

Integrating Heritage Impact Assessment (HIA) into Environmental Impact Assessment (EIA) as a part of Environmental Management; case study - Northern Expressway of Sri Lanka

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Abstract

Environmental management is a growing fundamental process being implemented in the development activities of Sri Lanka. Environmental Impact Assessment (EIA) is a major technical tool used to identify and propose mitigation measures to prevent/minimize impacts to environment in order to have a sustainable development.

By National Environment Act (NEA) was in 1980 recommended the adoption of EIA for development projects and from 1988 EIA was made mandatory for projects with a significant environmental impact. The types of projects that need EIA were listed under prescribed 31 categories of projects. In addition, all industrial projects that are to be located close to environmental, archaeological or culturally sensitive areas require assessment. The evaluation of EIA was delegated government project-approving agencies (PAA) and, with concurrence with the Central Environmental Authority (CEA), via standard process that decided the final approval of the development project.

A new expressway called Northern Expressway Project (NEP) will be constructed by the Roads Development Authority (RDA) of the Government

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of Sri Lanka connecting Colombo capital and Northern and Eastern provinces, under two phases. Phase one has four stages, Enderamulla to Meerigama 42 km; Meerigama to Kurunegala 39 km; Expressway link to Kandy 46 km and Kurunegala to Dambulla 63 km. As per the NEA this project was categorized as a prescribed project and the CEA has requested RDA to carrying out an EIA. Heritage Impact Assessment (HIA) has formulated and conducted by the author to integrate archaeological, historical and cultural heritage intended impacts and propose possible mitigation measures as a part of EIA of the project. Identification of heritage properties and attributes, mapping, describing possible impacts and propose appropriate mitigation measures are key objectives of the HIA. Literature survey, PRA tools, Direct observations and Field surveys were implemented methods to fulfil the assessment. Following are some of the outputs; Stage I & II – 20, Stage III – 21 and Stage IV – 26 heritage properties with their attributes was identified and proposed 23 mitigation measures to prevent/minimize impacts to already identified archaeological, historical and cultural heritage properties. Detail heritage assessment was conducted for each of the heritage property.

Finally, it was recommended to integrate HIA for each and every EIA in-order to have sustainable environmental management and development.

Keywords: *HIA (Integrating Heritage Impact Assessment) EIA into (Environmental Impact Assessment) Expressway*

การบูรณาการการประเมินผลกระทบต่อมรดกของชาติ (HERITAGE IMPACT ASSESSMENT หรือ HIA) เข้ากับการประเมินผลกระทบต่อสิ่งแวดล้อม (ENVIRONMENTAL IMPACT ASSESSMENT หรือ EIA) ซึ่งเป็นส่วนหนึ่งของการบริหารจัดการ สิ่งแวดล้อม; กรณีศึกษา - ทางด่วนทิศเหนือของศรีลังกา

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บทคัดย่อ

การบริหารจัดการสิ่งแวดล้อม เป็นกระบวนการพื้นฐานที่นำไปสู่การปฏิบัติมากยิ่งขึ้น ในกิจกรรมการพัฒนาของศรีลังกา การประเมินผลกระทบต่อสิ่งแวดล้อม (EIA) เป็นเครื่องมือทางเทคนิคสำคัญที่ใช้ในการระบุและเสนอแนะมาตรการบรรเทาเพื่อป้องกัน/ลดผลกระทบต่อสิ่งแวดล้อม เพื่อให้เกิดการพัฒนาที่ยั่งยืน

กฎหมายสิ่งแวดล้อมแห่งชาติ เมื่อ ปี ค.ศ. 1980 เสนอให้มีการใช้การประเมินผลกระทบต่อสิ่งแวดล้อมสำหรับโครงการพัฒนาต่างๆ และตั้งแต่ ปี ค.ศ. 1988 เป็นต้นมา โครงการที่มีผลกระทบเป็นอย่างมากต่อสิ่งแวดล้อม ต้องมีการประเมินผลกระทบต่อสิ่งแวดล้อม ประเภทของโครงการที่ต้องมีการประเมินผลกระทบต่อสิ่งแวดล้อม อยู่ในรายการ 31 ประเภทของโครงการ นอกจากนี้ โครงการอุตสาหกรรมทั้งหมดที่จะตั้งอยู่ใกล้พื้นที่ที่มีความอ่อนไหวทางด้านสิ่งแวดล้อม โบราณคดี หรือวัฒนธรรม จะต้องมีการประเมินดังกล่าว การประเมินผลกระทบต่อสิ่งแวดล้อม ดำเนินการโดยหน่วยงานที่ได้รับมอบหมายจากรัฐบาลให้อนุมัติโครงการ และพร้อมกันกับองค์การสิ่งแวดล้อมกลาง ผ่านกระบวนการที่ได้มาตรฐาน ซึ่งจะอนุมัติโครงการพัฒนาครั้งสุดท้าย

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ทางด่วนสายใหม่ เรียกว่า โครงการทางด่วนทิศเหนือ จะก่อสร้างโดยหน่วยงานการพัฒนาถนนของรัฐบาลศรีลังกา โดยเชื่อมกรุงโคลัมโบ เมืองหลวง เข้ากับจังหวัดต่างๆ ในภาคเหนือและภาคตะวันออก แบ่งออกเป็นสองระยะ ระยะแรก แบ่งออกเป็นสี่ช่วง จาก Enderamulla ไป Meerigama ระยะทาง 42 กม. จาก Meerigama ไป Kurunegala ระยะทาง 39 กม. ทางด่วนเชื่อมเมือง Kandy ระยะทาง 46 กม. และจาก Kurunegala ไป Dambulla ระยะทาง 63 กม. ตามกฎหมายสิ่งแวดล้อมแห่งชาติ โครงการนี้ อยู่ในรายการที่ถูกจัดให้ต้องมีการประเมินผลกระทบต่อสิ่งแวดล้อม และองค์การสิ่งแวดล้อมกลางได้ขอให้ หน่วยงานการพัฒนาถนน ทำการประเมินผลกระทบต่อสิ่งแวดล้อม

การประเมินผลกระทบต่อมรดกของชาติ ได้จัดทำขึ้น และดำเนินการโดยผู้เขียน โดยบูรณาการผลกระทบต่อมรดกทางโบราณคดี ประวัติศาสตร์ และวัฒนธรรม และเสนอมาตรการบรรเทาที่เป็นไปได้ ซึ่งเป็นส่วนหนึ่งของการประเมินผลกระทบต่อสิ่งแวดล้อมของโครงการดังกล่าว การระบุทรัพย์สินและคุณลักษณะของมรดกของชาติ การจัดทำแผนที่ การอธิบายผลกระทบที่อาจเป็นไปได้ และการเสนอมาตรการบรรเทาเป็นวัตถุประสงค์หลักของการประเมินผลกระทบต่อมรดกของชาติ การสำรวจวรรณกรรม เครื่องมือการให้ชุมชนมีส่วนร่วม การสังเกตโดยตรง และการสำรวจภาคสนาม เป็นวิธีการที่นำไปปฏิบัติ เพื่อให้การประเมินประสบความสำเร็จ ต่อไปนี้ เป็นผลลัพธ์บางส่วน เช่น ช่วงหนึ่งและสอง ได้มีการระบุทรัพย์สินพร้อมคุณลักษณะของมรดกของชาติ 20 แห่ง ช่วงสาม 21 แห่ง และช่วงสี่ 26 แห่ง และได้มีการเสนอมาตรการบรรเทา 23 มาตรการ เพื่อป้องกัน/ลดผลกระทบต่อทรัพย์สินของมรดกทางโบราณคดี ประวัติศาสตร์ และวัฒนธรรม ที่ได้กำหนดไว้แล้ว ทั้งนี้ ได้ดำเนินการประเมินมรดกของชาติอย่างละเอียด สำหรับทรัพย์สินของมรดกของชาติแต่ละแห่ง

ท้ายที่สุด ได้มีการเสนอให้มีการบูรณาการการประเมินผลกระทบต่อมรดกของชาติเข้ากับการประเมินผลกระทบต่อสิ่งแวดล้อมทุกครั้ง เพื่อให้เกิดการบริหารจัดการและการพัฒนาสิ่งแวดล้อมที่ยั่งยืน

คำสำคัญ: การบูรณาการการประเมินผลกระทบต่อมรดกของชาติ การประเมินผลกระทบต่อสิ่งแวดล้อมทางด่วน

Preamble

This paper is focus on integration Heritage Impact Assessment (HIA) conducted in order to fulfilment of the Environmental Impact Assessment (EIA) of Northern Expressway Project which will be constructed in late 2014 by connecting Colombo capital with Northern and Eastern Provinces of Sri Lanka and running through several important cities in Western, Central and North Central Provinces. To make it understandable background information has been provided from beginning of the paper; such as about Sri Lanka, environmental status of the country and EIA process. Hence the paper is reflects HIA as a case study in overall environmental management system of the country. Northern Expressway Project has been described and thereafter main component of HIA elaborated lengthy to deliver that is the case study and finally recommendations and several important points highlighted.

Sri Lanka at a Glance

Officially the country named as Democratic Socialist Republic of Sri Lanka, located as an island in the Indian Ocean just below the Indian sub-continent at latitude 5° 55. to 9° 50. north, longitude 79° 42. to 81° 52., 650 km north of the equator. The country diameter is 430 km North to South and 225 km East to West. Coastline is 1,340 km and total area is 65,525 km². For administration and govern the country has divided into 9 provinces and 24 districts. Executive/political, central and local government mechanisms operated from top to bottom. Administrative Capital is Sri Jayewardenepura and Commercial Capital is Colombo located in Western Province. Climate is typically tropical, average temperature is 27°C, central hills much cooler with dropping to 14°C. The south-west monsoon brings rain to the western, southern and central regions from May to July, while the north-eastern monsoon is from December to January bringing main rain to rest of the country. Country has around 108 rivers and thousands of small to large tanks, reservoirs which is an extra-ordinary character. Terrain of the country is mostly low, flat to rolling plain and mountains in south-central interior.

Population is 21 million and population growth rate is 1.3%. Population density is 309 people per km². Life expectancy at birth is 74 female and 64 male. Literacy rate is female 87.9 male 92.5 and this figure is the highest

in South Asia. Ethnic Groups are majority is Sinhalese 73.8%, Moors 7.2%, Indian Tamil 4.6%, Sri Lankan Tamil 3.9%, other 0.5%, unspecified 10%. Sinhala is the official and national language (74%) and Tamil is other national language (18%), English is a link language commonly used about 10% of the population. Buddhists are 69.1%, Muslims 7.6%, Hindus 7.1%, Christians 6.2% and unspecified 10%. Nearly 8,000 km² of the country covered by national parks and nature reserves.

As land use patterns nearly 50% of the country classified as permanent crops and 27% is paddy harvesting. Sri Lanka's most dynamic sectors are food processing, textiles and apparel, food and beverages, port s/harbours, telecommunications, insurance and banking. Plantation crops made up presently only 15% of exports but in 1970 it was 90%, while textiles and garments accounted for more than 60%. As labour force 34.3% of the labour population is employed in agriculture, 25.3% in industry and 40.4% in services, unemployment rate is 5.7%. Agriculture and products are rice, sugarcane, grains, pulses, oilseed, spices, tea, rubber, coconuts, milk, eggs... etc. Industries are processing of rubber, tea, coconuts, tobacco and other agricultural commodities, cement, petroleum refining. Real growth rate is 6.3% (2013) and GDP per capita is \$ 2004 (2014). Sri Lanka ranked first in South Asia in Human Development Index of UN (2014)

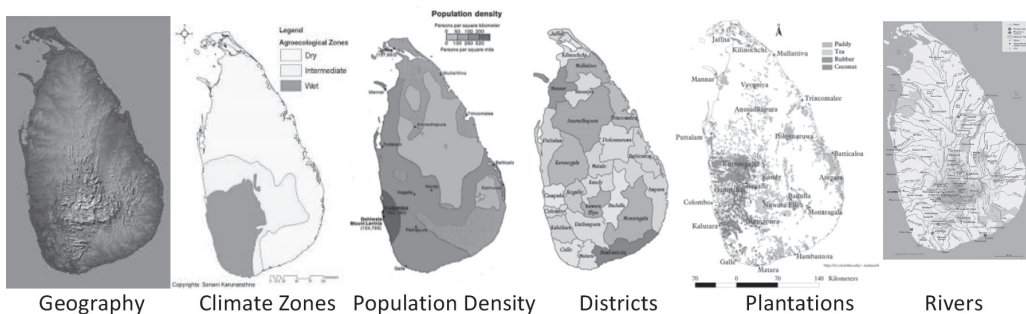


Fig 1 Some geographical features of Sri Lanka

ENVIRONMENT STATUS OF THE COUNTRY

Natural History

Sri Lanka has a long environmental history linked to southern Africa, Asia, Australia and South America when it was part of the ancient Gondwanaland. The Deccan plate, a fragment of this land mass comprising

India and Sri Lanka, collided with the Asian plate around 55 million years. 30 million years ago due to sea level raise and land uplift/submerge Miocene limestone formed in coastal region of northwest and northern parts of the country. 2 million years ago Pleistocene epoch was originated and it's important to evolution and extinction of country's present natural history, including hominid, and extended through 10,000 years old Holocene epoch. Nearly 40,000 years old Anatomically Modern Human (AMH) named as Balangoda Man (Deraniyagala, 1958) fossils discovered in the country, recorded oldest particular remains in the South Asia.

Present species composition of the country is suggested as Late-Pleistocene Mesolithic Fauna (LPMF) which can be identified along AMH. Before that species composition included mega-fauna, most of them extinct presently suggested as Pleistocene Pre-Mesolithic Fauna (PPMF) indicated by early hominids, elephant species, hippopotamus, rhinoceros species... etc (Yahapmath, 2012). The island's geological history, tropical location, diverse topography, including a wide range of altitude, and its varied climate, governed by seasonal monsoons, are among the key factors that responsible for its high levels of biological diversity and endemism. The long history of modern human civilisation dated back to 2,500 years has influenced the conservation status of this biodiversity.

Biodiversity

Biological diversity is the variety of life on Earth, the product of millions of years of evolution and thousands of years of cultivation of plants and domestication of animals. It is often referred to in abbreviated form as biodiversity. There are many levels of diversity, from DNA and genes to species, populations, communities and ecosystems.

Box 1 - Biological diversity, as defined in the Convention on Biological Diversity (CBD)

“Biological diversity” means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. [Article 2]

Sri Lanka together with the Western Ghats in southern India is a global hotspot for biological diversity of which 34 are currently recognised. These 34 hotspots are defined regions where 75% of the planet's most threatened mammals, birds and amphibians survive within habitat covering just 2.3% of the Earth's surface. To qualify as a hotspot, a region must meet two criteria: it must contain at least 1,500 species of vascular plants (> 0.5 % of the world's total) as endemics; and it must have lost at least 70% of its original habitat due to the impact of human activities. With respect to comprehensive global analyses of specific taxonomic groups, Sri Lanka is also recognised as one of 234 centres of plant diversity in the world and one of 221 endemic bird areas. Much of this diversity is found in the montane, submontane and lowland rain forests of the wet zone and moist monsoon forests of the intermediate zone. Among the ecosystems diversity Forests, Grasslands, Freshwater wetlands and Brackish water wetlands has been identified as major types.

Environment Challenges

Presently there are many environmental issues and challengers can be seen in the country. Following are some of them; Improper land use planning, Depreciation of forest cover (deforestation), Land degradation (soil erosion, river sedimentation, desertification), Scarcity of drinking water, Environmental pollution (air, water & soil), Loss of biodiversity (Degradation and loss of habitats), Ozone layer depletion, Greenhouse gas emission and climate change, Environmental & natural disaster, Lack of proper recognition of environmental values in environmental accounting, Increasing threat to endangered species, Encroachment of critical areas, Unsustainable management of natural resources, Unsustainable development activities (unsuitable agriculture expansion and settlements), Exploitation of sea coral reef and inland earth mining, Uncontrolled mining of sand and other minerals, Spread of alien/ invasive species, Introduction of genetically modified organisms, Solid, hazardous and Industrial waste generation, Health hazards related to environment pollution, Wildlife depletion, Human elephant conflict, Coastal erosion, damages to micro ecosystems..etc.

Table 1 – Species diversity of Sri Lanka

	Type of taxa	No. of species	No. of endemic species
Flora	Algae	896	
	Fungi	1,920	
	Lichens	110	39
	Mosses	575	
	Liverworts	190	
	Ferns and allies	314	57
	Gymnosperms	1	0
	Angiosperms	3,044	919
Fauna (Invertebrates)	Bees	148	21
	Dragon/damselflies	120	57
	Aphids	84	2
	Ants	181	1
	Butterflies	243	20
	Ticks	27	1
	Spiders	501	
	Freshwater Crabs	51	51
Fauna (Vertebrates)	Freshwater Fish	82	44
	Amphibians	102	88
	Reptiles	184	105
	Birds	482	25
	Mammals	91	16

Source: Ministry of Environment / IUCN

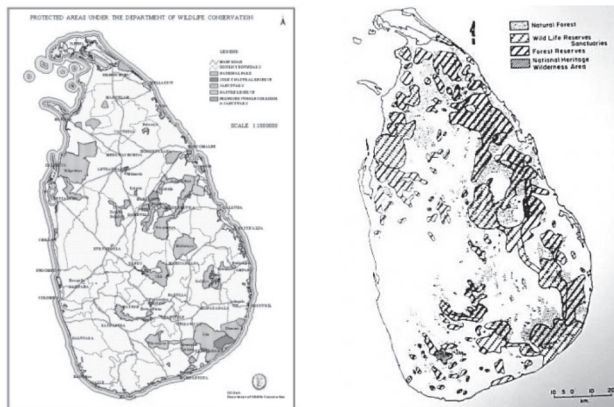


Fig 2 - Distribution of wildlife protected areas, forest and protected areas.
 Source: Wildlife Conservation Department and Gunatilleke (1997)

Conservation

In relation to conservation of overall environment of the country as well as biological diversity which includes genetic diversity, species diversity and ecosystem diversity and overall environmental status, there are two major types of conservation area categories has established; In-situ Conservation Areas and Ex-situ Conservation Areas. Under the In-situ Conservation, the protected areas managed by Forest Conservation Department (Strict Nature Reserves, Forest Reserves, Proposed Reserves... etc), and by Wildlife Conservation Department (Sanctuaries, National Parks.. etc). For Ex-situ Conservation Botanical Gardens, Zoological Gardens, Orphanages, Gene Banks, Research Institutions...etc being operated.



Fig 3 Pinnawala Elephant Orphanage is a best ex-situ conservation place in the country and globally its notable for having the largest herd of captive elephants in the world.

Legal background

Overall country's environment is protected by National Environment Act of 47 of 1980, which is authorized by Central Environmental Authority (CEA) under the Ministry of Environment. In addition there are many acts relevant to specific sectors of environment has authorized under each of the Ministry/Department legalised in the country. Some examples are as follows showing particular act and the authorized Agency.

- Fauna and Flora Protection Ordinance - Wildlife Conservation Ministry/Department
- Forest Ordinance – Forest Department
- State Lands Ordinance – Agriculture Ministry
- Mines and Minerals Act – Geological Survey and Mines Bureau
- Coast Conservation Act – Coast Conservation Department
- Marine Pollution Prevention Act – Marine Environment Protection Authority
- Soil Conservation Act – Agriculture Ministry
- Fisheries and Aquatic Resources Act – Ministry of Fisheries and Aquatic Resources

ENVIRONMENTAL IMPACT ASSESSMENT AND PROCESS IN SRI LANKA

The National Environmental (Amendment) Act No. 56 of 1988 was introduced Environmental Impact Assessment (EIA), as a part of the strategy. The importance of the Environmental Impact Assessment as an effective tool for the purpose of integrating environmental considerations into development planning was highly recognized in Sri Lanka. The EIA was helps to identify the likely effects of a particular project on the environment at an early stage and it also finds ways to reduce unacceptable impacts and to shape the project so that it suits the local environment. It was helps the officials make decisions about a project and helps the project proponent to achieve his aims more successfully. Thus the EIA was considered as a major planning tool and one of the key techniques to achieve sustainable development. EIA has also become a mandatory requirement for establishment of development projects in Sri Lanka under the National Environmental Act as well as under few other legislations.

Only large scale development projects that are likely to have significant impacts on environment were listed as prescribed projects (Annex 1), which needs in the EIA. In addition prescribed projects if located in “environmental sensitive areas” were required to undergo EIA irrespective of their magnitude.

Box 2 - Project Approving Agencies

PAA, which can grant approval for IEE / EIA as set out in the Gazettes. The respective ministries to which the following subjects are assigned; National Planning, Irrigation, Energy, Agriculture, Lands, Forests, Industries, Housing, Construction, Transport, Highways, Fisheries, Aquatic Resources, Plantation Industries, and the departments such as Department of Coast Conservation, Department of Wildlife Conservation, Department of Forest, Central Environmental Authority, Urban Development Authority, Geological Survey and Mines Bureau, Ceylon Tourist Board, Mahaweli Authority of Sri Lanka, Board of Investment of Sri Lanka.

The National Environmental Act stipulates that approval for all prescribed projects were must be granted by a Project Approving Agency (PAA). When there was more than one PAA is involved the appropriate PAA is decided by the CEA. It was important to note that a state agency which is a project proponent cannot function as a PAA for that project.

The National Environmental Act was identified two levels in the EIA process.

- ❖ If the environmental impacts of the project were not very significant then the project proponent may be asked to do an Initial Environmental Examination (IEE), which was a relatively short and simple study.
- ❖ If the potential impacts appear to be more significant, the project proponent may be asked to do an Environmental Impact Assessment (EIA) which was a more detailed and comprehensive study of environmental impacts.

Public participation was an important aspect of the EIA process. Once an EIA report was submitted the NEA provides provisions for public inspection and comment on the EIA report during a mandatory period of 30 days. EIA reports were available for perusal by the public in Sinhala,

Tamil and English. These reports were usually kept for public inspection in the CEA Headquarter Library, the relevant Divisional Secretariat Office and Local Authority. Any member of the public could send their comments to the CEA or the respective PAA, within 30 working days. The PAA was published notices in the national newspapers inviting the public to inspect and comment on the EIA report within 30 days. The notice specifies where and when the EIA report could be inspected. The public were having a right to obtain copies of the EIA report from the PAA by paying copying charges. The public comments received were sent to the project proponent for response. The project proponent was responded to comments by making every effort to improve the project. The IEE reports were not required to open for public comments for a mandatory period of 30 days. However, an IEE report was deemed to be a public document and shall open for inspection by the public. In addition to the above mandatory requirement, the project proponents were always advised to have informal dialogues / consultation with the local people during the EIA study. The project proponent was must ensure that the local people get accurate information about the project. If the local communities were negatively affected by the project, it was important that the project proponent consulted them and obtained their support in proposing mitigation measures to minimize the impacts.

The followed EIA process can be summarized in to several steps.

Approval for EIA Preliminary Information - A project proponent was required to provide the CEA with preliminary information on the proposed project, in order for the EIA process that initiated. Project proponent was submitted the preliminary information on the proposed project was as soon as the project concept was finalized and the location of the project was decided. The Basic Information Questionnaire (BIQ) form prepared by the CEA was used for this purpose. The BIQ has obtained from the EIA Unit of the CEA Head Quarters also it can be obtained from the Provincial / District offices of the CEA. It could also be downloaded from the CEA website

Environmental Scoping – After the prescribed project was referred to CEA, the CEA was decided a suitable Project Approving Agency (PAA). Then the PAA was carrying out scoping and Terms of Reference (ToR) for the EIA/IEE that was issued to the project proponent.

EIA/IEE Report Preparation - It was the responsibility of the project proponent to prepare the EIA / IEE report and submitted it to the PAA for evaluation. Preparation of EIA report was required the services of a team of consultants as many specialized areas were covered. Lists of consulting firms who prepare EIA reports are available at the CEA. In addition to this, project proponents can be used the services of suitably qualified consultants who not have been registered in the CEA. It is important to note that project proponent should obtain the services of reliable and adequately qualified experts in the relevant field, in order to ensure that the EIA reports will be of the required standard.

Public Participation & Evaluation of the Report - On receipt of an EIA report, it will be subjected to an adequacy check in order to ensure that the ToR issued by the PAA has been met. Then it opened for public inspection / comments for a period of 30 working days. Subsequent to the public commenting period the PAA was appointed a Technical Evaluation Committee (TEC) to evaluate the EIA report and made its recommendations. Behalf of project proponent EIA Team Leader of consultant team was make presentation to TEC.

Decision Making - Based on the recommendation of the TEC, the PAA made it's decision on granting approval for a project. If the PAA is not the CEA, it should obtain the concurrence of the CEA prior to granting approval. If the project proponent doesn't agree with the decision, has a right to appeal to the Secretary to the Ministry of Environment. The decision of the Secretary to the Ministry of Environment is final.

Compliance Monitoring - EIA / IEE approval is generally given with conditions which the project proponent is expected to meet. The CEA or the PAA will monitor the implementation of conditions / mitigation measures. If the project proponent violates the conditions, the approval may be revoked.

NORTHERN EXPRESSWAY PROJECT

Effective transport systems have always played a major role in a country's economic growth. Compare to other countries in the Asian region Sri Lanka has a higher road density. Most of these trunk roads have been

constructed during the colonial period. During the recent past some of these roads have been upgraded with better pavement conditions and to suit present traffic conditions. The government of Sri Lanka has identified the development of the transport network as one of the key requirement to achieve economic growth in the country. It has identified the importance of developing an expressway network, which will comprise a high-standard limited access road network, across the country connecting

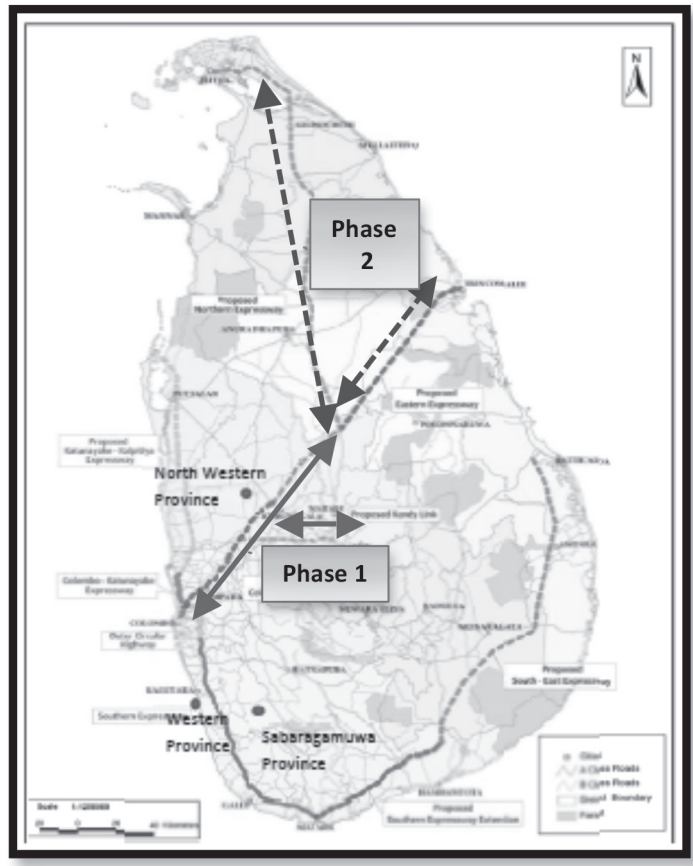


Fig 4 – Phase 1 and phase 2 of the NEP

Colombo and key centers around the country. The Road Development Authority (RDA) under the Ministry of Highways, Ports and Shipping has developed a plan for a network of expressways. Several sections of this expressway network have commenced operations. These sections include the Southern Expressway from Kottawa to Matara, Colombo – Katunayake Expressway (airport) and Kottawa – Kaduwela section of Outer Circular Highway. According to the Roads Master Plan of the country (2007 – 2017) it has identified to construction of Northern Expressway, formally known Northern Expressway Project (NEP). NEP will connects Colombo capital and Northern and Eastern provinces in the country and running through by connecting other important Cities/ Economic Centers. Development of NEP is to be undertaken in two phases.

- Phase 1 – From Enderamulla (Western Province) to Dambulla (North-Central Province)
- Phase 2 – From Dambulla to Northern and Eastern Provinces.

In addition in phase 1 there will be link road to Ambepussa that connect Colombo – Kandy highway. An Expressway Link to Kandy (Central Province) will be constructed through several other cities under phase 1. (Kandy is a main historical city of the country also one of the key socially and economically important districts).

Total length of the Expressway is 300 km and it has been estimated total cost of the project as US\$ 4.5 billion. NEP project is one of the largest development projects in the country. Key objectives for construction of NEP are formulated as follows;

- Form a part of an economically optimum expressway network system that connects various regions of the country,
- Handle the forecasted traffic at an adequate level of service by the year 2030,
- Facilitate the needs of expected industrial and social development town areas located along the expressway corridor,
- Provide an efficient transport network to expedite development plans in the Northern and Eastern Provinces,
- Improve connectivity between key growth centres of Colombo, Gampaha, Kurunegala, Kandy and Dambulla to the north and east regions of the country,
- To minimise the environmental and social impacts of the project,
- Achieve sustainable development outcomes in the project corridor.

Further benefits to the public will be expected after completion of the project, including; Improved transportation network connecting the Northern and Eastern Provinces, Improved opportunities for remote cities of the Northern and Eastern Provinces to attract for new investments, Increase motivation for foreign and private sector, thereby contributing to the expansion of new job opportunities, Reduced travel time between districts, Recue delay costs and fuel costs, Improved access to tourist destinations, Development of towns as economic centres, Enhancement of the value of the land and properties, Economic and social development of agricultural based cities, Ease and uniform resources distribution...etc.

The Study

Area

For the case study, Phase 1 of the NEP has been selected. As mentioned it will be constructed from Enderamulla of Colombo district to Dambulla of Matale district and to Kandy district, further link to Colombo – Kandy highway. Up to now feasibility study and EIA has been completed only for phase 1 in order to commence the construction in November of 2014. Phase 1 has planned to be constructed by four stages and the study was carried out accordingly. The area study carried out was;

- Stage 1 – Enderamulla to Meerigama (41 km)
(Ambepussa Link will connect the expressway to Kandy Highway – 9 km)
- Stage 2 – Meerigama to Kurunegala (39 km)
- Stage 3 – Kandy Link from Pothuhera to Kandy (46 km)
- Stage 4 – Kurunegala to Dambulla (63 km)

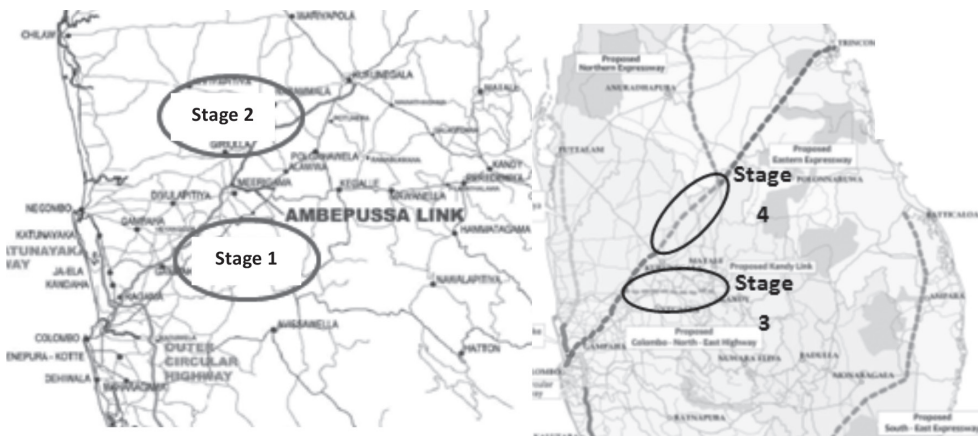


Fig 5 – Stages 1, 2, 3, and 4 in Phase 1 of NEP (The study area)

Justification

As per National Environment Act regulations, construction of national and provincial highways involving a length exceeding 10 km or if a section of a proposed new highway will be located within an environment sensitive area require a formal environmental approval. Hence, in 2013 April Road Development Authority (RDA) as the authorized agency for expressways and highways was submitted the application to CEA. After completion of

scoping of the project, CEA as the Project Approving Agency (PAA) was declared that the project requiring an EIA. Terms of Reference (ToR) for preparation of an EIA were issued to RDA in May 2013. SMEC International was engaged by RDA to prepare a feasibility study for the proposed project, which included an Environmental and Social Impact Assessment (EIA). SMEC International contracted Skills International to prepare the EIA in accordance with the ToR issued by CEA and RDA Environmental and Safeguards Compliance Manual.

It was understood present EIA report of the NEP phase 1 has following structure to explain environmental and social information, impacts, mitigation measures..etc, and the same structure had been followed by other projects in the country with some minor changes as a normal practice.

The study aimed to improve the cultural, historical and archaeological heritage component of the NEP EIA report structure as a main sub-topic, while presently it was laid as a sub-sub topic by reflecting minor concern. But the country has very rich cultural, historical and archaeological background as well as diversity of heritage values is significantly highlighted. UNESCO has designated six sites as World Heritage Sites in Sri Lanka. There are many more cultural, historical and archaeological heritage properties and attributes to be identified and recovered too.

Due to different types and scales of development or constructions activities in the country surrounded environment is destroying in a significant manner. Due to EIA process that certain projects already followed, their most of the negative impacts could minimized but rest of the projects and poor monitoring status of projects that already gone through the EIA are also being delivered environmental damages. Among those damages there are many cultural, historical and archaeological heritage properties and attributes. Not like other environmental damages, if damage occurred in cultural, historical and archaeological properties or attributes its difficult to recover or restore or redevelop the same with the heritage value, also will not maintain original heritage characteristics. Present EIA report format has structured as following and it can be showed the position of cultural, historical and archaeological heritage component.

1. Introduction
2. Description of the proposed project and reasonable alternatives
3. Description of existing environment

- Physical environment, Biological environment...
- Socio-cultural environment

✓ **Cultural, historical and archaeological heritage**

4. Anticipated environmental impacts

- Impacts on Hydrology, Biodiversity...
- Other potential social and environmental impacts

✓ **Potential Impacts for cultural, historical and archeological heritage**

5. Proposed mitigation measures

- Mitigation measures for Hydrological impacts, Biodiversity impacts...
- Mitigation measures for other possible social and environment impacts

✓ **Mitigation measure for impacts on cultural, historical and archeological heritage**

6. Extended Cost Benefit Analysis

7. Environmental management and monitoring programme

8. Public consultation and information disclosure

9. Conclusion and Recommendation

Annexes

Terms of Reference (TOR)

CEA was provided TOR for conduct the EIA which included cultural, historical and archaeological heritage component. Specifications, intended outputs and deliverables of the TOR were followed.

According to Specifications;

- ✓ Used current existing data, supplemented with the results of field surveys.
- ✓ Identified the existing artefacts, sites and areas of historical and cultural (including religious) heritage significance within the proposed road corridor.
- ✓ Mapped the locations of artefacts, sites and areas of historical and cultural heritage significance.

- ✓ Described the potential impacts of the road corridor on historical and cultural heritage.
- ✓ Developed appropriate recommendations and mitigation measures to minimise the impacts of the project to historic and cultural heritage.

Agreeing to Intended Outputs;

- ✓ Mapped the artefacts, sites and areas of historical and cultural heritage significance.
- ✓ Described specifications of recommended mitigation measures, including impacts avoidance where possible.

Deliverables were;

- ✓ Maps showing historical and cultural heritage for a 1000m wide corridor along the road corridor.
- ✓ Discussions of potential impacts on historical and cultural heritage.
- ✓ Mitigation measures to avoid or minimize impacts on historical and cultural heritage during construction and operation and suitable for inclusion in the ESMP.
- ✓ Report sections summarizing findings in EIA Report.

Scope & Model

The “scope” of the study has been developed, based on provided TOR which included specifications, intended outputs and deliverables for cultural, historical and archaeological heritage.

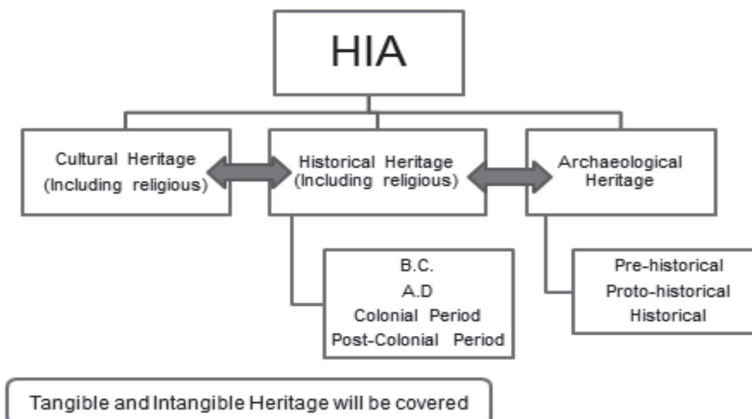


Fig 6 – Developed scope of the study

After the Preliminary Visit, it was formulated a modal for understand inter-relationships of cultural, historical and archaeological heritage. The modal reveal properties and attributes of cultural places, cultural-historical places and cultural-historical-archaeological places.

Mainly assessed heritage can be categorized as;

➤ **Cultural Heritage – Temples, Churches, Mosques/ Monuments**

➤ **Historical Heritage – Temples, Churches, Monuments**

➤ **Archeological Heritage – Temples, Other archaeological properties/ monuments**

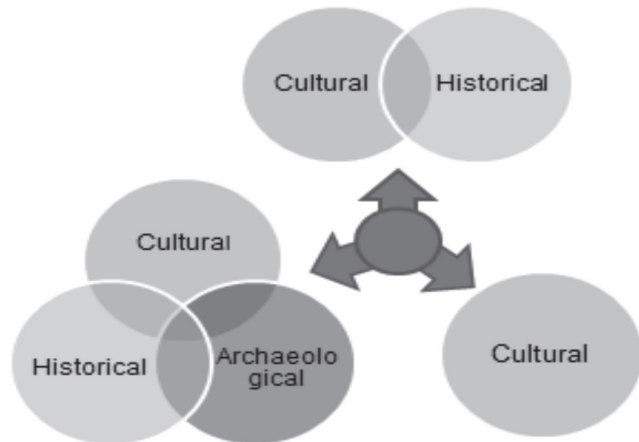


Fig 7 – Formulated modal of the study

Finally a strategy was developed for conduct the assessment based on overall literature survey, preliminary visits and formulated modules, it included;

- Step 1 – Conduct preliminary visit to project area
- Step 2 – Literature survey
- Step 3 – Development of relevant data base/maps/ formats/ tools
- Step 4 – Conduct detail survey (Property & Attributes Study) in pre-identified locations
- Step 5 – Data triangulations/ verifications and confirmations
- Step 6 – Stakeholder Consultation
- Step 7 – Report Development

Box 3 - What is heritage?

This refers to something inherited from the past. The word has several different senses. Eg. Cultural heritage is the legacy of physical artefacts and intangible attributes of a group or society that are inherited from past generations, maintained in the present and bestowed for the benefit of future generations.

As showed below the methodology was developed for conduct the study in the field. Priority was given for survey on 120 m road corridor in the centreline of proposed EW. Secondly it was considered +/- 500 m either side of the centreline of EW corridor. If a heritage property identified as a cultural or historical or archaeological property it was taken into account as a heritage property. Further GPS coordinates, distance to EW centreline, geo-morphological status between EW and the property were studied. Detail assessment conducted in such places to identify heritage properties and attributes in-depth level. Discussions were held with management or authority or community of the particular place and Key Informants Interview conducted as a PRA tool. Desktop study further carried out to development of the map and verifications/ triangulations.



Fig 8 – Field study methodology zonation.

RESULTS AND ANALYSIS

Results and analysis can be described as stage by stage, starting from Stage 1 & 2. Levels of impacts in terms of vulnerability/risk to the heritage properties and their attributes were assessed mainly based on physical proximity and geo-morphological nature between the property and expressway, also access roads in the particular area were considered

too. Priority was given accordingly; properties those located in 120 m road corridor (direct impact) and 500 m either side of the centreline, in addition beyond that margin. (indirect impacts)

STAGE 1 & 2

The assessment was identified 20 properties/ places during the study located 120 m road corridor and extended either side of the + 500 m. Among those 18 (90%) were temples & Buddhism related properties, 1 (5%) is a church, and 1 is a shrine (5%). Properties with cultural value were 20 (53%), with historical value are 13 (34%) and with archaeological value were 5 (13%). The properties reflected “cultural value” only were 38%, and properties reflected “cultural-historical value” were 38% and properties reflected “cultural-historical-archaeological value” were only 24%.

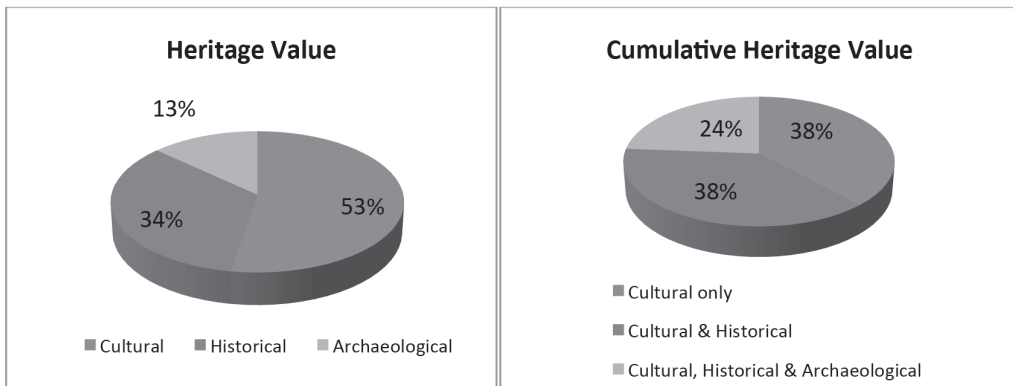


Fig 9 – Heritage value and cumulative heritage value of Stage 1 & 2

Table 2 – Stage 1 & 2 identified and studies cultural, historical and archaeological properties.

Title/ Name	Type of HP	Approximate Distance (m)	GPS Coordinates	Category	Level of Impact
Stage 1 & 2					
Sri Jayasumanaramaya	Temple	150	7° 4'6.80"N 79°56'48.14"E	Cultural Historical Archaeological	Indirect High
Yatawatta Purana Viharaya	Temple	400	7° 5'19.08"N 79°59'10.90"E	Cultural Historical Archaeological	Indirect High
Sri Bhodi Sanwardana Samithiya	Temple	250	7° 5'54.35"N 79°59'30.97"E	Cultural	Indirect Middle
Sri Mangalaramaya	Temple	450	7° 5'59.26"N 79°59'27.17"E	Cultural	Indirect Low
Purwarama Purana Viharaya	Temple	100	7° 6'12.44"N 80° 0'25.37"E	Cultural Historical	Indirect High
Sri Wardana Piriven Mulamaha Viharaya	Temple	500	7° 7'30.84"N 80° 1'43.60"E	Cultural	Indirect Low
Kandoluwawa Bauddha Sanscruthika Madyastanaya	Temple	500	7° 7'31.30"N 80° 2'10.40"E	Cultural	Indirect Low
Magalegoda Purana Viharaya	Temple	300	7° 8'0.70"N 80° 2'11.50"E	Cultural Historical	Indirect Middle
Sumiththa Sri Sunandarama / Dadagamuwa Rajamaha Viharaya	Temple	250	7° 8'11.60"N 80° 3'6.60"E	Cultural Historical Archaeological	Indirect High
Sri Janaraja Viharaya - Danvilana	Temple	100	7° 8'56.96"N 80° 3'35.99"E	Cultural Historical	Indirect High
Sri Jayasundara Vidarshanarama Purana Rajamaha Viharaya	Temple	200	7°10'35.28"N 80° 4'7.27"E	Cultural Historical Archaeological	Indirect High
Somaramaya Aramaya	Temple (Aramaya)	60	7°12'41.50"N 80° 6'19.80"E	Cultural	Indirect Middle
Khemaramaya Aramaya	Temple (Aramaya)	175	7°13'18.10"N 80° 6'39.19"E	Cultural	Indirect Middle
Sri Munindaramaya	Temple	100	7°14'42.85"N 80° 6'41.22"E	Cultural	Indirect High

Table 2 – Stage 1 & 2 identified and studies cultural, historical and archaeological properties. (cont)

Title/ Name	Type of HP	Approximate Distance (m)	GPS Coordinates	Category	Level of Impact
Hakurukumbara Purana Viharaya	Temple	200	7°15'19.70"N 80° 7'26.10"E	Cultural Historical	Indirect High
Sri Purana Paththini Dewalaya	Shrine	200	7°16'7.30"N 80° 8'10.20"E	Cultural Historical	Indirect Middle
Sri Shailarama Galdeniya Viharaya*	Temple			Cultural Historical	Indirect High
Sri Gangarama Viharaya	Temple	100	7°22'27.95"N 80°11'49.44"E	Cultural Historical	Indirect High
Sri Shailarama Purana Rajamaha	Temple	225	7°22'57.85"N 80°12'16.74"E	Cultural Historical Archeological	Indirect High
Malpitiya St. Sebastian Church	Church	60	7°26'31.34"N 80°20'24.46"E	Cultural Historical	Indirect High
Ambepussa Link					
Bothale Walauwa	Monument	150	7°14'53.57"N 80° 9'52.68"E	Historical	Indirect High
Thalagama Rajamaha Viharaya	Temple	90	7°15'2.91"N 80°10'53.27"E	Cultural Historical Archaeological	Indirect High

* Sri Shailarama Galdeniya Temple location needs to be verified.

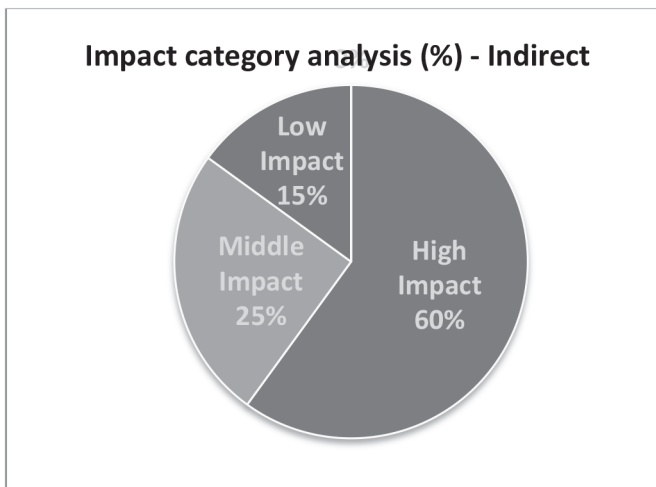


Fig 10 – Stage 1 & 2 impact category analysis

Stage 1 & 2 there was no any direct impact properties. But there were 12 properties with indirect high impact level (11 temples and 1 church), 5 properties with middle impact level (4 temples and 1 shrine) and 3 properties identified as low impact level (3 temples).

STAGE 3

The assessment was identified 21 properties/ places during the study located within and either side of the 120 m road corridor, and extended 500 m + in either side. Among those 16 (76%) were temples & Buddhism related properties, 3 (14%) were churches & Christian properties, and 1 mosque and 1 socio cultural property. Properties with cultural value were 21 (59%), with historical value were 12 (33%) and with archaeological value were 3 (8%). The properties reflects “cultural value” only were 43%, and properties reflects “cultural-historical value” were 43% and properties reflect “cultural-historical-archaeological value” were only 14%.

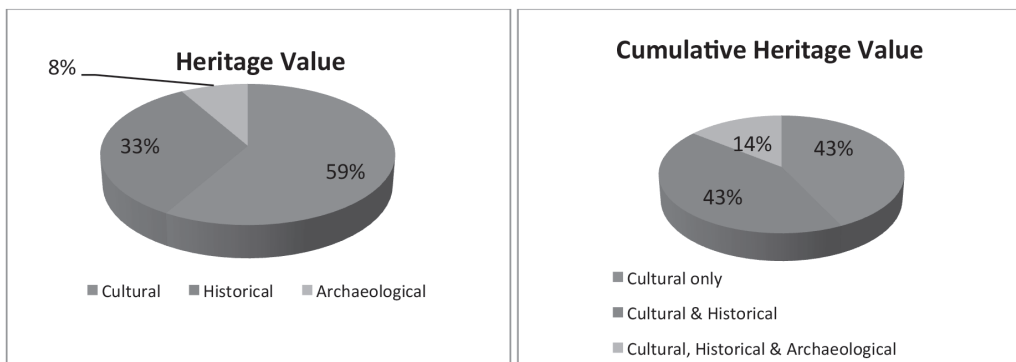
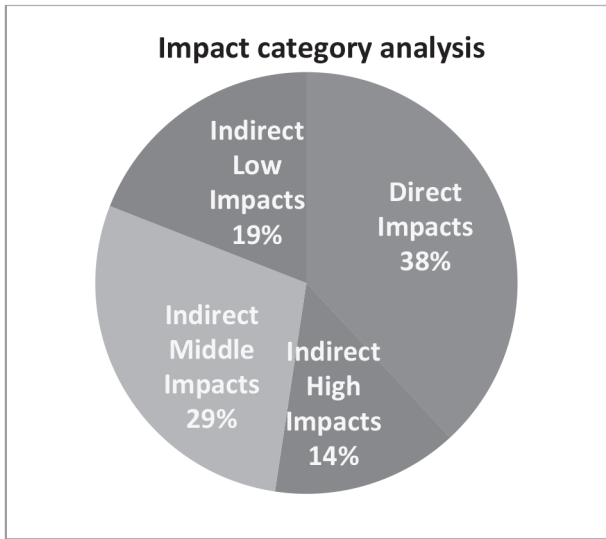


Fig 11 – Heritage values and cumulative heritage values of stage 3

Table 3 – Stage 3 identified and studied cultural, historical and archaeological properties.

Name of the Heritage Place	Type	Distance to EW (m)	GPS Coordinates	Heritage Category	Level of impact
Sri Vijeya Sundarama Rajamaha Viharaya	Buddhist Temple	1,500	07°24'03.3" 080°16'37.2"	Cultural Historical Archaeological	Indirect Low
Mayurawathi Rajamaha Viharaya	Buddhist Temple	700	07°24'18.3" 080°16'58.0"	Cultural Historical Archaeological	Indirect Middle
Pothgul Viharaya, Lihinigiriya	Buddhist Temple	75?	07°24'26.9" 080°17'18.6"	Cultural Historical	Direct
Sri Aswaththarama Viharaya	Buddhist Temple	670	07°23'40.7" 080°19'39.3"	Cultural Historical	Indirect Middle
Vivekarama Purana Viharaya	Buddhist Temple	550	07°22'58.1" 080°19'43.1"	Cultural Historical	Indirect Middle
Sri Saranapala Road Viharaya	Buddhist Temple	720	07°23'31.7" 080°20'09.8"	Cultural Historical	Indirect Low
Sri Negrodarama Senasanaya	Buddhist Temple	425	07°22'50.8" 080°20'11.7"	Cultural	Indirect Middle
Sambudda Mandiraya & Ella Bodiya	Buddhist Temple	710	7°23'27.23" 80°20'27.39"	Cultural	Indirect Low
Keththarama Viharaya (Road to)	Buddhist Temple	265	07°23'03.6" 080°21'03.6"	Cultural	Indirect Middle
Roadside Statue 01 (Christian)	Christian Statue	45	07°22'36.2" 080°21'27.3"	Cultural	Direct
Roadside Statue 02 (Christian)	Christian Statue	60	07°22'13.2" 080°21'37.9"	Cultural	Direct
Church	Christian Church	285	7°22'4.26" 80°21'38.14"	Cultural Historical	Indirect High
Galadenikada Purana Viharaya	Buddhist Temple	615	07°21'52.1" 080°21'39.1"	Cultural Historical	Indirect Middle
Dambulu Rajamaha Viharaya	Buddhist Temple	1750	07°21'11.3" 080°21'43.9"	Cultural Historical Archaeological	Indirect Low
Galagedara Mosque	Islamic Mosque	420	07°22'23.0" 080°30'55.1"	Cultural	Indirect High
Welivita Sri Saranankara Sangaraja Centre	Buddhist Temple	100	07°22'18.7" 080°31'30.2"	Cultural	Indirect High
Ambalama	Cultural Monument	32	07°20'56.4" 080°32'42.3"	Cultural	Direct
Statue (Load Buddha) – Hedeniya	Buddhist Statue	8	07°20'19.9" 080°33'26.5"	Cultural	Direct
Bhodhi Tree - Aladeniya	Buddhist Temple	18	07°20'04.4" 080°33'58.7"	Cultural Historical	Direct
Udawadiyagoda Purana Viharaya – Aladeniya	Buddhist Temple	24	07°19'57.2" 080°34'08.6"	Cultural Historical	Direct
Sri Vijeyananda Mahapirivena - Barigima	Buddhist Temple	50	07°19'40.1" 080°34'40.7"	Cultural Historical	Direct



Stage 3 there are 8 direct impact properties (5 temples/ Buddhism properties, 2 Road side Christian properties and 1 Cultural building). As indirect there are 3 properties with high impact level (1 church, 1 mosque and 1 temple), 6 properties with middle impact level (all were temples) and 4 properties identified as low impact level (all were temples).

Fig 12 – Stage 3 impact category analysis

STAGE 4

The assessment was identified 26 properties/ places during the study located within and either side of the 120 m road corridor, and extended 500 m + in either side. Among those 19 (73%) were temples, 5 (19%) were mosques, and 1 church and 1 shine. Properties with cultural value were 26 (60%), with historical value were 12 (28%) and with archaeological value were 5 (12%). The properties reflects “cultural value” only were 54%, and properties reflects “cultural-historical value” were 27% and properties reflect “cultural-historical-archaeological value” were only 19%.

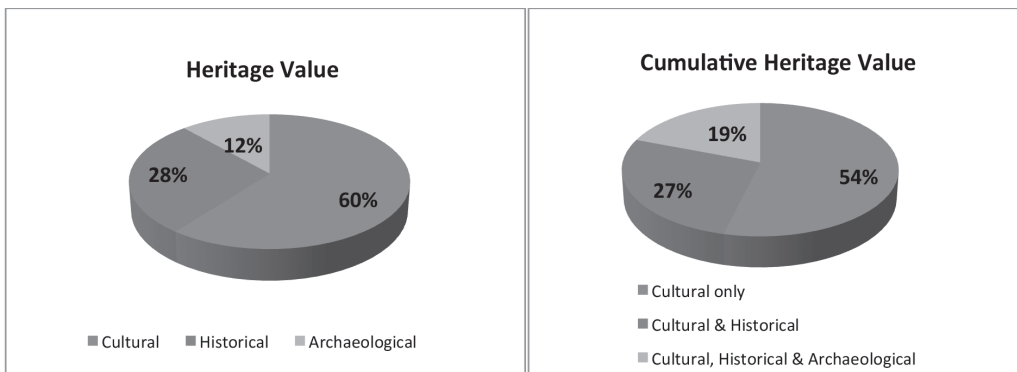


Fig 13 - Heritage values and cumulative heritage values of stage 4

Table 4 – Stage 4 identified and studied cultural, historical and archaeological properties.

Name of the Heritage Place	Type	Distance to EW (m)	GPS Coordinates	Heritage Category	Level of impact
Digampitiya Purana Viharaya	Temple	800	7°29'26.74"N 80°24'53.38"E	Cultural Historical	Indirect Low
Walasgala Rajamaha Viharaya	Temple	400	7°30'8.33"N 80°24'44.49"E	Cultural Historical Archaeological	Indirect Middle
Kongaswala Sri Nandaramaya	Temple	700	7°30'35.26"N 80°25'16.00"E	Cultural Historical	Indirect Low
Bolagama Kubalanga Purana Viharaya	Temple	300 ?		Cultural Historical	Indirect Middle
Kongahagedara Sri Darmavijeyaramaya	Temple	0	7°31'2.57"N 80°27'37.10"E	Cultural Historical	Direct
Ranaviru Village Temple	Temple	200	7°31'25.20"N 80°27'46.90"E	Cultural	Indirect High
Shrine Tree Place	Shrine	160	7°31'37.90"N 80°27'56.70"E	Cultural Historical	Indirect High
Nebilikumbura Galviharaya	Temple	450	7°31'54.70"N 80°27'54.00"E	Cultural	Indirect Low
Al Masjidur Jumma Mosque	Mosque	300	7°32'11.10"N 80°28'12.10"E	Cultural	Indirect High
Dethilianga Sri Jinarathanaramaya	Temple	250	7°32'11.90"N 80°28'35.40"E	Cultural	Indirect High
Nida-ul-islam Jumma Mosque	Mosque	800	7°32'29.83"N 80°29'6.77"E	Cultural	Indirect Negligence
Kirindigolla Megagiri Historical Viharaya	Temple	2000	7°33'25.31"N 80°27'50.74"E	Cultural Historical	Indirect Low
Al Fridous Mosque	Mosque		7°32'56.49"N 80°29'25.52"E	Cultural	Indirect Low
Temple	Temple	700	7°34'42.50"N 80°29'13.10"E	Cultural Historical	Indirect Low
Gopallawa Purana Gallen Viharaya	Temple	700	7°35'42.90"N 80°29'41.70"E	Cultural Historical Archaeological	Indirect Low
Sri Sumanarama Viharaya	Temple	1000	7°36'1.90"N 80°30'57.60"E	Cultural	Indirect Low
Gangamuwa Rajamaha Viharaya	Temple	1100	7°36'31.64"N 80°29'47.30"E	Cultural Historical Archaeological	Indirect Low
Sri Jinendramaramaya	Temple	300	7°37'7.80"N 80°30'48.30"E	Cultural	Indirect Middle
Humbulugala Aranya	Temple	500	7°39'43.10"N 80°31'56.00"E	Cultural	Indirect Low
Bambawa Rajamaha Viharaya	Temple	0	7°44'44.65"N 80°34'20.89"E	Cultural Historical Archaeological	Direct

Table 4 – Stage 4 identified and studied cultural, historical and archaeological properties. (cont.)

Name of the Heritage Place	Type	Distance to EW (m)	GPS Coordinates	Heritage Category	Level of impact
St Jude Church	Church	1250	7°45'2.20"N 80°33'47.13"E	Cultural	Indirect Low
Masjidul Hudha Jumma Mosque	Mosque	1350	7°45'19.12"N 80°34'0.57"E	Cultural	Indirect Negligence
Namadagahawaththa Jumma Mosque	Mosque	1500	7°45'59.04"N 80°34'50.04"E	Cultural	Indirect Negligence
Ashokaramaya	Temple	700	7°48'12.41"N 80°36'53.66"E	Cultural	Indirect Low
Dambulu Rajamaha Viharaya	Temple	1800	7°51'21.27"N 80°39'7.11"E	Cultural Historical Archaeological	Indirect Low
Sri Bodhirukkarama Viharaya	Temple	0	7°51'49.28"N 80°40'4.20"E	Cultural	Direct

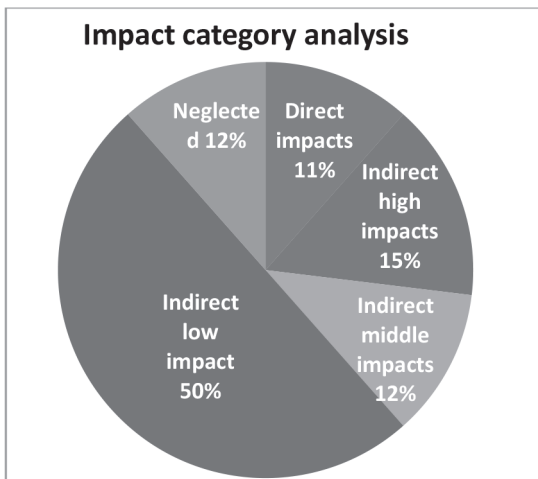


Fig 14 – Stage 4 impact category analysis

Stage 4 there were 3 direct impact properties (all were temples). As indirect there were 4 properties with high impact level (2 temples, 1 shrine and 1 mosque), 3 properties with middle impact level (all were temples) and 13 properties identified as low impact level (11 temples, 1 church, 1 mosque) and another 3 properties considered as neglected impacts. (all were mosques)

Conclusion & Discussion

The study for integrate HIA in to EIA process as a pioneering attempt in the country was not easy due to many reasons. Mainly environmental or engineering experts with science education background were lack of understanding of cultural, historical and archaeological heritage subjects and according to their perspectives most of them were given minor priority for such thematic areas. Hence it was difficult to make them understand the importance and need of heritage management in development or construction activities. Most of them were misunderstand on differences between cultural/historical and archaeological properties and, further meaning of the heritage. Other EIA reports of development projects in the country have significantly lack of heritage subject and only concentrated into archaeological properties also attached to Archaeological Impact Assessment (AIA) which is a separate report prepared under supervision of Archaeological Department of the Government and annexed to EIA report. With my assessment, the concept and application of HIA is an advanced step introduced to cover many properties and attributes with cultural, historical also archaeological values. Otherwise properties with cultural and historical values were neglected during EIA process.

Anyhow, still cultural, historical and archaeological aspects was considered under the Socio-cultural title of the EIA report and with my study it was suggested to consider cultural, historical and archaeological heritage as a separate title, so future EIA it can be described under Heritage Environment title same as Physical Environment, Biological Environment, Socio-economic Environment. It's justifiable to give more attention on heritage values because if any cultural, historical or archaeological property or attribute get damage or destroy due to development or construction activities it's very difficult or never in restoration to have same heritage values.

Not like a surrounded or restricted project location area (Eg. Buildings construction area), a new road construction without physical demarcation in the field by marking the future road corridor it was a highly challengeable work to assess possible impacts and suggesting mitigation measures for cultural, historical and archaeological heritage properties, further without knowing exact construction methodologies it was really complicated to conduct the assessment specially when assessing and suggesting specific parameters.

As per results of the assessment most of the properties will have impacts due to expressway construction were temples/Buddhism associated properties, it was totally 53, followed by totally 6 mosques and totally 5 churches/ Christian associated properties. Totally 11 places will directly affect due to expressway construction and then 19 indirect high impact places, 14 indirect middle impact places, 20 indirect low impact places were identified during the study. Most of the direct impacts were identified in stage 3 and stage 4. Highest numbers of indirect high impact places were identified in stage 1 & 2. Indirect low impacts were mainly resulted in stage 4. Generally indirect middle impact places distributed among stage 1, 2 and stage 3 and stage 4 without significant deviations.

The study was not identified special archaeological properties separately and always it was with historical and cultural properties. But there is a possibility of identify during construction activities. Therefore mitigation measure for archeological properties were suggested here (Annex II). It was supposed to conduct the Archaeological Impact Assessment (AIA) in pre-construction phase using aerial, surface and underground survey methods.

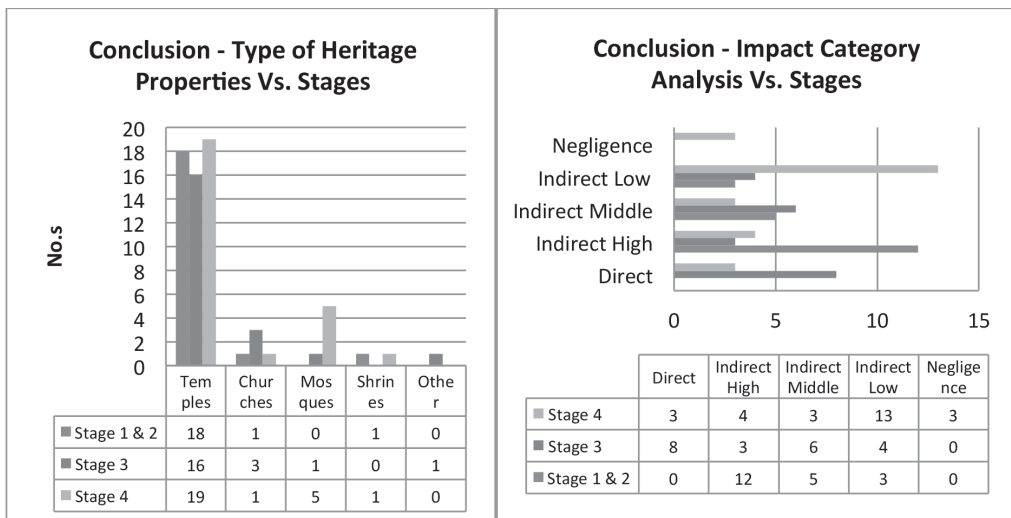


Fig 15 – Conclusion of results analysis from all stages

Possible impacts and mitigation measures were identified. Mainly based on the distance and geo-morphological barriers (natural/man made) between EW and the Property, also access roads to Properties/Places that can be blocked were taken into account. Possible impacts were categorized accordingly High, Middle and Low level as well as Specific Heritage Attributes/Values/Characteristics of the properties/places, Eg. Pilled-staged Image Houses (Tampita Viharaya) has highly sensitive for construction related vibrations. Majority of the identified heritage properties may effect due to air, land and water pollution, noise, vibrations, dust, gas, particles, air and water stagnation ...etc, further more impacts and damages from construction material aggregates can be expected.

Direct impact properties those were located inside the 120 m EW road corridor may demolish, damage or remove. But it was highly recommend to change/deviate the proposed EW road design to protect and preserve specially directly impact properties also already identified and needs to be identified historical and archaeological heritage properties. Cultural properties those were established in recent history can be moved up to some extent, without changing the road corridor design. HIA identifications, possible impacts and proposed mitigation measures were brought to include into Environmental Management Plans and Implementation Action Plans as well as Monitoring Plans. Contractor should submit Environmental Action Plans/ Method Statements accordingly. Intangible heritage was not covered due to limited time and it was recommended extending the study by using PRA tools to cover intangible heritage.

It was noticed community awareness for resettlement was not done properly and some areas experienced social unrest, it was highly recommended to conduct extensive community and stakeholder consultation and awareness as early as possible before or parallel to planning stage. Affected parties were very keen on their compensation status and amounts because they were looking for alternative settlement as per their social background. There were highly important and strong socio-cultural network were occupied in the society and cultural, historical including religious properties were tangibly and intangibly linked together.

Finally, this paper is suggesting to integrate Heritage Impact Assessment in to Environmental Impact Assessment process and reports. Overall modal of HIA present here can be revised according to cultural

historical and archaeological nature and context of different countries/ regions, but it should not be deviated from basic characteristics of HIA. The HIA has presented by this paper is a product of the author and therefore any copying or duplication or reproduction is under the prior approval of the author.

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Web Sites

[Http://www.archaeology.gov.lk/](http://www.archaeology.gov.lk/)

<http://www.cea.lk/>

<http://www.meteo.gov.lk/>

Annex 1 – List of Prescribed Projects which needs EIA in Sri Lanka

PART I - Projects and undertakings if located wholly or partly outside the coastal zone as defined by coast conservation act no. 57 of 1981

1. All river basin development and irrigation projects excluding minor irrigation works (as defined by Irrigation Ordinance chapter 453)
2. Reclamation of land, wetland area exceeding 4 hectares
3. Extraction of timber covering land area exceeding 5 hectares
4. Conversion of forest covering an area exceeding 1 hectare into non-forest uses
5. Clearing of land areas exceeding 50 hectares
6. Mining and Mineral Extraction
 - Inland deep mining and mineral extraction involving a depth exceeding 25 meters
 - Inland surface mining of cumulative areas exceeding 10 hectares
 - All off shore mining and mineral extractions.
 - Mechanized mining and quarrying operations of aggregate, marble, limestone, silica, quarts and decorative stone within 1 kilometre of any residential or commercial areas
7. Transportation systems
 - Construction of national and provincial highway involving a length exceeding 10 kilometres.
 - Construction of railway lines
 - Construction of airports
 - Construction of airstrips
 - Expansion of airports or airstrips that increase capacity by 50 % or more
8. Port and harbour development
 - Construction of ports
 - Construction of harbours
 - Port expansion involving an annual increase of 50% or more in handling capacity per annum
9. Power generation and transmission
 - Construction of hydroelectric power stations exceeding 50 Megawatts
 - Construction of thermal power plants having generation capacity exceeding 25 Megawatts at a single location or capacity addition exceeding 25 Megawatts to existing plants
 - Construction of nuclear power plants
 - All renewable energy based electricity generating stations exceeding 50 Megawatts.

10. Transmission lines
 - Installation of overhead transmission lines of length exceeding 10 kilometres and voltage above 50 kilovolts
11. Housing and building
 - Integrated multi-development activities consisting of housing, industry, commercial infrastructure covering a land area exceeding 10 hectares.
12. Resettlement
 - Involuntary resettlement exceeding 100 families other than resettlement effected under emergency situations.
13. Water supply
 - All ground water extraction projects of capacity exceeding $\frac{1}{2}$ million cubic meters per day.
 - Construction of water treatment plants of capacity exceeding $\frac{1}{2}$ million cubic meters
14. Pipelines
 - Laying of gas and liquid (excluding water) transfer pipelines of length exceeding 1 kilometre
15. Hotels
 - Construction of hotels or holiday resorts or projects which provide recreational facilities exceeding 99 rooms or 40 hectares, as the case may be
16. Fisheries
 - Aquaculture development projects of extent exceeding 4 hectares
 - Construction of fisheries harbours
 - Fisheries harbour expansion projects involving an increase of 50% or more in fish handling capacity per annum
17. All tunnelling projects
18. Disposal of waste
 - Construction of any solid waste disposal facility having a capacity exceeding 100 tons/day.
 - Construction of waste treatment plants treating toxic or hazardous waste
19. Development of all Industrial Estates and Parks exceeding an area of 10 hectares
20. Iron and Steel Industries
 - Manufacture of iron and steel products of production capacity exceeding 100 tons per day using iron ore as raw material
 - Manufacture of iron and steel products of production capacity exceeding 100 tons per day using scrap iron ore as raw material

21. Non-Ferrous Basic Metal Industries
 - Smelting of aluminium or copper or lead of production capacity exceeding 25 tons per day
22. Basic Industrial Chemicals
 - Formulation of toxic chemicals of production capacity exceeding 50 tons per day
 - Manufacture of toxic chemicals of production capacity exceeding 25 tons per day
23. Pesticides and Fertilizers
 - Formulation of pesticides of combined production capacity exceeding 50 tons per day
 - Manufacture of pesticides of combined production capacity exceeding 25 tons per day
24. Petroleum and Petrochemical
 - Petroleum refineries producing gasoline, fuel oils, illuminating oils, lubricating oils and grease, aviation and marine fuel and liquefied petroleum gas from crude petroleum
 - Manufacture of petro-chemicals of combined production capacity exceeding 100 tons per day from production processes of oil refinery or natural gas separation.
25. Tyre and Tube Industries
 - Manufacture of tyre and tubes of combined production capacity exceeding 100 tons per day from natural or synthetic rubber
26. Sugar factories
 - Manufacture of refined sugar of combined production capacity exceeding 50 tons per day
27. Cement and Lime
 - Manufacture of Cement through production of clinker
 - Manufacture of lime employing kiln capacity exceeding 50 tons per day
28. Paper and Pulp
 - Manufacture of paper or pulp of combined production capacity exceeding 50 tons per day.
29. Spinning, Weaving and Finishing of Textiles
 - Integrated cotton or synthetic textile mills employing spinning, weaving, dyeing and printing operations together of combined production capacity exceeding 50 tons per day
30. Tanneries and Leather Finishing
 - Chrome tanneries of combined production capacity exceeding 25 tons per day
 - Vegetable (bark) of combined production capacity exceeding 50 tons per day

Provided however, where the projects and undertaking set out in items 20 to 30 are located within Industrial Estates and parks as described at (19) above, the approval shall not be necessary under the provisions of Part IV C of the Act.

31. Industries which involved the manufacture, storage or use of Radio Active Materials as defined in the Atomic Energy Authority Act No. 19 of 1969 or Explosives as defined in the Explosives Act No. 21 of 1956, excluding for national security reasons.

PART II

32. All projects and undertaking listed in Part I irrespective of their magnitudes and irrespective of whether they are located in the coastal zone or not, if located wholly or party within the areas specified in Part III of the Schedule.

32 (a) Construction of all commercial buildings as defined by the Urban Development Authority Law, No. 41 of 1978 and the construction of dwelling housing units, irrespective of their magnitudes and irrespective of whether they are located in the coastal zone or not, if located wholly or partially within the areas specified in Part III of this schedule.

33. Iron and Steel

34. Non-Ferrous Basic Metal

35. Basic Industrial Chemicals

36. Pesticides and Fertilizers

37. Synthetic Resins, Plastic materials and Man-made Fibres

38. Other Chemical Products

39. Petroleum and Petro-chemical Products

40. Tyres and Tubes

41. Manufacturing and Refining of Sugar

42. Alcoholic Spirits

43. Malt Liquors and Malt

44. Cement, clinker and Lime

45. Non-metallic Mineral Products

46. Paper, Pulp and Paperboard

47. Spinning, Weaving and Finishing of Textile

48. Tanneries and Leather Finishing

49. Shipbuilding and Repairs

50. Railroad Equipment

51. Motor Vehicles

52. Air Craft

PART III

1. Within 100 m from the boundaries of or within any area declared under the National Heritage Wilderness Act No. 3 of 1988; the Forest Ordinance (Chapter 451); whether or not such areas are wholly or partly within the Coastal Zone as defined in the Coast Conservation Act No. 57 of 1981.
2. Within the following areas whether or not the areas are wholly or partly within the Coastal Zone:
 - any erodable area declared under the Soil Conservation Act (Chapter 540)
 - any Flood Area declared under the Flood Protection Ordinance (Chapter 449) and any flood protection area declared under the Sri Lanka Land Reclamation and Development Corporation Act 15 of 1968 as amended by Act No. 52 of 1982.
 - 60 meters from the bank of a public stream as defined in the Crown Lands Ordinance (Chapter 454) and having a width of more than 25 meters at any point if its course.
 - any reservation beyond the full supply level of a reservoir
 - any archaeological reserve, ancient or protected monument as defined or declared under the Antiquities Ordinance (Chapter 188).
 - any area declared under the botanic Gardens Ordinance (Chapter 446)
 - within 100 meters from the boundaries of or within any area declared as a Sanctuary under the Fauna and Flora Protection Ordinance (Chapter 469)
 - within 100 meters from the high flood level contour of or within a public lake as defined in the Crown Lands Ordinance (Chapter 454) including those declared under section 71 of the said Ordinance.

Annex II - Mitigation measures were suggested for archaeological heritage properties

- If any signs, hints, indicators, traces or remains identified in pre, during or post constructions phases it's highly recommend to apply Surface Reconnaissance, Arial Reconnaissance...etc methods in order to conduct Archaeological Survey, under supervision of Director General, Archaeological Department.
- If found any archaeological remains/ artefacts or similar items, immediately it should be stop the construction or related activities in the particular locations/ sites and immediately it should be informed to Director General, Archaeological Department.

- If found any archaeological remains/ artefacts or similar items, it's prohibited to conduct any excavation or similar activities without prior approval of Director General, Archaeological Department.
- If archaeological property/ attributes found to be damaged due to construction activities, recommended to relocate by using methodologies/ techniques of Salvage Archaeology/ Rescue Archaeology, under approval and supervision of Director General, Archaeological Department.
- There should not be any obstacles/ resistance to monitor/ report/ advise or take further actions for visiting the construction or related area/ sites by Director General or any authorized Officer of Archaeological Department, they should be well facilitated by the developer.
- If found any archaeological properties, items or may be part or traces of the archaeological remains, it should be handed over to kept in the government museums under approval and supervision of Director General, Archaeological Department and/or Director – National Museums.
- If any changes will be occurred in the plans and designs or other related items, it should be informed to Director General, Archaeological Department immediately.
- If any further activities need to be conducted with respect of Archaeological Assessment, Conservation or Preservation, it's a responsibility of the developer to mobilize financial resources.
- Developer should obtain prior approval and permission from relevant authorities, if any soils at the site remove to any other location and/or if any soils bring from any other location to the present site.
- It's understood by the developer The Antiquities Ordinance, has been enacted according to legal and judicial system of the country.
- It's recommend to recruit a full time or contract or consultancy basis Archaeology/ Heritage Specialist/Manager/Officer with required authorities and responsibilities, to Contractor (covering sub-contractors also) and/ or Consultant Agency (Supervision or Management Consultant Agency).

Annex III – Photos of some cultural, historical and archaeological heritage properties



Historical designs and formations at Sri Jayasumanaramaya Temple, Bulugahagoda.



Historical statues, paintings and designs at Magalegoda Purana Temple.



Ancient sacred Bhodi Tree found at Sri Jayasundara Vidarshanarama Purana Rajamaha Viharaya believed a “dethispalaruha” Bhodi Tree of sacred Jayasiri Maha Bhodi, Anuradapura



Ancient paintings belonged to Anuradhapura period and archaeological remains at Sumiththa Sri Sunandarama / Dadagamuwa Rajamaha Viharaya, Dadagamuwa.



Historical "tampita viharageya" at Yatawatta Purana Temple, Gampaha.



Historical Malpitiya Church at Kurunegala

Annex IV – Maps showing cultural, historical and archaeological properties identified according to the EW road design; Eg. Stage 3

