama Tourism Cluster	Promoting Panama Crocodile Lake as a major tourist attraction of Arugam Bay	TP-1-4-6 Section 3.1.4.6
Lagoon Fishing	Arugam Bay lagoon at Arugam Bay Tourism Cluster	Promoting the right bank corner of the Arugam Bay lagoon as an experience point of lagoon fishing	TP-1-1-1-5 Section 3.1.1.1 (g)

Table 26: Inland water activities; bird & crocodile watching and lagoon fishing experience points in Arugam Bay

In addition to above, bird watching and crocodile watching are promoted at Komari lagoon, Urani Lagoon along with lagoon safaris and lagoons in and around Lahugala & Kumana national parks and Kudumbigala sanctuary along with wildlife safaris as elaborated in the section 3.3.3.



Map 18: Inland water activities; bird & crocodile watching and lagoon fishing experience points in Arugam Bay

3.3.3 Promoting wildlife safaris at Lahugala-Kithulana & Kumana National Parks and Kudumbigala-Panama Sanctuaries. (Project Code – TP-3-3)

3.3.3.1 Development of Lahugala-Kithulana & Kumana National Parks entrances with innovative design approaches in collaboration with the Departments of Forest and Wildlife (Project Code – TP-3-3-1)

The development of National Park entrances may include the following components.

- Designed entrance gateways
- An exhibition space of wildlife and plant species exist at respective National Park
- Information centres
- Wildlife safari tour guides and safari cabs renting system
- Washrooms and other common facilities
- Ticket counters & access to online ticket and safari cab booking system
- Cafeterias
- Souvenir shops

3.3.3.2 Establishing a wildlife safari centre at the Kudumbigala-Panama sanctuary (Project Code – TP-3-3-2)

For those who do not wish to travel far to reach Kumana National Park, Kudumbigala-Panama sanctuary could serve as an alternative to have the wildlife experience. In this regard, it is proposed to establish a wildlife safari centre at the starting point of Panama-Okanda road to promote wildlife safari at Kudumbigala-Panama sanctuary. Also, it is proposed to establish all the facilities mentioned in the above section; 3.3.3.1 at the wildlife safari centre at the Kudumbigala-Panama sanctuary as well.

3.3.3.3 Identification of special bird reserves and facilitating bird watching with careful management at Kumana and Kudumbigala sanctuaries (Project Code – TP-3-3-3)

It is recommended to identify the bird frequent areas with the consultation of wildlife and bird experts and design bird observation towers at identified points. It is also proposed to install standard equipment use to facilitate bird watching and bird photography. The intention of this strategy is to promote

bird watching as a main tourism activity at Arugam Bay and make it an internationally recognized bird watching point in South Asia.

3.3.3.4 Establishing a Wildlife & Bird Research Centre at Kumana National Park (Project Code – TP-3-3-4)

It is proposed to establish a Wildlife & Bird Research Centre at the Kumana National Park entrance in order to facilitate bird and wildlife researchers and tourists. Also, this research centre can facilitate the wildlife observation activities by conducting studies focusing on the following.

- Improve understanding of the biology of watched species and monitoring of the effects of tourism on them
- Improve guide training and interpretation
- Evaluate the conditions required for wildlife watching tourism to be a viable option particularly for generating net revenues for conservation and benefits for local communities
- Improve planning and management of tourism in protected areas and wildlife viewing sites

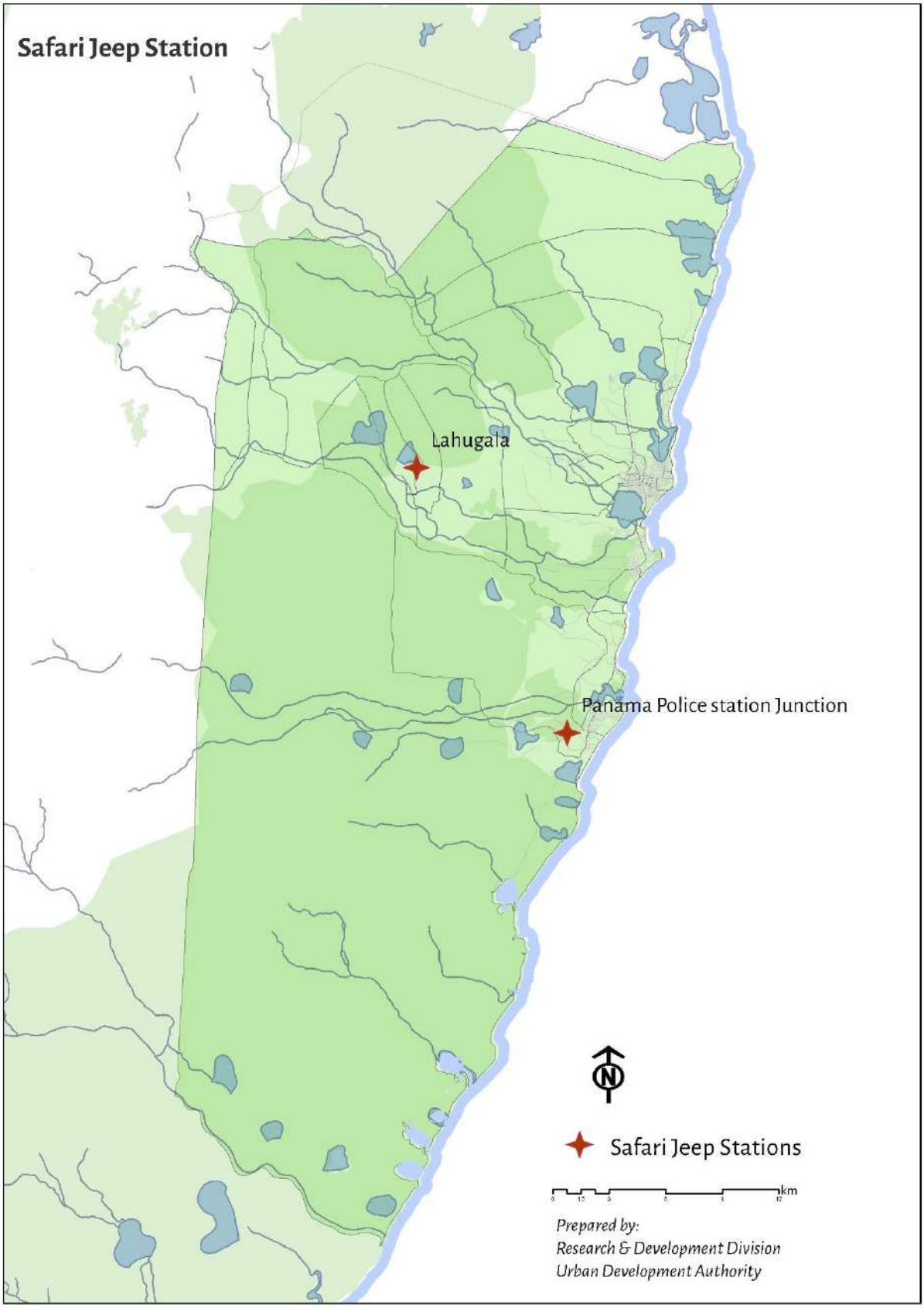
3.3.3.5 Carrying out training and awareness programs for tour guides and safari guides in the area to give better wildlife experience for the tourists and to minimize the disturbances to wildlife (Project Code – TP-3-3-5)

Wildlife watching tourism requires careful planning, management and monitoring if it is to take place without risk to the species that are watched or their habitats. In that case, it is recommended to provide appropriate training and awareness programs for safari guides on international practices and standards related to wildlife observation and safari activities.

3.3.3.6 Registration of safari guides and regular monitoring and management of wildlife safari and observation activities (Project Code – TP-3-3-5)

It is recommended to monitor the safari tours and control them not to congest the safari routes with unnecessary amount of safari cabs and tourists in order to reduce the disturbances to the wildlife. The optimum number of safari tours per day and tour patterns are recommended to be determine based on proper research and manage the tours accordingly.

In order to realize the above, it is recommended to register safari guides and cabs and introduce a license system to monitor and regulate the safari tours.



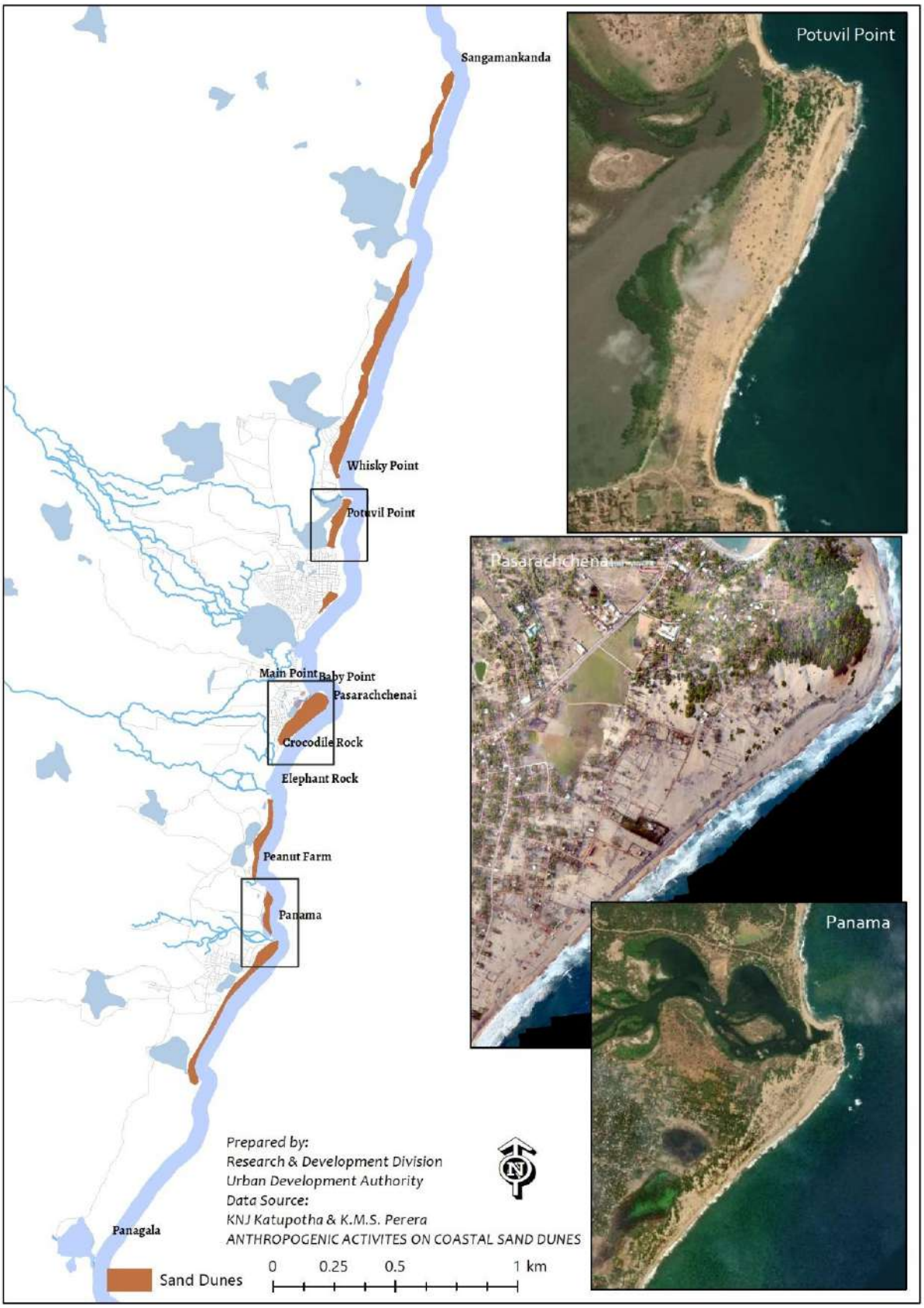
Map 19: Wildlife safari access points in Arugam Bay

3.3.4 Promoting sand dune safari trails at Pottuvil, Pasarichenai and Panama sand dunes

Although, sand dunes are not frequent in most of the beaches in Sri Lanka, Arugam Bay is blessed with around 340 has of sand dunes. Sand dunes are considered as very sensitive eco-system, however it is proposed to promote selected points and trails of sand dunes for tourism under careful management and observations.

Sand dune	Proposed strategy	Reference Project Code
Pottuvil sand dune	Bicycle trail along the existing jeep/ cart route fallen via the Pottuvil sand dune	TP-1-2-4 Section 3.1.2.5
Pasarichenai sand dune	Walking trail along the beach beneath the Pasarichenai sand dune	TP-1-1-4 Section 3.1.1.3 (d)
Panama sand dune	Walking trail along the existing jeep/cart route connecting Panama surf point	TP-1-4-4 Section 3.1.4.4

Table 27: Sand dune safari trails in Arugam Bay



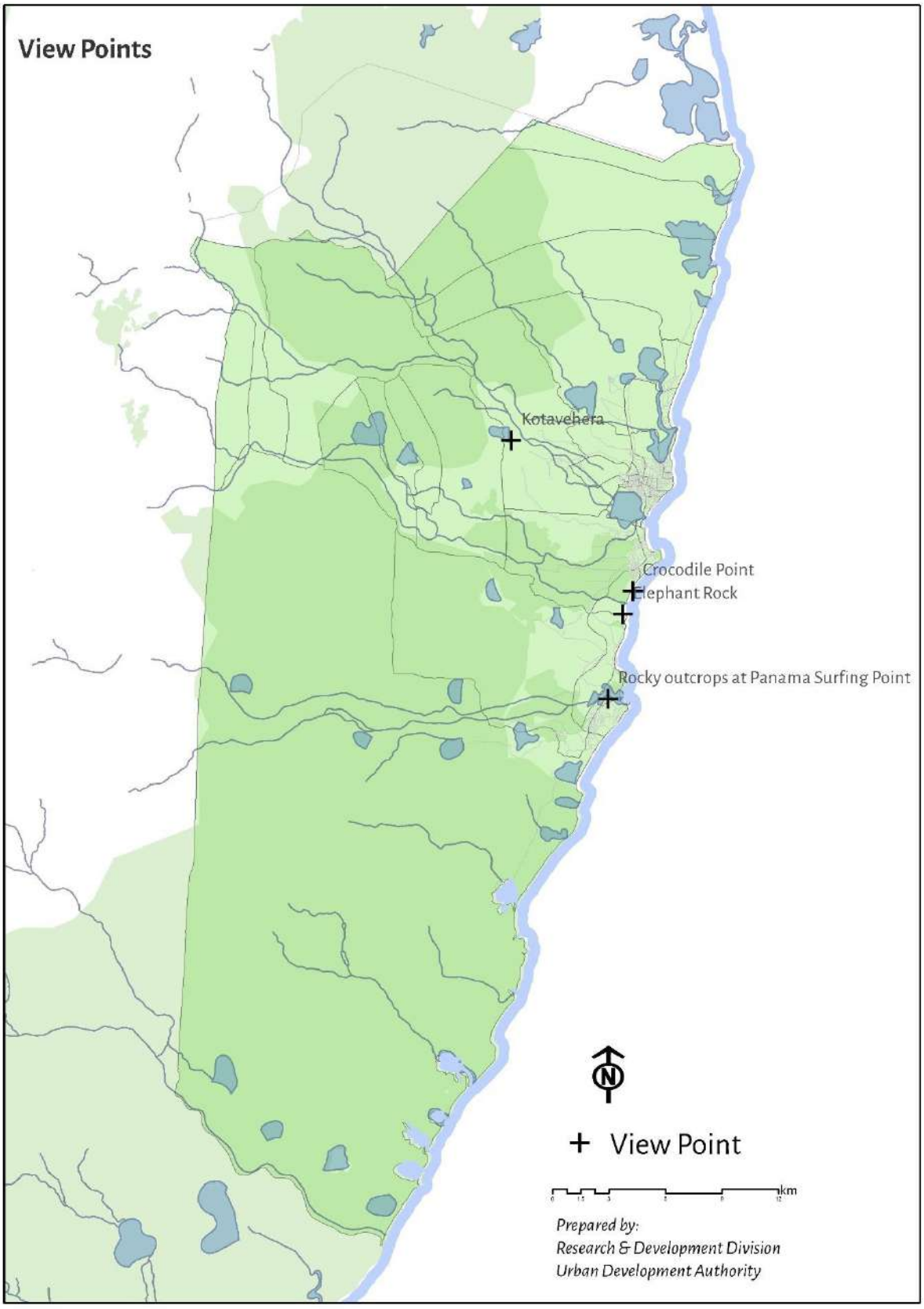
Map 20: Sand dune safari trails in Arugam Bay

3.3.5 Promoting identified rocky outcrops as sunrise/ sunset and 360° viewpoints in Arugam Bay (Project Code – TP-3-4)

Following rocky outcrops are promoted as sunrise/ sunset and 360° viewpoints in Arugam Bay.

No.	View Point	The view
01	Crocodile point	Sunrise viewing point
02	Elephant rock	Sunrise and 360° viewing point
03	Rocky outcrops at Panama Surfing Point	Sunrise and 360° viewing point
04	Kotavehera Viharaya	360° viewing point

Table 28: The viewpoints in Arugam Bay

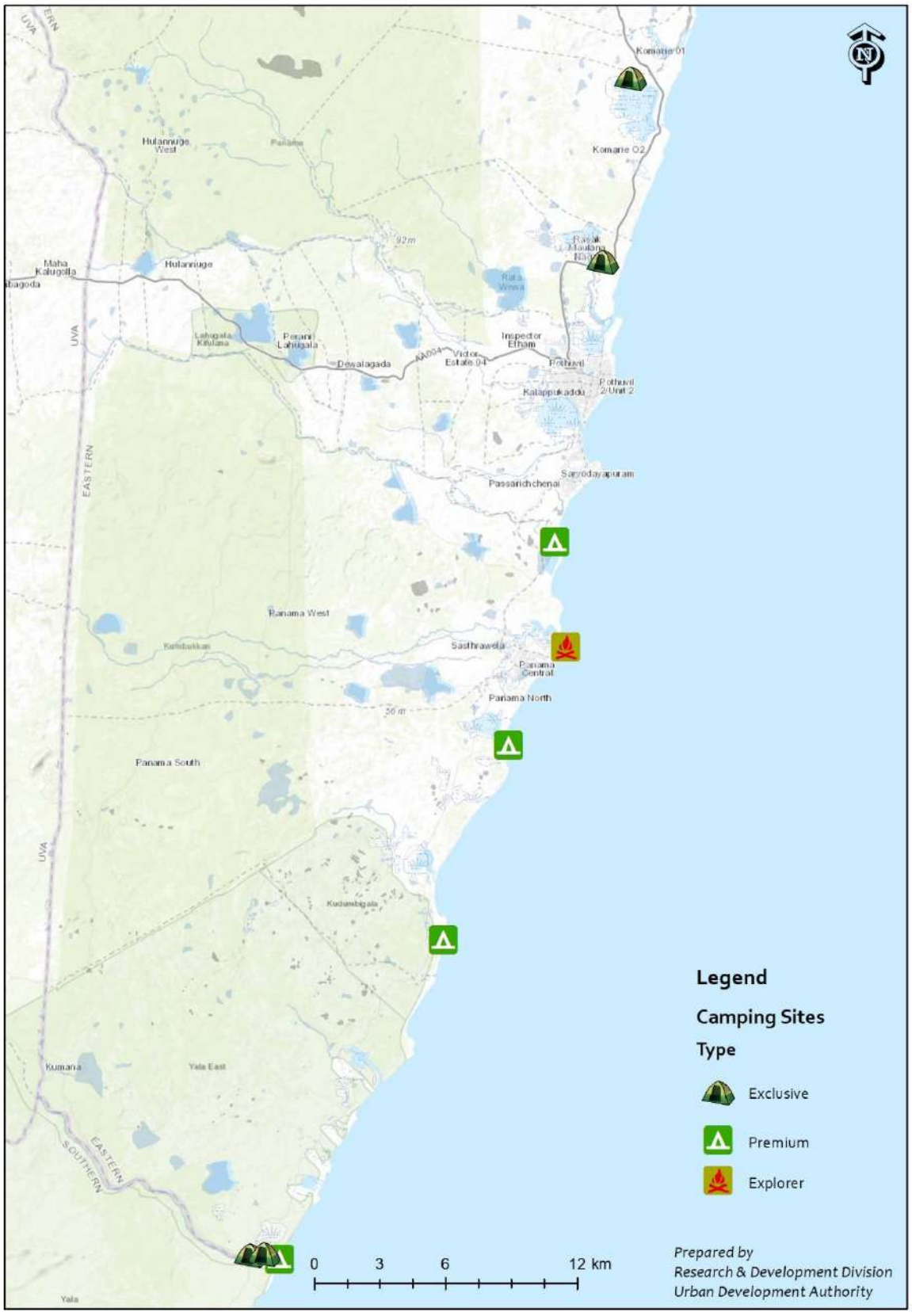


Map 21: The viewpoints in Arugam Bay

3.3.6 Promoting a variety of camping experiences at identified locations in Arugam Bay (Project Code – TP-3-5)

No.	Camping Site	Camping Type	Character
01	In the vicinity of Komari Lagoon	Exclusive Premium Lagoon Camping	Luxurious camping with nature, wildlife and lagoon experience
02	In the vicinity of Urani Lagoon	Exclusive Premium Lagoon Camping	Luxurious camping with nature, wildlife and lagoon experience
03	Kumana National Park – Site 01	Exclusive Premium Forest Camping	Luxurious camping with nature, wildlife & adventurous experience
04	Kumana National Park – Site 02	Premium Forest Camping	Deluxe camping with nature, wildlife & adventurous experience
05	Elephant Rock Surfing Point	Premium beach/ surf camping	Deluxe camping with nature, wildlife, beach, surfing, adventurous & mysterious experience
06	Panagala Surfing Point	Premium beach/ surf camping	Deluxe camping with nature, wildlife, beach, surfing, adventurous & mysterious experience
07	Okanda Surfing Point	Premium beach/ surf camping	Deluxe camping with nature, wildlife, beach, surfing, adventurous & mysterious experience
08	Panama beach	Standard beach camping	Regular camping with nature, wildlife, beach, surfing, adventurous & mysterious experience
09	Pasarichenai	Standard beach/ surf camping	Regular camping with beach, surfing & entertainment experience

Table 29: Different types of camping experiences at Arugam Bay



Map 22: Camping sites in Arugam Bay

TRANSPORT DEVELOPMENT STRATEGY

'CONVENIENT ACCESS TO ARUGAM BAY'

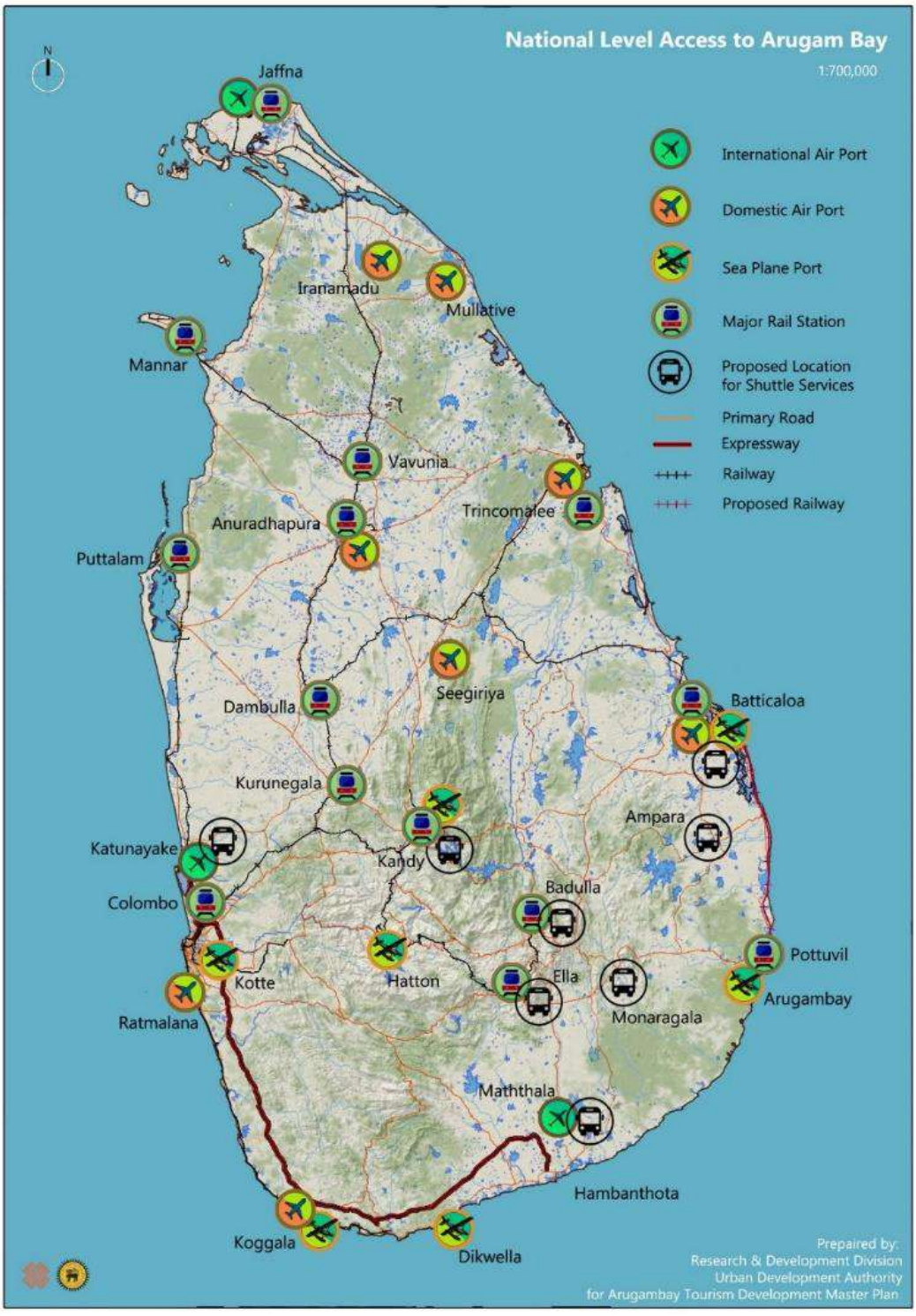
Regional Connectivity and Accessibility Improvement Strategy -
Tourism Attraction Access Ways Management Strategy -
Hierarchical Road Network Development Strategy -
Alternative Transport Modes Development Strategy -

Convenient Access to Arugam Bay

In future, number of alternative transport options will be available for those who dream about visiting Arugam Bay. The voyagers are given the opportunity to select the mode of their preference based on the route, time and cost. However, it has been ensured that all transport options will be convenient, affordable, safe and more time saving.

4.1 Regional Connectivity and Accessibility Improvement Strategy (Project Code – TR-1)

It is proposed to enhance national and regional level connectivity and accessibility of Arugam Bay by introducing alternative transport options including different routes and modes.

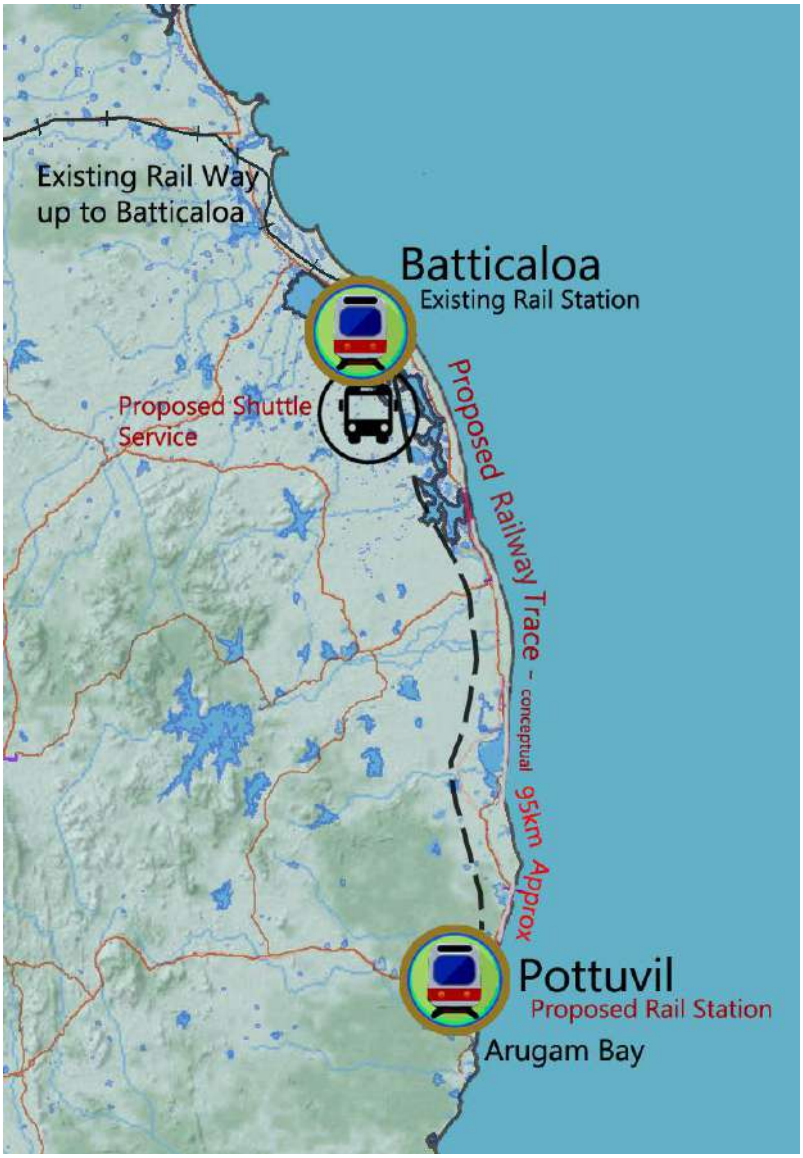


Map 23: National level accessibility of Arugam Bay

4.1.1 Extension of railway connection from Batticaloa to Pottuvil (Project Code – TR-1-1)

Extending a rail connection to Arugam Bay is foreseen as a strategic intervention to enhance the national and regional connectivity of Arugam Bay. It has been observed that a large number of tourists who visit Sri Lanka prefer rail transportation to travel among destinations. Therefore, having a railway link to Arugam Bay can benefit the tourism industry of Arugam Bay in a large scale.

Accordingly, it is recommended to extend the railway link (approximately 95 km in length) from Batticaloa to Pottuvil. Further, it is recommended perceive this project as a collaborative project by Department of Railways, Coast Conservation Department, Department of Forest & other relevant authorities and to proceed with mutual consent based on necessary feasibility studies.



Map 24: The trace of proposed railway link from Batticaloa to Pottuvil

4.1.2 Establishing a sea plane port at Arugam Bay lagoon (Project Code – TR-1-2)

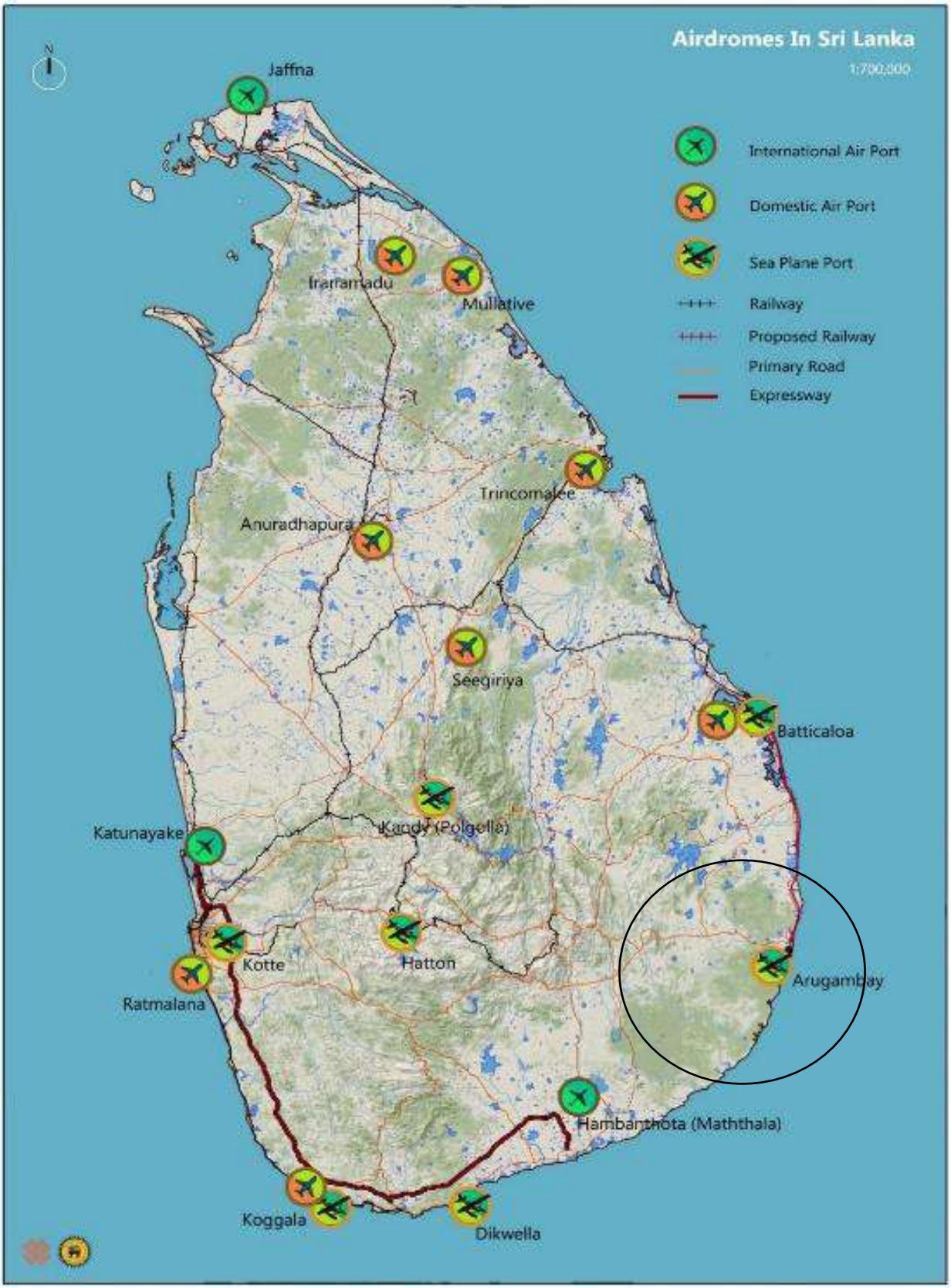
There had been a floating plane pier at the Arugam Bay lagoon which was in function about three to four years back. However at present, the sea plane service is not in operation and the floating plane pier remains abandoned.

During the tourists' perception survey and at stakeholder meetings, it was revealed that there is a considerable demand for a sea plane service to Arugam Bay. There is a significant portion of tourists who prefer to travel directly to Arugam Bay, especially the ones who purposely visit for surfing. Arugam Bay has its own tourists, who visit Sri Lanka for Arugam Bay. Therefore, sea plane service is a better option for them who do not wish to travel to other destinations in the country and who prefer a time saving journey.

Accordingly, it is proposed to establish floating plane pier (sea plane landing deck) at its existing location at Arugam Bay lagoon. (Previous Reference: TP-1-1-1-2/ Section 3.1.1.1 (b)).

The proposed sea plane service will link Arugam Bay directly with other airdromes such as Kotte, Kandy, Hatton, Batticaloa, Dikwella & Koggala. This will further enhance the connectivity of Arugam Bay with Capital City of Sri Lanka and other popular tourism destinations.
Further it is proposed to provide two access ways to connect the floating plane pier with the Pottuvil – Panama main road.

a) Access 1 – Sub road connecting floating plane pier with Pottuvil – Panama main road (Project Code – TR-1-2-1)
b) Access 2 – Boat service connecting the floating plane pier with the proposed Handicraft Village at the south bank of Arugam Bay lagoon and the Pottuvil – Panama main road (Project Code – TR-1-2-2)



Map 25: Arugam Bay sea plane airdrome in relation to other airdromes in Sri Lanka

Figure 41: The location of the proposed Arugam Bay floating plane pier

Figure 40: The proposed two access ways connecting the floating plane pier with the Pottuvil – Panama road

4.1.3 Introducing shuttle services to Arugam Bay from main regional destinations (Project Code – TR-1-3)

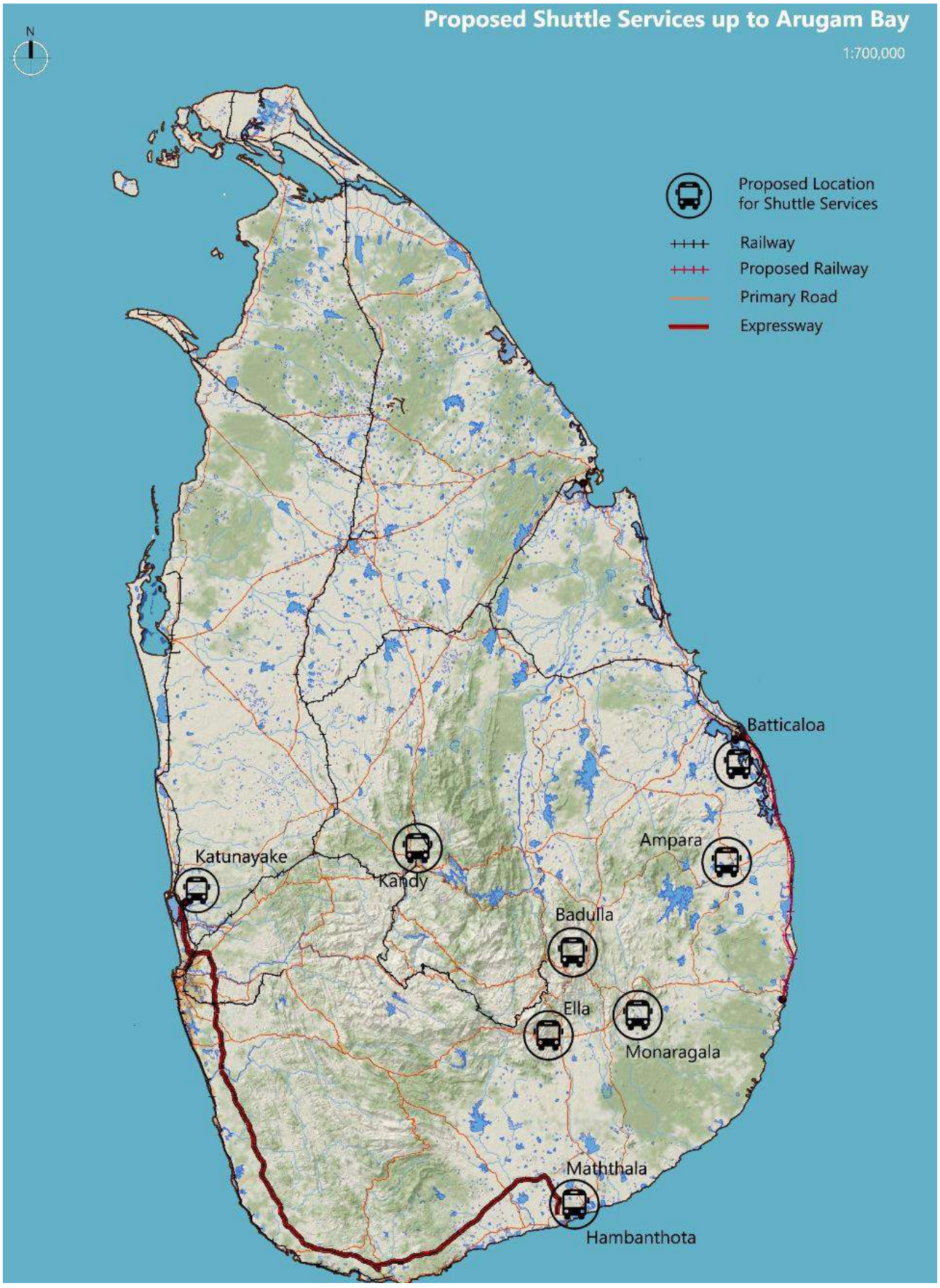
As per the national and regional connectivity study, Batticaloa, Ampara, Monaragala, Badulla, Ella and Hambantota are the surrounding major nodes connecting with Arugam Bay. There is a considerable portion of tourists who visit Arugam Bay using public bus transportation, and above are the major nodes which they have to pass on route to Arugam Bay. Further, it has been observed that tourists visiting Ella tend to visit Arugam Bay as the next destination in their journey.

Considering all above travel patterns, it is recommended to introduce bus shuttle service to Arugam Bay from these major regional nodes. This shuttle service will encourage more tourists to visit Arugam Bay as they are provided safe and convenient transport option.

The proposed shuttle service will enable better spatial links as follows.

- Katunayake at Hambanthota International Airports
- Expressway at Hambanthota
- Major public transport destinations @ Badulla, Monaragala, Ampara
- Existing Railway destination @ Btticaloa
- Ella & Kandy the Major Tourism destinations within closer proximity

It is recommended to implement and manage this shuttle service directly by the Sri Lanka Tourism Development Authority in collaboration with the Sri Lanka Transport Board or in the form of Public Private partnership.



Map 27: Proposed bus shuttle service links to Arugam Bay

4.1.4 Establishing a regional bus terminal at Pottuvil Town (Project Code – TR-1-4)

Not having a proper bus terminal at Pottuvil Town has been identified as a key issue in the context analysis as it was significantly highlighted by the tourists and other stakeholders engaged in the tourism industry of Arugam Bay.

Accordingly, it is proposed to establish a regional level bus terminal with all required facilities at the existing bus stand location in Pottuvil Town. It is proposed to build the bus terminal with required capacity to accommodate all the proposed shuttle service buses and other national and regional bus links. It is recommended to carry out the bus terminal project by the Sri Lanka Tourism Development Authority in collaboration with the Sri Lanka Transport Board as a PPP mode mix development project.

Further, it is proposed to locate Mini Tourist Facilitation Centre at the Pottuvil Bus Terminal (Project Code – TP-2-3-1/ Section 3.2.3) in order to facilitate the tourists visiting Arugam Bay using bus transport or proposed shuttle service. It is proposed to locate following amenities and services within the Mini Tourist Facilitation Centre and the bus terminal complex.

- Banking facilities
- Retail shops/supermarket
- Open restaurants
- Toilets and changing room facilities
- Waiting areas
- Information center
- Free WiFi connections

It is also proposed to locate a main unit of the intra city transportation system of Arugam Bay at the bus terminal so tourists can access available internal travel modes in Arugam Bay.

Figure 43: The location of proposed bus terminal at Pottuvil Town

Figure 42: Conceptual image of envisaged bus terminal at Pottuvil Town

Context Specific Travel Experience

Arugam Bay is a conglomeration of a variety of tourism experiences and attractions. There are very vibrant tourism attractions such as Arugam Bay Main Point and as well as very serene attractions hidden within wilderness such as Panama, Panagala, Okanda and many other archeological sites. The conservation of the unique characters of each attraction is one of our major concerns, thus we have tried our best to let you experience those different characters in deep scale starting from the moment you set off to such attractions.

That is why, you will find different types of roads within Arugam Bay. Not all of them will be tar roads with few lanes but many of them will be narrow gravel roads which take you to hidden attractions. We have ensured that it is not just the attraction itself that amuses you but the whole journey.

4.2 Tourism Attraction Access ways Management Strategy (Project Code – TR-2)

Diversified year around tourism destination is one of the key goals of the proposed Arugam Bay Tourism Development Master Plan. Hence maintaining a diverse tourism experience throughout Arugam Bay has been major concern in this plan and several measures have been proposed to conserve the diverse characters at each attraction site. However, the access ways of each attraction site also make an emotional impact on the tourist about the character of the place, thus it is important to maintain the access way compatible with the character of the attraction site and the context.

Further, the character of the access way can strongly influence on the transport mode and the level of congestion.

Accordingly, road types, elements and construction Materials to achieve anticipated development pattern while preserving the character of each tourism attraction are recommended in the following sections. Three main types of roads are identified based on the type of attraction.

- Roads leads to Cultural Sites
- Roads leads to Major Surfing Points & Main Beach areas
- Roads leads to Protected Lagoon

4.2.1 Managing the roads leading to archeological tourism attractions considering the character and other required facilities (Project Code – TR-2-1)

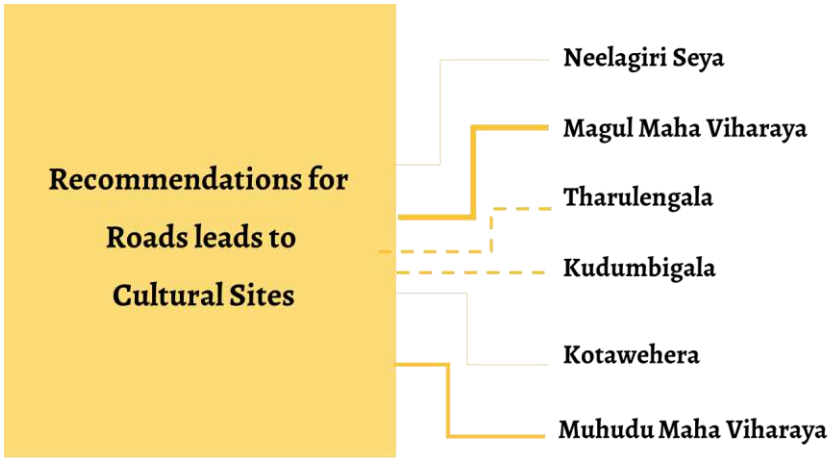


Figure 44: Different types of access ways leading to archeological attraction sites

4.2.1.1 Muhudu Maha Viharaya Access road (Project – TR-2-1-1)

Archeological Site Category	Category 01 - High exposure level with frequent visits
Road type	Tar road (as it is)
Foot path	Existing concrete path Covered with sand
Other facilities	Parking space (500m²) at the entrance
Navigation sign boards	At the junction where main access road meets Pottuvil – Panama road

Table 30: Details of the proposed Muhudu Maha Viharaya Access road

Figure 45: Existing condition of Muhudu Maha Viharaya Access Road

Figure 46: Muhudu Maha Viharaya Access road and relevant facilities

4.2.1.2 Magula Maha Viharaya Access road (Project Code – TR-2-1-2)

Archeological Site Category	Category 01 - High exposure level with frequent visits
Road type	Tar road (as it is) – Pansalgoda road
Foot path	Gray granite paving between grass
Other facilities	Parking space (3000m²)
Navigation sign boards	• Starting point of the main access road • At the junction in middle of the access road

Table 31: Details of the proposed Magul Maha Viharaya Access road

Figure 47: Existing condition of Magul Maha Viharaya Access Road

Figure 48: The character of proposed Gray granite paving between grass

4.2.1.3 Neelagiriseya Access road (Project Code – TR-2-1-3)

Archeological Site Category	Category 02 - Moderate exposure level with less frequent visits
Road type	Gravel Prime road
Foot path	Gravel
Other facilities	Parking space (200m^2)
	Solar powered street lights
Navigation sign boards	• Starting point of the main access road • Starting point of the Neelagiri Temple Road

Table 32: Details of the proposed Neelagiriseya Access road

Figure 49: Existing condition of Magul Maha Viharaya Access Road

Figure 50: The character of proposed Gravel Prime Road

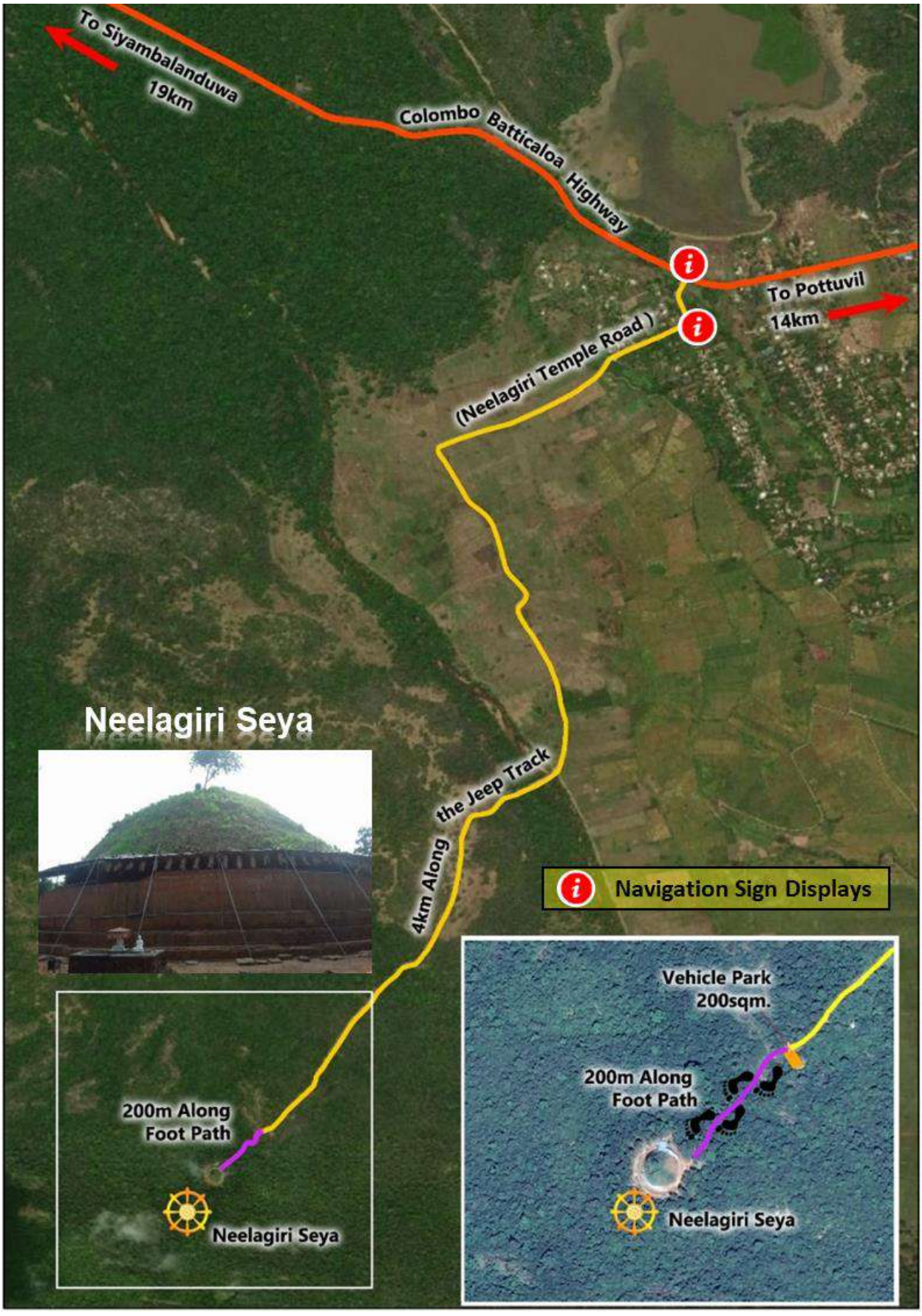


Figure 51: Neelagiriseya Access road and relevant facilities

4.2.1.4 Kotavehera Access road (Project Code – TR-2-1-4)

Archeological Site Category	Category 02 - Moderate exposure level with less frequent visits
Road type	Gravel Prime road
Landscaping at the either sides of the road	Planting shady trees (Bauhinia racemosa – Bidi leaf tree (මඩිල) along the access road (both side) is recommended.
Other facilities	Parking space (250m²)
	Solar powered street lights
Navigation sign boards	• Starting point of the access road

Table 33: Details of the proposed Kotavehera Access road

Figure 52: Existing condition of Kotavehera Access Road

Figure 53: (Bauhinia racemosa – Bidi leaf tree (මඩිල) tree

Figure 54: Kotavehera Access road and relevant facilities

4.2.1.5 Kudumbigala Monsatery Access road (Project Code – TR-2-1-5)

Archeological Site Category	Category 02 - Moderate exposure level with less frequent visits
Road type	Jeep Track (Gravel)
Foot path	Maintain as existing. (Concrete should not be used in further development)
Other facilities	Parking space (400m^2)
Navigation sign boards	• Panama junction • Junction of Panama- Kumbukkana Road

Table 34: Details of the proposed Kudumbigala Monastery Access road

Figure 55: Existing condition of Kudumbigala Monastery Access Road

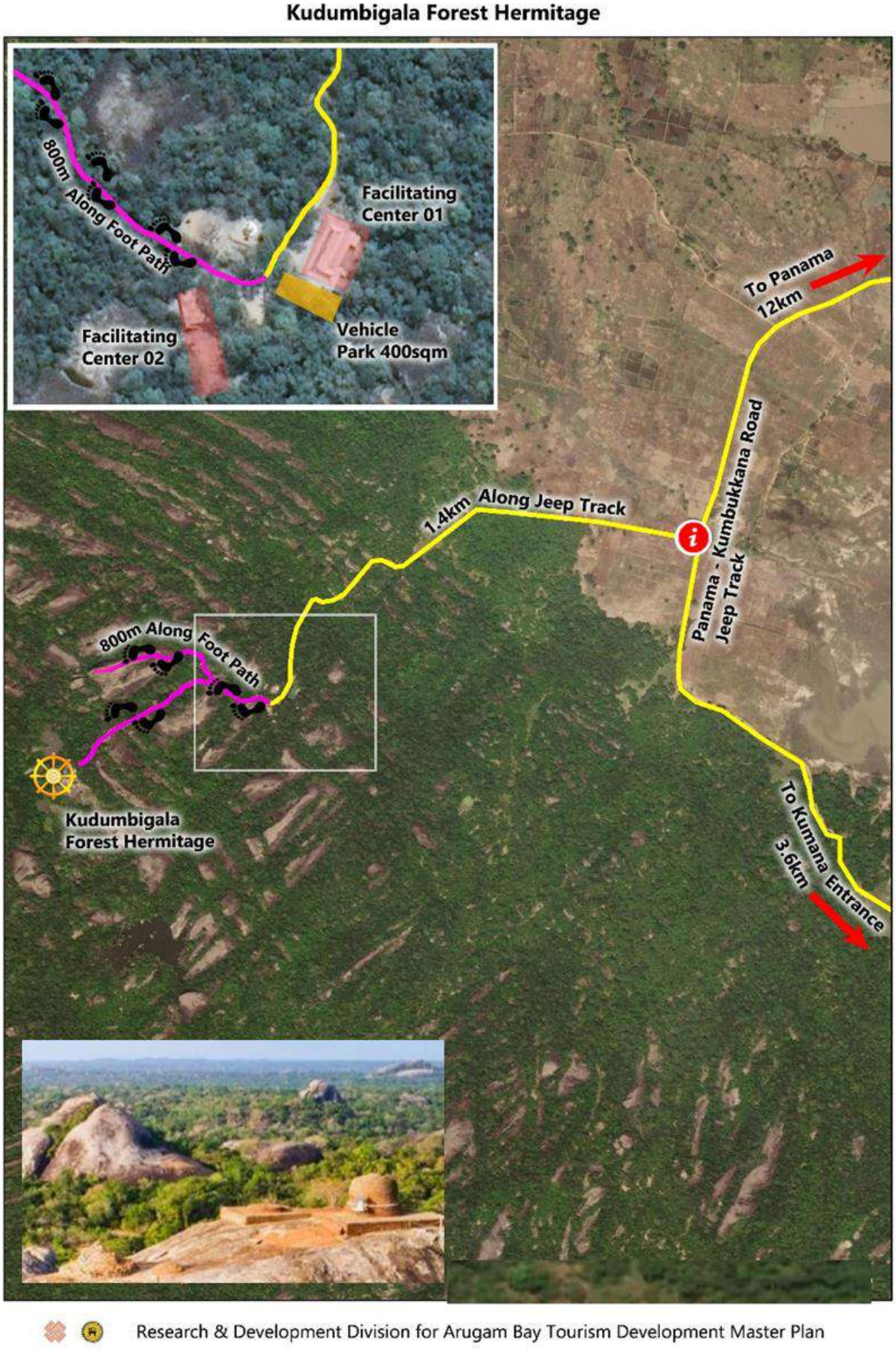


Figure 56: Kudumbigala Monastery Access road and relevant facilities

4.2.1.6 Tharulengala Access road (Project Code – TR-2-1-6)

Archeological Site Category	**Category 02 - Moderate exposure level with less frequent visits**
Road type	Jeep Track (Gravel Prime)
Foot path	Maintain as existing. (Concrete should not be used in further development)
Other facilities	Parking space (400m^2)
Navigation sign boards	• Hulan Nuge junction

Table 35: Details of the proposed Tharulengala Access road

Figure 57: Existing condition of Tharulengala Access Road

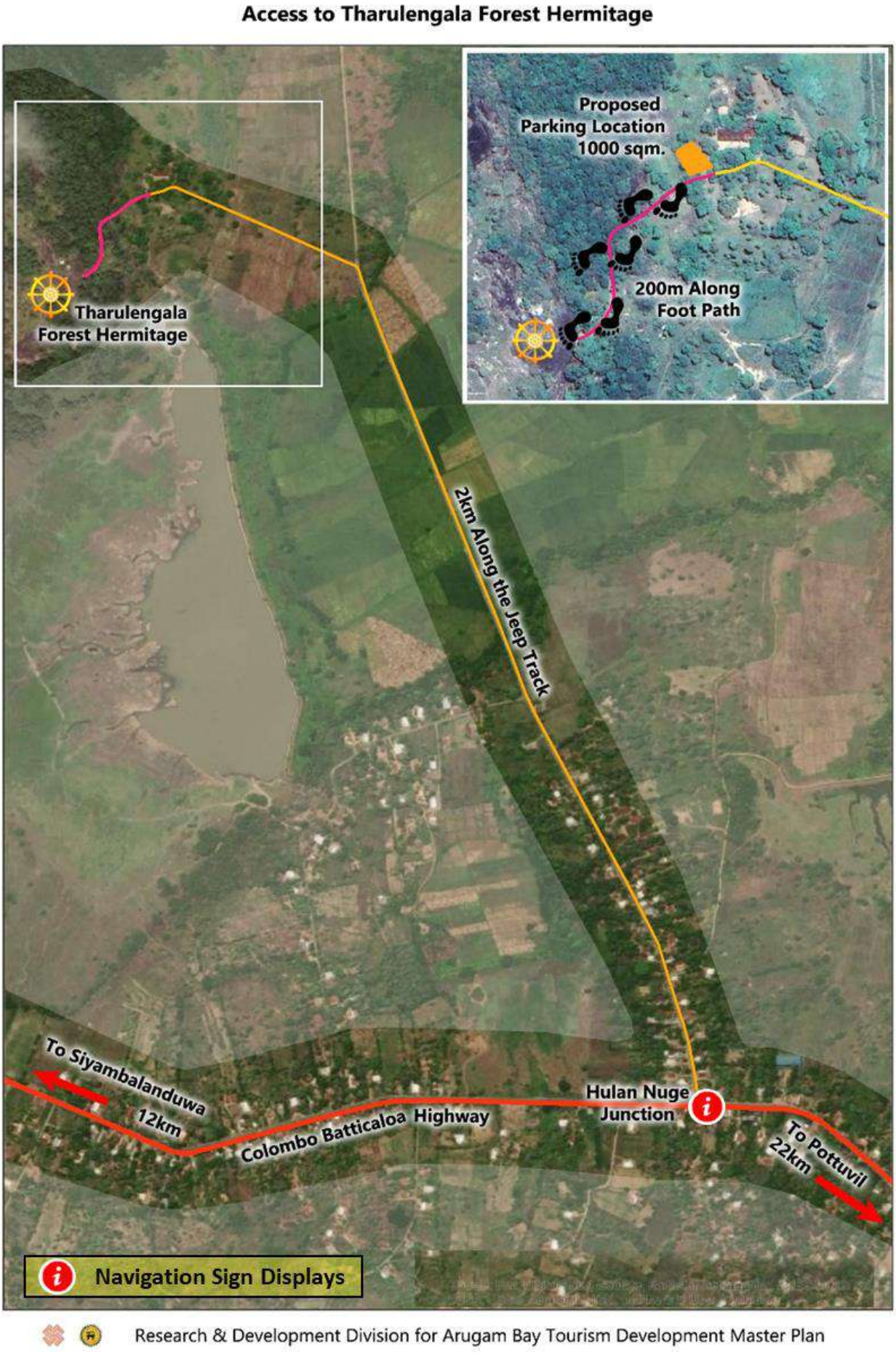


Figure 58: Tharulengala access road and relevant facilities

4.2.2 Managing the roads leading to surfing points and main beaches considering the character and other required facilities (Project Code – TR-2-2)

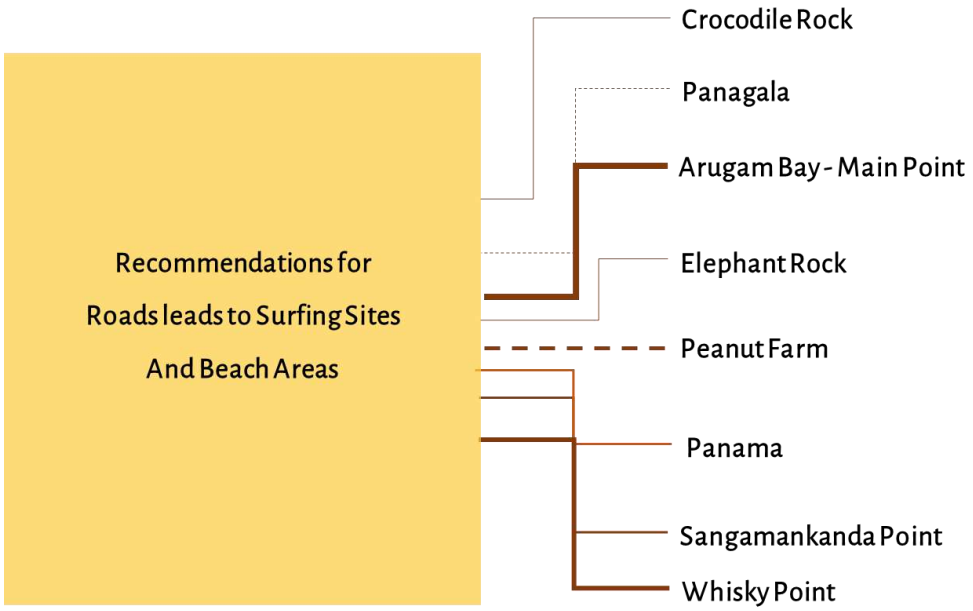


Figure 59: Different types of access ways leading to surfing points and main beaches

4.2.2.1 Access to Arugam Bay Beach/ Baby Point & Main Point (Project Code – TR-2-2-1)

Tourism Cluster & Character	Arugam Bay Tourism Cluster – Most vibrant cluster giving a climax experience
Road type	Paved Access
Other facilities	Solar Powered Street Lights
Navigation sign boards	• Starting point of the Surfing Place Road

Table 36: Details of the proposed access to Arugam Bay Beach/ Baby Point & Main Point

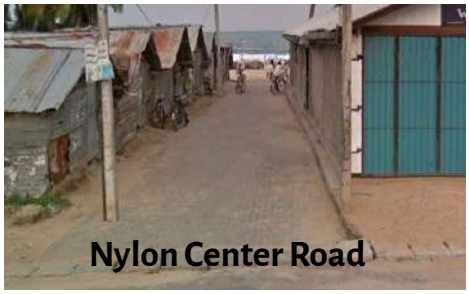


Figure 60: Existing condition of Arugam Bay main beach access roads

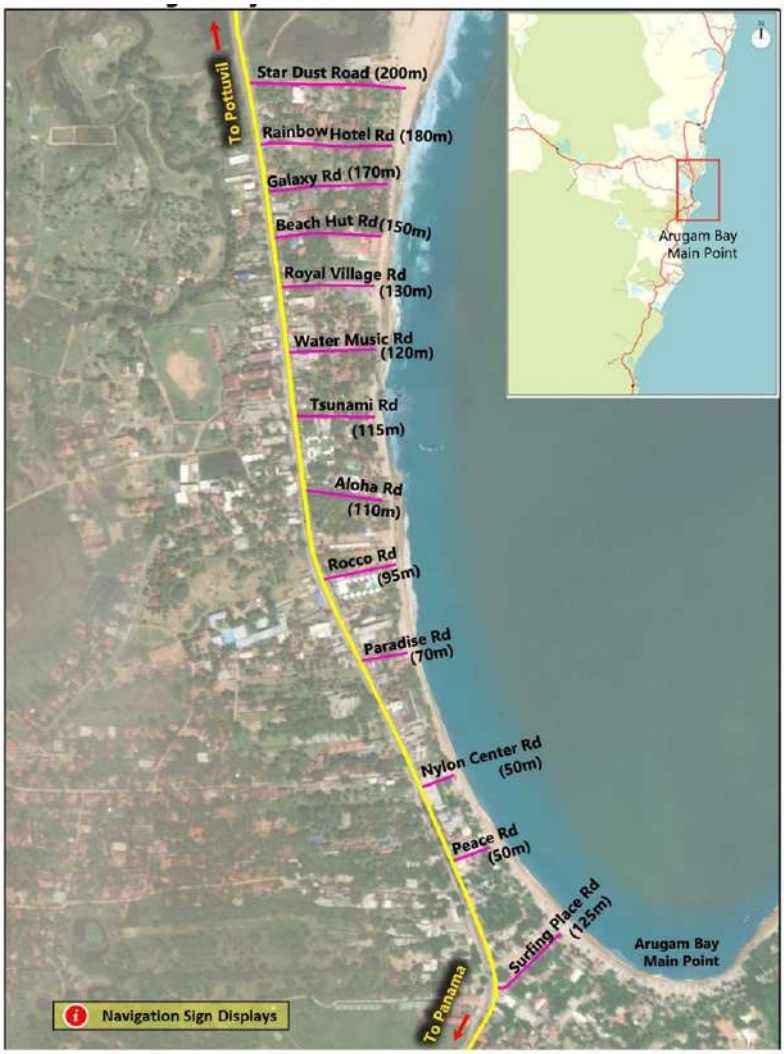


Figure 61: Alley ways connecting Arugam Bay beach and the Main Street

4.2.2.2 Access to Pasarichenai Surfing Point & Beach (Project Code – TR-2-2-2)

Tourism Cluster & Character	Arugam Bay Tourism Cluster – Most vibrant cluster giving a climax experience
Road type	Jeep Track (Gravel Prime)
Foot Path	Path along the beach
Other facilities	Parking space
Navigation sign boards	• Proposed car park • Cemetery Road Junction • Cemetery Road - Bypass Road Junction at Pottuvil – Panama Road

Table 37: Details of the proposed access to Pasarichenai surfing point & beach

Figure 62: Existing access ways to Pasarichenai beach

Figure 63: Proposed access to Pasarichenai surfing point and beach

4.2.2.3 Access to Whiskey Point & Kottukal Beach (Project Code – TR-2-2-3)

Tourism Cluster & Character	Whiskey Point Tourism Cluster – Moderately extravagant and vibrant
Road type	Jeep Track (Gravel Prime)
Other facilities	Parking space
Navigation sign boards	• Colombo Batticaloa Highway Turning Junction • Two main junctions within new road Network
Other	Bicycle path along Pottuvil Lagoon Boundary

Table 38: Details of the proposed access to Whiskey Point

Figure 64: Existing access ways to Whiskey Point

Figure 65: Proposed access to Whiskey point

4.2.2.4 Access to Sangamankanda Surfing Point (Project Code – TR-2-2-4)

Tourism Cluster & Character	Komari Tourism Cluster – Fully extravagant and calming
Road type	Manalchenai Road - Gravel Prime
Other facilities	Parking space
Navigation sign boards	• Starting point of the Manalchenai road at Colombo - Batticaloa highway
	• Main junctions within the road network

Table 39: Details of the proposed access to Sangamankanda Point

Figure 66: Existing access ways to Sangamankanda Point (Manalchenai road)

Figure 67: Proposed access to Sangamankanda point

4.2.2.5 Access to Crocodile Rock & Elephant Rock Surfing Points (Project Code – TR-2-2-5)

Tourism Cluster & Character	Close to Arugam Bay Tourism Cluster – Serene, nature based & adventurous
Road type	Jeep Track (Gravel Prime)
Foot Path	Path along the beach
Other facilities	Parking space
Navigation sign boards	• Kuda Kalli Road Junction • Al Ishraq Road Junction • Elephant Rock Road turning junction

Table 40: Details of the proposed access to Crocodile Rock & Elephant Rock Surfing Points

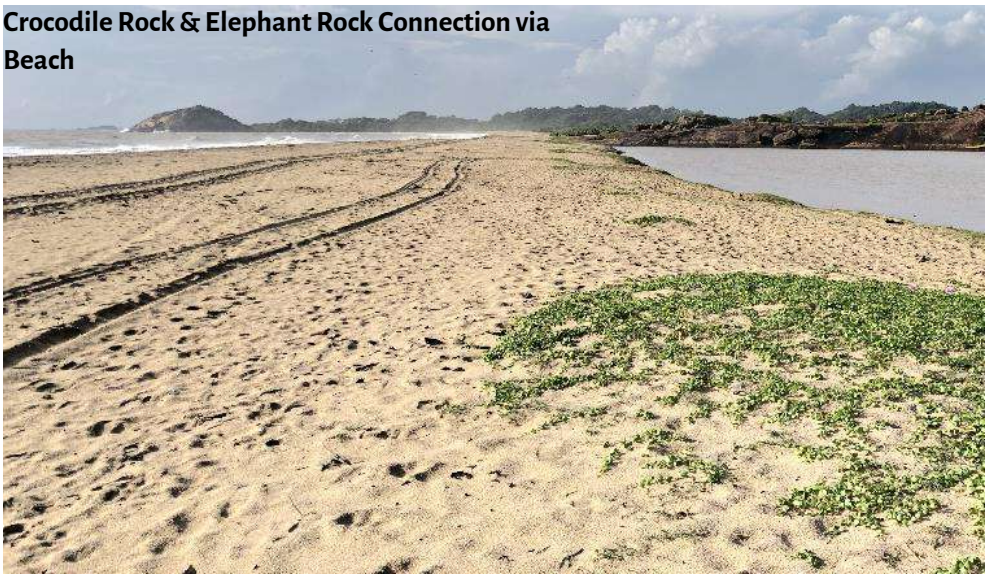


Figure 68: Crocodile Rock & Elephant Rock Connection via Beach

Figure 69: Proposed access to Crocodile Rock & Elephant Rock

4.2.2.6 Access to Peanut Farm Beach (Project Code – TR-2-2-6)

Tourism Cluster & Character	**Close to Panama Tourism Cluster – Serene, mysterious & adventurous**
Road type	Jeep Track (Gravel condition)
Foot Path	Maintaining as existing (Sandy Path)
Other facilities	Parking space
Navigation sign boards	Access road intersection at Panama – Pottuvil Road

Table 41: Details of the proposed access to Peanut Farm beach

Figure 70: Existing Peanut Farm beach access road

Figure 71: Proposed access to Peanut Farm beach

4.2.2.7 Access to Panama Beach and Panama Lagoon (Project Code – TR-2-2-7)

Tourism Cluster & Character	Panama Tourism Cluster – Serene, mysterious & adventurous
Road type	Jeep Track (Gravel Prime and Gravel)
Other facilities	Parking space
Navigation sign boards	• Panama Junction • Intersection at Panama – Kumbukkana Road

Table 42: Details of the proposed access to Panama beach and Panama lagoon

Figure 72: Existing Panama beach access road

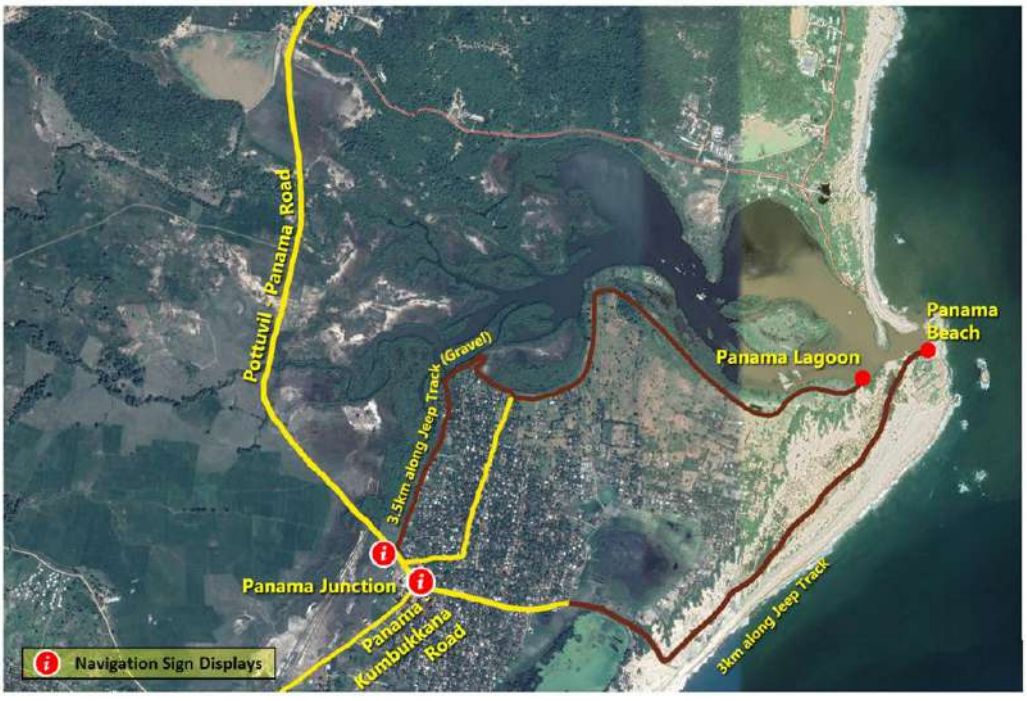


Figure 73: Proposed access to Panama beach & Panama lagoon

4.2.2.8 Access to Panagala Surfing Point & Beach (Project Code – TR-2-2-8)

Tourism Cluster & Character	Panagala & Okanda Tourism Cluster – Serene, mysterious & adventurous
Road type	Jeep Track (Gravel Prime)
Foot Path	Maintaining as it is (Concrete/Tar should not use in further development)
Other facilities	Parking space (400m²)
Navigation sign boards	• Panama Junction

Table 43: Details of the proposed access to Panagala surfing point and beach

Figure 74: Proposed access to Panagala surfing point and beach

4.2.2.9 Access to Okanda Beach and Hindu Temple (Project Code – TR-2-2-9)

Tourism Cluster & Character	Panagala & Okanda Tourism Cluster – Serene, mysterious & adventurous
Road type	Jeep Track (Gravel Prime)
Foot Path	Maintain as existing (Sandy Path)
Other facilities	Parking space
Navigation sign boards	• Panama Junction • Intersection at Panama – Kumbukkana Road

Table 44: Details of the proposed access to Okanda beach and Hindu temple

Figure 75: Existing access way to Okanda beach and Hindu temple

4.2.3 Managing the roads leading to lagoon environs considering the character and other required facilities (Project Code – TR-2-3)

Figure 76: Proposed access to Okanda beach & Hindu temple

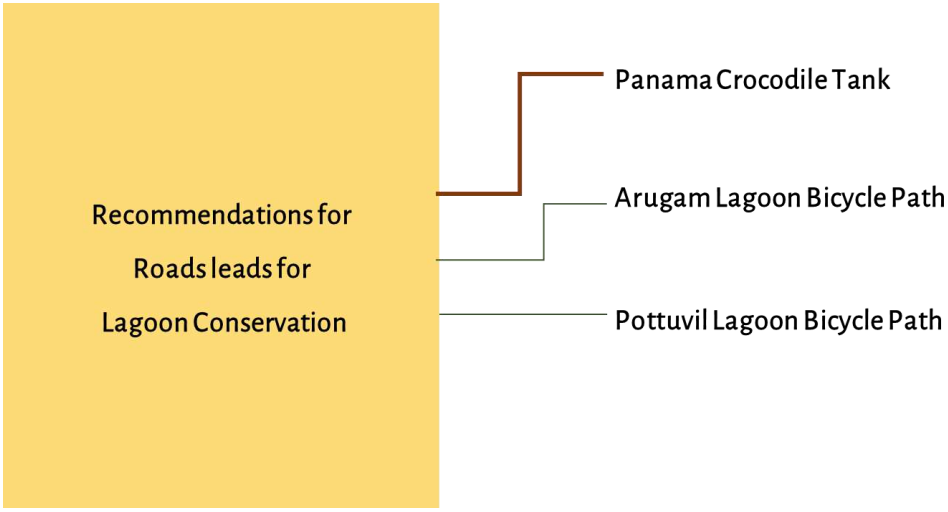


Figure 77: Different types of access ways leading to lagoon environs

4.2.3.1 Access to Pottuvil lagoon (Project Code – TR-2-3-1)

Tourism Cluster & Character	Whiskey Point Tourism Cluster – Moderately extravagant and vibrant
Road type	Non-motorized track developed as a bicycle path (based on a sand stabilizer)
Other facilities	Solar Powered Street Lightings
Navigation sign boards	• Connection nodes of Colombo – Batticaloa Highway
Other	Path will be promote as bicycle path which connects Pottuvil – Whishkey Point via Kottukal Beach

Table 45: Details of the proposed access to Potuvil lagoon

Figure 78: Proposed access to Potuvil lagoon

4.2.3.2 Access to Crocodile lake at Panama (Project Code – TR-2-3-2)

Tourism Cluster & Character	**Panama Tourism Cluster – Serene, mysterious & adventurous**
Road type	Jeep Track (Gravel Prime or Sand Stabilizer) Use of Concreate/ Tar is not recommended
Other facilities	Parking space
Navigation sign boards	• Panama junction • Connection nodes at Panama – Kumbukkan road

Table 46: Details of the proposed access to Crocodile lake at Panama

Figure 79: Existing access way to Crocodile lake at Panama

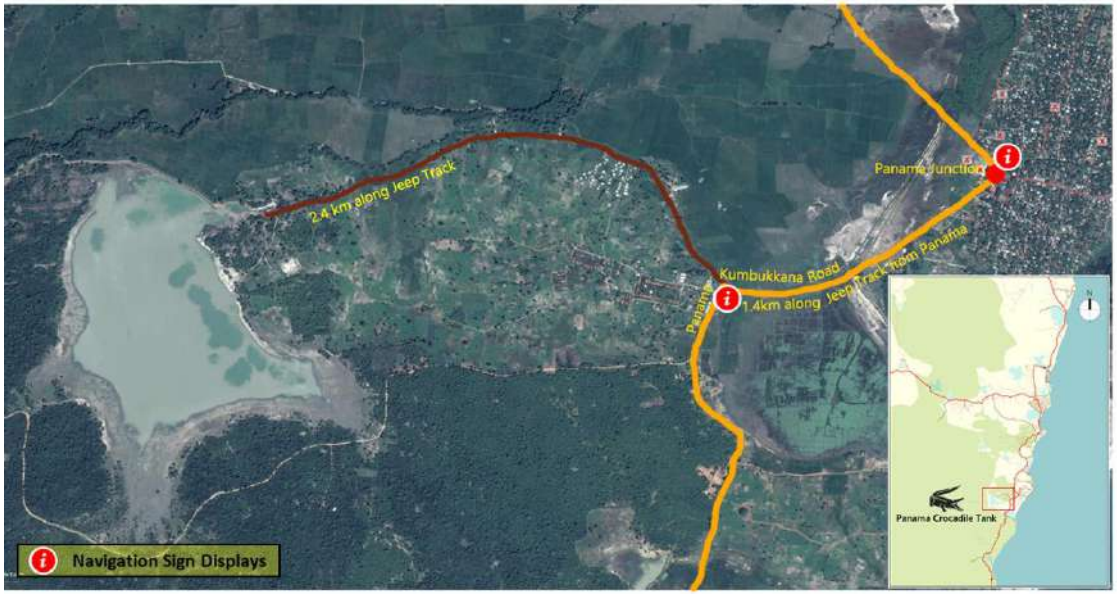


Figure 80: Proposed access to Crocodile lake at Panama

Convenient Mobility within Arugam Bay

We have ensured that moving around Arugam Bay is convenient and at the same time, traffic would not be a disturbance to the tourism activities. Main Street, the most functional street of Arugam Bay will be safe from rapid moving traffic and be more pedestrian friendly. Further, the hierarchically arranged roads will ensure that sensitive areas, serene tourists attractions and local neighborhoods will be free from congested roads and the road characters will be in compatible with the conserved characters of the different contexts.

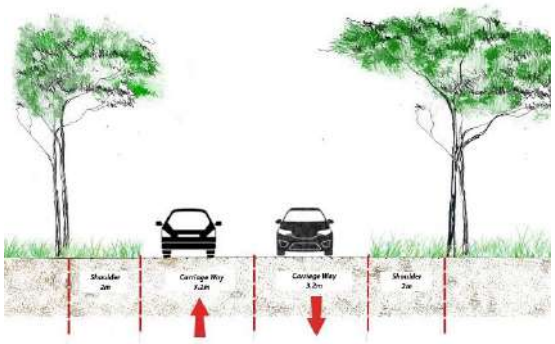
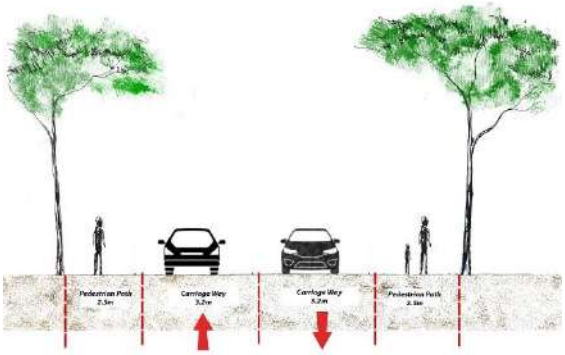
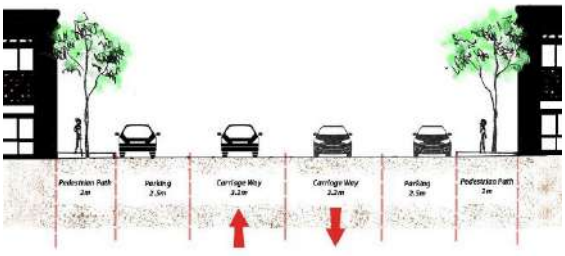
4.3 Hierarchical Road Network Management Strategy (Project Code – TR-3)

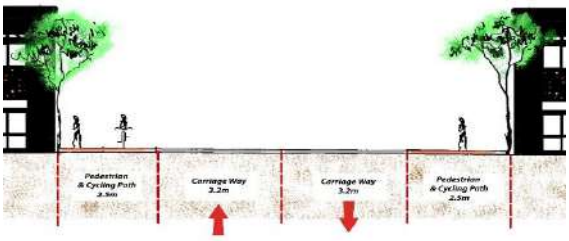
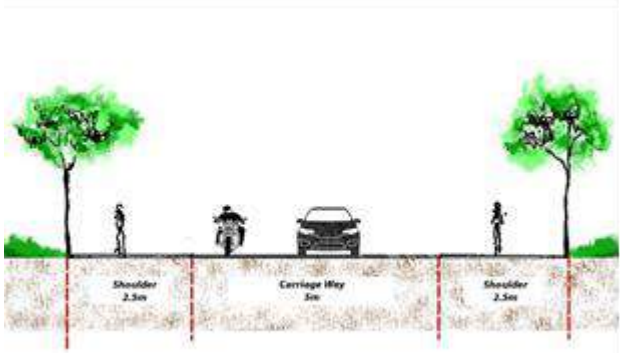
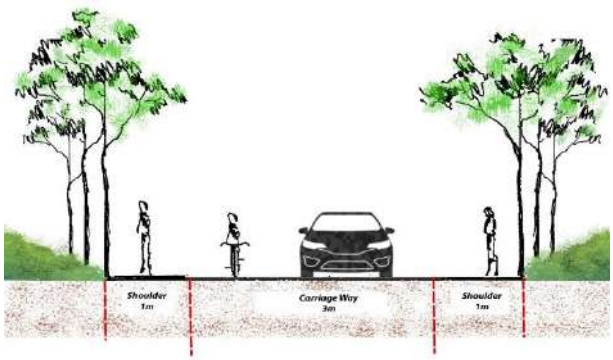
The street hierarchy is an urban planning technique for laying out road networks that exclude automobile through-traffic from developed & functional areas. It is conceived as a hierarchy of roads that embeds the link importance of each road type in the network topology (the connectivity of the nodes to each other). Street hierarchy restricts or eliminates direct connections between certain types of links, for example residential streets and arterial roads, and allows connections between similar order streets (e.g. arterial to arterial) or between street types that are separated by one level in the hierarchy (e.g. arterial to highway and collector to arterial.) By contrast, in many regular, traditional grid plans, as laid out, higher order roads (e.g. arterials) are connected by through streets of both lower order levels (e.g. local and collector. Hence, maintaining of hierarchically arranged & facilitated road network is a key factor to organize the urban setting. Accordingly, to enhance and protect the street functions and to ease the traffic conditions of the certain areas, the hierarchy arranged road network has been introduced to the area. This has two strategic interventions as follows,

1. Introducing default road sections to identified major/ significant roads in Arugam Bay
2. Developing a traffic by - pass road connecting Lahugala and Arugam Bay

4.3.1 Introducing default road sections for identified major/ significant roads in Arugam Bay (Project Code – TR-3-1)

Map 28: Cross sections of proposed major/ significat roads in Arugam Bay

Section Type	Recommendations
Section 01 	• The proposed section is preferred for Primary Roads lead towards major town area with less development/ density. • Paddy, Scrubs, Forest are preferable as alongside land use. • Two lanes, each with 3.2m width & 2m shoulders at each side and latter should be maintained as soft-scape
Section 02 	• The proposed section is preferred for Primary Roads lead towards major town area with moderate development/ density. • Moderately dense commercial/ residential development is preferable as alongside land use. • Two lanes, each with 3.2m width and 2.5m pedestrian paths at either side and the latter can be maintained as same as carriage way condition.
Section 03 	• The proposed section is preferred for Primary Roads lead through major town area with higher development/ density. • High dense commercial/ residential development is preferable as alongside land use. • Two lanes, each with 3.2m width and raised 2m wide pedestrian paths at both side should be maintained • Two on-street parking lanes should be maintained as same as carriage way level & condition.

Section 04  	• The proposed section is preferred for Primary Roads lead through major town area with high development/ Density. • Moderately dense commercial/ tourism development is preferable as alongside land use. • Two lanes, each with 3.2m width and pedestrian & cycling paths at both side which should be maintained as 2.5m in width and as same as carriage way level & condition.
Section 05  	• The proposed section is preferred for the Secondary Roads. • Recommended for areas anticipated to have less development and less traffic movements. • Mostly preferred for the Bypass road and Muhudu Maha Viharaya Access Road. • Single carriage way being 5m in width and having 2.5m wide shoulders at both side. The shoulders should be maintained as soft-scape.
Section 06  	• The proposed section is preferred for Existing Jeep Tracks. • Especially recommended for access ways of tourism attractions which are located away from main roads. (ex: Kudumbigala, Penut Farm Beach, Panama, Crocadile Tank ect.) • Single carriage way of 3m width and having 1m wide shoulders at both

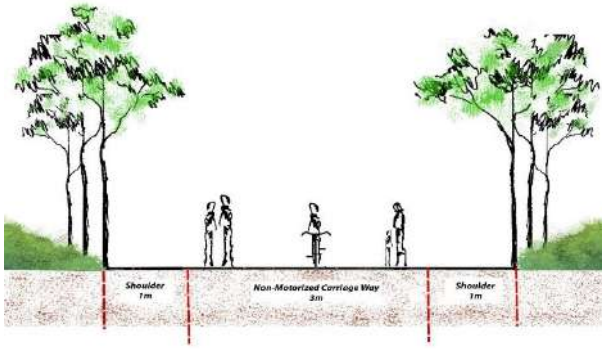
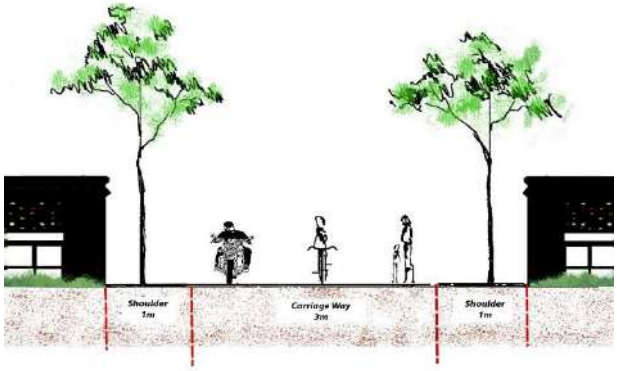
	side. The shoulders should be maintained as soft-scape.
Section 07  	• The proposed section is preferred for non-motorized access ways. • Recommended for lagoon conservation access/ bicycle paths and Whiskey Point access cycle path. • Single carriage way of 3m width and having 1m wide shoulders at both sides. The shoulders should be maintained as soft-scape.
Section 08  	• The proposed section is preferred for the beach access roads along Arugam Bay main strip. • Single carriage way of 3m width and having 1m wide shoulders at both sides. The shoulders should be maintained as soft-scape. • These roads are open for both motor vehicles and pedestrians

Table 47: Proposed road cross-sections for main/ significant roads in Arugam Bay

4.3.2 Developing a traffic by-pass road connecting Lahugala and Arugam Bay (Project Code – TR-3-2)

It is proposed to develop a traffic by-pass road connecting lahugala and Arugam Bay to by-pass Pottuvil town area. The proposed by-pass road will enable the tourists to reach Arugam Bay by-passing Pottuvil town. The proposed by-pass road which falls via Shasthrawela is a route fallen in the middle of forest and green area, thus it will enable tourists to have a relaxing travel experience to Arugam Bay from Lahugala.

More importantly, this by-pass road will divert the traffic leading to Panama from Moneragala area through Colombo – Batticaloa highway without disturbing the functions of the Main Street of Arugam Bay. Since, Arugam Bay Main Street is promoted as a pedestrian friendly street rather than a motorized vehicle friendly, the proposed by-pass road is an alternative for through traffic to by-pass the main street.

Map 29: The trace of the proposed by-pass road connecting Lahugala & Arugam Bay

Figure 81: Existing road through which the by-pass road is proposed

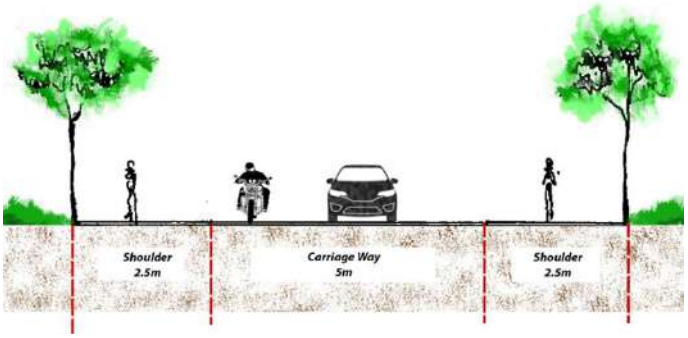


Figure 82: Proposed cross-section of the by-pass road

A variety of transport options to explore Arugam Bay

There are multiple modes of transport available within Arugam Bay and the tourists are welcome to use any mode of their preference. Tourists have the opportunity to select any mode which suits their budget, duration of stay, intended places to visit, size of the group and personal preference. Whichever the choice is made, we have assured that ever mode is safe, reliable and there are adequate affordable options to make Arugam Bay an inclusive destination.

4.4 Alternative Transport Modes Management Strategy (Project Code – TR-4)

Enabling tourists to have a range of transport options to select as per their preference makes a destination more convenient, affordable and inclusive. It helps to create a lasting impression in tourists and gradually increases the overall attraction level of the destination. It is for these reasons, a chain of alternative transport modes has been introduced in Arugam Bay. Not only, there are a variety of transport modes, but also they have been linked together to create a whole new intra-city transportation system.

4.4.1 Establishing an Intra City Transportation System (ICTS) combining all transport modes available in Arugam Bay (Project Code – TR-4-1)

It is proposed to establish an Intra City Transportation System integrating the below mentioned transport modes.

- Public bus
- Shuttle services
- Three-wheelers (tuk-tuk)
- Bicycles
- Motor Bikes, Dirt Bikes & Electric Bikes
- Caravans
- Taxi cars & vans
- Rental cars & vans

It is proposed to manage the above different modes of transport as mentioned below.

Transport Mode	Management Mechanism	Project Code
Public Bus transportation	• Key operators – SLTB & Private parties • Operational centre – Pottuvil Bus stand • Main bus routes – Colombo – Batticaloa highway (regional buses) & Pottuvil – Panama road (local buses)	TR-4-1-1

Shuttle services	• Shuttle links
	  ○ Lahugala – Arugam Bay
	  ○ Komari – Arugam Bay
		TR-4-1-2

	○ Panama – Arugam Bay • Key operators – SLTB & Private parties • Operational centres ○ Pottuvil Bus stand ○ Lahugala Entrance gateway ○ Komari Entrance gateway	
Three-wheelers (tuk-tuk)	• Key operators – Private parties • Registering all tuk-tuk drivers in Arugam Bay and including them in the special mobile transport app of Arugam Bay • Providing the tuk-tuk rental system where tourists can rent out tuk-tuks for preferred time periods (Installing GPS equipment in all rental tuk-tuks) • Placing tuk-tuk rental counters at intra city transportation system (ICTS) operation units	TR-4-1-3
Rental Bicycles	• Key operators – SLTDA & Private parties • Registering all rental bicycles and Installing GPS equipment • Placing bicycle rental outlets at ICTS operation units, proposed car park at Arugam Bay and at other major attraction points • Introducing self-renting of bicycles through mobile transport app of Arugam Bay	TR-4-1-4
Rental Motor Bikes, Dirt Bikes & Electric Bikes	• Key operators – SLTDA & Private parties • Registering all rental Motor Bikes, Dirt Bikes & Electric Bikes and Installing GPS equipment • Placing bike rental counters at ICTS operation units • Enabling rental bikes booking through mobile transport app of Arugam Bay	TR-4-1-5

Rental caravans	• Key operators – SLTDA & Private parties • Registering all rental caravans and Installing GPS equipment • Placing caravan rental counters at ICTS operation units • Enabling rental caravans booking through mobile transport app of Arugam Bay	TR-4-1-6
Taxi cars & vans	• Key operators – SLTDA & Private parties • Registering all taxi drivers and installing GPS equipment in every taxi car/ van • Enabling taxi booking through mobile transport app of Arugam Bay • Placing taxi parks at the ICTS operation units	TR-4-1-7
Rental cars & vans	• Key operators – SLTDA & Private parties • Registering all rental cars & vans and Installing GPS equipment • Placing rental counters at ICTS operation units • Enabling rental cars & vans booking through mobile transport app of Arugam Bay	TR-4-1-8

Table 48: Proposed management mechanisms of different transport

4.4.2 Establishing operational units of proposed Intra City Transportation System (ICTS) at identified locations in Arugam Bay

It is proposed to establish operation units of ICTS at following tourist facilitation centres.

	Tourist Facilitation Centre	Project Code
01	Tourist Facilitation Centre at the Lahugala Welcoming Gateway	TP-2-1-2
02	Tourist Facilitation Centre at the Komari Welcoming Gateway	TP-2-1-2
03	Tourist Facilitation Centre in close proximity to Arugam Bay Main Point	TP-1-1-6
04	Mini Tourist Facilitation Centre at the Pottuvil Bus Terminal	TP-2-3-1
05	Mini Tourist Facilitation Centre at the Main Bridge of Arugam Bay	TP-2-3-2

Table 49: The locations of proposed operation units of ICTS

4.4.3 Introducing a web site and a mobile application on Intra City Transportation System of Arugam Bay (Project Code – TR-4-2)

It is proposed to introduce a web site and a mobile application on Intra City Transportation System including following information.

- Available different transport modes, charges and terms & regulations
- Booking facilities of available transport modes
- Online payment for different transport modes
- Provisions for real time monitoring of travel routes of hired/ rented vehicles by admin
- Profiles of taxi & tuk-tuk drivers
- Emergency help notification options
- Taxi & tuk-tuk drivers and vehicle renting parties online registration and updating options

INFRASTRUCTURE MANAGEMENT STRATEGY

'ARUGAM BAY AS A WELL- MANAGED TOURISM DESTINATION'

Pipe borne water supply management strategy -
Electricity supply management strategy -
Waste water management strategy -
Solid waste management strategy -

Arugam Bay as a well- managed Tourism Destination

In order to ensure that Arugam Bay will remain a sustainable tourism destination, it is important to ensure that it is facilitated with adequate supply of provisions such as water &electricity while its wastes are responsibly managed without making any negative impact on the environment.

Accordingly, we have ensured the above through several measures as follows.

- *Safe drinking water for all*
- *Adequately powered Arugam Bay*
- *Responsible disposal of waste water*
- *Zero waster Arugam Bay*

5.1 Pipe borne water supply management strategy (Project Code – IN-1)

Adequate supply of good quality water is an essential requirement at all settlements. However, when it comes to tourism destinations, the water demand is relatively higher than that of a regular settlement. And tourists are much concerned about the quality of water thus they tend to depend on sealed water bottles for drinking purpose. Bottle drinking water is not considered as a sustainable solution as it largely results in non-biodegradable waste and now considered a global issue. Therefore, provision of good quality pipe borne water for all uses and an alternative supply of good quality drinking water are essential for sustainable management of Arugam Bay as a main tourism destination.

Different alternative scenarios for future water supply of Arugam Bay have been studied as elaborated in the annexure I. The considered alternative scenarios are as follows.

a) Do-nothing option – Depending on water supplied by NWSDB (1000 m^3 per day only for Pottuvil PS) + shallow/ tube well water + packaged water
b) Pipe-borne water supply from the NWSDB (future scenario based on the proposed Heda Oya Project)
    - Ulla: 1,000 m^3/day (augmented supply of the existing 450 m^3 tower)
    - Ulla: 2,000 m^3/day (new 750 m^3 tower)
    - Panama: 1,400 m^3/day (existing 500 m^3 tower and 1,000 m^3 tower)
    - Pottuvil: 4,100 m^3/day (augmented supply of the existing 1,000 m^3 tower)
    - Pottuvil: Direct pumping via new 500 m^3 sump at Ulla (quantity unspecified, but assumed to be 6,000 m^3/day)
    - Lahugala: 2,000 m^3/day new supply (new 750 m^3 tower)

c) Water supply using ground water (Obtaining the present amount of pipe-borne water + developing groundwater sources for new abstraction while keeping the current supply from shallow groundwater wells as reserves for future)
d) Desalination of sea water
e) Using recycled and harvested water for purposes other than drinking and cooking
f) Exploring a surface water source (There has been extensive studies by NWSDB to find a surface water source, however they have not yet found a reliable source)

According to the evaluation, the most suitable solution is the currently proposed Heda Oya Project by the National Water Supply & Drainage Board. However, it is the view of NWSDB that the implementation of this project is doubtful due to some reasons and currently there is no specific timeline available for the project.

In this background, water supply by desalination is considered as the second most suitable solution and is recommended by the Arugam Bay Tourism Development Master Plan – 2019-2030.

5.2 Electricity supply management strategy (Project Code – IN-2)

As per the Ceylon Electricity Board, there is no deficiency in supply to cater the overall electricity demand of the area. However, there is an issue with the reliability, as there is a tendency of frequent power cuts for some areas. But, since Arugam Bay is a well-functioning tourism destination, a reliable electricity supply is mandatory thus it is recommended to carry out necessary local area capacity improvement projects to ensure continuous supply.

5.3 Waste water management strategy (Project Code – IN-3)

Responsible management of waste water is mandatory to ensure that Arugam Bay is a sustainable tourism destination.

Accordingly, following alternative waste water management options were considered and evaluated.

a) Do-nothing option (allow the present scenario; not having systems for a proper system for wastewater collection, treatment and its safe disposal to continue without notable interventions)
b) Limited intervention with improved septic tank desludging practices. (This will also require a proper sludge disposal and treatment facility for the town)
c) On-site systems with restructuring the present wastewater systems (For individual hotels, commercial establishments or small clusters)
d) Off-Site Systems (should be considered only at cases where on-site sanitation systems fail)
    - Decentralized Wastewater Treatment system managed by Local Authority (These systems are applicable to Arugam Bay area (Kalappukattu and Sinna Ullai area and some areas in Pottuvil). For all other areas, on-site disposal systems should be considered.)
    - Sewerage network and Off-site treatment by an investor

From above alternative options, Decentralized Wastewater Treatment System is recommended for the Arugam Bay area including Kalappukattu and Sinna Ullai area and some areas in Pottuvil. For all other areas, on-site disposal systems are recommended. Detail evaluation of alternative options are explained in the annexure II.

5.4 Solid waste management strategy (Project Code – IN-4)

Solid waste management strategy is detailed out in the section 2.1.6 under Environment Management Strategy by the project name;

'Implementing Zero Waste Arugam Bay Program throughout Arugam Bay Tourism Area' (Project Code – EN–1-2)

SOCIAL DEVELOPMENT STRATEGY

'EMPOWERED AND CONTENTED COMMUNITY'

Establishment and strengthening of sector and location wise - Community Based Organizations
Creating opportunities for local community - to engage with the local tourism industry
Upgrading the existing Vocational Training Centre - into a Smart Vocational Training Centre

Empowered and Contented Community

The success of any tourism destination relies upon its host community and no destination can survive without the active contribution of its locals. The active participation of local community is a key factor as well as creating opportunities for community engagement is also equally important. Therefore, this strategy focuses on actions to empower local community by providing necessary social infrastructure and adequate opportunities to engage with tourism while improving the local economy.

6.1) Establishment and strengthening of sector and location wise Community Based Organizations (Project Code – SD-1)

Community Based Organizations (CBOs) formed by a group of people in a certain context who share common goals and interests are effective in representing such goals in other platforms, securing their own rights and interests and realizing several benefits and common goals. Already, there are few active CBOs operating in Arugam Bay Tourism Planning Area. In order to provide more opportunities for local communities while empowering them, it is proposed to initiate a program to strengthen the existing CBOs and introduce new CBOs based on different sectors (local hoteliers, three wheel drivers, restaurant and food outlet operators, spa and salon operators, safari operators, farmers and fishermen etc.) and locations (Panama village, Komari village, Arugam Bay handicraft village etc.).

It is also proposed to link all types of CBOs to a single platform and build a representative committee (example – Arugam Bay Tourism Task Force) to coordinate with and act on behalf of all CBOs in the area.

6.2) Creating opportunities for local community to engage with the local tourism industry (Project Code – SD-2)

6.2.1) Linking the local agriculture production with the tourism industry (Project Code – SD-2-1)

Arugam Bay is a predominantly agriculture area and it's also a traditional fishing village. There is a huge potential to link the agriculture production in the area with the tourism industry. Therefore, it is proposed to introduce a sustainable mechanism to link the hoteliers and local agriculture producers; farmers and fishermen. The proposed mechanism is recommended to be initiated through the common representative committee of all CBOs in the area.

The following actions are recommended in the initiation phase of the program.

- Identification of the agricultural product demand in the tourism industry. i.e. the daily/ weekly requirement of rice, grains, vegetables, fruits, milk, meat, fish and other food products by hotels and restaurants.
- Identification of local agriculture producers and their willingness to supply to the potential buyers in the local tourism industry
- Planning an appropriate supply chain linking the potential buyers with suppliers with an intermediate distribution mechanism which will be managed through the representative committee of all CBOs (Arugam Bay Task Force)

- Introducing a e-commerce platform to facilitate the operations of local agro product supply chain (example – developing an app where hoteliers, restaurant owners can directly purchase goods from different local agro product suppliers)
- Providing required facilities and equipment such as deep freezers, storages to facilitate the operations of the local agro product supply chain
- Introduce a unique brand for all local agro products in Arugam Bay area and promote it in the external market as well

6.2.2) Promoting local handicraft products in the tourism market

Arugam Bay is already popular for its unique local handicraft products including clothing items, arts & crafts, jewelry, ornaments and paintings etc. The local traders are already maintaining a unique character and a brand when it comes to handicraft products. This brand can be further enhanced and promoted even beyond the limits of Arugam Bay planning area. Main strategy to promote local handicraft products is to introduce new market spaces for the local producers. The two main market spaces to promote local handicrafts are Arugam Bay Handicraft Village (TP- 1-1-1-3) and Panama Tourism Village (TP-1-4-1).

It is proposed to engage local community and establish a network and a community-based organization composed of local community producing and selling handicraft items.

6.2.3) Promoting local food products in the tourism market

Being a traditional village, Arugam Bay and Panama inherit unique traditional culinary practices and food items which can be promoted among tourists. This will provide more opportunities for local community engage with tourism industry and gain more economic benefits. The main locations where local food products can be promoted are Arugam Bay Main Tourism Strip (TP-1-1-5) and Panama Tourism Village (TP-1-4-1).

As a part of this strategy, it is proposed to organize local food festivals during the tourism season of Arugam Bay. It is proposed to coordinate the events through the Arugam Bay Tourism Task Force. The scale, locations, time and character of the event can be determined based on the demand and tourists' expectations.

6.2.4) Providing more opportunities for the local community to engage with the tourism industry

The below mentioned is a list of opportunities/ roles where the local community can actively engage with the Arugam Bay tourism industry.

- Tourist guides
- Surfing instructors
- Safari guides and safari cab drivers
- Lagoon safari boat operators
- Local handicraft producers and sellers
- Local arts demonstrators and instructors
- Local food producers and sellers
- Local culinary practices demonstrators and instructors
- Local farming and traditional practices demonstrators and instructors (teaching tourists how to farm with local techniques)
- Hotel and restaurant staff
- Staff of Ayurveda spas, salons and other recreational and entertainment places

6.3) Upgrading the existing Vocational Training Centre into a Smart Vocational Training Centre (Project Code – SD-3)

It is proposed to upgrade the existing Vocational Training Centre at Pottuvil into a Smart Vocational Training Centre with a variety of training programs focusing on tourism industry. One of the limitations at Arugam Bay is not having adequate skilled labor to recruit at local hospitality industry. Therefore, it is highly recommended to link the existing Vocational Training Centre with Sri Lanka Hotel School and introduce hospitality training programs where the locals; especially young people can train themselves to be skilled professionals in the tourism industry.

Annexure I

Evaluation of Alternative Scenarios for Water Supply in Arugam Bay

1. **Do-nothing option**

- Water to be obtained from the NWSDB + shallow/tube well water + packaged water

Present water demand is supplied by a combination of pipe-borne water from the NWSDB, extraction of groundwater from shallow ells and consumption of packaged water from drinking.

Pipe-borne water from NWSDB is available only for the amount an hour, which is not adequate during the times when the occupancy rates of hotels are high. Most of the hotels have their own shallow or tube wells, which they use for pumping water to replenish the balance requirement of water. Most of this water is used for bathing and washing purposes, as the water is brackish and or hard. No treatment is done for this water, and therefore the safety of water is questionable, given the fact that sewage is disposed onosite n all the hotels, by way of having septic/soakage systems.

Issues in carrying on with 'do-nothing option.'

- Use of shallow wells for extracting groundwater has its inherent issues. Primary concerns are the water becoming more and more saline due to intrusion of seawater into the baseflow of the fresh groundwater through salt-water interface. With more and more extraction to meet the increased demand for freshwater, the saltwater intrusion will become critical and the water so extracted will not be usable for many purposes.

- The groundwater is highly vulnerable for faecal contamination due to none of the hotels have proper wastewater treatment facilities. All the hotels have on-site collection and disposal systems (septic tank + soakage spit arrangements) and emptying the septic/soakage pits using gulley bowsers. Ground soakage and overflowing of septage continuously pollute groundwater and coastal waters. Therefore, with increased wastewater mismanagement will continue to pollute the groundwater. This makes the groundwater unfit for human consumption.

The above two issues suggest that 'do-nothing' option is not sustainable, given the premise that the tourism industry will flourish in the near future, and demand for fresh water supplies would increase proportionality.

2. Pipe-borne water supply from the NWSDB (future scenarios)

To augment the water supply in the Pottuvil and Arugam Bay areas in the future, the NWSDB is planning to abstract water from Heda Oya Reservoir, a project planned by the Department of Irrigation. Further, the proposed Heda Oya Reservoir Project is planning to supply 10,000 m³ per day for Pottuvil and 2,000 m³ per day for Panama. According to the population predictions, the proposed project can meet the water demand until 2039.

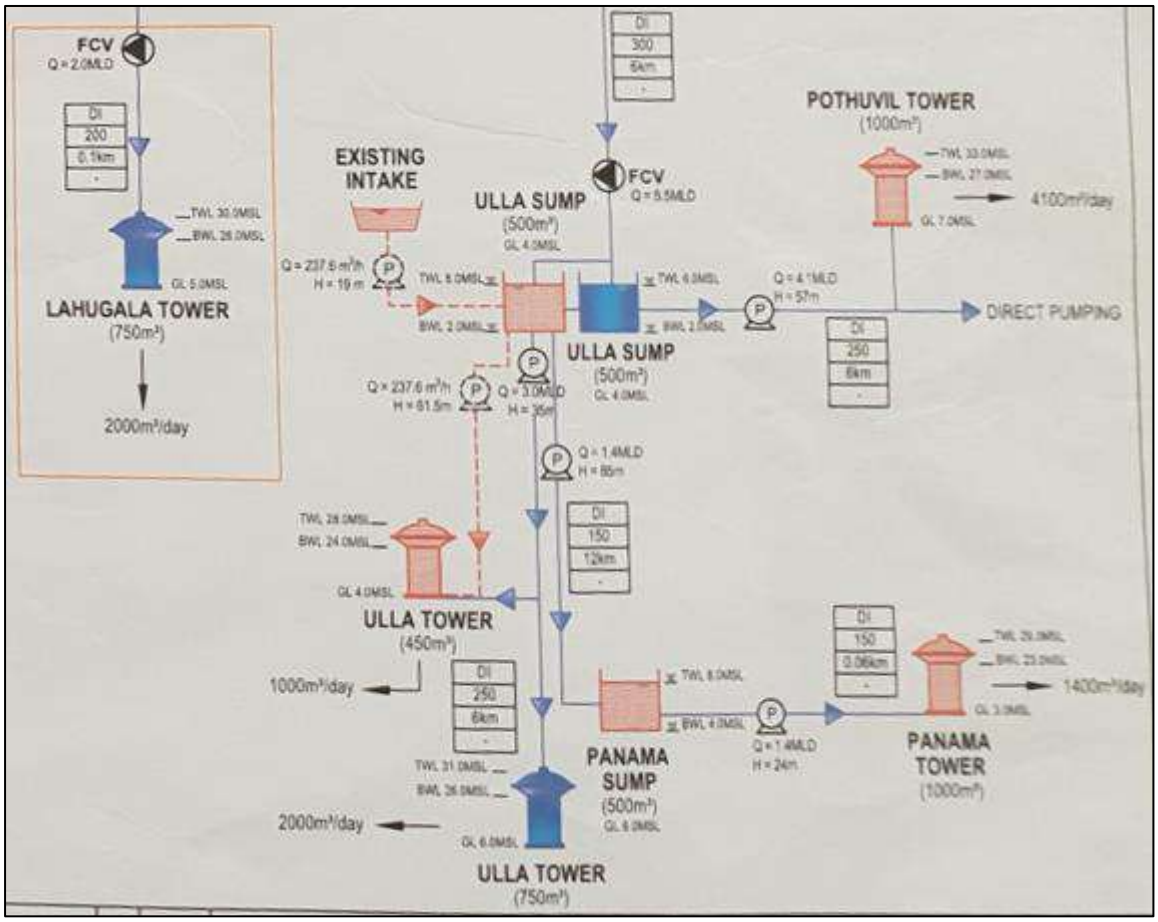


Figure **: Water supply to Project area by the proposed Heda Oya Reservoir (Source: Drawing of Schematic Diagram of Heda Oya Water Supply Project, Ceywater Consultants (Pvt) Ltd. dated 17.11.2017)

According to the Plans of the NWSDB under the proposed Heda Oya, the following quantities of water supply can be expected:

(i) Ulla: 1,000 m³/day (augmented supply of the existing 450 m³ tower)

(ii) Ulla: 2,000 m³/day (new 750 m³ tower)

(iii) Panama: 1,400 m³/day (existing 500 m³ tower and 1,000 m³ tower)

(iv) Pottuvil: 4,100 m³/day (augmented supply of the existing 1,000 m³ tower)

(v) Pottuvil: Direct pumping via new 500 m³ sump at Ulla (quantity unspecified, but assumed to be 6,000 m³/day)

(vi) Lahugala: 2,000 m^3/day new supply (new 750 m^3 tower)

If the Ulla area would get 1,000 m^3 + 2,000 m^3 supply of pipe-borne water, it will be sufficient to satisfy the community demand up to 2039 at the same time the water demand of the tourism industry.

However, the timeline for implementing the project is unknown, according to both eh NWSDB and Department of Irrigation.

3. Water supply using groundwater

The other option for the tourism industry is to:

- Obtain the present amount of pipe-borne water + developing groundwater sources for new abstraction (the current supply from shallow groundwater wells being kept as reserves)

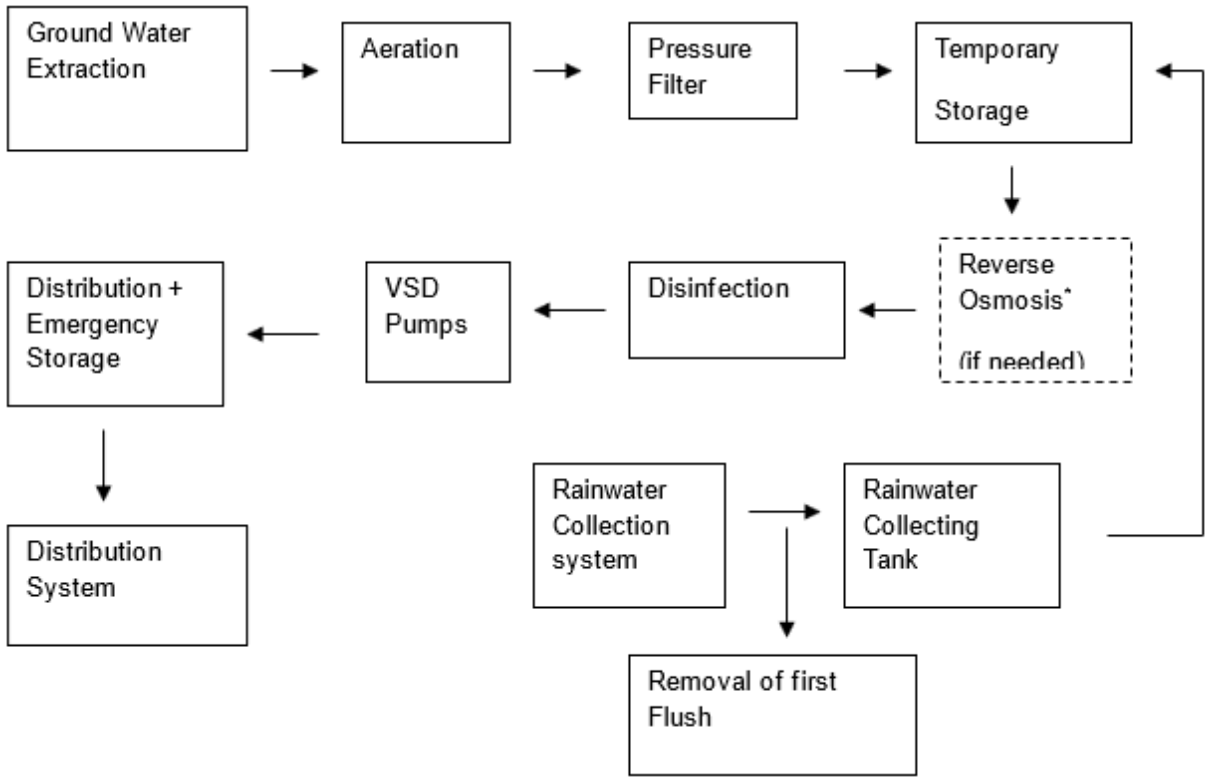
Groundwater extraction can be another source of water supply for the hotel sector in Aru Gam Bay. Selection of extraction points should be mainly based on a geo-hydraulic study (which has to be carried out by either the Water Resources Board or the National Water Supply & Drainage Board) aimed at identifying up to five possible locations to meet the required water demand. These five extraction points will mainly cover respective zones to cater to different type of water demand centres. Having separate extraction points will eliminate the need to have one large structure, which will, however, be technically a less preferred option. Yet, number of extraction points and their individual locations has to be determined after yield tests carried out at the site premises. Water quality of each location should also be a determinant in choosing the most suitable locations. The main concern at this particular location would be the salinity level of the water, hardness and presence of silt and other dissolved substances, including dissolved gases.

If water is distributed for human consumption, it has to make sure that quality of drinking water, should conform to SLS 614 (2013): Sri Lanka Standards for Potable Water after appropriate treatment (if needed). Also, if groundwater use is proposed, it is, however, necessary to carry out pumping and recovery test by the Water Resources Board in order to estimate the maximum yield or the safe abstraction rate without disturbing the other users in the locality. The exploitation of groundwater provisions of Water Resources Board Act, No. 29 of 1964 and subsequent amendments are to be complied with). For exploitation of groundwater, provisions under the Order made (Ref. Gazette Extraordinary 2010/23: 10.03.2017) under Section 16 of the Water Resources Board Act, No. 29 of 1964 and subsequent amendments by Act, No. 42 of 1999 are to be complied with).

Water Treatment

After finalizing the location of extraction wells, a detailed water quality analysis should be done to determine the exact method of treatment. Basically, for water containing high amounts of salinity, pre-treatment followed by Reverse Osmosis process is necessary to remove salt and other minerals. Pre-treatment must be rigorous to remove sediment, organic matter and other microscopic particles to ensure efficient reverse osmosis operations.

Proposed Process Diagram



Basically, the pipe network is divided into several zones to cater to individual water demand and to suit periodic fluctuations of the water requirement. Hence, the pipe network is designed to provide the minimum and maximum water demand for each zone using appropriate sets of pumps with Variable Speed Drives. This method is basically adopted to avoid having one large structure (e.g. having one large overhead storage tank) above ground level. These structural components, mainly water towers, cost huge amounts of money and visually impairment of natural scenery.

Pipe material will be decided by considering soil characteristics, groundwater levels and tidal variation etc. Hence, the underlying assumption is that Polyethylene (PE) pipes are more suitable for conditions prevalent in this particular site.

The investment for source development, CAPEX for the treatment plant and the distribution network should be found, either by government spending or private-sector investment. Besides, OPEX also should be borne by the consumers of water on top of capital recovery built into the cost of water supplied.

4. Desalination

Another option for the tourism industry is to:

- Obtain the present supply of pipe-borne water + developing a desalination plant to treat mild brackish water (the current supply from shallow groundwater wells being kept as reserves)

Desalination is the process of removing salt from saline sources and is a technologically feasible process to provide safe drinking water. Effective treatment of saline sources can be one of the most promising ways of fulfilling freshwater demands in water-stressed regions, such as the Pottuvil and Arugam Bay area. It is true that in the past high costs, high energy needs, possible environmental harm and often high maintenance requirements have made desalination an unattractive option of last resort for most populations/industrial needs. However, it has been demonstrated by several countries faced with severe water stress (e.g. Maldives, Israel, UAE, Qatar, Saudi Arabia, Egypt) as a viable option for bringing relief to millions of people. Israel, for example, once classified as a water-stressed country, now meets 55% of its domestic water needs via desalination and has a surplus of freshwater. All the water now supplied in Maldives (including al the hotels) is from desalination plants.

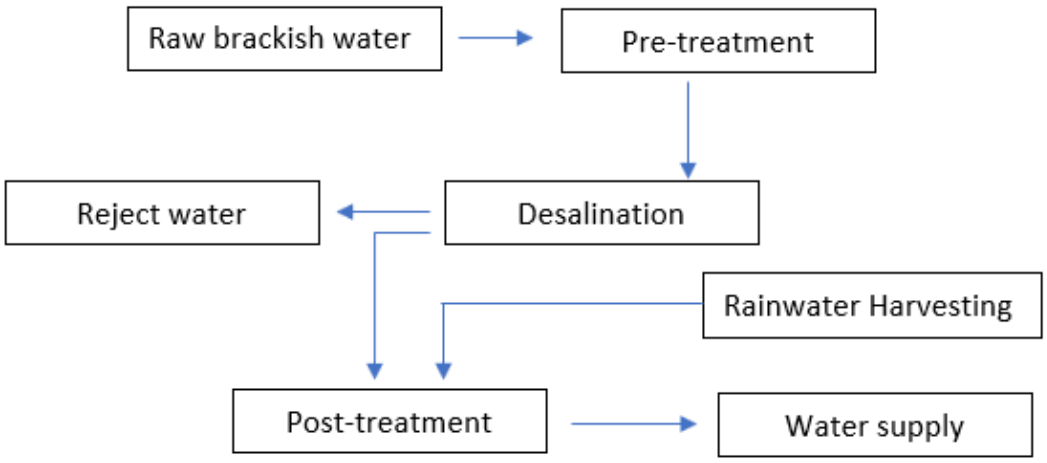


Figure **: Water treatment by desalination

Reverse osmosis (RO), is the most commonly available desalination technology worldwide and has been commercialised at the household, community and industrial scales. Having been optimized and commercialized for decades, RO technology is relatively inexpensive and low-risk. Overall, RO is an up-and-coming option for desalination facilities in Arugam Bay, especially for the hotel sector. RO is the most common desalination technology, in which an applied external pressure greater than the natural osmotic pressure forces water across a semi-permeable membrane, resulting in streams of freshwater and highly concentrated brine.

The following are the considerations in selecting the appropriate technology for desalination:

1. Selecting the source of influent

- Seawater (salinity < 35,000 ppm) or brackish water (salinity < 3,500–35,000 ppm) or mildly brackish water (3,500 ppm)

2. Selection of desalination technology (depending on the salinity of source water)

- Reverse osmosis, Membrane capacitive deionization, Electrodialysis reversal, solar still distillation, etc.

3. Selecting the source of energy

- Electricity from the grid, fossil fuels (e.g., diesel generators), renewable sources (e.g., solar)

4. Pre- and post-treatment requirements of water, finding a suitable location to dispose of the concentrate (reject water)

5. Technical/managerial skills in operations, environmental impacts, CAPEX and OPEX

Considering the above, it is recommended that, if desalination is selected as an option for Arugam Bay, RO treatment plant to treat mildly brackish water (Salinity < 3,500 ppm) is recommended. Rainwater harvesting can also augment the water supply.

The investment for source development, CAPEX for the treatment plant and the distribution network should be found, either by government spending or private-sector investment. Besides, OPEX also should be borne by the consumers of water on top of capital recovery built into the cost of water supplied.

5. Water for purposes other than drinking

The following can be practised to supplement the water supply.

- Recycling of treated wastewater

- Rainwater harvesting

In addition to water extraction from groundwater and/or desalination, possibility of rainwater harvesting should also be exploited. Options for implementing suitable systems for rainwater harvesting have to be exploited in order to accommodate the National Rainwater Policy (2006). For new projects, the Urban Development Authority (Amendment) Act No. 36 of 2007 which requires the formulation of a scheme for rainwater harvesting to be included in the Development Plan prepared in terms of Section 8A of the UDA Law No. 41 of 1978 should be made mandatory. Apart from satisfying the legal requirement, rainwater harvesting will be of immense benefit to the proposed projects in this dry zone area as a secondary source to supplement water usage for gardening and landscaping purposes, and also for groundwater recharge, etc. Thus, it is highly recommended to adopt a suitable system for rainwater harvesting under the proposed storm water management and drainage improvement projects alongside the proposed developments.

In addition to this, the possibility of re-using wastewater has to be explored, with particular emphasis paid on the greywater produced at hotels. By the nature of locating hotels would provide an array of options for wastewater re-use, which is expected to satisfy the water demand for gardening etc. at least partially.

6. Finding a surface water source

This has been extensively studied by the NWSDB; however, no available surface water source had been found – which can be dependent both during wet and (prolonged) dry seasons.

Therefore, this option is not feasible.

CRITERION	Option for water supply			
	Do-nothing option	**NWSDB water supply Project (Heda Oya)**	**Water supply using groundwater**	**Water supply by desalination**
Feasibility and Sustainability	Not sustainable in the long run provided that the water demand increase with time. Faecal pollution and salinity intrusion will limit the extraction of groundwater.	Highest sustainability; very cost-effective for consumers. However, no timeline is available for implementation.	High sustainability; Technical feasibility depends on the availability of groundwater. Questions remain as to who should bear the CAPEX	High sustainability; Technically highly feasible. Questions remain as to who should bear the CAPEX Questions remain as to who should incur the CAPEX
CAPEX	Small-scale water treatment units may be needed to disinfect water and remove salinity	No investment is required by hotels	Moderate to high, which depends on the depth, number of deep wells and groundwater availability.	Very high The cost of the treatment plant can be 5–8 higher than conventional plant treating groundwater
OPEX	Low – tariff + cost of pumping (and treatment – if any)	Very low – only the tariff	Low to moderate (Note: cost of pumping is the same for this option and desalination)	Very high Require 3–4 times more energy than conventional water treatment. OPEX (other than energy consumption) is much higher than conventional treatment.
Water quality	Water quality is not suitable for drinking/ consumption for most of the pumped water	Very good	Very good	Very good
Technology sophistication	Minimal	Not applicable	Medium	High

Environmental impacts	Groundwater will continually be contaminated until proper wastewater treatment is established	Not applicable	Very low, provided that the pump and recovery rates are within limits	Low to medium Disposal of reject water should be done after careful studies

Annexure II
Evaluation of Alternative Scenarios for Waste Water Management in Arugam Bay

1) Sanitation and wastewater responsibility

According to the Urban Council Ordinance and Pradeshiya Sabha Act, sanitation comes under the authority of the local government. However, similar to many other local authorities in the country, Pottuvil Pradeshiya Sabha does not have adequate financial, technical and managerial capabilities for developing and managing a fully mechanized waterborne sewerage system. Thus, such wastewater management systems in the country at present (except for the city of Colombo) are developed and managed by National Water Supply and Drainage Board (NWSDB) which has a specialized section for wastewater management.

2) Do-nothing option

The do-nothing option will allow the present scenario to continue without notable interventions. This option will exacerbate the present problems of not having systems for a proper system for wastewater collection, treatment and its safe disposal. Some of the impacts of do-nothing option would be as follows:

- Coastal pollution: due to sewage, untreated wastewater from restaurants, fisher communities
- Ground water pollution: due to untreated sewage
- Public health: due to fecal pollution of the beach, ground water and soils
- Nuisance: odor, unpleasant surroundings, flies, rodents

I) Limited intervention with improved septic tank desludging practices

The do-nothing option accepts that septic tank effluent will continue to be discharged off-site. This is in the context of the difficulties of operating a system as a strictly on-site system. It also reflects the realities of current practice.

Septic tanks provide, at best only primary treatment of the influent wastewater. The design of a normal domestic sized septic tanks is based on minimum hydraulic retention of 24 hours. However, if the sludge level is high in the tank, it is common for a channel to form on top of the sludge, and consequently, the influent completely short circuits the tank. In these cases, there is virtually no treatment from the tank, and the effluent discharged is essentially raw sewage.

Frequency of desludging of septic tanks should increase, and desludging should be carried out before the tanks are overflowing. Ground soakage should (if available) should be properly sized and placed, so that ground water quality is not affected due to effluent discharged to such infiltration/percolation/soakage pits. If the water table is at depth, the soil at the interface of the land application system and to some depth beneath the soil interface further treats the effluent before it reaches the groundwater. Treatment is most effective where the soil is unsaturated (i.e., above the groundwater level).
This will also require a proper sludge disposal and treatment facility for the town.
Assuming that the storm water drainage system will be improved in congested areas, this will result in significant improvements to the local environment, especially where the storm water drains are lined. This will reduce the nuisance due to restaurant/hotel/domestic wastewater diverted or overflown into road-side drains, but not eliminate it.

II) On-site systems with restructuring the present wastewater systems

<u>On-site disposal: For individual hotels, commercial establishments or small clusters:</u>
Options for on-site disposal of wastewater are provided in the following:

- SLS 745 – Part 1: 2004; Code of practice for design and construction of septic tanks and associated effluent disposal systems Part 1 - Small systems disposing to ground.

  This code of practice covers the design, construction, testing and maintenance of septic tanks for the disposal of domestic wastewater including all waste, black water and grey water systems for small installations disposing effluent into the ground and is limited to systems producing an average daily effluent flow of 5 m^3/ day or less.

- SLS 745 – Part 2: 2009; Code of practice for design and construction of septic tanks and associated effluent disposal systems Part 2 - Systems disposing to surface, systems for on-site effluent reuse and larger systems disposing to ground.

  This code of practice covers the design, construction, testing and maintenance of septic tanks for the disposal of domestic wastewater including all waste, black water and grey water systems. It also recommends guidelines for the selection, design, construction and maintenance of systems for the on-site disposal of effluents from septic tanks.

- PHI Manual: Manual for Sri Lanka Public Health Inspector (1989) published by the Ministry of Health of Sri Lanka

- NWS&DB Design Manual D7: For wastewater treatment - March 1989, National Water Supply and Drainage Board of Sri Lanka

Any treatment system should be designed based on the above Standards/Guidelines.
These systems are applicable for most of the areas where soil conditions and ground water levels allow such systems to be adopted, including Arugam Bay area where hotels and restaurants are located away from the coastal area (which are located on landward side towards Sarvodayapuram). Other areas away from the Bay areas have many options for on-site disposal of wastewater.

III) Off-Site Systems

Conventional off-site sewerage systems should only be considered where on-site sanitation systems fail. This is because conventional off-site sewerage systems are:

- Considerably very expensive than on-site systems
- Require increased water supply to operate the system – this increases the costs of the water supply.
- Require regular and continuous maintenance.
- Have high operational costs (much higher than water supply schemes), especially if gravity systems are not possible (i.e., in areas of flat terrain such as the Arugam Bay and coastal areas of Pottuvil).
- They have a poor track record of good performance and sustainability in most developing countries.

Despite the difficulties of an entirely satisfactory on-site sanitation solution, the above indicates that a conventional centralized off-site system should only be adopted when absolutely necessary. A poor operated off-site system can be worse than a less than satisfactorily operated on-site systems.

(a) Decentralized Wastewater Treatment system operated by the Local Authority

These systems are applicable to Arugam Bay area (Kalappukattu and Sinna Ullai area and some areas in Pottuvil). For all other areas, on-site disposal systems should be considered.
Given the context in the town, Decentralized Wastewater Treatment Systems (DEWATS) can be used where small isolated pockets or areas (e.g., core business areas in Sinna Ullai) suggest that an improved system is desirable. There is a wide range of technologies from low energy (e.g., septic tanks followed by constructed wetlands), small package up-flow anaerobic plants, to more compact high energy systems. DEWATS are gaining popularity as effective small scale treatment systems in developing countries as they are designed to provide effective treatment without external energy supplies, chemical dosing, and moving parts.
For preliminary planning purposes, DEWATS options for hotels/restaurants (that can include households, too) could consist of two or three main stages:

(i) Preliminary/Primary treatment (e.g., grease traps and septic tank)

followed by treatment of settled sewage by:

(ii) Secondary Treatment - Anaerobic digestion (e.g., anaerobic filters/baffled reactor)

and/or,

(iii) Tertiary treatment (e.g. horizontal planted gravel filters)

The existing on-site septic tanks could be maintained as part of this system, thus reducing the components of the DEWATS plant.

Anaerobic filters or anaerobic baffled reactors are the preferred secondary treatment options that are suitable for the single or small neighborhood where septic-soakage arrangements are not technically feasible options. This is essentially a fixed-bed bioreactor where wastewater flows through the filter, and the particles and organic matter trapped are degraded by the biomass attached to the filter material. The settled sewage has to be directed to the filter/reactor, which may consist of several chambers depending on the size and the design. The filters can be operated either by up flow or down flow mode, although the up flow is preferred as it reduces the risk of having the fixed biomass being washed out. Operation of the filter at full capacity may take some time considering the start-up time required for the anaerobic biomass to stabilize. Installation of the filter/reactor, whether above or below ground depending on the hydraulic gradient

For clusters of hotels/restaurants and houses, places where a large amount of wastewater is generated, septic tank systems will not be applicable. This also includes the central bus stand, public places proposed at the Bay, the drainage generated from the peripheral areas that are discharged to the Bay are several locations where separate treatment systems are needed. Preferred DEWATS options for such large volumes of wastewater are described below:

Settled sewage from septic tanks of the clusters of households can be connected to a decentralized wastewater treatment facility, which can be designed to treat volumes of wastewater ranging from 10-100 m^3/d of wastewater or even more, and can comprise of the following components (a combination of the following):

(i) Gravity-fed sewer systems: It should consist of small-bore piping installed for each connected household to carry the settled sewage from the septic tank and grey water to the DEWATS.

(ii) Primary settling units: This unit installed just before the DEWATS system will serve as a wastewater retention point and an area for control of influent fluctuations (an equalization tank), which allows any large sludge, debris and other floatable and visible wastes to settle or be screened out.

(iii) Anaerobic baffled reactor (ABR): An upgraded baffled anaerobic septic tank (BAST) that uses static devices to regulate the flow fluids, forcing wastewater to flow from the inlet to the tank outlet.

(iv) Anaerobic filters (AF): Particles and dissolved solids are trapped, organic matter is degraded, and pathogens and chemicals in the wastewater are removed by the bacterial biofilm in the filters.

(v) Horizontal gravel filter (HGF) and constructed wetlands: The vegetated soil filter (or reed bed) is used to further treat wastewater by copying the natural purification abilities of wetlands. The plant roots within the gravel helps to oxygenate the wastewater. This oxygenation helps to degrade remaining organic pollutants and reduce the door.

(vi) Discharge: After the AF and/or HGF, the effluent is usually considered clean enough for discharge to a nearby drain or canal. However, discharge by way of having Infiltration gulleys, galleries or trenches are preferred.

Discharge of treated effluent into a drain or a canal is usually not permitted under National Environmental (Protection and Quality) Regulations, No. 1 of 2008 (Gazette Extraordinary of the Democratic Socialist Republic of Sri Lanka – No. 1534/18, 01.02.2008): Schedule 1: Tolerance limits for industrial waste discharged to Inland Surface Waters. Therefore, obtaining prior approvals and consent of both the Central Environmental Authority and the relevant Local Authority is needed.

For a population of about 2,000 people, the footprint would be about 60 m x 120 m for a simple DEWATS plant without facultative ponds. About 90% of the footprint is associated with the planted gravel filter. The shape of the land can be adjusted to fit drainage channels or pond edges.

Option Comparison and opinions of the Stakeholders

During the reconnaissance field visits in some of the areas within Arugam Bay, Polluvil and areas of interest (Panama, Kumana, etc.), a number of options were identified where on-site wastewater disposal is possible, mainly due to small quantities of wastewater generation and appropriate soil conditions for such on-site disposal systems.

Considering the ground conditions in the town, continued use of the existing hybrid off-site sanitation system (on-site septic tank and off-site discharge of septic tank effluent/sludge) is sensible in conjunction with:

- The settled sewage is treated by way of anaerobic fliters/reactors, constructed wetlands where on-site disposal is not possible
- The treated effluent (e.g., by way of anaerobic filters) disposed to improved storm water drainage (however, this needs the consent of both the Central Environmental Authority and the relevant Local Authority).
- Improved septic tank maintenance to improve the quality of septic tank effluent.
- Improved disposal of septage at the treatment plant proposed at the integrated waste management facility.
- Improved solid waste collection.

This system:

- Acknowledges the real difficulties of satisfactory on-site systems in high water table environments, and

- provides a staged upgrade towards an extensive off-site system (e.g. small bore sewer system which collects septic tank effluent to treat downstream).

Improved septic tank sludge disposal management of the systems is needed. A critical step for this is a dedicated site for waste material treatment.

Once a dedicated septage disposal site is established, the use of private contractors for collection and disposal of the contents of on-site tanks reduces the demand on the UC and PS resources, provided they adequately manage and regulate this process.

Wastewater from toilets in highly populated areas where there is insufficient space for properly sized septic tanks or where they cannot be reached by gully bowzers should drain to a common septic tank constructed with an effluent infiltration chamber.

In areas with a high groundwater table where septic tank effluent cannot drain naturally into the ground, in order to reduce pollution of the surface drainage system (and water bodies) alternative secondary treatment is required.

The most economical solution is to install small bore sewerage to collect septic tank overflows connected to a small decentralized effluent treatment (DEWATS) plant. If the topography is flat and the distance to the treatment plant is great, a small wastewater pumping station might be required.

Proposed Sanitation and Wastewater Component

Five sub-project components are identified in the sanitation sector.

- Increase sanitation coverage to un-served or under-served areas, including public amenities.
- Provision of DEWATS(s) for the core business/high density areas. The land has to be identified and quarantined for the proposed small decentralized wastewater treatment plants serving these areas.
- Provision of a dedicated disposal site for septage sludge. This would be best located at the proposed solid waste disposal site.
- Appropriate regulations and enforcement for the proper disposal of contents of on-site tanks should be undertaken once a dedicated site is developed.
- Capacity building of the urban authorities to increase their technical and management skills of on-site sanitation.

The preferred option for the septic tank sludge treatment facility

Lime stabilization is a likely component of the septage treatment facility; other major unit processes include settling/sand filtering and treating/disposing of liquid and solids fractions. Liquid fraction treatment can be either biological or physical-chemical systems.

The proposed option for treatment of the liquid fraction is by means of an anaerobic reactor followed by an aerobic reactor. The effluent should then be clarified and disinfected before being discharged to

comply with national regulations[1]. If there are no natural water courses close to the proposed treatment site, the option is to use the treated wastewater for irrigation or ground application. The solid fraction that is settled in the settling tank and retained in the sand filter beds can be composted at the composting yard that has been proposed at the same site.

Operation and Maintenance

Options for operating and maintaining the waste collection and treatment facilities can include total in-house responsibility of the owner or a Private Public Partnership (PPP). These options can be analyzed further as a detailed feasibility study.

b) Sewerage network and Off-site treatment by an investor

Proposed activities for the proposed wastewater treatment plant

a. Reconnaissance survey to be carried out in order to identify all the wastewater generation points. It is necessary that both grey and black water generation points be identified with their quantities (approximate), respectively. Design a separate network for storm water.
b. Characterization of the wastewater
c. Building or rehabilitating the sewerage network; manholes, gulleys, grease traps etc.
d. Providing separate pre-treatment system for hotels, restaurants, commercial buildings, houses, etc.
e. Installing a proper treatment system (completely new) as the case may be based on the demand (existing and future)
f. A system for re-use of treated effluent for toilet flushing, irrigation etc.
g. Install a short sea outfall for disposal of treated effluent (which remains after part of treated effluent is re-used)
h. A proper system for de-sludging, drying and disposal of sludge

The following should be noted:

The wastewater collection and treatment system should have the following essential features:

- The collection system, including pipelines, manholes, pump stations have to be newly constructed making provisions for future expansions and new construction of facilities
- The treatment system should be:
    - Low sludge production, low O&M cost
    - Free from bad odor, noise and the arrangement of treatment plant does not create a visually unacceptable view

[1] National Environmental (Protection and Quality) Regulations, No. 1 of 2008 (Gazette Extraordinary of the Democratic Socialist Republic of Sri Lanka – No. 1534/18, 01.02.2008): Schedule 1: Tolerance limits for industrial waste discharged on land for irrigation purpose.

- Compact enough to be located in a premises where land availability is limited
- Automated system with minimum operator engagement

The treated effluent should be utilized for irrigation, rather than disposing without re-use

Proposed Treatment Process and Cost Estimates

The major unit processes shall comprise as follows.

(a) Sewerage Network
(b) Preliminary physical treatment units
(c) Equalization Tank with proper pumping arrangements
(d) Anaerobic Reactor
(e) Aerobic Reactor
(f) Sedimentation Tank
(g) Filter Unit for tertiary treatment for reuse of treated wastewater
(h) Disinfection Unit

The final treated wastewater could be safely used for toilet flushing and gardening purposes. And the remainder disposed to the sea via a short outfall.

Estimated cost for the sanitation and wastewater component is provided below:

Cost items:

- Rehabilitation and/or construction of sewer network, manholes etc.
- Installation of preliminary treatment unit processes: screens, grease traps, grit chambers etc.
- Pre-treatment of wastewater from individual facilities: hotels, restaurants, shops etc.
- Primary and secondary treatment of wastewater (description as discussed above)
- Tertiary treatment for re-use of treated effluent
- Discharge of treated effluent by way of a short sea outfall
- Sludge management

The cost of the treatment plant incorporating the above unit processes has been estimated at LKR 80–90 million (excluding the sea outfall).

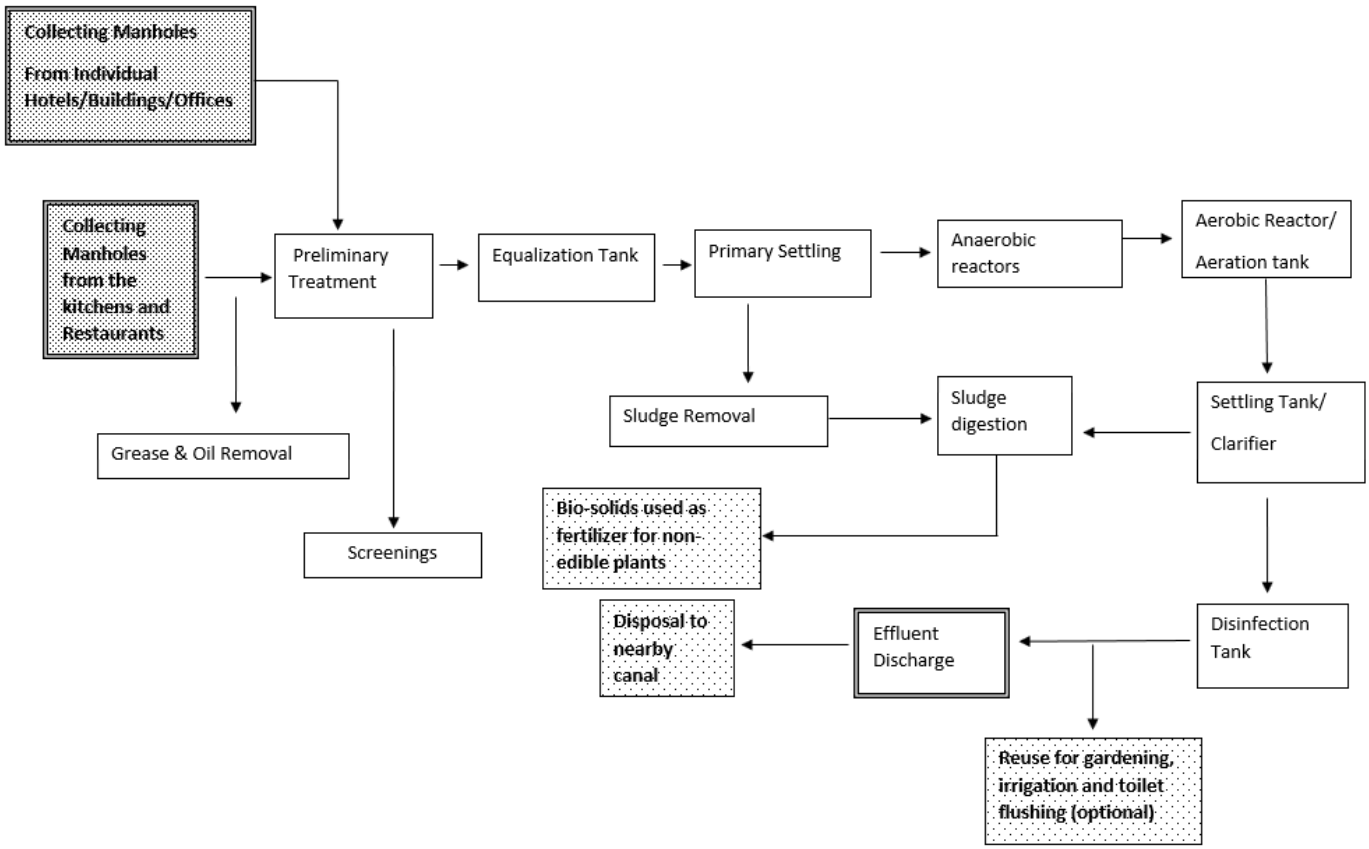


Figure 1: Preferred configuration for the proposed off-site treatment plant to be established by an Investor

Comparison between Central Wastewater Treatment & Disposal Vs. Decentralized Wastewater Treatment and Disposal

	Central Wastewater Treatment & Disposal	**Decentralized Wastewater Treatment and Disposal**
Cost		
- Capital cost	High	Low
- Operations and Maintenance	Electricity cost is high	Low
Treatment of wastewater	Quality of effluent conforms to Regulations	Quality of effluent may or may not conforms to Regulations
Reliability of operations	High reliability	Low reliability in the long-term
Disposal option	Effluent can be reused	Only part of effluent can be reused (depending on the designs and location)
Storage of treated effluent	Storage of effluent is possible for a few days	Storage of effluent may cause difficulties
Possibility of Pollution	No pollution is expected	High possibility of pollution due to the disposal of effluent, both surface, and groundwater. Re-use of effluent will also cause pollution.
Operations and Maintenance	Easy, though the cost is high	Operation is difficult; Troubleshooting is cumbersome

Options for areas other than Arugam Bay

On-site disposal: For individual locations, commercial establishments or small clusters:
Options for on-site disposal of wastewater are provided in the following:

- SLS 745 – Part 1: 2004; Code of practice for design and construction of septic tanks and associated effluent disposal systems Part 1 - Small systems disposing to ground.

  This code of practice covers the design, construction, testing and maintenance of septic tanks for the disposal of domestic wastewater including all waste, black water and grey water systems for small installations disposing effluent into the ground and is limited to systems producing an average daily effluent flow of 5 m^3/ day or less.

- SLS 745 – Part 2: 2009; Code of practice for design and construction of septic tanks and associated effluent disposal systems Part 2 - Systems disposing to surface, systems for on-site effluent reuse and larger systems disposing to ground.

  This code of practice covers the design, construction, testing and maintenance of septic tanks for the disposal of domestic wastewater including all waste, black water and grey water systems. It also recommends guidelines for the selection, design, construction and maintenance of systems for the on-site disposal of effluents from septic tanks.

- PHI Manual: Manual for Sri Lanka Public Health Inspector (1989) published by the Ministry of Health of Sri Lanka

- NWS&DB Design Manual D7: For wastewater treatment - March 1989, National Water Supply and Drainage Board of Sri Lanka

Considering the ample land availability, providing individual septic tanks is the best option for individual locations, commercial establishments or small clusters located outside Arugam Bay. Generation of wastewater for these entities is mostly during the daytime, hence the wastewater is predominantly wash water, wastewater generated at urinals and flushing of toilets. The solid accumulation is limited with compared to a place where people reside (e.g., the hotel). The effluent treatment will follow by use of constructed wetlands or provision allowed for soakage gullies/pits (Figure **). The treated effluent can be utilized for watering gardens and green areas.

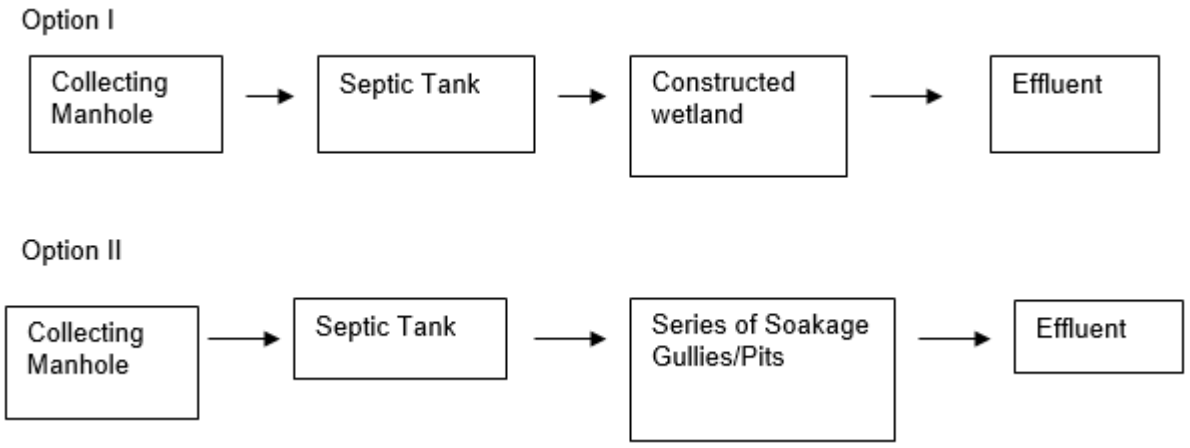


Figure 2: Options available for wastewater disposal for individual locations, commercial areas and other small clusters outside Arugam Bay

The expected volumes of wastewater should be calculated depending on the number of occupants of the particular location. The design and detailing of septic tanks, constructed wetlands, soakage gullies and pits should be based on SLS 745: Code of Practice: Sri Lanka Standards Part I and Part II (2004) on the design and construction of septic tanks and associated effluent disposal systems.

For Hotels located outside Arugam Bay

The above description is valid also for individual hotels located outside Arugam Bay.

In addition, they have the option of installing small treatment plants, especially modular DEWATS systems which are commercially available. The election of the technology will be dependent on the capacity requirement of the wastewater treatment plant.

Two separate systems are proposed for black water and grey water. Providing separate septic tanks for each hotel is an option for backwater generated from toilets while the effluent treatment will be by provision allowed for Anaerobic Biofilters (commercially available units) followed by on-site effluent disposal by providing soakage pits, seepage beds/seepage trenches. The effluent is then discharged on-site by having soakage pits and/or seepage beds/trenches. Settled wastewater from several septic tanks can be collected before on-site disposal.

For greywater which is collected separately from bathrooms and wash areas on to a distributor tank, percolation beds or constructed wetlands are proposed. The bed area of constructed wetlands and percolation beds can be used for growth of non-edible crops (or any other non-edible plants) such as flowering plants and can be used as green areas. The effluent can be re-used or disposal to surface water. For meaningful treatment, several sections of the hotel can be connected to one distribution tank before treatment, so that sufficient amounts of effluent can be collected for subsequent re-use.

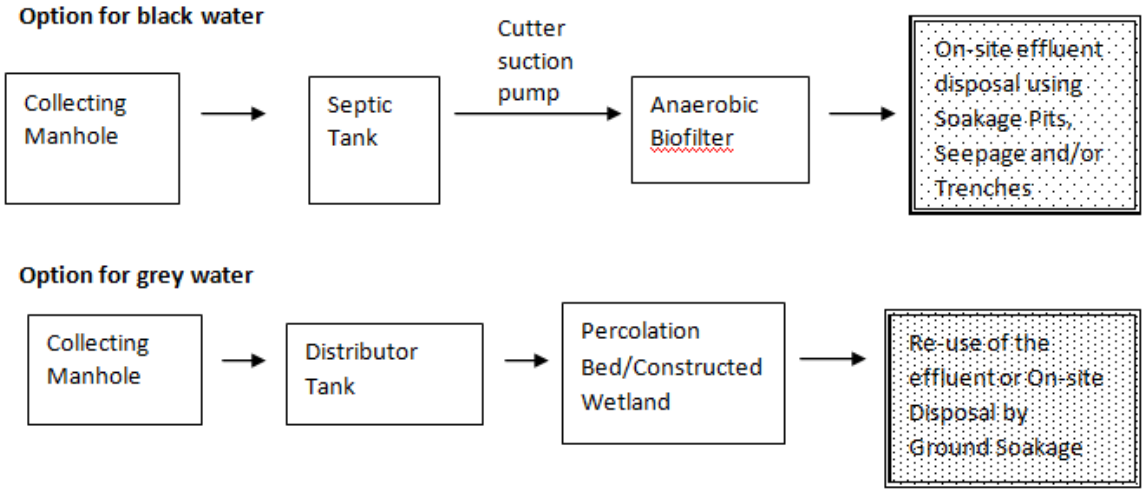


Figure 3: Options available for wastewater disposal

Out of the various options, the above option is recommended due to its ease of operation and suitability of the ground geology that allows high rates of percolation and climatic conditions favouring high rates of evaporation, which are both, very favourable for soakage/seepage and percolation beds.

Individual septic tanks need regular emptying (design period for de-sludging is one year), a task that has to be outsourced to commercial operators who uses gulley suction bowsers and who can ensure proper disposal.

Kitchens and Restaurants

Wastewater from the kitchens/restaurants will have to be pre-treated to remove food residue and grease and oil, before conveying to a soakage gulley. This wastewater has to be passed through screens and then through the grease trap to remove grease and oil, followed by soakage of effluent through soakage gullies.

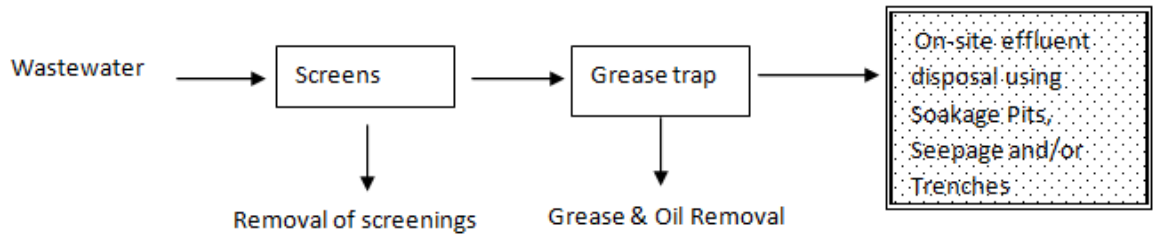


Figure 4: Options available for wastewater disposal for kitchen

Anaerobic Biofilters, Soakage pits, Percolation Beds and Constructed Wetlands

The Anaerobic Biofilters have to be designed according to SLS 745 (Part 1): Section 5.6 and Annex H of the SLS 745 OR commercially available units can be installed.

The Seepage trenches/percolation beds and constructed wetlands have to be designed according to SLS 745 (Part 1): Section 5.5 and Annex G of the SLS 745.

Limits for treatment

Regular cleaning and flushing of the sewerage pipe network have to be carried out. Effluent quality has to be checked regularly to ensure that it conforms to CEA Effluent Standards: National Environmental (Protection and Quality) Regulations, No. 1 of 2008.

The operations of the anaerobic treatment units should be strictly monitored in order to ensure that the effluent quality conforms to CEA Standards. The disposal of treated effluent should conform to the National Environmental (Protection and Quality) Regulations, No. 1 of 2008 (Gazette Extraordinary of the Democratic Socialist Republic of Sri Lanka – No. 1534/18, 01.02.2008): Schedule 1, List 2: Tolerance limits for discharge of industrial waste discharged on land for inland waters.

Annexure III

Population Estimation

1) Residential Population Forecast

Existing (2018)

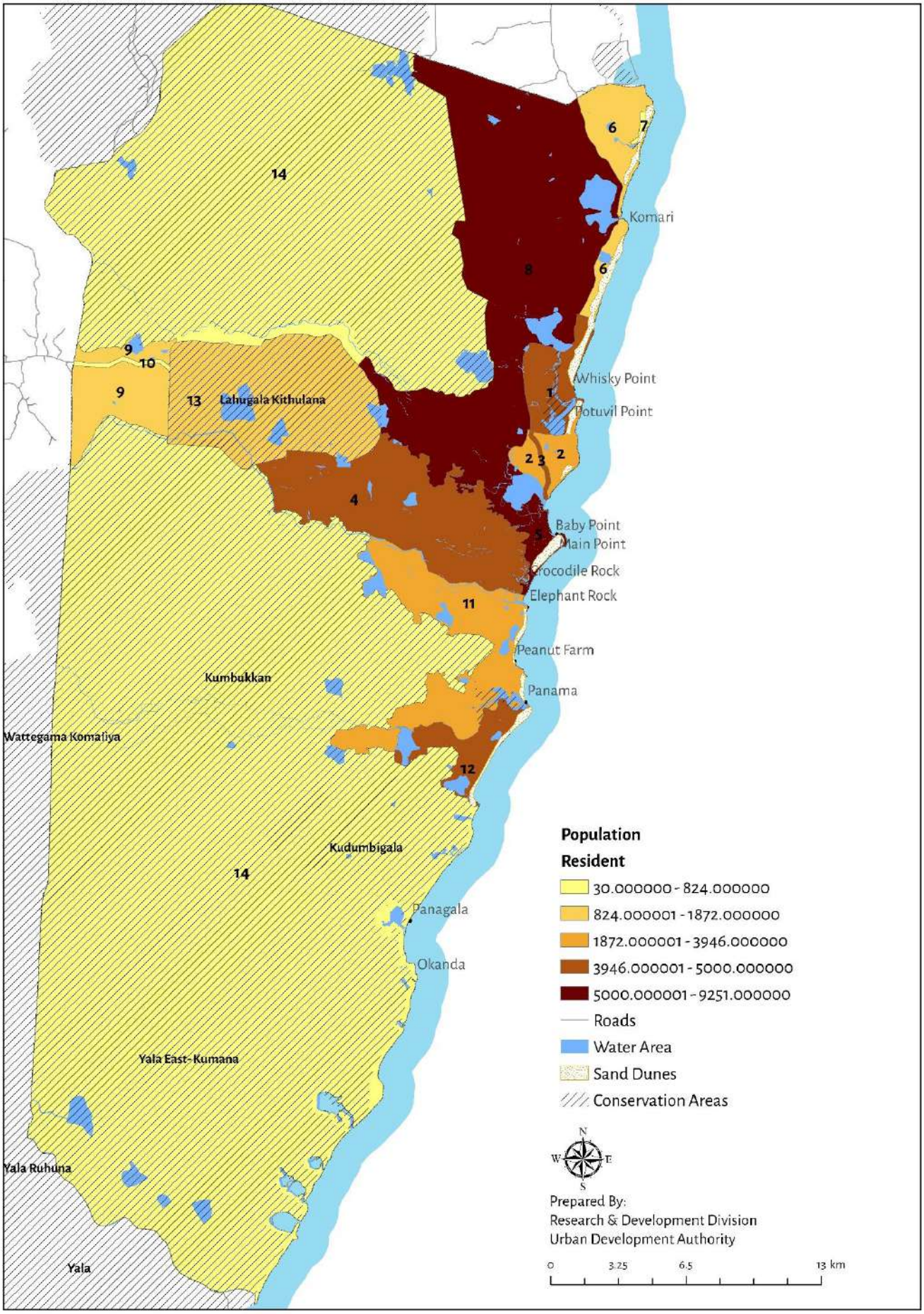
Residential Population of Pottuvil DSD – 2018	- 42,494
Residential Population of Lahugala DSD – 2018	- 10,284
Total Residential Population – 2018	- 52,778
Average Population Growth Rate (2011-2018)	- 3.14%

Forecast (2030)

Estimated Residential Population – 2030	**- 78,243**
Estimated Average Population Growth Rate (2018-2030)	**- 3.28%**
Estimated Residential Population of Pottuvil DSD – 2030	- 64,407
Estimated Residential Population of Lahugala DSD – 2030	- 13,835

Zone wise Distribution of Residential Population - 2030

No.	Zone	Residential Population - 2030
1	Zone 1 - Pothuwil High Density Tourism Zone	4980
2	Zone 2 - Pothuvil High Density Residential Zone	31032
3	Zone 3 - Pothuvil High Density Commercial Zone	5000
4	Zone 4 - Arugambay Medium Density Residential zone	4377
5	Zone 5 - Arugambay Medium Density Tourism Zone	8257
6	Zone 6 - Komari Medium Density Residential zone	1872
7	Zone 7 - Komari Medium Density Tourism Zone	30
8	Zone 8 - Pothuvil Komari Medium Density Agricultural Zone	9251
9	Zone 9 - Lahugala Medium Density Residential Zone	1718
10	Zone 10 - Lahugala Medium Density Commercial Zone	560
11	Zone 11 - Panama Low density Residential Zone	3946
12	Zone 12 - Panama Low Density Eco Tourism Zone	4330
13	Zone 13 - Wildlife Conservation Zone	1285
14	Zone 14 - Forest Conservation Zone - I	781
	Zone 14 - Forest Conservation Zone - II	824


14
6
7
Komari
8
6
9
10
9
13
Lahugala Kithulana
Whisky Point
1
Potuvil Point
2
3
2
4
Baby Point
5
Main Point
Crocodile Rock
Elephant Rock
11
Peanut Farm
Kumbukkan
Panama
Wattegama Komaliya
12
Kudumbigala
14
Panagala
Okanda
Yala East-Kumana
Yala Ruhuna
Yala
Population
Resident
30.000000 - 824.000000
824.000001 - 1872.000000
1872.000001 - 3946.000000
3946.000001 - 5000.000000
5000.000001 - 9251.000000
Roads
Water Area
Sand Dunes
Conservation Areas
N
W
E
S
Prepared By:
Research & Development Division
Urban Development Authority
0
3.25
6.5
13 km

2) Tourist Population Forecast

7. Existing Tourist Arrivals of Arugambay 2018

Tourist Arrivals of Arugam Bay

Seasonal tourist arrival %	- 73%
Seasonal tourist arrival	**- 125,000**
Off Season tourist arrival	- 27%
Off Season tourist arrival	**- 33,750**
Total tourist arrival of Arugam Bay (2018)	***- 158,750 (160,000)***

Month	% of Tourists
January	5
February	5
March	4
April	5
May	8
June	17
July	17
August	17
September	5
October	4
November	5
December	5

Season of the Arugam Bay

Source: Hoteliers Association, Arugambay & Tourism & Coastal Development on the Southeast Coast of SL by ICUN SL

8. **Expected Tourist Arrivals of Arugam Bay 2030**

1) Surfers

BAU Scenario

Tourist arrivals 2011 – 100,000 (Source: Daily News Paper 2011)

Tourist arrivals 2018 – 160,000 (*Source: Hoteliers Association, Arugambay)*

Exponential Growth rate – 6%

Expected tourist arrivals in 2030 – 300,000

Scenario based on Carrying capacity

Carrying capacity for surfing

Scenario 01 - One Wave for one Person thumb rule

Surf wave come 8-10 min in Arugambay (Source: Arugambay Surfing Coaches)
Hence assume
surf wave comes once in every 8min
There for per hour 7 times
If 12 hours - 84 times can surf in beach
Maximum no of waves ride by one person per day 20 times

Considering 11 main beaches about 50 maximum times can surf in a one day

Scenario 02 - One Wave for More People for Advanced/Intermediate surfers (based on Observations)

General length of surfing wave of Arugm bay 50m
General wave ride of Arugam bay 400m
Surfing area of Arugam bay sea 400x50 = 20000m^2
Per person surfing area 1600 m^2
(Considering Arm span of a person is 2m for 6ft person & extra 2m space for the width/ length is 400m since the wave ride is 400m)

Maximum no of surfers in one beach = 20000/1600
= 12
Maximum no of surf times in a hour =12x7
Maximum no of surf times in a day = 84x12
= 1000

If Maximum no of waves ride by one person per day 20 times

Considering 11 main beaches about 550 maximum surfers can surf in a one day

Scenario 03 - One Wave for More People for beginner surfers (based on Observations)

Surf wave come in every 3 min in Arugam bay

(Considering Arm span of a person is 2m for 6ft person & extra 2m space for the width/ length is 400m since the wave ride is 400m)

Maximum no of surfers in one beach = 20000/1600
= 12

Maximum no of surf times in a hour =12x20

Maximum no of surf times in a day = 240x12 hours
= 2800

If Maximum no of waves ride by one person per day 20 times

Considering 11 main beaches about 1540 maximum surfers can surf in a one day

Altogether Considering 11 main beaches about 2000 maximum times can surf in a one day

2) **Beach Users**

Assumptions

1. **1/3 of the beach use by surfers**
2. **2/3 of the beach use for sun bathing & recreation**
3. **Per capita space for sun bathing & recreation 10sqm (Source: California Public Outdoor Recreation Plan)**

Sun Bathing	total length	2/3 of beach	width of the beach	for sun bathing and sea bathing	per tourist 10sqm	no of tourist for sun bathing and sea bathing
Okanda Beach	433	288	60	17307	10	1731
Peanut Farm Beach	3020	2013	35	70456	10	7046
Arugam Bay Coast	1502	1001	30	30036	10	3004
Kottukal Beach	1791	1194	50	59685	10	5968
Panama Beach	1031	687	40	27498	10	2750
Wishky Point	877	584	100	58440	10	5844
Pasarichenei Beach	1058	705	30	21164	10	2116
Elephant Roack Wave Surfing Site	391	261	40	10429	10	1043
Total						**31,828**

3) Sanctuary visitors

For the Sanctuaries	
per day maximum jeep can be entered is	60
per day maximum tourist	480

Total Carrying capacity (Surfers + Beach Visitors & Sanctuary Visitors) = 2000 +31800+480
=34000 per day

Expected tourist arrivals in 2030 is 1/10 of total carrying capacity of = 3400 per day

Total tourist arrivals in 2030

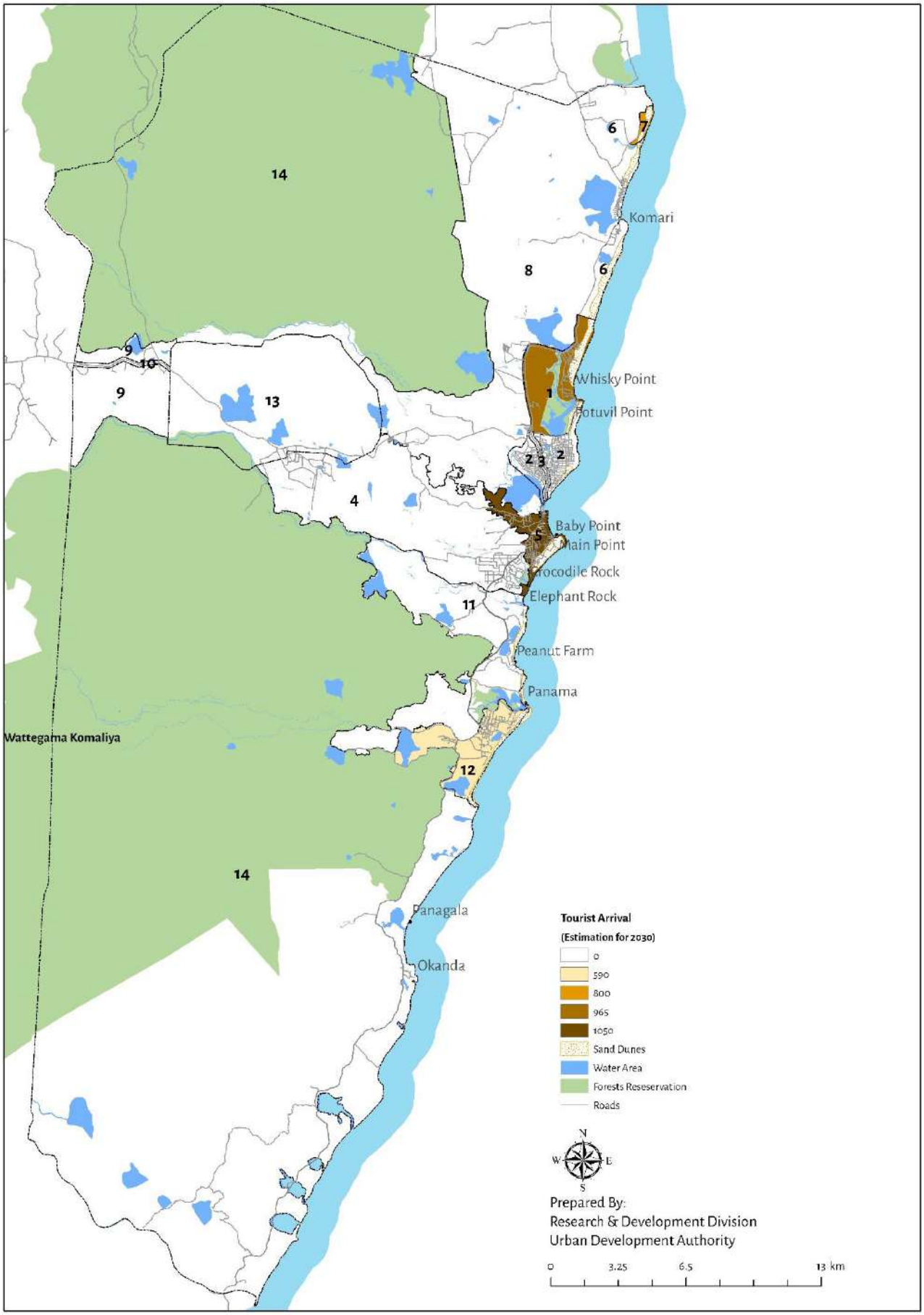
Maximum expected demand during the season per day	=3400
Average tourist arrival during the season per day	= 850
(Based on current average, 1/4 of peak demand)	
Season of arugambay	=214 days
Expected tourist arrival in the season	= 850 x 214
	= 182,000
Off season tourist arrival	= 182,000 x 27%
(Based on current off seasonal %, 27% of seasonal arrival)	= 49,000
Expected Total tourist arrivals by 2030	**= 231,000**
Expected Maximum peak demand (4 nights stay)	**= 850 x 4 = 3400**
Expected growth rate	**= 3%**
Expected total foreign tourist arrival in SL by 2030	= 5000000
Expected foreign arrivals to the Arugam Bay=200,000	
Percentage by national tourist arrival	

Distribution of Tourists for different tourism zones

The distribution ratio was determined based on several brainstorming sessions considering five criteria as follows.

- Criteria 1 – Areas with higher developable areas have higher potential to attract more tourists
- Criteria 2 – Areas with less environmental sensitivity levels have higher potential to attract more tourists
- Criteria 3 – Areas with higher potential for tourist development demand and potential have higher potential to attract more tourists
- Criteria 4 - Areas with higher infrastructure capacity levels have higher potential to attract more tourists
- Criteria 5 – Areas promoted for tourism activities based on the envisaged vision and concept have higher potential to attract more tourists

No.	Zone Name	Scores for Different Criteria (Scoring Range: 1 low potential & 10 high potential)					Distribution Ratio based on the total score	**No. of Tourists per day**
		C1	C2	C3	C4	C5		
1	Zone 1 - Pothuvil High Density Tourism Zone	4	7	8	8	9	28%	**964**
2	Zone 5 – Arugam Bay Medium Density Tourism Zone	6	8	10	8	7	31%	**1044**
3	Zone 7 - Komari Medium Density Tourism Zone	8	3	6	6	7	24%	**803**
4	Zone 12 - Panama Low Density Eco Tourism Zone	8	1	4	4	5	17%	**589**
	Total no. of tourists per day							**3400**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6
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Komari
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13
Whisky Point
1
Potuvil Point
2
3
2
4
Baby Point
5
Main Point
Crocodile Rock
Elephant Rock
11
Peanut Farm
Panama
Wattegama Komaliya
12
14
Panagala
Okanda
Tourist Arrival
(Estimation for 2030)
0
590
800
965
1050
Sand Dunes
Water Area
Forests Reseservation
Roads
N
W
E
S
Prepared By:
Research & Development Division
Urban Development Authority
0
3.25
6.5
13 km