Initial Environmental Examination

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— Heritage Restoration and Conservation Works of Forts, Monuments & Temples at 13 different locations

Package No. IDIPT/TN/T4/NCB/13/2017

Prepared by the Department of Tourism and Culture Government of Tamil Nadu for the Asian Development Bank.

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CURRENCY EQUIVALENTS
(as of 15 December 2017)

Currency unit	–	Indian rupee (₹)
₹1.00	=	$0.015
$1.00	=	₹65.50

ABBREVIATIONS

ADB	-	Asian Development Bank
CAC	-	common air contaminants
CFE	-	consent for establishment
CFO	-	Consent for operation
CRZ	-	Coastal Regulation Zone
DOT	-	Department of Tourism
PMSC	-	Project Management and Supervision Consultant
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
GoI	-	Government of India
IEE	-	Initial Environmental Examination
NGO	-	non-government organization
NOC	-	No Objection Certificate
PIU	-	Project Implementation Unit
PMSC	-	Project Management Consultant
PMU	-	Project Management Unit
RCC	-	Reinforced Cement Concrete
ROW	-	right-of-way
SPS	-	Safeguard Policy Statement

NOTE

In this report, "$" refers to US dollars.

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EXECUTIVE SUMMARY

Background. The India Infrastructure Development Investment Program for Tourism (the Investment Program) envisages environmentally and culturally sustainable and socially inclusive tourism development in the project states of Himachal Pradesh, Punjab, Tamil Nadu and Uttarakhand, delivered through a multi-tranche financing facility (MFF) modality. Project 2 includes the states of Uttarakhand and Tamil Nadu. Alagarkoil in Madurai District, Alangudi in Thiruvarur District, Ammapet in Salem District, Thingalur in Thanjavur District are some of the proposed beneficiary tourist destination in Tamil Nadu under tranche IV of the Sub Project.

The Thiyagadhurgam Fort is located 12 kilometers (km) east of Kallakurachi in Villupuram district. It lies between Ulundurpettai and Salem Highway. The village was called Arunidai Thiyagan. Though the construction of the hill fort at Gingee is traditionally ascribed to one AnadaKon, a local chief, it came into prominence with the rise of Nayakas of Gingee in early 17th century. The outer fortification of Gingee runs in a triangular form over the three prominent hillock viz. Rajagiri, Krishnagiri and the Chakklidurg and the intervening spaces. The fortification is about 13 km in length and the fort covers an area of about 11 square kilometers. There are two prominent gateways viz. the Arcot and Pondicherry gates.

The fort in Tamil Nadu is located 14 km from Nagercoil in Thuckalay Town, Kanyakumari District on the Thiruvananthapuram-Nagercoil National highway at Puliyurkurichi of Tamil Nadu State, India.

Thirumalai Nayak Palace is a 17th-century palace erected in 1636 AD by King Thirumalai Nayak, a king of Madurai's Nayaka dynasty who ruled Madurai from 1623–59, in the city of Madurai, India. This Palace is a classic fusion of Dravidian and Rajput styles. The building, which can be seen today, was the main Palace, in which the king lived. The original Palace Complex was four times bigger than the present structure. In its heyday, Tirumalai Nayak Palace at Madurai was considered to be one of the wonders of the South. This palace is situated 2 km south east of the Meenakshi Amman Temple.

Maruthupandiyar Fort is located in a small village in Sivagangai District of Tamil Nadu State, India located at 70 km from Madurai Airport, 20 kms from Karaikudi and 2 km from Aranmanai Siruvayal via Kallar bus stand. AranmanaiSiruvayal lies in between Kalayarkoil and Kallal in Sivagangai Taluk. The ancient name of this village used to be Siruvayal. It was then renamed as Aranmanai Siruvayal.

Koolamandal Gangaikonda Choleeswarer Temple is located 22 km (13.5 mi) from Vandavasi, Tiruvannamalai district, Tamil Nadu, India. The temple was built by Cholas. It is one of the protected monuments in Tamil Nadu declared by Archaeological Survey of India.

The ruins of Alamparai Fort (also called Alampara) lie near Kadappakkam, a village 50 km from Mamallapuram on the land overlooking the sea. Constructed in the late 17th century during the Mughal era, the Alamparai Fort once had a 100-metre long dockyard stretching into the sea, which exported zari cloth, salt, and ghee. Nawab Doste Ali Khan ruled during 1735 AD. In 1750, as a reward for services rendered by the famous French Commander to Subedar Muzarfarzang, the fort was given to the French. In 1760 AD, the fort was captured and destroyed after the French were defeated by the British. More recently the structure was damaged in the 2004 Indian Ocean earthquake.

Poondi Arugar temple is located near Arrani town, which is well known for silk and rice. According to an inscription of Sambuvaraya, the temple was referred as Viravira Jinalayam, during 13th century CE.

Panchalkurichi is a small but historic village, 3 km from Ottapidaram and 18 km from in district, Tamil Nadu, India. Panchalankurichi was once a Palayam and is best known as the birthplace of Veerapandiya Kattabomman, an 18th-century Palayakarrar ('Polygar'), who opposed the British colonial rule in India and their Tax collecting methods.

Nagappatinam is a huge area under Nagapattinam Taluk in Nagappatinam District of Tamil Nadu State. The Nagapattinam dutch dome is situated 350 km away from Chennai, 14 km from Karaikal, 40 km from Mayiladuthurai, 40 km from Kumbakonam, 80 km from Thanjavur and 25 km from Thiruvarur.

Tharangambadi is a town in the Nagapattinam district of the Indian state of Tamil Nadu on the Coromandel Coast. Tharangambadi is the headquarters of Tharangambadi taluk, while its name means "place of the singing waves". It is 350 km from State capital Chennai. It lies 15 km (9.3 mi) north of Karaikal, near the mouth of a tributary of the Kaveri River. Tharangambadi is surrounded by Karaikal towards the south, Kuthalam and Mayiladuthurai Taluk towards the west, Sirkali Taluk towards the north. Costal area towards East. Built in the 18th century, opposite to the Fort Dansborg, by the Danish East India Company in which was once a pepper trading port of Tranquebar, now known as Tarangambadi.

Thellar is a small village Located at about 5 kms North-west of Thirumalpadi Ranganathar temple. This is a very big temple and has sahasra and 108 lingam with very beautiful Nandi. Thellar is surrounded by Anakkavur Block towards the west, Vembakkam Block towards the west, Kanchipuram Block towards the north, Walajabad Block towards the north.

The Manora Fort is situated 65 km away from Thanjavur and 20 km away from the town of Pattukkottai. The British army at waterloo defeated Napoleon in 1814 AD. Since Serfoji-II was friendly with the British, as a commemoration of their victory, he built the Manora Fort Tower in 1814. It was known as a port and for ship building. It is an 8-storied, hexagonal tower, which is 23-meters high overlooking the bay of Bengal. The fort derives its name Manora, from the word *minaret*. The tower is surrounded by a wall and a moat and it resembles a pagoda. It is surrounded by a rampart. European architectural influence is also strong as seen in its vaults and arches.

Chinnayankulam in Chinnayanpettai is a Kulam which located 34.6 km (21.5 mi) from Tiruvannamalai, Tiruvannamalai district, Tamil Nadu, India. The Kulam was built by local chieftain called Chinnayan. It is one of the protected monuments in Tamil Nadu declared by Archaeological Survey of India.

Executing and implementing agencies - The executing agency is the Department of Tourism & Culture, Government of Tamil Nadu. Project Management Unit (PMU) is set up at Chennai to coordinate the overall execution. The implementing agency is Project Implementation Unit (PIU) set up at Chennai by Tamilnadu Tourism Development Corporation (TTDC). To support the PIU, Project Management and Supervision Consultant (PMSC) have been placed. The asset owner is the Tamilnadu Tourism Development Corporation (TTDC).

Categorization – Subproject package IDIPT/TN/T4/NCB/13/2017 is classified as environmental category B per ADB SPS as no significant impacts are envisioned. Accordingly, this Initial Environmental Examination (IEE) has been prepared to assess the environmental impacts and

provide mitigation and monitoring measures to ensure no significant impacts as a result of the subproject.

Subproject Scope - The major scope of this subproject is Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at (i) Thyagadurgam Fort, Villupuram District; (ii) Udhayagiri Fort, Kanyakumari District; (iii) Thirumalai Naicker Mahal, Madura i District; (iv) Marudhupandiyar Fort, Sivagangai District; (v) Koolamandal Gangaikonda choleeswarer Temple, Tiruvanamalai District; (vi) Alamparai Fort, Kanchipuram District; (vii) Poondi Arugar Temple, Tiruvanamalai District; (viii) Kattabomman kottai at Panchalankurichi, Tuticorin District; (ix) Dutch Dome, Nagapattinam District; (x) Governor House at Tharangambadi, Nagapattinam District; (xi) Thadagapureeswarar Temple, Tiruvannamalai District; (xii) Manora Fort,Thanjavur District; (xiii) Chinnayankulam in Chinnayanpettai, Tiruvanamalai.

Proposed subproject - The primary objective of this sub-project is to provide Heritage Restoration and Conservation Works of Monuments (i.e., renovation, illumination) at the following subproject sites:

(i) Thyagadurgam Fort, Villupuram District:
- (a) Heritage Conservation and Restoration works on the Fort.
- (b) Provision of chain link and grill fencing.
- (c) Conservation of the ruins on the hill top.
- (d) Chemical cleaning to the Canon.
- (e) Reconstruction of existing steps leading to the hill top.
- (f) Provision of approach road.
- (g) Provision of drinking water facilities.
- (h) Provision of signage, cultural, guide board and protection notice board.
- (i) Provision of security guard room.
- (j) Provision of lighting arrangements.
- (k) Landscaping arrangements.
- (l) Vegetation clearing in and around the hillock, front side and fencing area

(ii) Udhayagiri Fort, Kanyakumari District:
- (a) Conservation and restoration works around De Lennoy‘s Tomb.
- (b) Restoration of Pillai Kottai wall.
- (c) Landscaping wherever required within the De Lannoy‘s tomb.
- (d) Provision of drinking water facilities.
- (e) Provision of electrical arrangements.
- (f) Provision of signage, cultural, guide board and protection notice board.
- (g) Enamel Painting in existing Compound grills, Gate, Grills, Ladder, and Well grill.
- (h) Removal of various kinds of vegetation like thorny plants, twine plants etc. at inner and outer yard of the monument thoroughly.
- (i) Treatment of cracks found in structures at various levels by grouting and sealing the existing cracks by injection method with combination mortar 1: 1: 5.
- (j) Supply, fixing and erection of 1.5 HP jet pump with motor.
- (k) Removal of worn out lime plastering and re plastering with lime mortar.

(iii) Thirumalai Naicker Mahal, Madurai District:
- (a) Conservation works on the 248 pillars of the Mahal in Madurai.

(b) Provision of weld mesh arrangements to the open court yard to avoid pigeon entry .
(c) Conservation efforts to address leaking problems
(d) Structure conservation and repair works to address structure dampness and repair leakages
(e) Improvement of existing drainage facility and provision of signage boards.

(iv) Marudhupandiyar Fort, Sivagangai District:
(a) Repair and restoration of the Maruthupandiyar fort.
(b) Provision of steel chain link fencing all around the fort.
(c) Provision of a proper approach.

(v) Koolamandal Gangaikonda choleeswarer Temple, Tiruvanamalai District:
(a) Establishment of a dormitory – ground floor (G) to accommodate at least 33 pilgrims,
(b) Establishment of a toilet building – ground floor (G) only.

(vi) Alamparai Fort, Kanchipuram District:
(a) Heritage Conservation and Restoration of Fort.
(b) Construction of Restrooms for the visitors.
(c) Provision of drinking water facilities.
(d) Landscaping at Entrance of the Fort.
(e) Provision of car parking facilities.
(f) Provi
(g) Provision of lighting arrangements.
(h) Construction of Security Guard room.
(i) Provision of signage, cultural, guide board and protection notice board.
(j) Removal of various kinds of vegetation like thorny plants, twine plants etc. at inner and outer yard of the monument thoroughly.
(k) Removal of overburden heaped sand at the outer/inner yard of the fort up to its flooring area.
(l) Careful Removal / Reinstallation of the fallen Brick structures.
(m) Treatment of cracks found in structures at various levels by grouting and sealing the existing cracks by injection method with combination mortar 1: 1 : 5.
(n) Brick Stitching in worn out portions of fortress wall surfaces using country bricks of size 23 x 12 x 5cm with special grinded lime mortar 1:2 by adding extract of gallnut and jaggery.
(o) Re-construction of brick fortress wall with Lime mortar 1:3 using restored bricks from fallen structures, in missing portions of the walls.
(p) Removal of worn out lime plastering and re plastering with lime mortar.
(q) Shifting of available boulders found along the sea shore and placing them at East side of the Fort to prevent erosion.
(r) Provision of additional facilities like Approach road, Bore well with Motor, etc.

(vii) Poondi Arugar Temple, Tiruvanamalai District:
(a) Construction of dormitory hall with toilet block
(b) Provision of drinking water facilities
(c) Provision of signage, cultural, guide and protection board signage
(d) Provision of an approach road

(viii) Kattabomman kottai at Panchalankurichi, Tuticorin District:

(a) Provision of toilet – ground floor(G),
(b) Provision of security room – ground floor
(c) Chain link fencing.

(ix) Dutch Dome, Nagapattinam District:
(a) Landscaping
(b) Provisiong of lighting and signage
(c) Provision of car parking facilities
(d) Provision of drinking water facilities
(e) Renovation of Governor House at Tharangambadi, Nagapattinam District

(x) Thadagapureeswarar Temple, Tiruvannamalai District:
(a) Establishment of a dormitory – ground floor (G) to accommodate at least 33 pilgrims,
(b) Establishment of a toilet building – ground floor (G) only.
(c) Establishment of a security cabin

(xi) Manora Fort,Thanjavur District:
(a) Conservation and Restoration works for the Fort.
(b) Provision of grill fencing over the dwarf wall.
(c) Landscaping inside the Fort.
(d) Provision of lighting arrangements.
(e) Provision of drinking water facilities for the tourist
(f) Provision of signage, cultural, guide board, and protection notice board.
(g) Construction of security guard room.
(h) Provision of CCTV arrangements for the better surveillance and safety during wee hours.
(i) Provision, fabrication and repair of structural steel M.S. gate.
(j) White washing one coat using freshly burnt white shell lime in all floors.
(k) Application of Water repellent coat to avoid dampness in the fort wall

(xii) Chinnayankulam in Chinnayanpettai, Tiruvanamalai:
(a) Provision of lighting Arrangements
(b) Provision of drinking water facilities
(c) Provision of signage, cultural, guide and protection of notice boards

Description of Environment: Thyagadurgam Town Panchayat was built in 1953, classified as a 1st Grade Town Panchayat in 1954, and then turned 1982 Selection Grade Town Panchayat. The town spreads over an area of 11.65 km, including 15 wards and 113 streets. Total area is 11.69 km^2. The population, as of the 2011 census, was 18,764, consisting 9467 males and 9297 females. Thiyagadurgam, a Selection grade Town Panchayat in Villupuram district is located northeast of Villupuram and 12 km west of Kallakurichi. Villupuram, Cuddalore and Pondichery on the east and Thirukovilur, Thiruvannamalai on the north and Kallakurichi, Aathur, Salem on the west are the major urban centers, well connected with this town through districts roads and national Highways (NH 65, NH45) line. Thyagadurgam town is geographically located at 120 13‘ north latitude and at 730 37‘ east longitudes. It is 6.24 meters above the sea level. The town is bound by Udhayamampattu on the north, Gandhinagar and Periyamampattu on the west, Pukkulam on the south.

The 400-year-old fort in Udayagiri is located at a distance of 14 km from Nagercoil in Kanyakumari District. The fort is situated on the Thiruvananthapuram-Nagercoil National highway at

Puliyoorkurichi. Originally built in the 1600s, it was destroyed by Raja Raja Chola. Later, it was reconstructed during the reign of the famous Venad King Sri Marthanda Varma in 1741 -44 under the supervision of a Flemish commander, Captain Eustachius De Lannoy of the Dutch East India Company. In 1810, the British East India Company under the Command of Coloner Leger marched into the Travancore State through the Aramboly Pass to quell a rebellion against Velu Thambi Dalavai. Until the middle of the 19th century, East India Company's troops were stationed here. A protected site under the Archaeological Department of India, the fort has been turned into a bio - diversity park by the Tamilnadu forest department, with sites of historical importance, such as Captain Eustachius De Lannoy's Tomb. Tourists can see deer, ducks, fountains, birds and over 100 varieties of trees inside the fort. Built with granite blocks, the fort has 290 ft walls. The tomb of De Lannoy and of his wife and son can seen inside a partly ruined chapel in the fort. De Lannoy was one of the 24 prisoners captured by King Marthanda Varma when he defeated the Dutch Army at the great Colachel Travancore-Dutch war. Later, De Lannoy, soon became one of the most trusted generals of the King and the Chief of the Travancore Army. De Lannoy modernized the Travancore Army by introducing modern warfare, the present 9th Battalion of Madras Regiment. He also established foundry for the manufacture of guns, mortars and cannon balls. The fort was once called Dillanai Kottai— De Lennoy's Fort in honour of this. He has lived in the fort with his family for several years and died on June 1, 1777 at the age of 62. His tomb is marked out by a stone cro ss stands on the top, with the inscription in both Tamil and Latin. One of the main feature of the fort is a 16 ft long brass gun, which could not be removed even with the help of 16 elephants. An artificial fountain has also been established in the fort. There also is an underground passage within the fort.

The Madurai district is the ninth largest in population of the 32 districts of the state of Tamil Nadu in southeastern India. The city of Madurai serves as the district headquarters to the world-famous Sri Meenakshi Sundareshwarar temple and is situated on the banks of the river Vaigai. Thiruparankundram is one of the major tourist place in the district. As of 2011, the district had a population of 3,038,252 with a sex-ratio of 990 females for every 1,000 males. Aside from the city of Madurai, the larger towns are Melur, Avaniapuram, Thirumangalam and Usilampatti. It is an important hub for various film shootings.

Sivagangai district is one of the 32 districts in the Tamil Nadu State of India and occupies an area of 4189 km². It is bound by Pudukkottai district on the northeast, Tiruchirapalli district on the north, Ramanathapuram district on southeast, Virudhunagar district on southwest and Madurai District on the west. The famous towns are Karaikudi, Manamadurai, Sivaganga, Devakottai, Tirupattur, Kalayar Kovil. According to 2011 census, Sivagangai district had a population of 1.339 million. Major towns are Kalayar Kovil. Kallal Town. Kanadukathan. Kandanur. Kandramanickam. Karaikudi. Kothamangalam, Sivaganga. Kottaiyur. Being one the important Monument and one of the places of bravery monuments. The Marudhupandiyar Fort, is maintained and administered by the Tamil Nadu State Archaeology Department. The Fort is counted as an important monument.

Tiruvanamalai district is one of the 32 districts in the Tamilnadu State of India and occupies an area of 6191 km². According to 2011 census, Tiruvanamalai district had a population of 2,464,875. Major towns are Tiruvanamalai, Arani, Chengam, Polur, Thandarampattu, Vandavasi, Kalasapakkam, Chetpet, Cheyyar, and Vembakkam. Koolamandal Gangaikonda Choleeswarer Temple, a Hindu temple dedicated to Lord Shiva located in the village of Koolamandal in the Cheyyar Taluk of Tiruvanamalai. The temple complex covers 1.92 acres and is maintained and administered by the State Archaeological Department of the Government of Tamil Nadu.

Kanchipuram district lies in the northeastern part of the state of Tamil Nadu in India. It is bound in the west by Vellore and Thiruvannamalai Districts, in the north by Tiruvallur and Chennai Districts,

in the south by Viluppuram District and in the east by the Bay of Bengal. It lies between 11° 00' to 12° 00' latitudes and 77° 28' to 78° 50' longitudes. The district has a total geographical area of 4,432 km2 (1,711 sq mi) and coastline of 57 km (35 mi). The town of Kanchipuram is the district headquarters. The Chennai International Airport is located in Tirusulam in Kanchipuram district, which is now under Greater Chennai Corporation Limit. In 2011, Kancheepuram district had a population of 3,998,252, with a sex-ratio of 986 females for every 1,000 males.

Tiruvanamalai district is one of the 32 districts in the Tamilnadu State of India and occupies an area of 6191 km². According to 2011 census,Tiruvanamalai district had a population of 2,464,875. Major towns are Tiruvanamalai, Arani, Chengam, Polur, Thandarampattu, Vandavasi, Kalasapakkam, Chetpet, Cheyyar, and Vembakkam. Koolamandal Gangaikonda choleeswarer Temple, a Hindu temple dedicated to Lord Shiva located in the village of Koolamandal in the Cheyyar Taluk of Tiruvanamalai. The temple complex covers 1.92 acres. The temple is maintained and administered by the State Archaeological Department of the Government of Tamil Nadu.

Tuticorin district is one of the 32 districts in the Tamil Nadu State of India and occupies an area of 4745 km². It lies between Virudhunagar district and Ramanathapuram district on the north and Thirunelveli District on the west, and is bounded by the bay of bengal on the south. According to 2011 census, Tuticorin district had a population of 1,750,176. Major towns are Thiruchendur, Kovilpatti, Tirunelveli and Thoothukudi.

Nagapattinam is a town in the Indian state of Tamil Nadu and the administrative headquarters of Nagapattinam District. The town came to prominence during the period of Medieval Cholas (9th – 12th century CE) and served as their important port for commerce and east-bound naval expeditions. The Chudamani Vihara in Nagapattinam constructed by the Sri Lankan king with the help of Chola kingdom is an important Buddhist structure of the times. Nagapattinam was settled by the Portuguese and, later, the Dutch under whom it served as the capital of Dutch Coromandel from 1660 to 1781. In November 1781, the town was conquered by the British East India Company. It served as the capital of Tanjore district from 1799 to 1845 under Madras Presidency of the British. It continued to be a part of Thanjavur district in Independent India. In 1991, it was made the headquarters of the newly created Nagapattinam District. Nagapattinam is administered by a Selection-grade municipality covering an area of 17.92 km^2 (6.92 sq mi) and had a population of 102,905 as of 2011. A majority of the people of Nagapattinam are employed in sea -borne trading, fishing, agriculture and tourism. Kayarohanaswami Temple and Soundara raja perumal Temple, Nagapattinam are the major Hindu pilgrimage sites. Nagapattinam is the base for tourism for Sikkal, Velankanni, Poompuhar, Kodiakkarai, Vedaranyam, Mannargudi and Tharangambadi Roadways is the major mode of transport to Nagapattinam, while the city also has rail and sea transport. Nagapattinam district was carved out by bifurcating the erstwhile composite Thanjavur district on October 19, 1991. The town of Nagapattinam is the district headquarters. As of 2011, the district had a population of 1,616,450 with a sex-ratio of 1,025 females for every 1,000 males. It is the only discontinuous district in Tamil Nadu. Major towns are Kilvelur, Kuthalam, Mayiladuthurai, Nagapattinam, Sirkali, Tharangambadi, Thirukkuvalai, Vedaranyam. Governor‘s House, Tharangambadi is now, this House is the oldest monument. Tharangambadi in the Tharangambadi taluk of Nagapattinam district, is a place of architectural interest and an important tourist centre. The Bungalow on the Beach is an 18th-century Danish colonial house which has belonged to the former Danish Governor. Tranquebar is a Danish term and came from the native Tamil word Tarangambadi, meaning 'place of the singing waves. The restored colonial house covers 0.38 acres and its landscaping and Varandah. The Governor’s House is maintained and administered by the Tamil Nadu State Department of Archaeology. The colonial house is one of the most visited tourist place in the district.

Landscaping and Varandah. The Governor‘s House is maintained and administered by the Tamil Nadu State Department of Archaeology. The colonial house is one of the most visited tourist place in the district.

Thanjavur is well known for its rich architectural and cultural heritage. Brihadeeswara temple has been declared as UNESCO world Heritage site. There are innumerable ancient temples around Thanjavur. The city is one of the oldest ruled by Cholas, Nayaks and Marathas.It is city is also famous for Music, Dance and Artifacts. Thanjavur paintings and Dancing dolls are very famous. The city is an important agricultural centre located in the Cauvery Delta and is known as the "Rice bowl of Tamil Nadu".

The selection of components is consistent with the subproject selection criteria outlined in the Environmental Assessment and Review Framework (EARF) aimed at enhancing protection of these sites and enhancing their environmental quality. Subprojects are consistent with defined management plans designed to protect environmentally sensitive and cultural locations. Management plans guided subproject design and location; therefore, all proposed facilities in natural areas are located outside sensitive areas and sited in designated tourist development zones.

Environmental Management: An environmental management plan (EMP) is included as part of this IEE, which includes (i) mitigation measures for environmental impacts during implementation; (ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting; (iii) public consultation and information disclosure; and (iv) grievance redress mechanism. A number of impacts and their significance have already been reduced by amending the designs. The EMP will be included in civil work bidding and contract documents.

Impacts are readily mitigated through careful siting, specific selection criteria for procuring contractors with demonstrated experience; execution of proven mitigation measures during the design; and adoption of good engineering practices during construction and implementation. A detailed monitoring plan prepared as part of this IEE will further mitigate negative environmental impacts during implementation.

Potential induced impacts are addressed through the following: (i) awareness - building of local management plans at proposed sites specifically addressing the need to regulate tourism related development and planning in the area through coordination with related Government Departments and local land use committees; and (ii) project-supported environmental awareness campaigns in surrounding communities to encourage participatory sustainable development consistent with eco-tourism principles and in compliance with the state's tourism policy ecotourism aspects.

The Investment Program includes upfront and on-going supervision and training assistance for environmental monitoring reporting in project management structures. The effective implementation of the measures proposed will be ensured through the building up of capacity towards environmental management within the project management unit (PMU) supplemented with the technical expertise of a Safeguards Specialist as part of the Project Management and Supervision Consultants (PMSC). Further, the environmental monitoring plans provide adequate opportunities towards course correction to address any residual impacts during construction or operation stages.

Tranche 4 includes additional environmental awareness-building to raise conservation values consistent with management plans and Tamil Nadu‘s environmental and tourism policies (which emphasize ecotourism) amongst local communities and local governments in order to ensure future sustainable development in and around these locations.

Information Disclosure, Consultation, and Participation: Public consultations were done in the preparation of the project and IEE. Ongoing consultations will occur throughout the project implementation period. A grievance redress mechanism (GRM) is described within the IEE to ensure any public grievances are addressed quickly.

Grievance Redress Mechanism: A GRM will be established by the TN-IDIPT to deal with complaint(s) from affected persons (TNs) during implementation. This would be done in line with the GRM as described in the IDIPT environmental assessment and review framework (EARF) that has been prepared for the IDIPT and this IEE. Affected persons can seek redress of their grievance at three levels: (i) the TN-IDIPT at implementation level, (ii) the grievance redress committee (GRC) at PMU level, and (iii) the appropriate courts of law. GRC is set up by the PMU as soon as the project commences and will function as such from construction to operation. The PMU will ensure the representation of women on the members of GRC which will consist of representatives from the local Panchayat Head, a District Revenue Commissioner, representative from the contractor(s) only during construction phase, designated staff of TN-IDIPT on safeguards, Manager/Director of TN-IDIPT, and a witness of the complainant/affected person.

Monitoring and Reporting: The PMU, PIU and PMSC will be responsible for environmental monitoring. The PIU, with support from the PMSC will submit semi-annual monitoring reports to the PMU. The PMU will consolidate the semi-annual reports in assistance of PMSC and will send it to ADB. ADB will post the environmental monitoring reports on its website.

Conclusion: The proposed subproject is unlikely to cause significant adverse impacts. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation of application of recommended mitigation measures and procedures. Based on the findings of the IEE, there are no significant impacts and the classification of the subproject as Category B is confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS 2009 or Government of India EIA Notification 2006.

I. INTRODUCTION

A. Background

1. The proposed Tranche IV (the Project) targets enhanced economic growth and provision of livelihood opportunities for local communities through tourism infrastructure development with a focus on preservation and development of natural and cultural heritage and incidental services. The Project supports the states of Uttarakhand and Tamil Nadu to develop the tourism sector as a key driver for economic growth. The Project aims to enhance contribution of the tourism industry to sustainable and inclusive economic growth for each participating state. Increased visits of domestic and international tourists to tourist destinations within each participating state would be the outcome of the Project.

2. The Project aims to enhance contribution of the tourism industry to sustainable and inclusive economic growth for each participating state. Increased visits of domestic and international tourists to tourist destinations within each participating state would be the outcome of the Project.

3. The India Infrastructure Development Investment Program for Tourism (the Investment Program) envisages environmentally and culturally sustainable and socially inclusive tourism development in the project states of Himachal Pradesh, Punjab, Tamil Nadu and Uttarakhand, delivered through a multi-tranche financing facility (MFF) modality. Project 2 includes the states of Uttarakhand and Tamil Nadu. Alagarkoil, Alangudi, Ammapet, Thingalur, Thirunageswaram, Thiruvenkadu, Veerapur and Keelperumpallam in Tamil Nadu has been considered under tranche IV of the Sub Project.

4. The Thiyagadhurgam Fort is located 12 km east of Kallakurachi in Villupuram district. It lies between Ulundurpettai and Salem Highway. The village was called Arunidai Thiyagan. Though the construction of the hill fort at Gingee is traditionally ascribed to one AnadaKon, a local chief, it came into prominence with the rise of Nayakas of Gingee in early 17th century. The outer fortification of Gingee runs in a triangular form over the three prominent hillock viz. Rajagiri, Krishnagiri and the Chakklidurg and the intervening spaces. The fortification is about 13 km in length and the fort covers an area of about 11 square kilometers (km^2). There are two prominent gateways viz. the Arcot and Pondicherry gates.

5. The fort in Tamil Nadu is located 14 km from Nagercoil in Thuckalay Town, Kanyakumari District on the Thiruvananthapuram-Nagercoil National highway at Puliyurkurichi of Tamil Nadu State, India.

6. Thirumalai Nayak Palace is a 17th-century palace erected in 1636 AD by King Thirumalai Nayak, a king of Madurai's Nayaka dynasty who ruled Madurai from 1623–59, in the city of Madurai, India. This Palace is a classic fusion of Dravidian and Rajput styles. The building, which can be seen today, was the main Palace, in which the king lived. The original Palace Complex was four times bigger than the present structure. In its heyday, Tirumalai Nayak Palace at Madurai was considered to be one of the wonders of the South. This palace is situated 2 km south east of the Meenakshi Amman Temple.

7. Maruthupandiyar Fort is located in a small village in Sivagangai District of Tamil Nadu State, India. Located 70 km from Madurai Airport, 20 km from Karaikudi and 2 km from Aranmanai Siruvayal via kallar Bus Stand. Aranmanai Siruvayal lies in between Kalayarkoil and Kallal in Sivagangai Taluk. The ancient name of this village was Siruvayal. Since a big palace was built in later days it is named as Aranmanai Siruvayal.

8. Koolamandal Gangaikonda Choleeswarer Temple is a temple which located 22 km (13.5 mi) from Vandavasi, Tiruvannamalai district, Tamil Nadu, India. The temple was built by Cholas. It is one of the protected monuments in Tamil Nadu declared by Archaeological Survey of India.

9. The ruins of Alamparai Fort (also called Alampara) lie near Kadappakkam, a village 50 km from Mamallapuram on the land overlooking the sea. Constructed in the late 17th century during the Mughal era, the Alamparai Fort once had a 100-metre long dockyard stretching into the sea, from which zari cloth, salt, and ghee were exported. During 1735 AD it was ruled by Nawab Doste Ali Khan. In 1750, for the services rendered by the famous French commander Duplex to Subedar Muzarfarzang, the fort was given to the French. When French were defeated by the British, the fort was captured and destroyed in 1760 AD. More recently the structure was damaged in the 2004 Indian Ocean earthquake.

10. Poondi Arugar temple is located near Arrani town, which is well known for silk and rice, according to an inscription of Sambuvaraya, the temple was referred as Viravira Jinalayam during 13th century CE.

11. Panchalkurichi is a small but historic village, 3 km from Ottapidaram and 18 km from the district in Tamil Nadu, India. Panchalankurichi was once a Palayam and is best known as the birthplace of Veerapandiya Kattabomman, an 18th-century Palayakarrar ('Polygar'), who opposed the British colonial rule in India and their Tax collecting methods.

12. Nagappatinam is a huge area under Nagapattinam Taluk in Nagappatinam District of Tamil Nadu State, Nagapattinam dutch dome is situated at a distance of 350 km from Chennai, 14 km from Karaikal, 40 km from Mayiladuthurai, 40 km from Kumbakonam, 80 km from Thanjavur and 25 km from Thiruvarur.

13. Tharangambadi, is a town in the Nagapattinam district of the Indian state of Tamil Nadu on the Coromandel Coast. Tharangambadi is the headquarters of Tharangambadi taluk, which means "place of the singing waves". It is 350 km from State capital Chennai, and lies 15 kilometres (9.3 mi) north of Karaikal, near the mouth of a distributary of the Kaveri River. Tharangambadi is surrounded by Karaikal towards the south, Kuthalam and Mayiladuthurai Taluk towards the west, Sirkali Taluk towards the north. Costal area towards the east. Built in the 18th century, opposite to the Fort Dansborg, by the Danish East India Company in which was once a pepper trading port of Tranquebar, now known as Tarangambadi.

14. Thellar is a small village Located about 5 kms northwest of Thirumalpadi Ranganathar temple. This is a very big temple and has sahasra and 108 lingam with very beautiful Nandi. Thellar is surrounded by Anakkavur Block and Vembakkam Block towards the west, Kanchipuram Block and Walajabad Block towards the north.

15. The Manora Fort is situated 65km away from Thanjavur and 20 km away from the town of Pattukkottai. British army at waterloo defeated Napoleon in 1814 AD. Since Serfoji-II was friendly with British, as a commemoration of their victory, he built Manora Fort Tower in 1814. It was known as a port and for ship building. It is an 8-storey, hexagonal tower, which is 23-meters high overlooking the bay of Bengal. The fort derives its name Manora, from the word minaret. The tower is surrounded by a wall and a moat and it resembles a pagoda. It is surrounded by a rampart. European architectural influence is also felt in its vaults and arches.

16. Chinnayankulam in Chinnayanpettai is a Kulam located 34.6 km (21.5 mi) from Tiruvannamalai, Tiruvannamalai district, Tamil Nadu, India. The Kulam was built by local chieftain

called Chinnayan. It is one of the protected monuments in Tamil Nadu declared by Archaeological Survey of India.

17. Executing and implementing agencies. The executing agency is the Department of Tourism & Culture, Government of Tamil Nadu. Project Management Unit (PMU) is set up at Chennai to coordinate the overall execution. The implementing agency is Project Implementation Unit (PIU) will be set up by Tamilnadu Tourism and Development Corporation (TTDC) through Department of Tourism (DOT). To support the PIU, Project Management and Supervision Consultant (PMSC) is proposed to be placed. The asset owner is Tamilnadu Tourism and Development Corporation (TTDC).

18. **Proposed subproject:** The primary objective of this sub-project is to increase visits of domestic and international tourists to tourist destinations. The subp-projects involve the Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at

(i) Thyagadurgam Fort, Villupuram District:
- (a) Heritage Conservation and Restoration works on the Fort.
- (b) Provision of chain link and grill fencing.
- (c) Conservation of the ruins on the hill top.
- (d) Chemical cleaning to the Canon.
- (e) Reconstruction of existing steps leading to the hill top.
- (f) Provision of approach road.
- (g) Provision of drinking water facilities.
- (h) Provision of signage, cultural, guide board and protection notice board.
- (i) Provision of security guard room.
- (j) Provision of lighting arrangements.
- (k) Landscaping arrangements.
- (l) Vegetation clearing in and around the hillock, front side and fencing area

(ii) Udhayagiri Fort, Kanyakumari District:
- (a) Conservation and restoration works around De Lennoy‘s Tomb.
- (b) Restoration of Pillai Kottai wall.
- (c) Landscaping wherever required within the De Lannoy‘s tomb.
- (d) Provision of drinking water facilities.
- (e) Provision of electrical arrangements.
- (f) Provision of signage, cultural, guide board and protection notice board.
- (g) Enamel Painting in existing Compound grills, Gate, Grills, Ladder, and Well grill.
- (h) Removal of various kinds of vegetation like thorny plants, twine plants etc. at inner and outer yard of the monument thoroughly.
- (i) Treatment of cracks found in structures at various levels by grouting and sealing the existing cracks by injection method with combination mortar 1: 1: 5.
- (j) Supply, fixing and erection of 1.5 HP jet pump with motor.
- (k) Removal of worn out lime plastering and re plastering with lime mortar.

(iii) Thirumalai Naicker Mahal, Madurai District:
- (a) Conservation works on the 248 pillars of the Mahal in Madurai.
- (b) Provision of weld mesh arrangements to the open court yard to avoid pigeon entry .
- (c) Conservation efforts to address leaking problems

(d) Structure conservation and repair works to address structure dampness and repair leakages
(e) Improvement of existing drainage facility and provision of signage boards.

(iv) Marudhupandiyar Fort, Sivagangai District:
(a) Repair and restoration of the Maruthupandiyar fort.
(b) Provision of steel chain link fencing all around the fort.
(c) Provision of a proper approach .

(v) Koolamandal Gangaikonda choleeswarer Temple, Tiruvanamalai District:
(c) Establishment of a dormitory – ground floor (G) to accommodate at least 33 pilgrims,
(d) Establishment of a toilet building – ground floor (G) only.

(vi) Alamparai Fort, Kanchipuram District:
(s) Heritage Conservation and Restoration of Fort.
(t) Construction of Restrooms for the visitors.
(u) Provision of drinking water facilities.
(a) Landscaping at Entrance of the Fort.
(b) Provision of car parking facilities.
(c) Prov
(d) Provision of lighting arrangements.
(e) Construction of Security Guard room.
(f) Provision of signage, cultural, guide board and protection notice board.
(g) Removal of various kinds of vegetation like thorny plants, twine plants etc. at inner and outer yard of the monument thoroughly.
(h) Removal of overburden heaped sand at the outer/inner yard of the fort up to its flooring area.
(i) Careful Removal / Reinstallation of the fallen Brick structures.
(j) Treatment of cracks found in structures at various levels by grouting and sealing the existing cracks by injection method with combination mortar 1: 1 : 5.
(k) Brick Stitching in worn out portions of fortress wall surfaces using country bricks of size 23 x 12 x 5cm with special grinded lime mortar 1:2 by adding extract of gallnut and jaggery.
(l) Re-construction of brick fortress wall with Lime mortar 1:3 using restored bricks from fallen structures, in missing portions of the walls.
(m) Removal of worn out lime plastering and re plastering with lime mortar.
(n) Shifting of available boulders found along the sea shore and placing them at East side of the Fort to prevent erosion.
(o) Provision of additional facilities like Approach road, Bore well with Motor, etc.

(vii) Poondi Arugar Temple, Tiruvanamalai District:
(a) Construction of dormitory hall with toilet block
(b) Provision of drinking water facilities
(c) Provision of signage, cultural, guide and protection board signage
(d) Provision of an approach road

(viii) Kattabomman kottai at Panchalankurichi, Tuticorin District:
(a) Provision of toilet – ground floor(G),
(b) Provision of security room – ground floor
(c) Chain link fencing.

(ix) Dutch Dome, Nagapattinam District:
- (a) Landscaping
- (b) Provisiong of lighting and signage
- (c) Provision of car parking facilities
- (d) Provision of drinking water facilities
- (e) Renovation of Governor House at Tharangambadi, Nagapattinam District

(x) Thadagapureeswarar Temple, Tiruvannamalai District:
- (a) Establishment of a dormitory – ground floor (G) to accommodate at least 33 pilgrims,
- (b) Establishment of a toilet building – ground floor (G) only.
- (c) Establishment of a security cabin

(xi) Manora Fort,Thanjavur District:
- (a) Conservation and Restoration works for the Fort.
- (b) Provision of grill fencing over the dwarf wall.
- (c) Landscaping inside the Fort.
- (d) Provision of lighting arrangements.
- (e) Provision of drinking water facilities for the tourist
- (f) Provision of signage, cultural, guide board, and protection notice board.
- (g) Construction of security guard room.
- (h) Provision of CCTV arrangements for the better surveillance and safety during wee hours.
- (i) Provision, fabrication and repair of structural steel M.S. gate.
- (j) White washing one coat using freshly burnt white shell lime in all floors.
- (k) Application of Water repellent coat to avoid dampness in the fort wall

(xii) Chinnayankulam in Chinnayanpettai, Tiruvanamalai:
- (a) Provision of lighting Arrangements
- (b) Provision of drinking water facilities
- (c) Provision of signage, cultural, guide and protection of notice boards

19. The project will further increase the tourist attractions having all facilities which will induce economic upliftment of local communities by generating self-employment opportunities. The sub project will assist design and implement capacity building measures for the community and the stakeholders.

20. The IEE is based on a careful review of subproject site plans and reports defined management plans; field visits, and secondary data to characterize the environment and identify potential impacts; and consultations/ discussions with stakeholders. An environmental management plan (EMP) outlining the specific environmental measures to be adhered to during implementation of the subproject has been prepared. Subprojects will provide needed environmental and tourist infrastructure to improve the environmental management and quality of the sites towards preserving their ecological and cultural integrity. The subproject will conform to all Government regulations, policies, and standards, as well as
Asian Development Bank‘s Safeguard Policy Statement (2009).

21. Categorization. The subproject package IDIPT/TN/T4/NCB/13/2017 is classified as environmental category B per ADB SPS as no significant impacts are envisioned. Accordingly, this Initial Environmental Examination (IEE) has been prepared to assess the environmental impacts and

provide mitigation and monitoring measures to ensure no significant impacts as a result of the subproject.

22. Under the EIA Notification, 2006 promulgated under Environment (Protection) Act 1986 of the MOEF, Govt of India, all developmental projects and activities listed under the schedule of the Notification are broadly categorized in to two categories - Category A and Category B, based on the spatial extent of potential impacts on human health and natural and manmade resources.

23. All projects or activities under Category ‗A' in the Schedule, including expansion and modernization of existing projects or activities and change in product mix, shall require prior environmental clearance from the Central Government in the Ministry of Environment and Forests (MoEF) on the recommendations of an Expert Appraisal Committee (EAC) to be constituted by the Central Government for the purposes of this Notification.

24. All projects or activities under Category ‗B' in the Schedule, including expansion and modernization of existing projects or activities as specified in sub paragraph (ii) of paragraph 2, or change in product mix as specified in sub paragraph (iii) of paragraph 2, but excluding those which fulfill the General Conditions (GC) stipulated in the Schedule, will require prior environmental clearance from the State/Union territory Environment Impact Assessment Authority (SEIAA). The SEIAA shall base its decision on the recommendations of a State or Union territory level Expert Appraisal Committee (SEAC) as to be constituted for in this Notification. In the absence of a duly constituted
SEIAA or SEAC, a Category ‗B' project shall be treated as a Category ‗A' project.

25. Purpose of the IEE. The IEE was based on a careful review of subproject site plans, detailed design and reports, defined management plans, field visits, stakeholder consultations/discussions and secondary data to characterize the environment and identify potential impacts. The adverse environmental impacts for this contract package are primarily related to the Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at (a) Thyagadurgam Fort, Villupuram District; (b) Udhayagiri Fort, Kanyakumari District; (c) Thirumalai Naicker Mahal, Madurai District; (d) Marudhupandiyar Fort, Sivagangai District; (e) Koolamandal Gangaikonda choleeswarer Temple, Tiruvanamalai District; (f) Alamparai Fort, Kanchipuram District; (g) Poondi Arugar Temple, Tiruvanamalai District; (h) Kattabomman kottai at Panchalankurichi, Tuticorin District; (i) Dutch Dome, Nagapattinam District; (j) Governor House at Tharangambadi, Nagapattinam District; (k) Thadagapureeswarar Temple, Tiruvannamalai District; (l) Manora Fort,Thanjavur District; (m) Chinnayankulam in Chinnayanpettai, Tiruvanamalai.

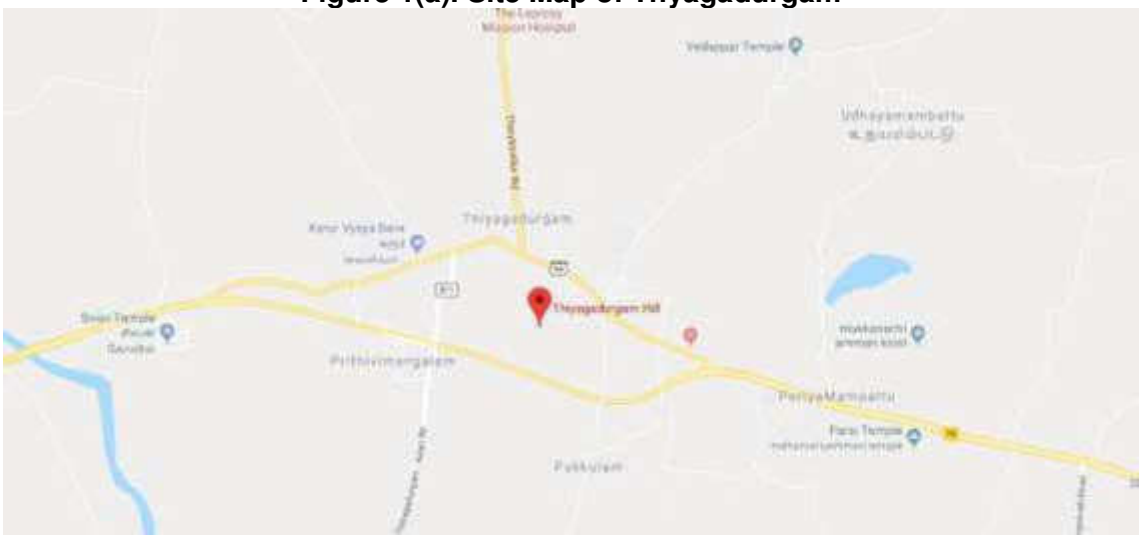
26. Therefore, as per the Asian Development Bank's (ADB) Environmental Assessment Guidelines (SPS 2009), the sub-project components are categorized as ‗B' and an IEE carried out. This IEE provides mitigation measures for impacts related to location, design, construction, operation, and maintenance. The REA checklist is attached as Appendix 3 with this report.

II. DESCRIPTION OF THE SUBPROJECT

A. Existing Condition and Need of the Subproject

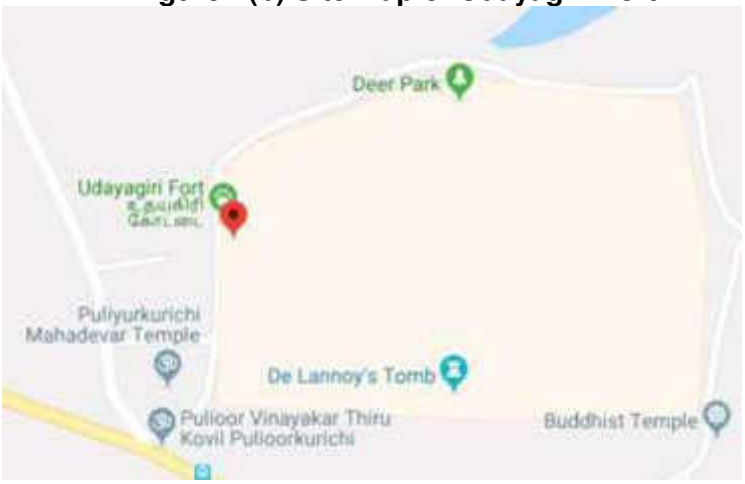
27. **Location**. The Thyagadhurgam Fort is located 12kms east of Kallakurachi in Villupuram district. It lies between Ulundurpettai and Salem Highway. The village was called Arunidai Thiyagan. The site map of Thyagadurgam is given in Figure 1(a) below.

Figure 1(a). Site Map of Thyagadurgam



28. The fort in Tamil Nadu is located 14 km from Nagercoil in Thuckalay Town, Kanyakumari District on the Thiruvananthapuram-Nagercoil National highway at Puliyurkurichi. It covers an area of 90 acres enclosed by isolated hills that are almost 260 feet in height. Lying on the famous Thiruvananthapuram- Nagercoil National highway, Puliyoorkurichi, this fort was once an important military base for the rulers of Travancore. The geographical coordinates of the fort are latitude 8Ã¸14'38.4N and longitude 77Ã¸19'55.2E. It is situated almost 14 km away from the town of Nagercoil in Kanyakumari District. It was one of the most prominent military barracks of the Travancore Royal Family, when Padmanabhapuram served as the capital of the ruling family. The site map of Udayagiri Fort is given in Figure 1(b) below.

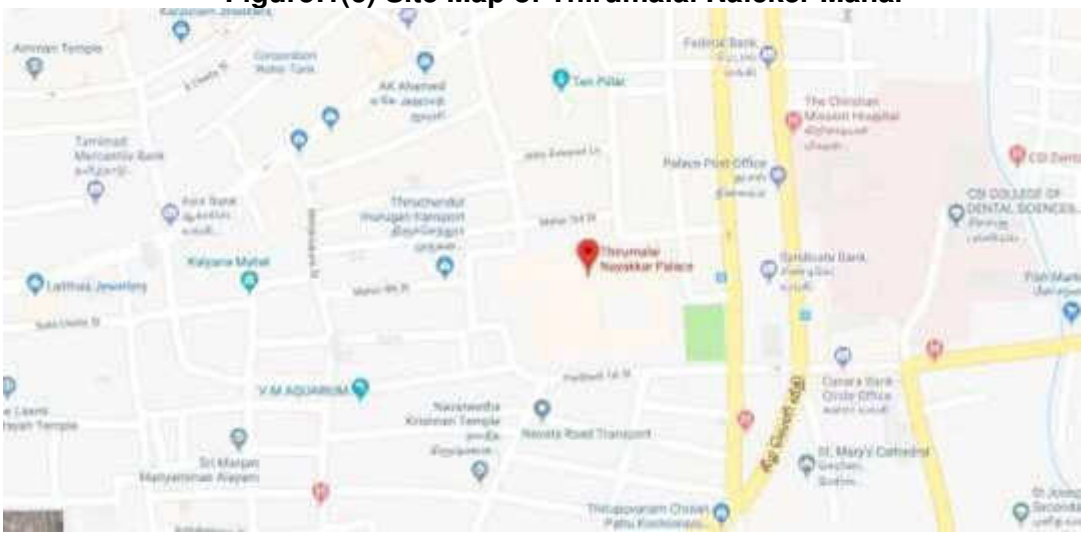
Figure:1(b) Site Map of Udayagiri Fort



29. Thirumalai Nayak Palace is a 17th-century palace erected in 1636 AD by King Thirumalai Nayak, a king of Madurai's Nayaka dynasty who ruled Madurai from 1623–59, in the city of Madurai, India. This Palace is a classic fusion of Dravidian and Rajput styles. The building, which can be seen today, was the main Palace, in which the king lived. The original Palace Complex was four times bigger than the present structure. In its heyday, Tirumalai Nayak Palace at Madurai was considered

to be one of the wonders of the South. This palace is situated 2 km south east of the Meenakshi Amman Temple . The site map of Thirumalai Naicker Mahal is given in Figure 1(c) below.

Figure:1(c) Site Map of Thirumalai Naicker Mahal



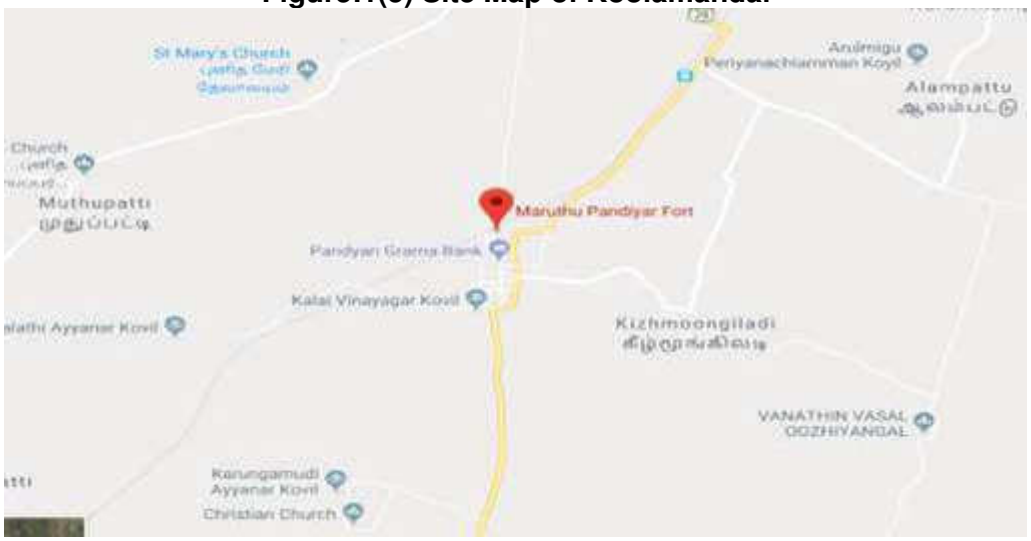
30. Maruthupandiyar Fort is located in a small village in Sivagangai District of Tamil Nadu State, India. Located 70 kms from Madurai Airport, 20 kms from Karaikudi and 2 kms from Aranmanai Siruvayal via kallar Bus Stand. AranmanaiSiruvayal lies in between Kalayarkoil and Kallal in Sivagangai Taluk. The ancient name of this village was Siruvayal. Since a big palace was built in later days it is named as Aranmanai Siruvayal. The site map of Maruthupandiyar Fort is given in Figure 1(d) below.

Figure:1(d) Site Map of Maruthupandiyar Fort

31. Koolamandal Gangaikonda choleeswarer Temple is a temple which located 22 kilometres (13.5 mi) from Vandavasi, Tiruvannamalai district, Tamil Nadu, India. The temple was built by Cholas.

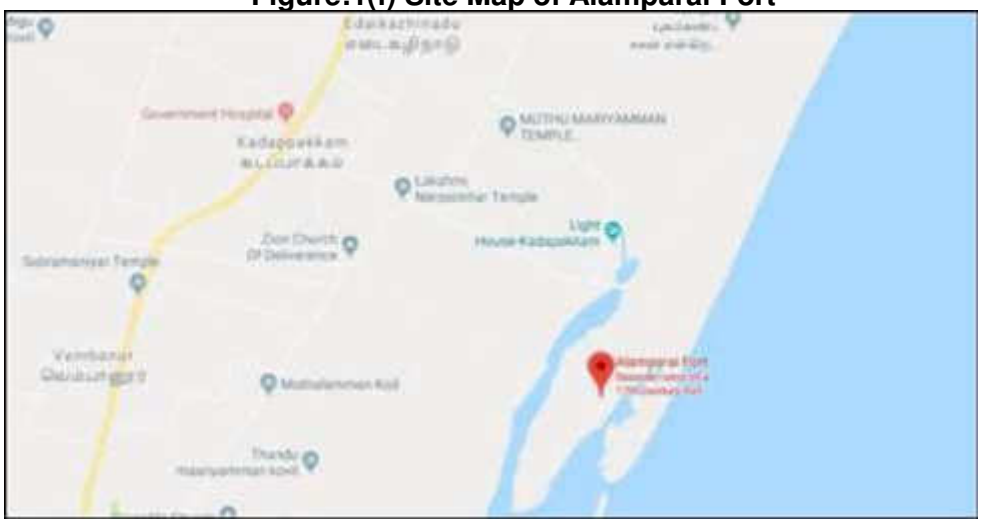
It is one of the protected monuments in Tamil Nadu declared by Archaeological Survey of India. The site map of Koolamandal is given in Figure 1(e) below.

Figure:1(e) Site Map of Koolamandal



32. The ruins of Alamparai Fort (also called Alampara) lie near Kadappakkam, a village 50 km from Mamallapuram on the land overlooking the sea. Constructed in the late 17th century during the Mughal era, the Alamparai Fort once had a 100-metre long dockyard stretching into the sea, from which zari cloth, salt, and ghee were exported. During 1735 AD it was ruled by Nawab Doste Ali Khan. In 1750, for the services rendered by the famous French commander Duplex to Subedar Muzarfarzang, the fort was given to the French. When French were defeated by the British, the fort was captured and destroyed in 1760 AD. More recently the structure was damaged in the 2004 Indian Ocean earthquake. The site map of Alamparai Fort is given in Figure 1(f) below.

Figure:1(f) Site Map of Alamparai Fort

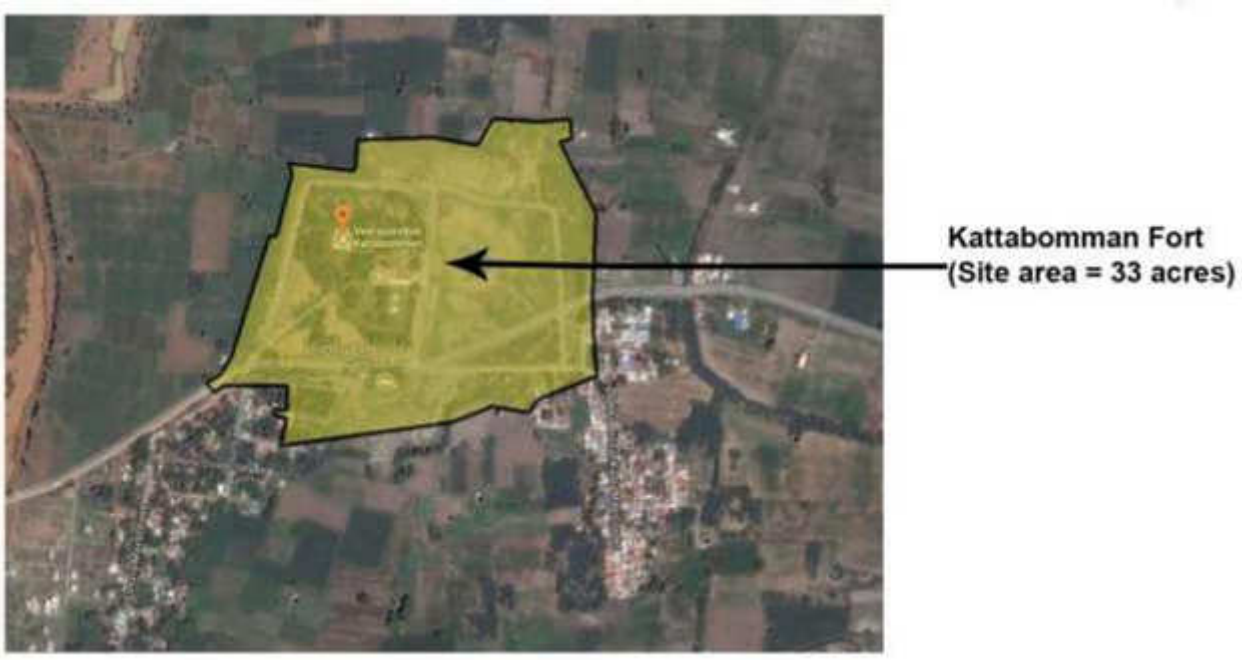


33. Poondi Arugar Temple is a Jain temple which located 3 kilometres (1.9 mi) from Arani, Tiruvannamalai district, Tamil Nadu, India. The temple was built by Cholas. It is one of the protected monuments in Tamil Nadu declared by Archaeological Survey of India. The site map of Poondi Arugar temple is given in Figure 1(g) below.

Figure:1(g) Site Map of Poondi Arugar temple

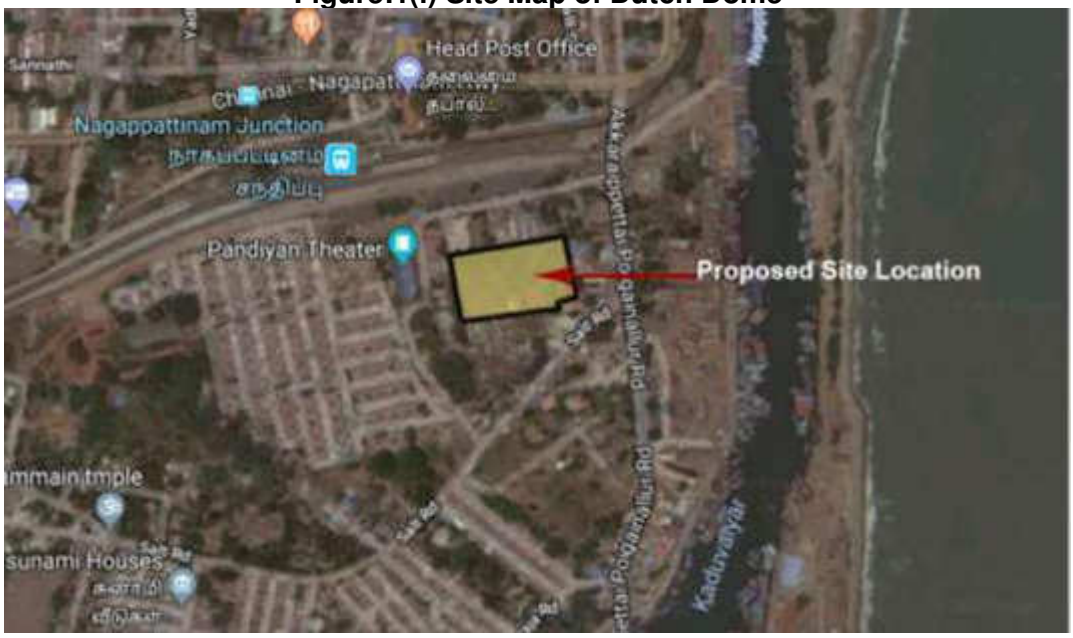
34. Panchalkurichi is a small but historic village, 3 km from Ottapidaram and 18 km from in district, Tamil Nadu, India. It is 587 km from State capital Chennai. The site map of Kattabomman Memorial Fort is given in Figure 1(h) below.

Figure:1(h) Site Map of Kattabomman Memorial Fort



35. Nagapattinam is a huge Nagapattinam Taluk in Nagapattinam District of Tamil Nadu State, Nagapattinam dutch dome is situated at a distance of 350 km from Chennai, 14 km from Karaikal, 40 km from Mayiladuthurai, 40 km from Kumbakonam, 80 km from Thanjavur and 25 km from Thiruvarur. The site map of Dutch Dome is given in Figure 1(i) below.

Figure:1(i) Site Map of Dutch Dome



36. Tharangambadi is a town in the Nagapattinam district of the Indian state of Tamil Nadu on the Coromandel Coast. Tharangambadi is the headquarters of Tharangambadi taluk, while its name means "place of the singing waves". It is 350 km from State capital Chennai It lies 15 kilometres (9.3 mi) north of Karaikal, near the mouth of a distributary of the Kaveri River. Tharangambadi is

surrounded by Karaikal towards South, Kuthalam and Mayiladuthurai Taluk towards west, Sirkali Taluk towards North. Costal area towards East. Built in the 18th century, opposite to the Fort Dansborg, by the Danish East India Company in which was once a pepper trading port of Tranquebar, now known as Tarangambadi. The site map of Governer's House, Tharangambadi is given in Figure 1(j) below..

Figure:1(j) Site Map of Governer's House, Tharangambadi

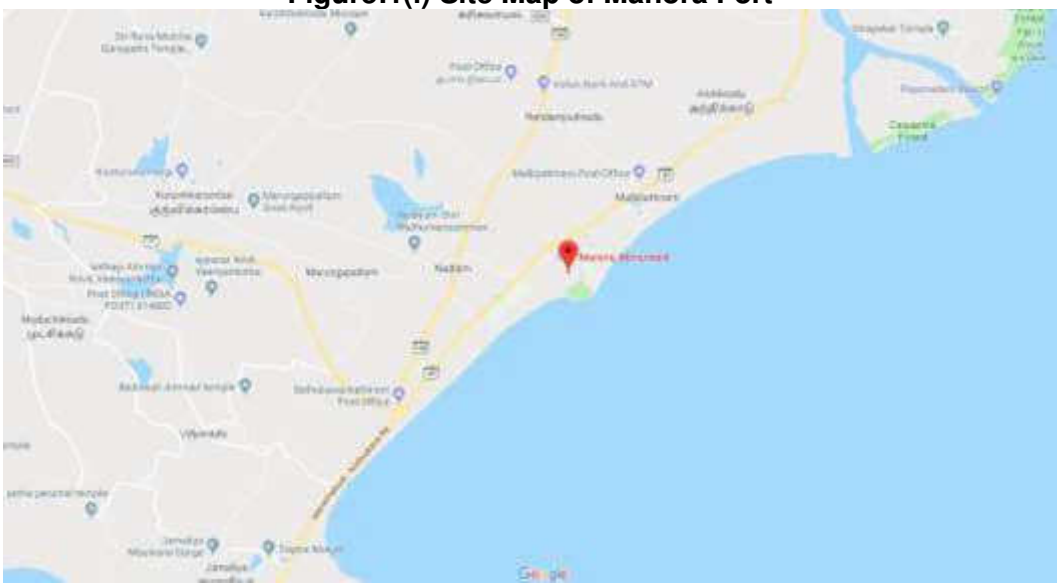
37. Sri Thadagapureeswarar Temple at Thellar village. Located at about 5 kms North-west of Thirumalpadi Ranganathar temple, this is a very big temple and has sahasra and 108 lingam with very beautiful Nandi. But the temple gopuram was mutilated by Moghuls. The site map of Thellar village is given in Figure 1(k) below.

Figure:1(k) Site Map of Thellar village

38. The Manora Fort is situated 65km away from Thanjavur and 20km away from the town of

Pattukkottai.British army at waterloo defeated Napoleon in 1814 AD. Since Serfoji-II was friendly with British, as a commemoration of their victory, he built Manora Fort Tower in 1814. It was known as a port and for ship building. It is an 8-storied, hexagonal tower, which is 23-meters high overlooking the bay of Bengal. The fort derives its name Manora, from the word minaret. The tower is surrounded by a wall and a moat and it resembles a pagoda. It is surrounded by a rampart. European architectural influence is also felt in its vaults and arches. The site map of Manora Fort is given in Figure 1(l) below.

Figure:1(l) Site Map of Manora Fort



39. Chinnayankulam in Chinnayanpettai is Kulam which located 34.6 kilometres (21.5 mi) from Tiruvannamalai, Tamil Nadu, India. The Kulam was built by local chieftain called Chinnayan. It is one of the protected monuments in Tamil Nadu declared by Archaeological Survey of India. The site map of Chinnayanpettai is given in Figure 1(m) below.

Figure:1(m) Site Map of Chinnayanpettai

40. **Brief History**. There is a small mount in the middle of the town There is a fort on the mount . It
was builder some of the indian ruler it is ruled i 1756 AD France sovereign. It was under the control of Hyder Ali that 1770 AD was taken over by the British ruler next year, before British ruler take over the fort Tipu Sultan ruled by so many years he was fought for it. against for british. The fort was later served as a base for British rule. Now under the control of the Archeological Department of the Government of India. Jain saints stayed on the Thiagadurgam hillock. Statue of Thirthankara and Kooshmandini relief dating back to 6-7th century AD are still found here. This is now worshipped as Malaiamman. The Jinar relief is on a tapering granite seated on a "Singathana lotus" pedestal with ornaments. Important festivals are all Pournamis, Adipooram, Navarathri, and thai Veli.

54. The fort in Tamil Nadu is located 14 kilometers from Nagercoil in Thuckalay Town, Kanyakumari District on the Thiruvananthapuram - Nagercoil National highway at Puliyurkurichi.

(i) This was the most important military barracks of the Travancore rulers, when Padmanabhapuram was their capital.

(ii) The Udayagiri fort was first constructed with mud by the Venad king Vira Ravi Varma (1595 - 1607 CE) in the year 1600 CE. Later on, it was reconstructed with granite by MarthandaVarma (1729-1785 CE) under the supervision of the Dutch lieutenant, DeLannoy of the Travancore army, in the year 1744 CE.

(iii) The fort is built of massive granite blocks around an isolated hillock. The tombs of the Dutch Admiral Eustachius De Lannoy, (in whose honor the fort was once called DillanaiKottai— De Lennoy's Fort), and of his wife and son can still be found inside a partly ruined chapel in the Fort.

(iv) De Lannoy's body was buried within the fort and a chapel was built at his burial site. De Lannoy's tombstone lies within the walls of the ruined chapel. The inscriptions on his stone are both in Tamil and in Latin. His wife and son were buried by his side.

(v) Recently, officials of the Department of Archaeology found an underground tunnel within the fort. Presently, the fort has been turned into a bio-diversity park by the Tamil

Nadu forest department [the existing infrastructure/facilities are not adequate to cater the increasing needs of the Local as well as Foreign Tourist. Hence the enhancement of the current Infrastructure for better tourist inflow is essential.

(vi) Kanyakumari district is the southernmost district in Tamil Nadu state and mainland India. It stands second in terms of population density among the districts of Tamil Nadu and the second most urbanized, next only to Chennai district. It is also the richest district in Tamil Nadu in terms of per capita income.

41. The Madurai district is the ninth largest in population of the 32 districts of the state of Tamil Nadu in southeastern India.[1] The city of Madurai serves as the district headquarters. It houses the world-famous Sri Meenakshi Sundareshwarar temple and is situated on the banks of the river Vaigai. Thiruparankundram is one of the major tourist place in the district. As of 2011, the district had a population of 3,038,252 with a sex-ratio of 990 females for every 1,000 males. Aside from the city of Madurai, the larger towns are Melur, Avaniapuram, Thirumangalam and Usilampatti. It is an important hub for various film shootings. Madurai is called with various nicknames like Athens of the East, Thoonga Nagaram (City that never Sleeps), Naan maada koodal (City of Four junctions), Malligai Managar (City of Jasmine), Koodal Managar (City of Junction) Koil Nagar (Temple city) etc. The main kingdoms which ruled Madurai during various times are the Pandyas and the Nayaks.

=42. The Maruthu Pandiar brothers, Periya Maruthu and Chinna Maruthu were born on 1748 and 1753 respectively in Tirupatur, Sivagangai district.Maruthu Brothers played an inevitable role in the History of Indian Freedom Struggle fighting against the British with valour. Kalaiyar Koil was built by Maruthu Brothers. In the year 1801, The British people declared that Kalayar Koil will be demolished, if Maruthu brothers refused to surrender. Maruthu brothers voluntarily surrendered to the British. They were hanged in the Fort of Tiruppathur on 24th October 1801.A memorial has been constructed for Maruthu Pandiars at a cost of 0.96 Lakhs in Tirupathur, Sivaganga district by the Government of Tamil Nadu. Honourable Chief Minister of Tamil Nadu Selvi J Jayalalithaa inaugurated the memorial on 21st October 1992.The Death Anniversary of Maruthu Pandiars is commomerated annually on 24th October in Tirupathur, Sivaganga district by the Government of Tamil Nadu. Sivaganga district is renowned for its glory. The region has been part of many famous kingdoms such as Pandyas. Even during the Mauryan expansion the region remained independent. Local kingdoms such as Cheras, etc ruled the area throughout the centuries. Real glory was achieved under the Chola Empire.

43. The history of Tiruvannamalai revolves around the Annamalaiyar Temple. The recorded history of the town dates back to the ninth century, as seen from a Chola inscriptions in the temple. Further inscriptions made before ninth century indicate the rule of Pallavakings, whose capital was Kanchipuram he seventh century Nayanar saints Sambandar and Appar wrote of the temple in their poetic work, Tevaram. Sekkizhar, the author of the Periyapuranam records both Appar and Sambandar worshiped Annamalaiyar in the temple.[9]The Chola Kings ruled over the region for more than four centuries, from 850 to 1280, and were temple patrons. The inscriptions from the Chola king record various gifts like land, sheep, cow and oil to the temple commemorating various victories of the dynasty. The Hoysala kings used Tiruvannamalai as their capital beginning in 1328. There are 48 inscriptions from the Sangama Dynasty (1336–1485), two inscriptions from Saluva Dynasty, and 55 inscriptions from Tuluva Dynasty (1491–1570) of the Vijayanagara Empire, reflecting gifts to the temple from their rulers.

44. Kanchipuram district is a district in the northeast of the state of Tamil Nadu in India. In Early Days Chengalpattu was called as the District. In Later Kanchipuram is considered as a District. It is bounded in the west by Vellore District and Thiruvannamalai District, in the north by Tiruvallur District and Chennai District, in the south by Viluppuram District and in the east by the Bay of Bengal. It lies between 11° 00' to 12° 00' latitudes and 77° 28' to 78° 50' longitudes. The district has a total geographical area of 4,432 km2 (1,711 sq mi) and coastline of 57 km (35 mi). The town of

Kanchipuram is the district headquarters. The Chennai International Airport is located in Tirusulam in Kanchipuram district now under Greater Chennai Corporation Limit. In 2011, Kancheepuram district had a population of 3,998,252, with a sex-ratio of 986 females for every 1,000 males.

45. Tuticorin district is one of the 32 districts in the Tamil Nadu State of India and occupies an area of 4745 km². It lies between Virudhunagar district and Ramanathapuram district on the north and Thirunelveli District on the west, and is bounded by the bay of bengal on the south. According to 2011 census, Tuticorin district had a population of 1,750,176. Major towns are , Thiruchendur, Kovilpatti.

46. Nagapattinam district is one of the 32 districts in the Tamil Nadu State of India and occupies an area of 2715.83 Sq. km². Nagapattinam district, the land of communal harmony, was carved out by bifurcating the composite Thanjavur district on 18.10.1991. This district hastraditionally been referred to as East Thanjavur and Paddy granary of South India Nagapattinam District lies on the shores of the Bay of Bengal between Northern Latitude 10.10' and 11.20' East Longtitute 79.15' and 79.50' This is peninsular delta District surrounded by Bay of Bengal on the East, Palk Straint on the South and land on the West and Northern Side. This District is predominantly, A Coastal District having a large coast line of 141 kilometres. This District has a numerous places of historical importance. Nagapattinam is an old Port Town. Nagapattinam district was carved out by bifurcating the erstwhile composite Thanjavur district on October 19, 1991. The town of Nagapattinam is the district headquarters. As of 2011, the district had a population of 1,616,450 with a sex-ratio of 1,025 females for every 1,000 males. It is the only discontiguous district in Tamil Nadu. Major towns are Kilvelur, Kuthalam, Mayiladuthurai, Nagapattinam, Sirkali, Tharangambadi, Thirukkuvalai, Vedaranyam. Governor‘s House, Tharangambadi is now, this House is the oldest monument. Tharangambadi in the Tharangambadi taluk of Nagapattinam district, is a place of architectural interest and an important tourist centre. The Bungalow on the Beach is an 18th-century Danish colonial house which has belonged to the former Danish Governor. Tranquebar is a Danish term and came from the native Tamil word Tarangambadi, meaning 'place of the singing waves. The restored colonial house covers 0.38 acres and it Landscaping and Varandah. The Governor‘s House is maintained and administered by the Tamil Nadu State Department of Archaeology. The colonial house is one of the most visited tourist place in the district. Tharangambadi is renowned for The Bungalow on the Beach is an 18th-century Danish colonial house which has belonged to the former Danish Governor. Tranquebar is a Danish term and came from the native Tamil word Tarangambadi.

47. Thanjavur is well known for its rich architectural and cultural heritage. Brihadeeswara temple has been declared as UNESCO world Heritage site. There are innumerable ancient temples around Thanjavur. The city is one of the oldest ruled by Cholas, Nayaks and Marathas.It is city is also famous for Music, Dance and Artifacts. Thanjavur paintings and Dancing dolls are very famous. The city is an important agricultural centre located in the Cauvery Delta and is known as the "Rice bowl of Tamil Nadu". The Manora Fort is situated 65 km (40 miles) away from Thanjavur, Tamilnadu, India. The fort was built by Maratha ruler Serfiji II in 1814-1815 to commemorate the successful advance of the British over Napoleon Bonaparte. It is an 8-storied, hexagonal tower, which is 23-meters high overlooking the Bay of Bengal. The fort derives its name Manora, from the word minaret.

48. **Existing Conditions**. The fort was built the 17th century which was constructed by the French Government and Tippu Sultan also had a captured the hills his regime. This fort was attacked by the Emperor Tippu Sultan and the Arcot Nawab. Being a proof of war field, the restoration of the fort wall and conservation are the main components of the proposal.

49. The Udhayagiri fort total area is 90 acres, fort wall length is 2250 RMT and height of wall is 4.70m, wall width is 0.80 m.

(i) Fort wall built with dry stone masonry 3.00 m (old structure) height and balance is built in brick masonry with plastering recently.
(ii) The Periphery of fort wall and De Lannoy's memorial portion (approximately 200.00 sqm) are under control of Archaeological department, the inner portion area is under control of Forest Department.
(iii) The path way available inside nearer to fort wall from entrance of width 1.80 m of length 0.5 KM after this there is no approach road and other covered by trees and bushes.
(iv) One toilet block is existing near to the entrance of the fort. Ticket issuing counter is located in the Main entrance area.
(v) One Aquarium building is existing, one small Pone and minizoo are existing, these are maintained by Forest Department.
(vi) One structure is available in name of Mr.De Lannoy's tomb of approximately area of 23.0mx8.0m in good condition and it was protected by RR masonry compound wall of height 1.2m and width is 0.5 m and grills and gate, the covering area of compound wall is
(vii) approximately 69.0m x 38.0m.
(viii) The existing path way made by paver block finishing of length 250.0m and remaining path way made by concrete surface finishing of length around 300.0m up to De Lannoy‘s tomb.

50. The Nayaks of Madurai ruled this former Kingdom from 1545 till 1740‘s and Thirumalai Nayak (1623-1659) was one of their greatest kings that line notable for various buildings in and around Madurai. During the 17th centuries the Madurai Kingdom had Portuguese, Dutch and other Europeans as traders, missionaries and visiting travellers. Tirumala Nayak is believed to have recruited the services of an Italian architect, for the construction of his Palace. Over a span of 400 years many parts of the buildings were suffered much by time, and not inconsiderably... by the destructive effects of war; a few, however, are sufficiently in repair to be converted into use by the garrison, as granaries, store - houses, powder magazines during time of East India Company. King Thirumalai Nayak‘s grandson had demolished much of the fine structure and removed most of the jewels and woodcarvings in order to build his own palace in Tiruchirapalli. However Lord Napier, the Governor of Madras, had partially restored the palace in 1866-72, and the subsequent restoration works carried out several years ago, today, we get to see the Entrance Gate, The Main Hall and the Dance Hall.

51. The Maruthupandiyar fort total area is 0.37 acres, fort wall length is 22m and Width is 4.75m, Fort wall Height is 4.5m.

(i) Fort wall built in brick masonry and Lime mortar were used in Super structure and Vaulting Roof with plastering.3 rooms have inside of the fort. Most of the wall in damaged condition.
(ii) Steel chain link fencing provided all around the fort.
(iii) Approach is not given properly.
(iv) Children‘s park area is located from Fort around 200m.

52. Tiruvannamalai is one of the most venerated places in Tamil Nadu. In ancient times, the term "Annamalai" meant an inaccessible mountain. The word "Thiru" was prefixed to signify its greatness, and coupled with the two terms, it was called Thiruvannamalai. Thiru means 'holy' or 'sacred' and is traditionally used in front of names in all parts of Tamil Nadu like Thiruneermalai (Lord Ranganatha), Thirunageswaram (Lord Vishnu and Lord Shiva), Thirumayam (Lord Vishnu and Lord Shiva),

53. Thirumayilai (Lord Adikeshava Perumal and Lord Kapali Eshwaran), Tiruvannamalai (Lord Shiva), Thiruchendur (Lord Muruga), Tiruchirappalli (Lord Sriranganathar), Thiruttani (Lord Muruga),

Tiruchengode (Lord Shiva), Thiruchitrambalam(Lord Shiva), Thirumanancheri (Lord Shiva), Thirunallar (Lord Shani Eshwaran), Thiruporur(Lord Muruga), Thirukkadaiyur (Lord Shiva), Tirukalukundram(Lord Vedagiriswarar temple), Thirukarugavur (Lord Garbharakshambigai temple), Tirunelveli, Tiruppur, Tiruvallur and many more.

54. Alamparai was a seaport in historical times. The place had other names like Idaikazhinadu, Alamparva and Alampuravi. The fort was built during the Mughal era between 1736 and 1740 AD. The fort was initially under the control of the Nawab of Arcot, Doste Ali Khan, and was later given to the French. After the Carnatic wars, when the French lost to British, the fort came under the direct control of the British and was demolished in 1760. Alamparai is mentioned in several places in the diaries of Ananda Ranga Pillai, Dubash to Dupleix in French India. It was the primary port of trade for the Arcot nawabs. They had a mint there, and later, at the request of Dumas, the governor of Madras Presidency, The People who worked in the Mints of Alambarai (it is mentioned as 'Alampuravi') moved to Pondicherry and established a mint with the approval of the Nawab of Arcot. It was a regular port of call on the Coromandel Coast, having a 100 m (330 ft) dockyard. The other contemporary ports were Pulicat, Madras, Mylapore, Sadras (12 km from Mahabalipuram), Pondicherry, Cuddalore, Porto Nova, Tharangambadi (Tranquebar), Karaikal, and Nagapattinam. The fort experienced further damages during the Indian Ocean tsunami in 2004 and portions of the dilapidated fort remains under the sea. A team of archaeologists found out coins minted during the rule of Nawabs. Some rare artifacts like the arms and ammunition used by the Nawabs and French were also found in fort.

55. Panchalkurichi is a small but historic village, 3 km from Ottapidaram and 18 km from in district, Tamil Nadu, India. Panchalankurichi was once a Palayam and is best known as the birthplace of Veerapandiya Kattabomman, an 18th-century Palayakarrar ('Polygar'), who opposed the British colonial rule in India and their Tax collecting methods.

56. The Nagapattinam Kayaroganam Shiva temple existed even in the 6th century ApparSambandar and Sundarar were associated with this temple; Kayaroganam Shivatemple is based on the 'Laguleesa Pusuptha Cult' .Soundaraja Perumal ViashnavaTemple is one of the notable features of Nagapattinam. This favorite town of Chola Kings was also celebrated latter; by Vijaya Nagara Kings. Portuguese had a commercial contact with this town during the Tanjore Nayakkas rule [Sevvppa Nayakkar] and [Acchuthappa Nayakkar] Portguese commercial centure was eastablished in 1554; Since then christianity began to take root under the commercial contact, 10 -villages are taken control of by Portugese traders With the advent of Portugese Velankanni Church came into existence.

57. The Governor‘s house of Tharangambadi also known as18th-century Danish colonial house, located at Tharangambadi Taluk, Nagapattinam District is an important tourist destination. Most of the tourists prefer to stay at Nagapattinam considering that it is a bigger place or some small private places at Tharangambadi. Considering this, Tamil Nadu Tourism Development Corporation is planning to conservation and restoration of Governor‘s house. To enhanced quality of natural and cultural tourist attractions, Livelihood opportunities at local community level, developed basic urban infrastructure and services at tourist destinations, Improved connectivity to tourist attraction, strengthened capacity of concerned sector agencies and local communities for planning, development, management and marketing of tourist destinations and attractions and, Enhanced capacity to promote private sector participation and small businesses. Tarangambadi, Nagapattinam District was to study and observe the impacts of the proposed infrastructure projects on the respective community in order to suggest suitable preventive, promotional and protective intervention to be undertaken by the implementing agency.

58. The fort derives its name Manora, from the word Minaret. In December 2004, five monuments including this fort were damaged in Tsunami .This fort needs conservation due to sea proximity.

59. **Proposed Subproject.** Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at

(a) Thyagadurgam Fort, Villupuram District:

(i) Heritage Conservation and Restoration works on the Fort.
(ii) Provision of chain link and grill fencing.
(iii) Conservation of the ruins on the hill top.
(iv) Chemical cleaning to the Canon.
(v) Reconstruction of existing steps leading to the hill top.
(vi) Provision of approach road.
(vii) Provision of drinking water facilities.
(viii) Provision of signage, cultural, guide board and protection notice board.
(ix) Provision of security guard room.
(x) Provision of lighting arrangements.
(xi) Landscaping arrangements.
(xii) Vegetation clearing in and around the hillock, front side and fencing area

(b) Udhayagiri Fort, Kanyakumari District:

(i) Conservation and restoration works around De Lennoy‘s Tomb.
(ii) Restoration of Pillai Kottai wall.
(iii) Landscaping wherever required within the De Lannoy‘s tomb.
(iv) Provision of drinking water facilities.
(v) Provision of electrical arrangements.
(vi) Provision of signage, cultural, guide board and protection notice board.
(vii) Enamel Painting in existing Compound grills, Gate, Grills, Ladder, and Well grill.
(viii) Removal of various kinds of vegetation like thorny plants, twine plants etc. at inner and outer yard of the monument thoroughly.
(ix) Treatment of cracks found in structures at various levels by grouting and sealing the existing cracks by injection method with combination mortar 1: 1: 5.
(x) Supply, fixing and erection of 1.5 HP jet pump with motor.
(xi) Removal of worn out lime plastering and re plastering with lime mortar.

(c) Thirumalai Naicker Mahal, Madurai District:

(i) Conservation works on the 248 pillars of the Mahal in Madurai.
(ii) Provision of weld mesh arrangements to the open court yard to avoid pigeon entry .
(iii) Conservation efforts to address leaking problems
(iv) Structure conservation and repair works to address structure dampness and repair leakages
(v) Improvement of existing drainage facility and provision of signage boards.

(d) Marudhupandiyar Fort, Sivagangai District:

(i) Repair and restoration of the Maruthupandiyar fort.
(ii) Provision of steel chain link fencing all around the fort.
(iii) Provision of a proper approach .

(d) Koolamandal Gangaikonda choleeswarer Temple, Tiruvanamalai District:

a. Establishment of a dormitory – ground floor (G) to accommodate at least 33

pilgrims,

b. Establishment of a toilet building – ground floor (G) only.

(e) Alamparai Fort, Kanchipuram District:

a. Heritage Conservation and Restoration of Fort.
b. Construction of Restrooms for the visitors.
c. Provision of drinking water facilities.
d. Landscaping at Entrance of the Fort.
e. Provision of car parking facilities.
f. Provision of lighting arrangements.
g. Construction of Security Guard room.
h. Provision of signage, cultural, guide board and protection notice board.
i. Removal of various kinds of vegetation like thorny plants, twine plants etc. at inner and outer yard of the monument thoroughly.
j. Removal of overburden heaped sand at the outer/inner yard of the fort up to its flooring area.
k. Careful Removal / Reinstallation of the fallen Brick structures.
l. Treatment of cracks found in structures at various levels by grouting and sealing the existing cracks by injection method with combination mortar 1: 1 : 5.
m. Brick Stitching in worn out portions of fortress wall surfaces using country bricks of size 23 x 12 x 5cm with special grinded lime mortar 1:2 by adding extract of gallnut and jaggery.
n. Re-construction of brick fortress wall with Lime mortar 1:3 using restored bricks from fallen structures, in missing portions of the walls.
o. Removal of worn out lime plastering and re plastering with lime mortar.
p. Shifting of available boulders found along the sea shore and placing them at East side of the Fort to prevent erosion.
q. Provision of additional facilities like Approach road, Bore well with Motor, etc.

(f) Poondi Arugar Temple, Tiruvanamalai District:

a. Construction of dormitory hall with toilet block
b. Provision of drinking water facilities
c. Provision of signage, cultural, guide and protection board signage
d. Provision of an approach road

Kattabomman kottai at Panchalankurichi, Tuticorin District:

e. Provision of toilet – ground floor(G),
f. Provision of security room – ground floor
g. Chain link fencing.

(g) Dutch Dome, Nagapattinam District:

a. Landscaping
b. Provisiong of lighting and signage
c. Provision of car parking facilities
d. Provision of drinking water facilities

(h) Renovation of Governor House at Tharangambadi, Nagapattinam District

(i) Thadagapureeswarar Temple, Tiruvannamalai District:

(i) Establishment of a dormitory – ground floor (G) to accommodate at least 33 pilgrims,
(ii) Establishment of a toilet building – ground floor (G) only.
(iii) Establishment of a security cabin

(l) Manora Fort,Thanjavur District:

(i) Conservation and Restoration works for the Fort.
(ii) Provision of grill fencing over the dwarf wall.
(iii) Landscaping inside the Fort.
(iv) Provision of lighting arrangements.
(v) Provision of drinking water facilities for the tourist
(vi) Provision of signage, cultural, guide board, and protection notice board.
(vii) Construction of security guard room.
(viii) Provision of CCTV arrangements for the better surveillance and safety during wee hours.
(ix) Provision, fabrication and repair of structural steel M.S. gate.
(x) White washing one coat using freshly burnt white shell lime in all floors.
(xi) Application of Water repellent coat to avoid dampness in the fort wall

(m) Chinnayankulam in Chinnayanpettai, Tiruvanamalai:

(i) Provision of lighting Arrangements
(ii) Provision of drinking water facilities
(iii) Provision of signage, cultural, guide and protection of notice boards

60. All sites for subproject are owned by government thus no land acquisition or NOC is required. The sites are not within or adjacent to any protected area. Location map of proposed site is shown in Figure 2 and the proposed site plan is shown in Figure 3. All pre-construction, construction, and operation activities that are likely to cause environmental impacts were identified, and evaluated to assess their magnitude, duration, and potential receptors in consultation with the stakeholders. Consultations were held with the government representatives of TTDC and local communities. Accordingly, an EMP has been prepared for each component to mitigate any adverse impacts that may occur during implementation of the project.

61. The design, material and scale will be compatible to the local architectural, physical, cultural and landscaping elements. Preference will also be given to the use of local material and labor as best as possible.

Figure:2(a) Proposed Site Location - Thyagadurgam

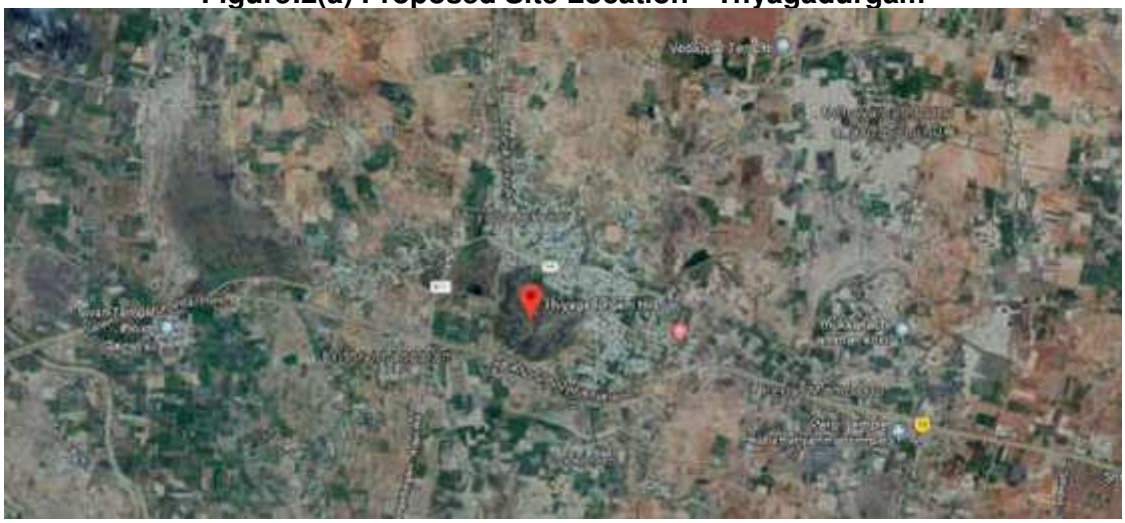


Figure:3(a) Proposed site plan for subproject components – Thyagadurgam

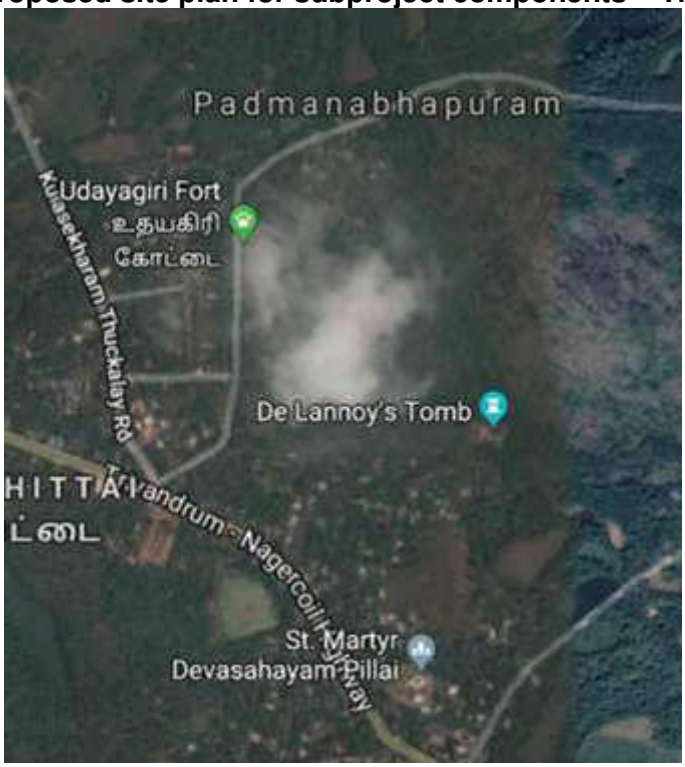


Figure:2(b) Proposed Site Location - Udhayagiri fort

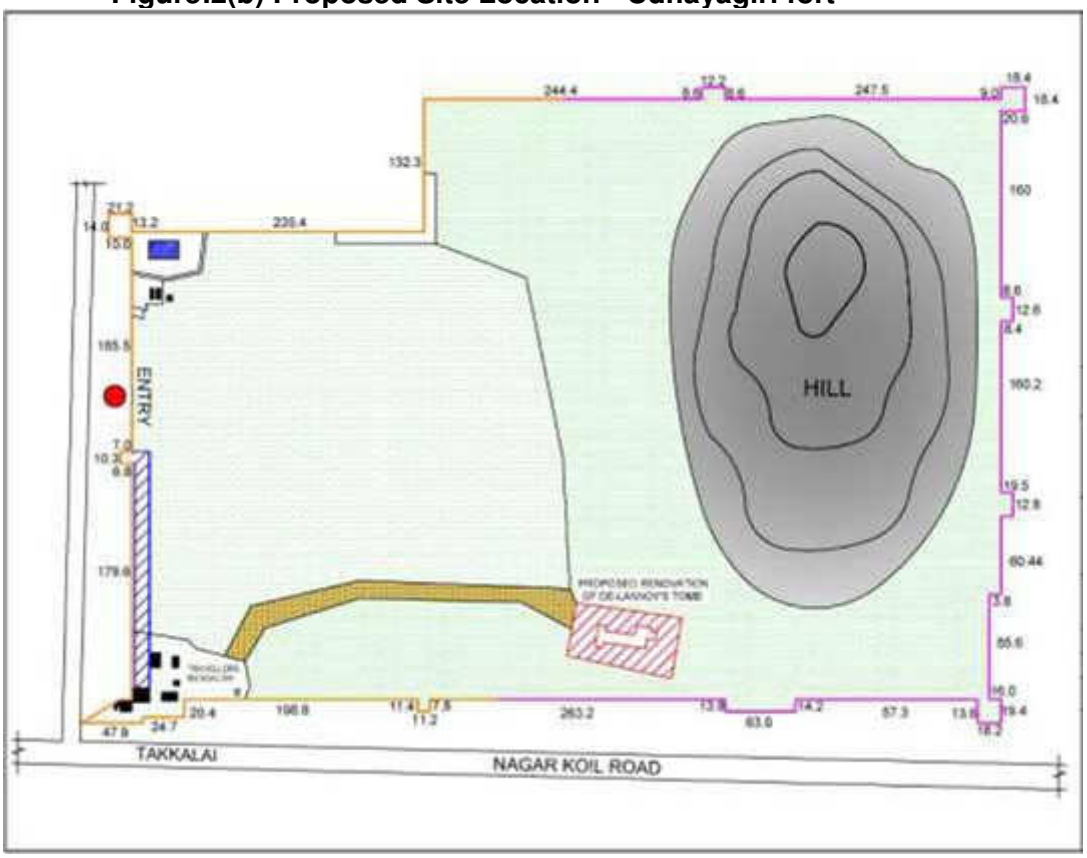


Figure:3(b) Proposed site plan for subproject components – Udhayagiri fort

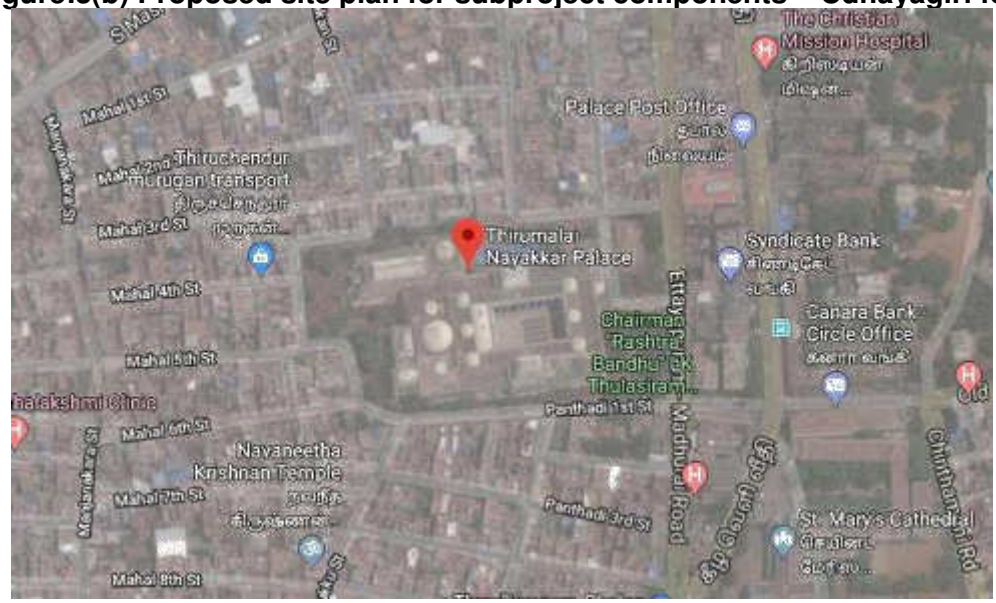


Figure:2(c) Proposed Site Location - Thirumalai Naicker Mahal at Madurai District

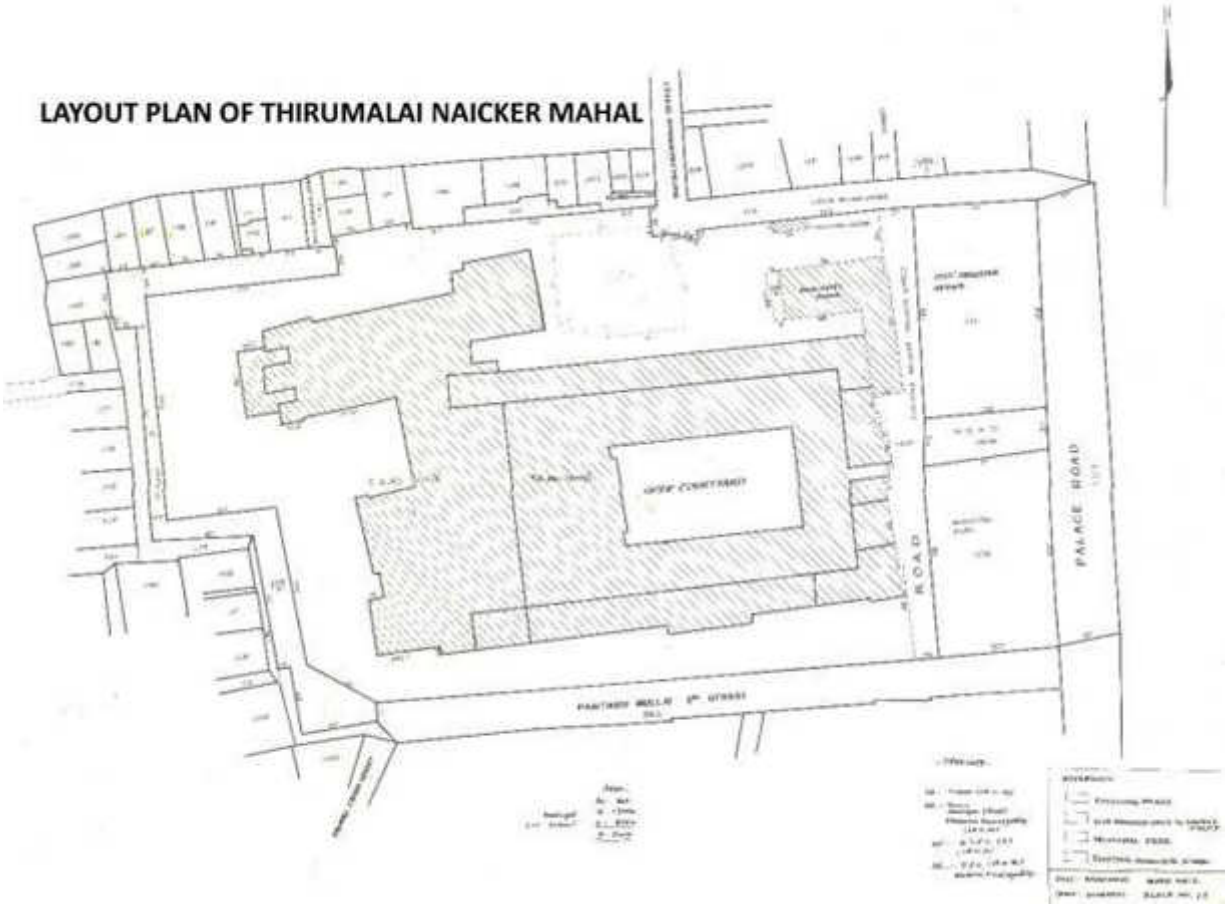


Figure:3(c) Proposed site plan for subproject components – Thirumalai Naicker Mahal at Madurai District

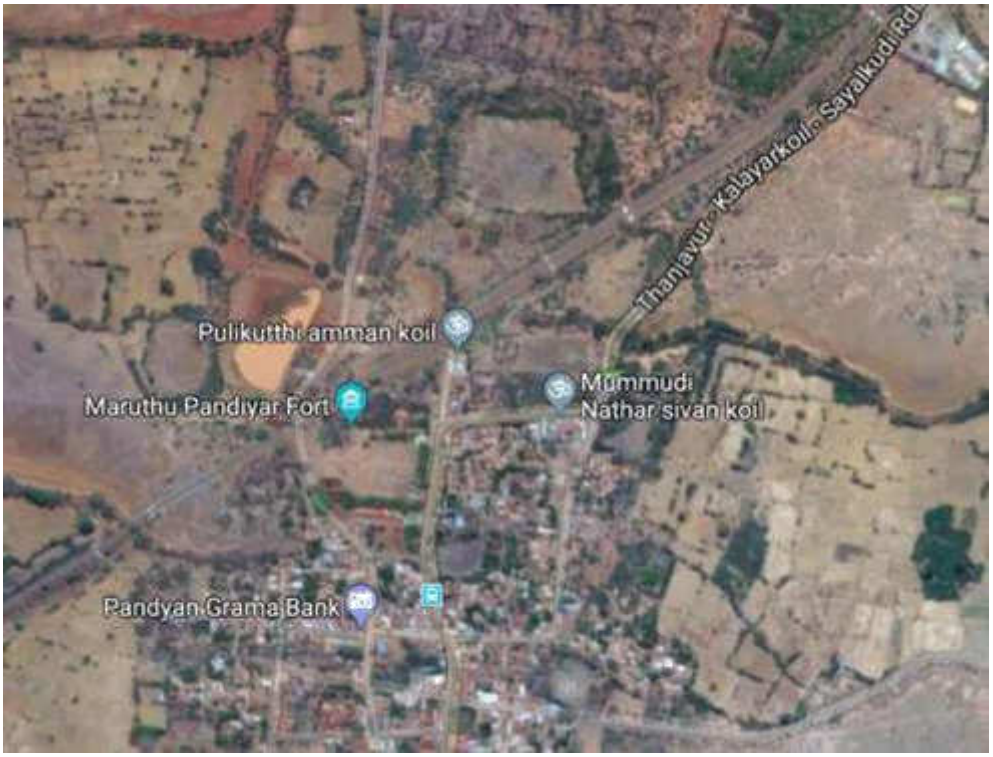


Figure:2(d) Proposed Site Location - Maruthupandiyar fort

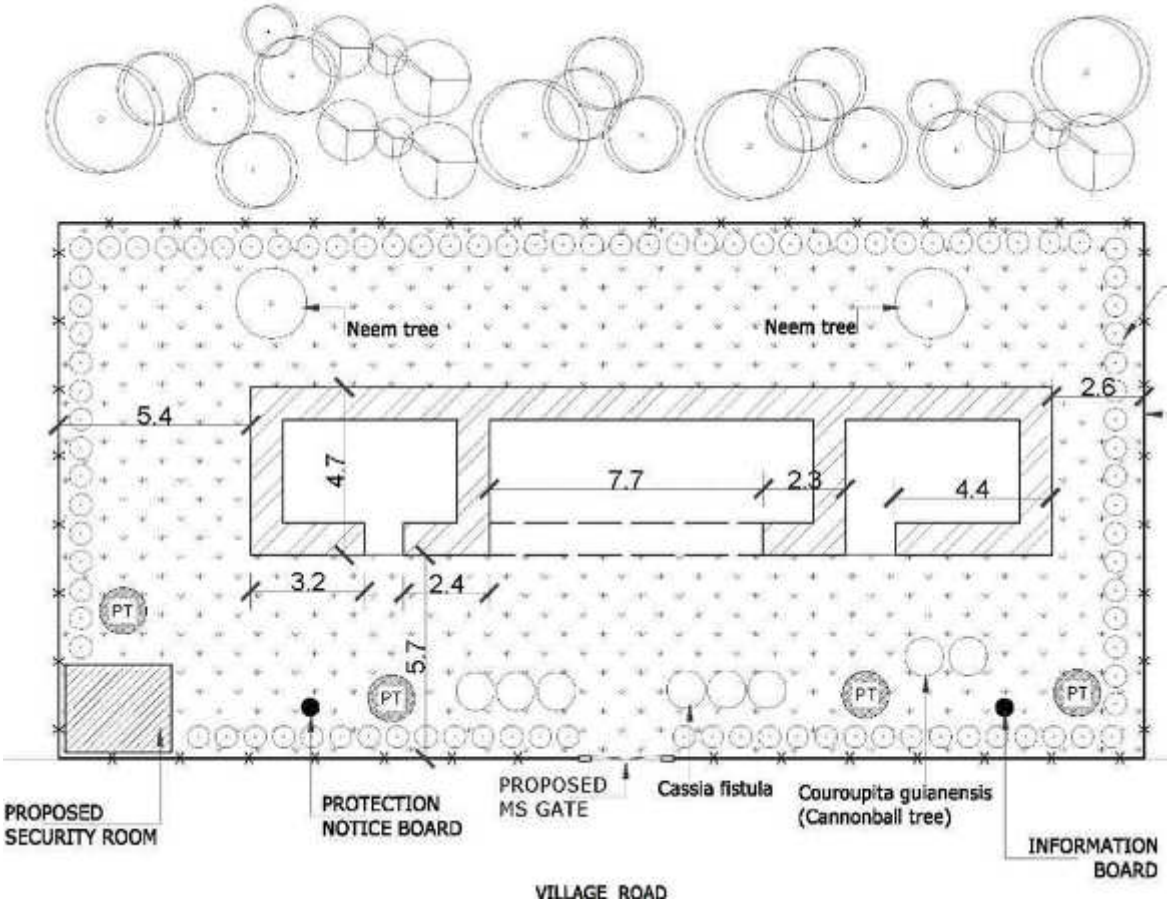


Figure:3(d) Proposed site plan for subproject components – Maruthupandiyar fort

Figure:2(e) Proposed Site Location - Koolamandal

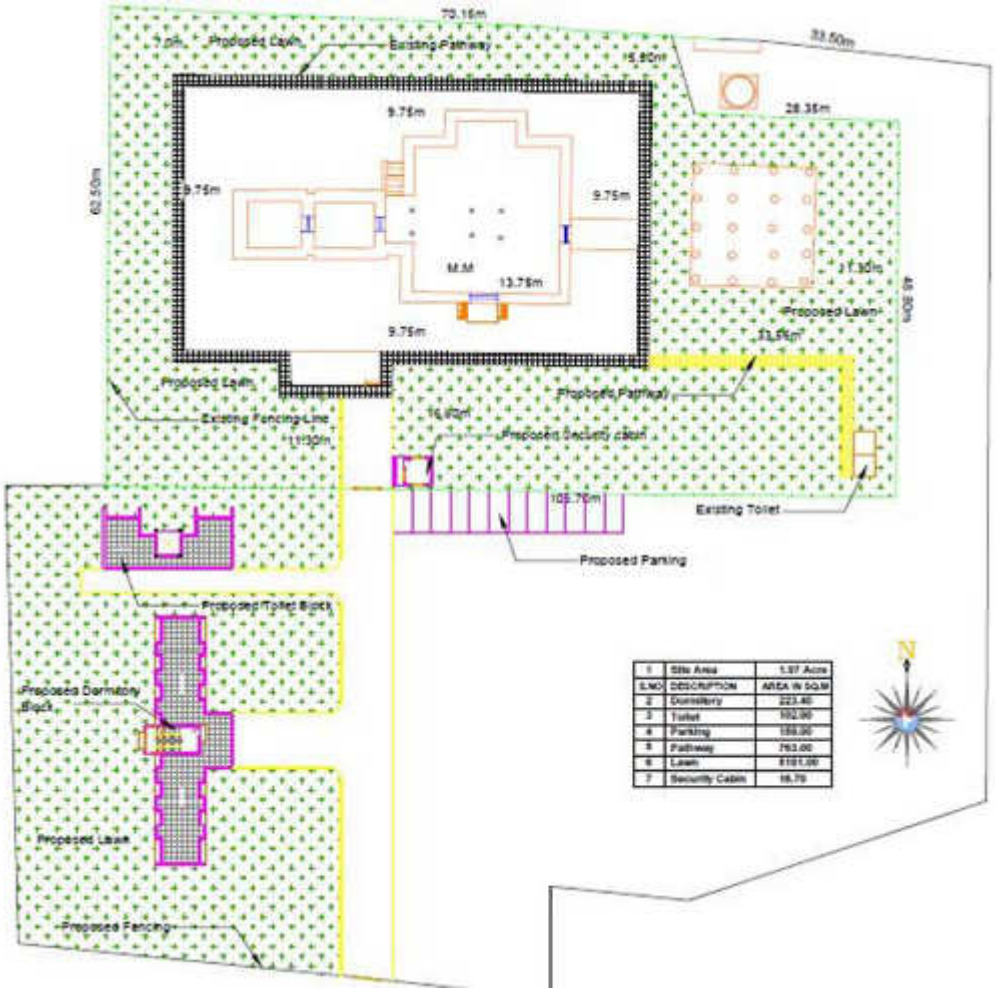


Figure:3(e) Proposed site plan for subproject components – Koolamandal

Figure:2(f) Proposed Site Location - Almapari Fort

Figure:3(f) Proposed site plan for subproject components – Almapari Fort

Figure:2(g) Proposed Site Location - Poondi Arugar Temple

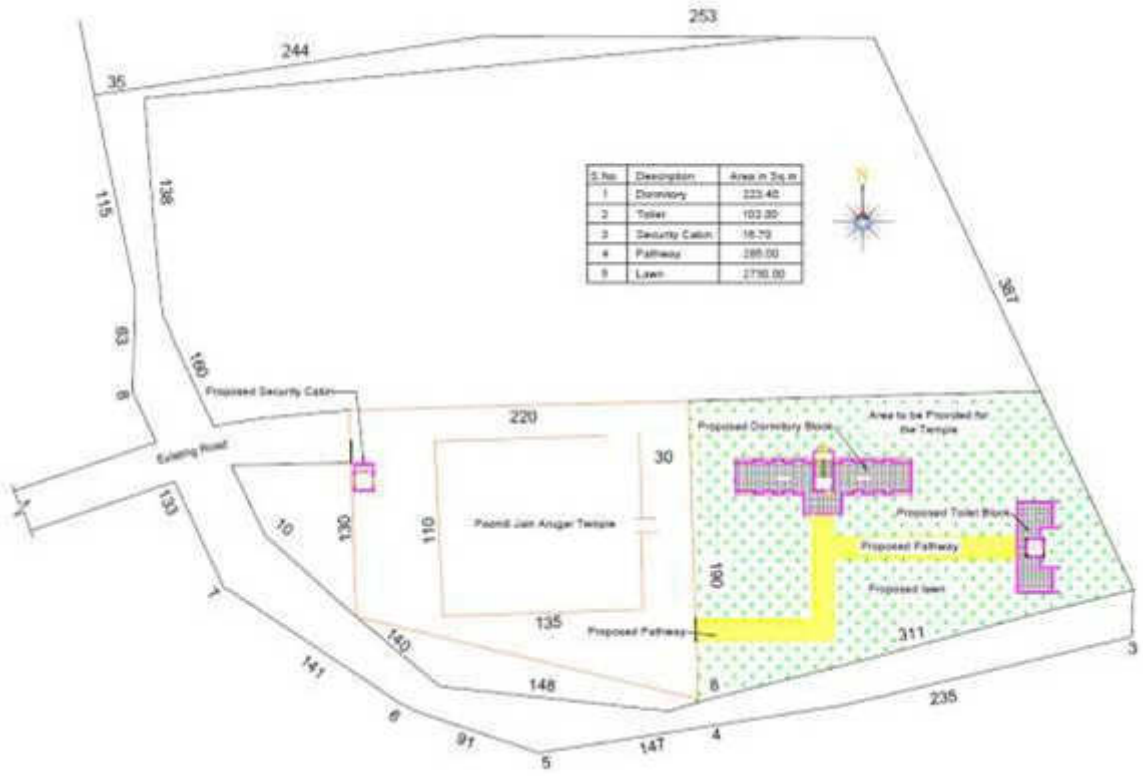


Figure:3(g) Proposed site plan for subproject components – Poondi Arugar Temple

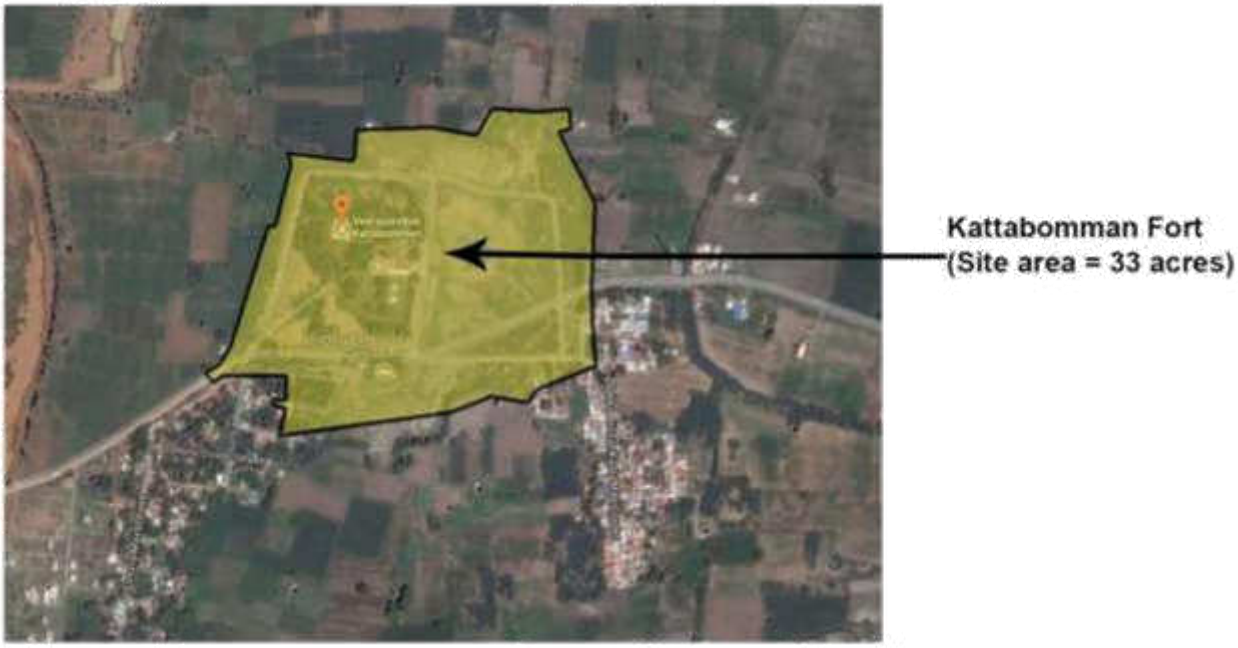


Figure:2(h) Proposed Site Location - Kattabomman Memorial Fort

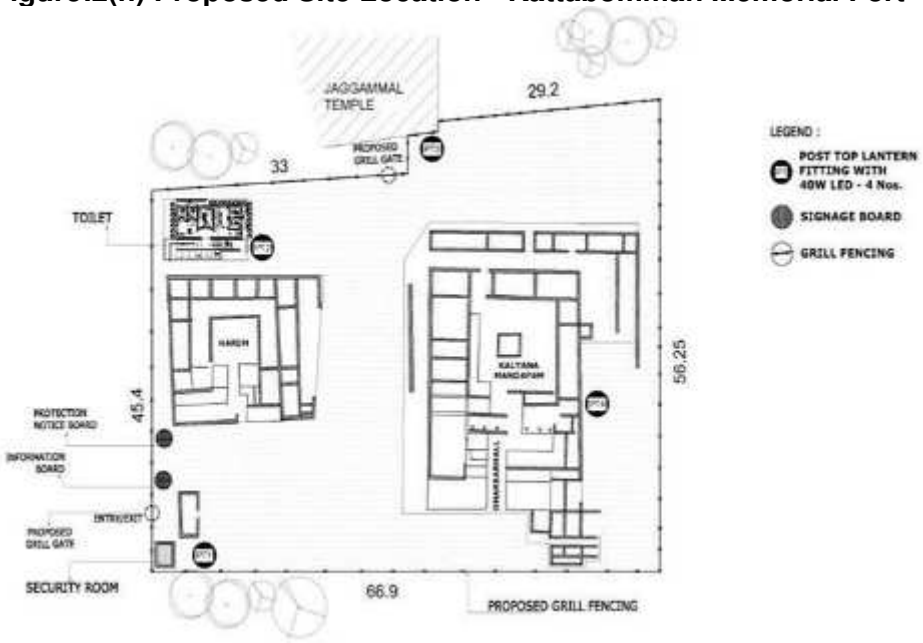


Figure:3(h) Proposed site plan for subproject components – Kattabomman Memorial Fort

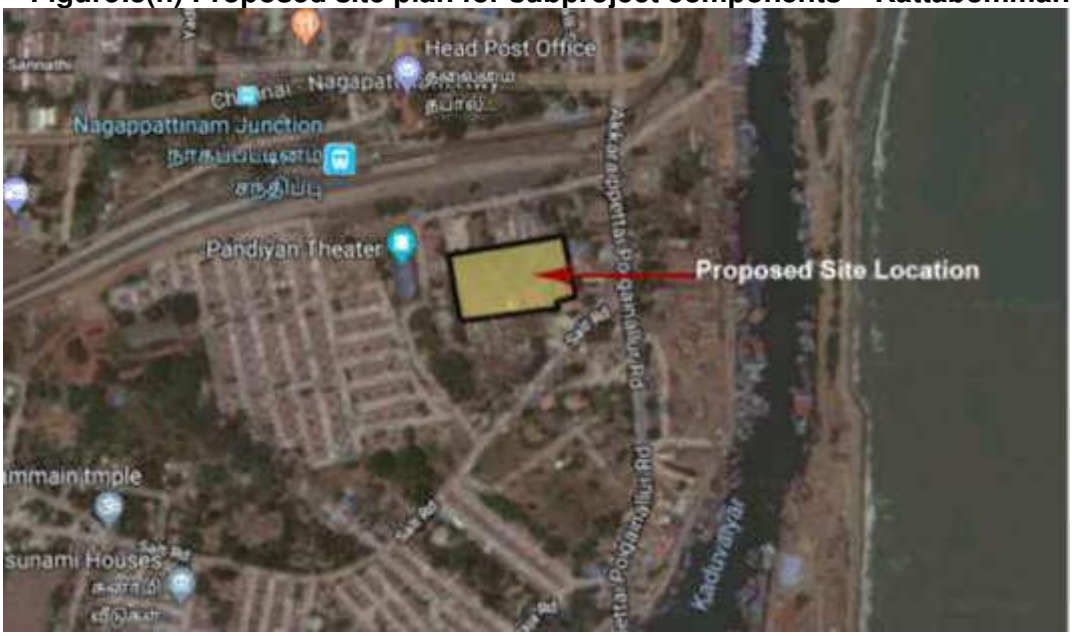


Figure:2(i) Proposed Site Location - Dutch Dome

Figure:3(i) Proposed site plan for subproject components – Dutch Dome

Figure:2(j) Proposed Site Location - Governer's House, Tharangambadi

Figure:3(j) Proposed site plan for subproject components – Governer's House, Tharangambadi

Figure:2(k) Proposed Site Location - Thellar village

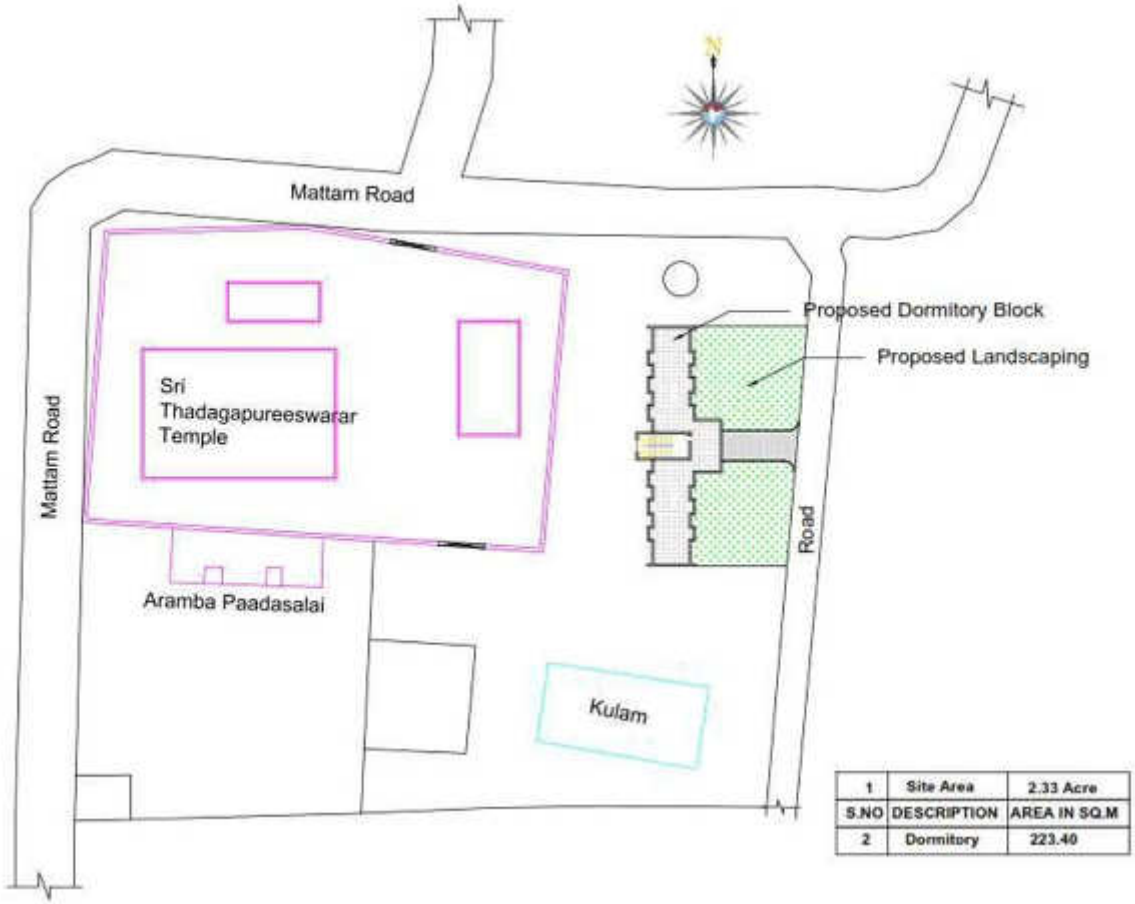


Figure:3(k) Proposed site plan for subproject components – Thellar village

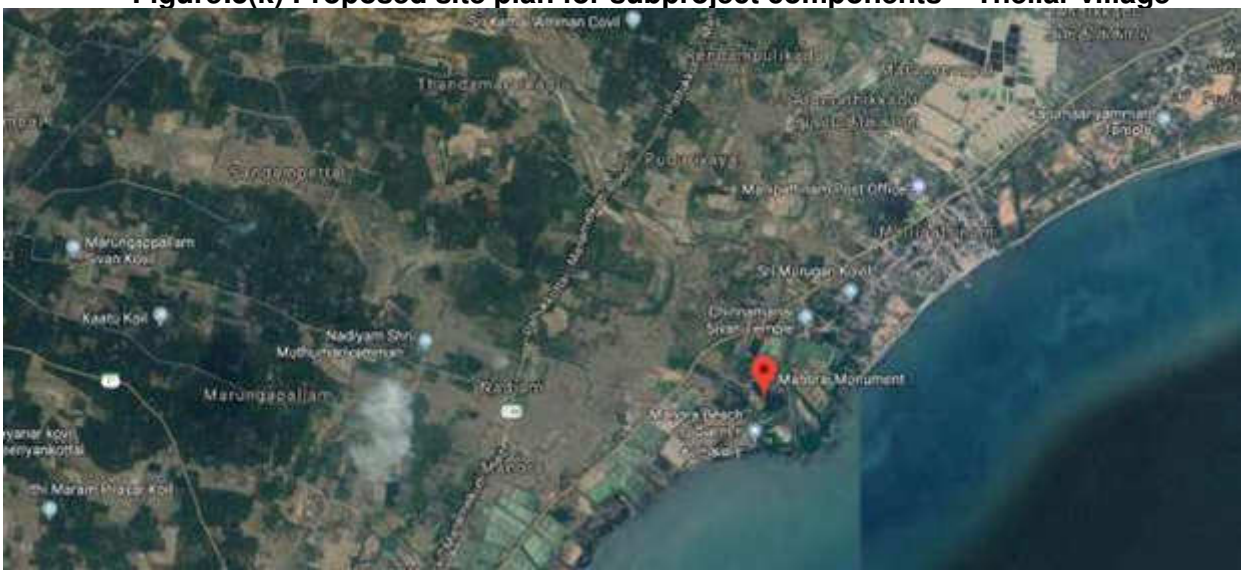


Figure:2(l) Proposed Site Location - Manora Fort

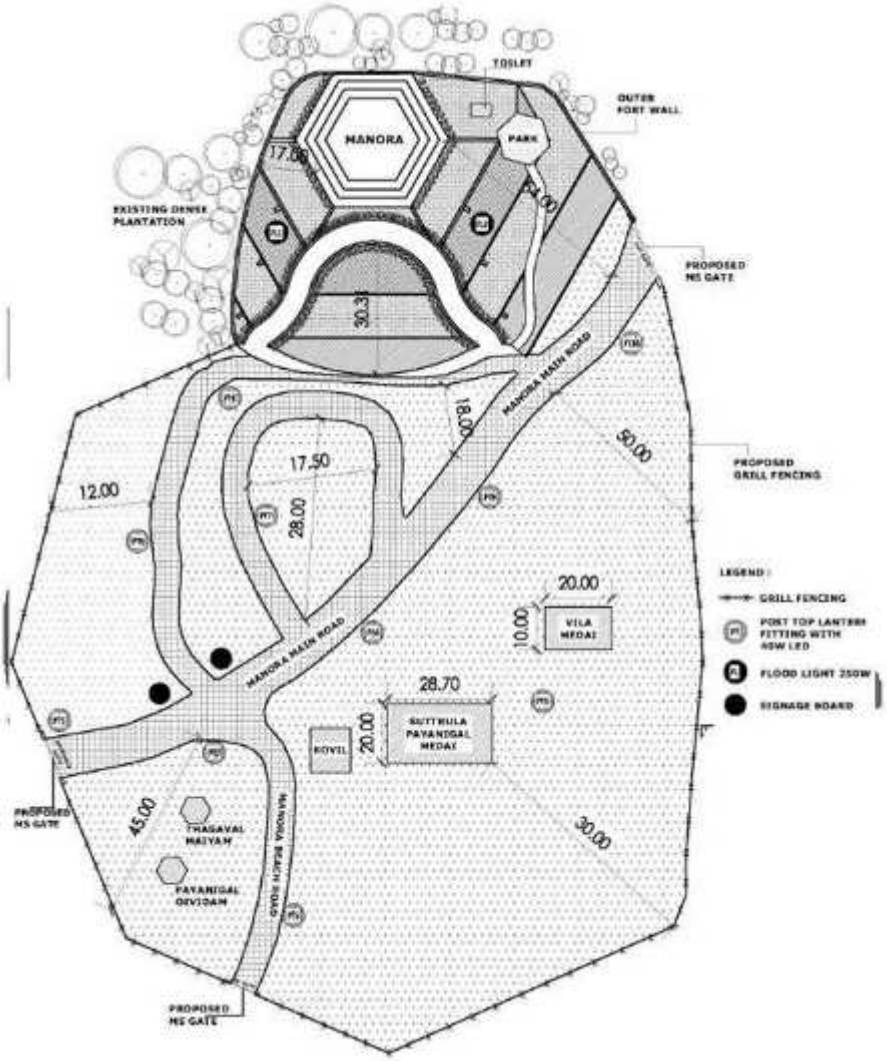
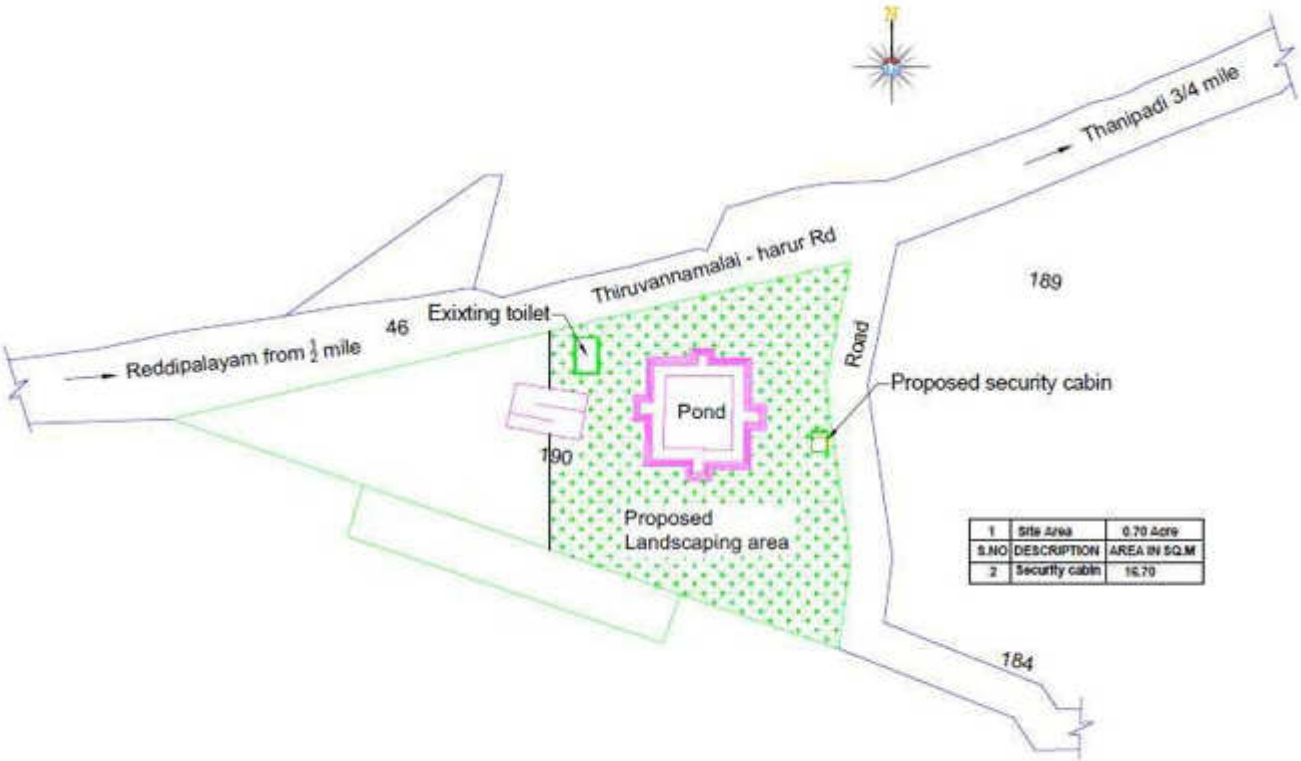


Figure:3(l) Proposed site plan for subproject components –Manora Fort

Figure:2(m) Proposed Site Location - Chinnayanpettai



B. Implementation Schedule

62. Preliminary design of the subproject has been done by the Project Management and Supervision Consultant (PMSC) team and will be finalized during detailed design stage. It is estimated that construction period will cover 18 months.

63. The final detailed implementation schedule will be provided in the updated IEE once the detailed design phase is completed.

III. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

64. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, and loans involving financial intermediaries, and private sector loans.

65. **Screening and Categorization**. The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project, the sensitivity, scale, nature and magnitude of its potential impacts, and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impact and are assigned to one of the following four categories:

(i) **Category A**: A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required.

(ii) **Category B**: A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible and, in most cases, mitigation measures can be designed more readily than for category A projects. An initial environmental examination is required.

(iii) **Category C**: A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.

(iv) **Category FI**: A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary

66. **Environmental Management Plan** - An EMP which addresses the potential impacts and risks identified by the environmental assessment shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the Project's impact and risks.

67. **Public Disclosure** - The IEE will be put in an accessible place (e.g., local government offices, libraries, community cum tourist reception centers, etc.), and a summary translated into Hindi for the project affected people and other stakeholders shall also be disclosed. The following safeguard documents will be put up in ADB website so that the affected people, other stakeholders, and the general public can provide meaningful inputs into the project design and implementation:

(i) For environmental category A projects, a draft EIA report at least 120 days before Board consideration;

A comparison on noise level requirements between the WB EHS guidelines and the NAAQS under the Air (Prevention and Control of Pollution) Act, 1981 of GOI as given in table B shows that the required levels are equal for residential, institutional and educational areas. The NAAQS requirements for commercial areas are more stringent while the WB EHS requirement for daytime noise in industrial area is more stringent.

Table A3.1: Ambient Noise level standards of WB EHS Vs. the GOI NAAQS

Receptor	WB EHS		GOI NAAQS	
	Daytime	Nighttime	Daytime	Nighttime
	7:00-22:00	22:00-7:00	6:00-22.00	22:00-6:00
Residential	55	45	55	45
Institutional; educational			None	None
Industrial	70	70	75	70
Commercial			65	55
Silence Zone	None	None	50	40

B. National and State Laws

68. Implementation of the subproject will be governed by the national and State of Tamil Nadu environmental acts, rules, regulations, and standards. These regulations impose restrictions on activities to minimize/mitigate likely impacts on the environment. It is the responsibility of the project executing and implementing agencies to ensure subprojects are consistent with the legal framework, whether national, state or municipal/local. Compliance is required in all stages of the subproject including design, construction, and operation and maintenance.

69. The realm of environmental regulations and mandatory requirements for the proposed subproject is shown in Table 1. The EIA Notification (2006) by the Government of India Ministry of Environment, Forests and Climate Change(MOEFCC) specifies the mandatory environmental clearance requirements. Accordingly, all projects and activities are broadly categorized in to two categories1 - Category A and Category B, based on the spatial extent of potential impacts and potential impacts on human health and natural and man-made resources.

70. It may be noted that Prima facie applicable laws, notifications, policies etc. those may be relevant in the context of the implementation of the proposed sub-project activities are briefly presented below. During the course Initial Environmental Examination, the applicability of these laws, regulations, policies etc. has been verified and their applicability matrix has been presented below.

71. The IEE has been prepared considering the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act 2013 (Act 30 of 2013),

Government of India and ADB‘s Policies for Social and Environmental Safeguards. The

Department of Tourism and HR&CE will ensure compliance of legal and regulatory framework during the project cycle. Further, during project execution influx of workmen from other states is anticipated and considering the large number of workmen to be engaged in various activities, the applicable Acts those are binding on the contractor has been briefed below.

Table 1: Applicability of Acts and Rules

	Acts and Rules	Year	Compliance Criteria
1	Environment (Protection) Act	1986	This act is applicable all environmental Notifications, rules and schedules issued under this act.
2	Environment Impact Assessment Notification	2006	As per the Notification, Projects categorized as A and B need prior Environmental clearance from the Central and State Expert Appraisal Committee respectively. But, this Sub-project does not come under the purview of the above categories hence this Notification is not applicable.
3	Forest Conservation Act	1927 and 1980	This Act will be applicable in case the proposed project road is passing through the Forest Areas which requires the diversion of forest land to the non-forestry purposes. This is not applicable as there is no forest land involved fortheprojectdevelopment. Permission and clearance for cutting and transportation of trees will be required from Divisional Forest Officers, which is not applicable for this sub-project.
4	Wild Life (Protection) Act	1972	This act will be applicable in case the project road traverses through wildlife protected areas for which permission will be sought from National Board for wildlife. This is not applicable as there is no wildlife protected area is involved for the project development.
5	Coastal Regulation Zone (CRZ) Notification	1991 and 2011	Under the Environment Protection Act, 1986 a notification was issued in February 1991, for regulation of activities in the coastal area by the Ministry of Environment and Forests (MoEF). As per the notification, the coastal land up to 500m from the High Tide Line (HTL) and a stage of 100m along banks of creeks, estuaries, backwater and rivers subject to tidal fluctuations, is called the CRZ. Government of Tamil Nadu have prepared Coastal Zone Management Plan Maps for its entire coastal stretches of Tamil Nadu on the basis of CRZ Notification 1991. The activities in CRZ areas have been regulated based on the above approved Coastal Zone Management Plan maps till date. CRZ-III-Areas that are relatively undisturbed and those do not belong to either CRZ-I or II which include coastal zone in the rural areas (developed and undeveloped) and also areas within municipal limits or in other legally designated urban areas, which are not substantially built-up. The subproject is located in the bank of backwater categorized us CRZ-III area. Regulations: a) The area up to 200m from the HTL is be

	Acts and Rules	Year	Compliance Criteria
			earmarked as 'No Development Zone'. No construction shall be permitted in this zone
			except for repairs of existing authorized structures not exceeding existing FSI, existing plinth area and existing density. However, the following uses may be permissible in this zone- agriculture, horticulture, gardens, pastures, parks, play fields, forestry and salt manufacture from sea water. b) Development of vacant plots between 200 and 500m of High Tide Line in designated areas of CRZ-III with prior approval of Ministry of Environment and forests permitted for construction of hotels/beach resorts for temporary occupation of tourists / visitors. c) Construction/ reconstruction of dwelling units between 200m and 500m of the High Tidal Line permitted so long as it is within the ambit of traditional rights and customary uses such as existing fishing villages and gothans. Building permission for such Construction/reconstruction will be subject to the conditions that the total member of dwelling unit shall not be more than twice the number of existing units; total area covered on all floors shall not exceed 9 meters and construction shall not be more than 2 floors (ground floor plus one floor). d) Reconstruction/alteration of an existing authorized building permitted subject to (1) to (3) above. The subproject involves repairing and maintenance of the existing Jetty and enhancing the site by placing lighting, furniture, toilet facility etc. for the convenience of tourists and does not involve any new developments. Hence, does not come under the purview of CRZ regulations.
6	Water (Prevention and Control of Pollution) Act	1974	The Sub-projects require consent to establish from the State Pollution Control Board if it involves discharge waste water from labor camps which is applicable during construction phase of the project. But, it is being ensured that no discharges will be there to any inland water bodies or sea/ocean, hence this Act will not be applicable. Moreover, the excreta from the toilets will be collected in sewer line wherever possible for remaining places septic tanks/soak pits were used ensuring no discharges to water bodies.
7	Air (Prevention and Control of Pollution) Act	1981	The project requires consent to establish from the State Pollution Control Board if it involves operation and Diesel Generator Sets. This act will be applicable to the project during construction phase of projects as use of DG sets is being envisaged.
	Acts and Rules	**Year**	**Compliance Criteria**

8	Noise Pollution Regulation and Control Act	1990	The project requires consent to establish from the State Pollution Control Board if the noise level from the construction machinery and the
			vehicles are above the standards. This act will apply to the project especially during the construction phase if such machineries will be used which is unlikely.
9	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act 2013 (Act 30 of 2013), GoI	2013	This act will be applicable in case land is being acquired for the project road.This act will not be applicable as no land acquisition is required for the project development. The project is being developed on existing HR&CE owned land.
10	Ancient Monuments and Archaeological Sites and Remains Act	1958	This act is applicable is case of any chance finds during construction phase of the project which may be remains/ monuments which are deemed to be protected by ASI or the State Directorate of Archaeology. This act will not be applicable as no archaeological sites are affected because of the project development. However, provision has been made so that chance found ancient properties are protected.
11	The Hazardous Wastes (Management, Handling andTran boundary movement) Rules	1989 2003 2008	These rules will be applicable if contractors during construction phase will store and handle hazardous material such HSD and paints etc. But, the EMP spells out that all such materials will be procured from licensed depots and consumed immediately so storage is ruled out
12	The Explosives Act (and Rules)	1884	This Act specifies regulations regarding the use of explosives and precautionary measures while blasting and quarrying. Provisions of these rules are not applicable to this project as materials will be procured from 3 rd party licensed holders.

[a] All projects or activities included as Category A in the Schedule, including expansion and modernization of existing projects or activities and change in product mix, will require prior environmental clearance from the Central Government in the Ministry of Environment and Forests, Climate Change (MOEFCC) on the recommendations of an Expert Appraisal Committee (EAC) to be constituted by the Central Government for the purposes of this Notification. All projects or activities included as Category B in the Schedule, including expansion and modernization of existing projects or activities as specified in sub paragraph (ii) of paragraph 2, or change in product mix as specified in sub paragraph (iii) of paragraph 2, but excluding those which fulfil the General Conditions (GC) stipulated in the Schedule, will require prior environmental clearance from the State/Union territory Environment Impact Assessment Authority (SEIAA). The SEIAA will base its decision on the recommendations of a State or Union territory level Expert Appraisal Committee (SEAC) as to be constituted for in this Notification. In addition, GC of the Notification specifies that any project or activity specified in Category B will be treated as Category A, if located in whole or in part within 10 km from the boundary of (i) protected Areas notified under the Wild Life Protection) Act, 1972, (ii) critically polluted areas as notified by the Central Pollution Control Board from time to time, (iii) notified eco-sensitive areas, and (iv) inter-State boundaries and international boundaries.

72. Further, during project execution influx of workmen from other states is anticipated and considering the large number of workmen to be engaged in various activities, the applicable Acts that are binding on the contractor have been enumerated in Table 1.

73. Further, for sand, soil and stone quarrying, prior permission is to be obtained from the state authorities for the purpose. However, considering the project profile, it is preferred to procure materials from the licensed third-party owners.

74. However, considering the kind and quantum of activities, it is envisaged that no borrow areas and quarry sites will be established as a part of activity / sub project. Raw materials will be procured from licensed quarry owners. Similarly, no crusher sites will be opened by the contractor. Also, no borrow area shall be made available by the Employer for this work. The arrangement for the source of supply of the material for the civil works shall be the sole responsibility of the Contractor.

75. The contractor need to use diesel generator sets for which the permission will be required under Air Act 1981.

76. No fuel storage is envisaged in this project and for construction purposes, the fuel shall be procured from the existing fuel outlets.

77. For labor accommodation, no labor camp will be established and for accommodation of labors nearby construction sites rented houses will be engaged by the contractor.

78. Considering the workforce to be mobilized during construction phase, the Contractor is expected to acquaint with all the latest applicable/binding Acts as listed in Appendix 2.

79. The table above indicates that the proposed subproject does not need to go through a full scale environmental assessment process; as the scale of impacts and categorization of the subproject components will not require consent/clearances from competent authorities. Therefore, any further approvals or clearances from the Government of India or GoTN are not envisaged. The ADB guidelines stipulate addressing environmental concerns, if any, of a proposed activity in the initial stages of project preparation. For this, the ADB guidelines categorizes the proposed components into categories (A, B, or C) to determine the level of environmental assessment required to address the potential impacts. The subproject has been categorized as B. Accordingly, this IEE has been prepared to address the potential impacts, in line with the recommended IEE content and structure for Category B projects.

IV. DESCRIPTION OF THE EXISTING ENVIRONMENT

Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at Thyagadurgam Fort, Villupuram District:

A. Physical Environment

80. Thiyagadurgam is a panchayat town near to Kallakurichi and 23 Kms from Ulundurpet in Villupuram district. At the centre of the town a small range of mountain called as Thyagadurgam range. Moreover, it is in small range but it has more rocks. At the moderate height and beneath of a huge rock a natural cavern with canopied by another rock.

1. Climate

81. The area falls under tropical climate with temperature in the summer months of March to May. The average temperature varies from 26 to 410 C. The humidity is also high in the order of 80%. The wind speed is high during the months of July and August. The wind speed ranges from 7.4 to 12.6 km/hr, which increases from 100 to 120 km/hr during cyclone period.

2. Geographical features

82. Thiyagadurgam town is geographically located at 120 13‘ north latitude and at 730 37‘ east longitudes. It is 6.24 meters above the sea level.

3. Accessibility

83. The nearest airport to Thyagadurgam is Civil Airport (TRZ) at Tiruchirappalli, Tamil Nadu, which is 158 km away from Thyagadurgam\ VIllupuram Railway Junction is about 32 km from Thyagadurgam. There are frequent bus services to and from Chennai, Cuddalore, Pondicherry, Tiruchirappalli, Vellankanni, and Nagapttinam.

4. Geomorphology

84. The residual hills and denudation hills are common in Tirukoilur, Kallakurichi and Gingee taluks. Structural hills are noticed in the western part of the district. The shallow pediments and buried pediments are common in the central part of the district. Coastal areas are having older and younger flood plains and also beach landforms at places. The ground slope is gentle towards coast. The valley fill near Villupuram is thick, which forms main ground water discharge zone. Lineaments are restricted to parts of Kallakurichi and Sankarapuram areas and productive fractures are noticed in select pockets. The crystalline sedimentary contact fault is having sympathetic fractures in hard rocks but mostly they are dry fractures.

5. Soil

85. The soils in the district are mostly forest soils and red soil. Alluvial soils are found in eastern side bordering coast. Black soils are confined to low ground in select pockets in

6. Hydrogeology

86. Villupuram district is underlain by crystalline metamorphic complex in the western part of the district and sedimentary tract in eastern side (Plate-II). The thickness of sediments exceeds 600m near southern part of the district. Groundwater occurs under phreatic and semi–confined conditions in consolidated formations, which comprises weathered and fractured granites, gneisses and charnockites whereas in unconsolidated sedimentary rocks the groundwater occurs in phreatic, semi-confined conditions in Vanur sandstone, Kadapperi kuppam formation and Turuvai limestone.

7. Groundwater quality

87. Ground water in phreatic aquifers in Villupuram district is, in general, colorless, odorless and slightly alkaline in nature. The specific electrical conductance of ground water in phreatic zone (µS/cm at 250 C) during May 2006 was in the range of 770 to 3650 in the district. Conductance below 750 has been observed only in select pockets of the district.

88. It is observed that the ground water is suitable for drinking and domestic uses in respect of all the constituents except total hardness and nitrate. In about 40% of samples, nitrate concentration is above permissible limits of 100 mg/l. The incidence of high total hardness is attributed to the composition of litho units constituting the aquifers in the district, whereas nitrate pollution is most likely due to use of fertilizers and other improper waste disposal.

8. Natural Disaster / Hazard

89. According to GSHAP data, the state of Tamil Nadu falls mostly in a region of low seismic hazard with the exception of western border areas that lie in a low to moderate hazard zone. Puducherry lies in a low hazard region. As per the 2002 Bureau of Indian Standards (BIS) map, Tamil Nadu and Puducherry fall in Zones II and III. Historically, parts of this region have experienced seismic activity in the M5.0 range.

9. Ambient Air and Noise Quality

90. The air environment of the subproject areas is generally found to be good and is free from industrial pollution. The ambient air quality in Thyagadurgam, Villupuram District is perceived to be within acceptable standards. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period. Impacts on air quality (if any) during construction stage are due to operation of various construction equipment and transport vehicles. Consequently, although emissions of common air contaminants (CAC) and fugitive dust may be elevated in proximity to the active work sites, this impact will be of short-term and localized to the immediate vicinity of the project site.

91. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land filling of residual wastes). Given the subproject‘s relatively minor contribution to CAC and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible during construction.

92. Most of the subproject area is in a quiet environment. Noise intensive industrial operations are not observed in the project influence area. Present ambient noise levels, both in the day and night time, are perceived to be well within permissible levels. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period.

93. Noise levels in the immediate proximity of most work sites are expected to increase during construction. The duration of this exposure will be relatively brief. This exposure represents temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the subproject operations will be largely imperceptible as civil works will be confined in relatively small sites within the district proper.

94. Since the subproject will be built in existing infrastructure, it will not conflict with existing or planned land use. However, traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads, sidewalk closures, traffic delays and detours, parking modifications, and increased volumes of construction–related traffic. There should be improved traffic movement along the access routes once construction is completed. During operations of the improved infrastructure and services, added residential developments, commercial and business facilities and increased densities are expected to develop and enhance the subproject area. This can be considered a long-term cumulative benefit of the subproject. (Refer Environmental Management plan for Subproject Specific impacts and their mitigation measures).

95. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and CAC emissions will occur in proximity to subproject work sites during construction, due to their short term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The subproject operations will benefit the general public by contributing to the long-term improvement of tourism in Tamil Nadu and livelihood opportunities to the local people.

B. Socio-economic and Cultural Environment

1. Trade and Commerce

96. Presently, the economy is solely dependent on tourism business and competition from other towns and other states has altered the potentials of the town leading to reduced growth rates and inflow of floating population.

2. Administration

97. Viluppuram (also Villupuram and Vizhupuram) is one of the thirty two districts which make up Tamil Nadu state situated on the southern tip of India. The district headquarters is located at Viluppuram. Viluppuram district came into existence on 30 September 1993 when it was created out of South Arcot district. Viluppuram is the largest district in the state. The district lies in the middle of the Tiruchirapalli to Chennai National Highways No. 45. It is well connected by the rail road and it is major junction. From here one can go to any corner of the Tamil Nadu as well as to other part of India. This district is having variety of tourist spots which are more than 500 years old. The district has temples, mosques and churches which are very old and famous. Villupuram which is located on the bank of thenpennai. It having all government offices in one complex. Gingee fort, aurovile, tirukoilur, malaikovil

98. At present Vilupuram district comprises 1490 Revenue Villages, 4 Revenue Divisions, 13 Administrative Taluks, 22 Blocks, 15 Town Panchayat Unions, 1099 Village Panchayats and 3 Municipalities.

99. Important places to visit in Villupuram:

(i) **Gingee Fort** (also known as Chenji, Chanchi, Jinji or Senchi) in Tamil Nadu, India is one of the surviving forts in Tamil Nadu, India. It lies in Villupuram District, 160 kilometres (99 mi) from the state capital, Chennai, and is close to the Union Territory of Puducherry. The fort is so fortified, that Shivaji, the Maratha king, ranked it as the "most impregnable fortress in India" and it was called the "Troy of the East" by the British. The nearest town with a railway station is Tindivanam and the nearest airport is Chennai (Madras), located 150 kilometres (93 mi) away

(ii) **Auroville** is an experimental community in southern India. It was founded in 1968 by the spiritual leader Mirra Alfassa as a town where people from all over the world could live in harmony. Its focal point is the Matrimandir, a futuristic, spherical temple covered in gold discs. Auroville Botanical Gardens protects the region‘s tropical dry evergreen forest. Auroville Beach is a long sandy stretch with gentle surf.

3. Area Population

100. As per Census 2011, Thiyagadurgam's population is 18,764.

3. Languages

101. In addition to the Tamil language, English, Urdu are also spoken by the local People. Due to its proximity to the neighboring states and it being a popular tourist spot, English, Kannada and Malayalam are also spoken and understood to an extent.

4. Sanitation and Sewage Disposal

102. The current sewerage system for disposal of sullage is through septic tanks and public conveniences. The same shall be maintained for this site.

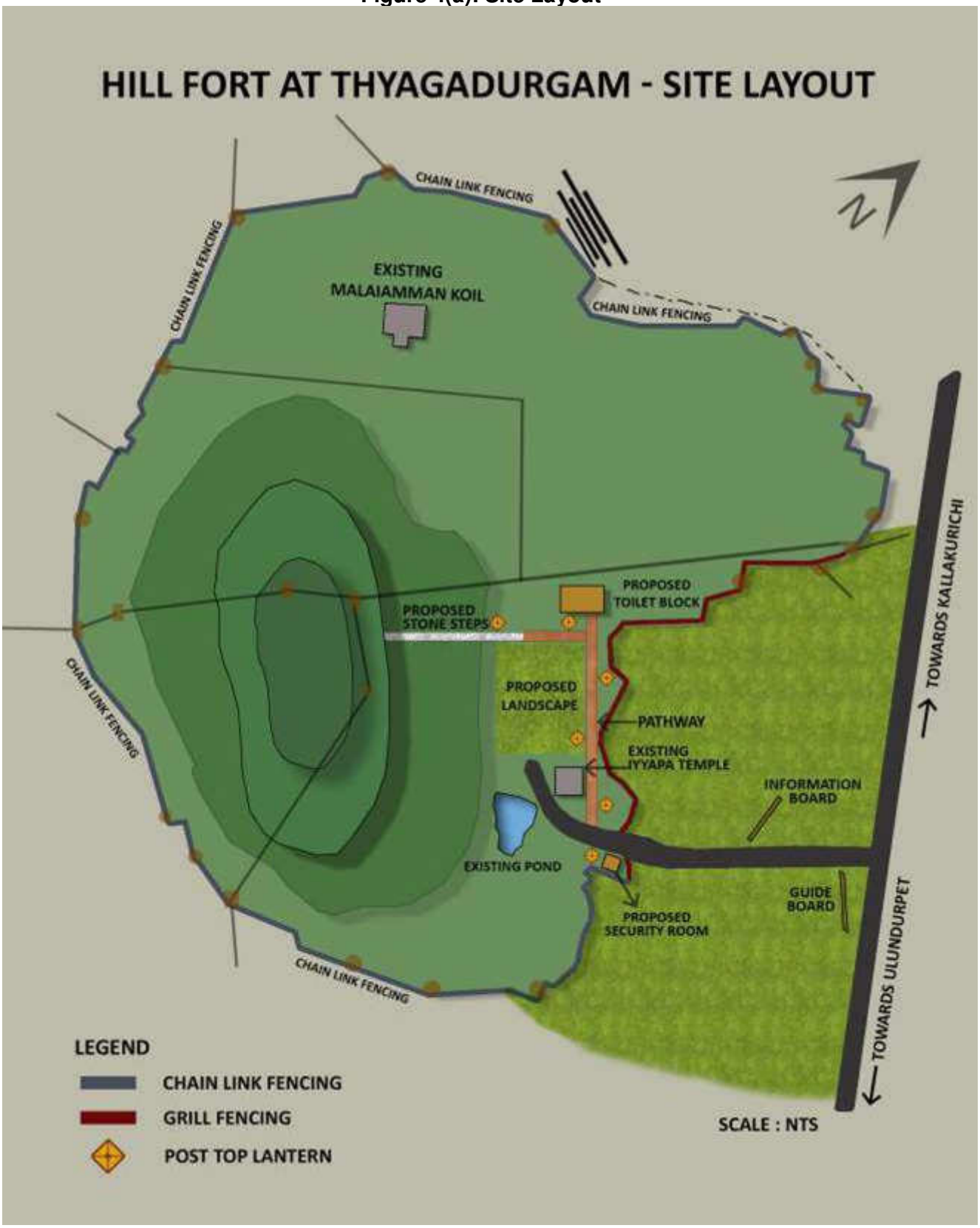
5. Solid Waste Management

103. Municipal solid waste consists of household waste, construction and demolition debris, sanitation residue, and waste from streets. This garbage is generated mainly from residential and commercial complexes. In Tamil Nadu due to urbanization and change in lifestyle and food habits, the amount of municipal solid waste has been increasing rapidly and its composition changing.

6. Site Details

104. The site is free from encumbrances and is freely available with the Government of Tamil Nadu. Further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with the present manager of the site. The site details are given in the Table 2(a) below along with the proposed site layout in Figure 4(a).

Figure 4(a): Site Layout



(b) Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at Udhayagiri Fort, Kanyakumari District:

A. Physical Environment

117. Udayagiri fort is a beautiful blend of few elevated patches of red cliffs with valleys andplains between the mountainous terrain and the sea – coast. Closely interwoven with The Udaygiri fort situated in the Kanyakumari district lies at a distance of 14 km from the town of Nagercoil.

118. Udayagiri Fort which of late has a biodiversity park set up inside it. In the border roads of tamil nadu, the terrain is much similar to Kerala, apart from the fact that the plainlands are much more with some hills at a distance. have to take a deviation Eastward after 3 kms from Thuckalay.

1. Climate

119. Average temperature of Kanyakumari varies from 20 °C to 36 °C and it receive an annually rainfall of 120 cm (approx). According to the census report bright weather. Rainfall varies from 103 cm to. 310 cm, and elevation from sea level to 1829 m above sea level (Figure 1). Gneissic rocks are predominant in this region. The soil is red, varying in the quantity of ferruginous element. Biodiversity of Udayagiri Fort

120. The District has a favorable agro-climatic condition, which is suitable for growing a number of crops. The proximity of equator, its topography and other climate factors favour the growth of various crops.The paddy varieties grown in the second crop season in Thovalai and Agasteeswaram taluks are grown during the first crop season in Kalkulam and Vilavancode taluks. This shows that there is distinct variation in the climatic conditions prevailing within the district. Unlike other district in Tamil Nadu, it has a rainfall both during the South West and the North East monsoons. The South West monsoon period starts from the month of June and ends in September, While the North East monsoon period starts from October and ends in the middle of December.

2. Geographical features

121. Kanyakumari is the Southernmost district of Tamil Nadu. The district lies between 77o 15' and 77o 36' of the Eastern Longitudes and 8o 03' and 8o 35' of the Northern Latitudes. The district is bound by Tirunelveli district on the North and the East. The South eastern boundary is the Gulf of Mannar. On the South and the South West, the boundaries are the Indian Ocean and the Arabian sea. On the west and North West it is bound by Kerala. With an area of 1672 sq.km it occupies 1.29% of the total area of Tamil Nadu. It ranks first in literacy among the districts in Tamil Nadu.

3. Accessibility

122. At a distance of 1 km from Kanyakumari Bus Station & 1 km from Kanyakumari Railway Station, the nearest airport of Kanyakumari is Thiruvananthapuram. This airport is located at a distance of 93 km from Kanyakumari. This airport is well connected with other major cities of India.

4. Geomorphology

123. Udayagiri fort is a beautiful blend of few elevated patches of red cliffs with valleys and plains between the mountainous terrain and the sea – coast. Elevation from sea level is 1,829 m. The forest area is 30.2 % of total ... relief goes over to 15 m above MSL. This stretch comprises of Udayagiri fort.

124. The prominent geomorphic units Udayagiri fort is a beautiful blend of few elevated patches of red cliffs with valleys and plains between the mountainous terrain and the sea – coast. Elevation from sea level is 1,829 m.

125. Major part of the district Udayagiri Fort, built by King Marthanda Varma, has a foundry for casting guns. It is also the tomb-site of the king's trusted European general Captain De Lennoy. Udayagiri Fort is now a bio-diversity park, administered by the Department of Forests, Kanyakumari Division.

5. Soil

126. The Red soil, Brown soil and Alluvial soil. The mixed soil type of red and alluvial soil also occurs in Kanyakumari district. The soils are mostly sandy and sandy barns in nature. Clay mixed loamy soil is also prevalent.

6. Hydrogeology

127. Kanyakumari Beach has rocky shores and the sea is rough due to the confluence of the three waters – Arabian Sea, Bay of Bengal and Indian Ocean.

7. Groundwater quality

128. The major river in the district is Tamiraparani river locally known as Kuzhithuraiar. This river has two major tributaries with the Pechiparai dam and Perunchani dam respectively built across them, Kodayar and Paralayar. There are many tributaries for the Kodayar river of which Chittar river I and Chittar II, with their dams are the major ones. The origin of Thamirabarani River is in the Western ghats and the river confluences with Arabian Sea near Thengapattanam, about 56 km west of Kanyakumari town. Valliar, another small river and its tributary Thoovalar, originate from the Vellimalai hills, collect the drainage from P.P. channel and its branches, ayacuts (irrigated area under a tank) and confluence with the Arabian sea near Manavalakurichi. The Pazhayar river, another small river, starts at Shorlacode, a place about 18 km north-west of Nagercoil. This is mainly a drainage river, mostly collecting the drainage of Thovalai, Ananthanar and N.P. Channels.

129. The Pahrali river also flows through the district. The Mathur hanging trough, the highest and longest aqueduct in Asia, was built over it near Mathur.

8. Natural Disaster / Hazard

130. Earth Quake and Tidal Waves hits Southern part of India with major divastation in Kanyakumari, Tamil Nadu. ... Tsunami Affected Areas in Kanniyakumari ... Pachipara, Kulasegaram, Thiruvattar, Kuzhitturai, Kollencode, Padmanabhapuram, Bhutapandi, Takkalai, Aralvaymaoli, Udayagiri, Taingapapatam, Eraniel. Cyclone Ockhi has crippled the entire power infrastructure of the Kanyakumari district of Tamil Nadu. Estimates say 4,000 power lines have been affected including 1,500 high tension lines leaving the district largely powerless.

9. Ambient Air and Noise Quality

131. Kanyakumari Located at the tip of the country and surrounded by the sea on three sides, Kanyakumari enjoys a tropical coastal climate. Due to its close proximity to the water bodies all around it, the place does not experience much variation in the climate. The temperatures remain fairly same throughout the year

132. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land filling of residual wastes). Given the subproject's relatively minor contribution to CAC and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible during construction.

133. Most of the subproject area is in a quiet environment. Noise intensive industrial operations are not observed in the project influence area. Present ambient noise levels, both in the day and night time, are perceived to be well within permissible levels. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period.

134. Noise levels in the immediate proximity of most work sites are expected to increase during construction. The duration of this exposure will be relatively brief. This exposure represents temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the subproject operations will be largely imperceptible as civil works will be confined in relatively small sites within the district proper.

135. Since the subproject will be built in existing infrastructure, it will not conflict with existing or planned land use. However, traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads, sidewalk closures, traffic delays and detours, parking modifications, and increased volumes of construction–related traffic. There should be improved traffic movement along the access routes once construction is completed. During operations of the improved infrastructure and services, added residential developments, commercial and business facilities and increased densities are expected to develop and enhance the subproject area. This can be considered a long-term cumulative benefit of the subproject. (Refer Environmental Management plan for Subproject Specific impacts and their mitigation measures).

136. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and CAC emissions will occur in proximity to subproject work sites during construction, due to their short term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The subproject operations will benefit the general public by contributing to the long-term improvement of tourism in Tamil Nadu and livelihood opportunities to the local people.

B. Socio-economic and Cultural Environment

1. Trade and Commerce

137. Presently, the economy is solely dependent on tourism business and competition from other towns and other states has altered the potentials of the town leading to reduced growth rates and inflow of floating population.

2. Administration

138. Administration of Kanyakumari district consists of two revenue divisions; Nagercoil and Padmanabhapuram. Each of these divisions is headed by a revenue divisional officer. The Nagercoil revenue division comprises of two Taluks. One of the taluks is Agasteeswaram with its headquarters at Nagercoil and another one is Thovalai with its headquarters at Boothapandi. The

Padmanabhapuram revenue division contains two taluks; Kalkulam with its headquarters at Thuckalay and Vilavancode with its headquarters at Kuzhithurai. These taluks are administered by the Tahsildars.

139. After the carving of the Kanyakumari district out of the territories transferred to the then Madras State from the erstwhile Travancore-Cochin State in the year 1956, the administrative set up of the local bodies then in existence, were permitted to continue until the 31st of March 1962. The Tamil Nadu Panchayats Act 1958 was extended to the district of Kanyakumari with effect from the first of April 1962. There are nine Panchayat Unions which consist of fifty six Town Panchayats and ninety nine Village Panchayats. There are four municipalities in this district called Nagercoil, Padmanabhapuram, Colachel and Kuzhithurai.

140. The collector is the head of the district and is assisted by several revenue department officers in the general administration of the district. The officers who assist the Collector are District Revenue Officer at Nagercoil, Personal Assistant (Accounts) to the Collector, Nagercoil, Personal Assistant (General) to the Collector, Nagercoil, Revenue Divisional Officer, Padmanabhapuram, District Supply Officer, Nagercoil, Revenue Divisional Officer, Nagercoil, District Adi-Dravidar Welfare Officer, Nagercoil, District Backward Classes Welfare Officer, Nagercoil, Assistant Commissioner (Excise), Nagercoil, Assistant Commissioner (Agricultural Income-Tax) Grade-I, Nagercoil, Tahsildar (Vilavancode), Tahsildar (Kalkulam), Tahsildar (Agasteeswaram), Tahsildar (Thovalai), Taluk Supply Officers in each of the four taluks, Special Tahsildars (DRS) in each of the four Taluks, Divisional Excise Officer, Agasteeswaram and Divisional Excise Officer, Kalkulam.

141. The Collector of the Kanyakumari district of Tamil Nadu state receives petitions from the public on every Monday and all the District Officers and Second Level Officers attend the Monday Grievance day, as per the orders of the Government. The petitions received from the public are sent to the concerned department officers and most of the grievances are redressed on the day itself. The other petitions which are received for the grant of benefits under several welfare schemes are sent to the concerned officers for the necessary actions.

142. Important places to visit in Kanyakumari District:

(i) **Vivekananda rock memorial.** Vivekananda Rock Memorial is another place in Kanniyakumari which attracts large number of tourists. As its name implies, it is essentially a sacred monument, built by the Vivekananda Rock Memorial

(ii) Committee to commemorate the visit of Swamy Vivekananda to —Shripada Paraill during 24th, 25th and 26th December 1892 for deep meditation and enlightenment. From very ancient times, the rock has been regarded as sacred place. In Puranic tradition, it has been known as —Sripada Parai: meaning the rock, that has been blessed by the touch of Shripada feet of the Goddess. On the rock, is a projection similar in form to a human fort and a little brownish in complexion, which has traditionally, been revered as a symbol of Shripadam. According to legend, it was on this rock that Goddess Kanniyakumari did Tapas.

(iii) **Fountain at Kanniyakumari** Kanniyakumari district, which lies in the southern most tip of Peninsular India, is famous for its majestic hills, virgin beaches, pristine rivers and meandering rivulets.The district has a fragrance of architecture culture and customs of neighbouring Kerala mixed with the rich deep traditions, culture and architecture of Tamil Nadu. However, for want of promotional campaign and lack of basic amenities most of the tourists coming to this district return back after seeing just Kanniyakumari and Padmanabhapuram Palace. It was at this juncture that the district administration decided to take up tourism promotion initiatives in a major way. Attempt

has been made to put up basic amenities at the virgin beautiful spots so as to facilitate the inflow of the tourists.

(iv) **Mahatma Gandhi Memorial** The place has been associated with great men like Swami Vivekananda and Mahatma Gandhi in whose names memorials have been here. They are very beautiful and add to the attraction of this place. The beautiful Gandhi Memorial completed in 1956, is situated as a memorial to the Father of the Nation. An urn of Mahatma Gandhi was kept here for public to pay homage before immersion.Mahatma Gandhi visited Kanniyakumari twice in 1925 and 1937. Mahatma Gandhi visited Kanniyakumari in January 1937. In 1948 his ashes were immersed in the sea waters in Kanniyakumari. In commemoration of this event a beautiful monument has been constructed here. Its central shape is 79 feet high representing the age of the Mahatma at the time of the sun at Mid day on 2nd October would fall on the peedam through a hole in the roof. The memorial was transferred to the administrative control of the Public (Information and Public Relations) Department from Public Works Department of Government of Tamil Nadu in the year 1978.

(v) **Thiruvalluvar Statue** Thiruvalluvar is the immortal poet of Tamil Nadu and has given to the world Thirukkural. The memorial statue of Thiruvalluvar is in Kanniyakumari. The pedestal of the statue is of 38 feet height and the statue over it is 95 feet tall with a grand total of 133 feet for the entire sculpture. The 3 tier pedestal known as Atharapeedam is surrounded by an artistic Mandapa known as Alankara Mandapam with 38 feet height. Surrounding the Alankara Mandapa stand 10 elephant statues signifying 8 directions with earth and space down. The father of Sri. Rama, the hero of Ramayana was called Dasaratha as he was able to charioteer in ten directions. To help the tourists to worship the holy feet of Thiruvalluvar 140 steps are constructed inside the Mandapa. The pedestal with a height of 38 feet represents the 38 chapters in the Book of Aram in Thirukural and the statue of 95 feet on the pedestal represents the total chapters in Porul (70 chapters) and Inbam (25 Chapters). Thus the statue symbolically, and artistically signifies that the theme of Porul and Inbam are based on Aram.

(vi) **Kamarajar Manimandapam** Another monument Kamarajar Manimandapam was raised and dedicated to Late. Sri. Kamarajar, The freedom fighter, Former Chief minister of Tamil Nadu, President of Indian National Congress. He was popularly known as Black Gandhi among the masses and king maker during congress regime. This monument was constructed where his ashes were kept here for public to pay homage before immersion into the sea

(vii) **Sunrise and Sunset:** Sunrise can be seen in Kanniyakumari through out the year at Bay of Bengal. Sunset can be seen from View Tower through out the year except the months of June, July and August.

(viii) **View Tower and Telescope House** Panoramic view of landscape, seashore, Vivekananda Rock Memorial, Thiruvalluvar Statue etc., can be seen at View Tower and through Telescope.

(ix) **Guganathaswamy Temple** This is a 1000-year-old temple and is said to have been built by the King Raja Raja Chola. The architectural style of the Cholas is quiet apparent in this temple. It is located near Railway Station. There are 16 inscriptions found in this temple that date back to the years 1038 A.D., 1044 A.D., 1045 .A.D.

(x) **Suchindrum Suchindrum** is a small village about 12 km. from Kanniyakumari and about seven kilometres from Nagercoil. This holy place is located on the bank of the river Pazhayar, adjoining fertile fields and coconut groves and the temple is dedicated to Sri Sthanumalayan. The word denotes Siva, Vishnu and Brahma as. Sthanu represents Siva, Mal represents Vishnu while Ayan represents Brahma i.e. Siva, Vishnu and Brahma in —One Formll.Suchindrum means the place where Indra

attained ‗Suchi' i.e., purification. The Sthalapurana has it that Indra suffered a curse from sage Gowthama, when he stealthily cast amorous glances at Ahalya the wife of Gowthama. Not able to suffer the mortification brought about by the curse. Indra had to seek immediate redemption. He came to ‗Gnana Aranya' as this place was then called and offered worship to Lord Shiva. Relieving Indra of his curse, Lord Shiva granted him of his wish that the place where he attained purification should henceforth be called ‗Suchindrum'. Another story goes to say that the Trimurthys i.e. Brahma,

(xi) Vishnu and Shiva, cajoled by their divine consorts came down to the earth to test the chastity of Anusuya, wife of sage Athri at Gnana Aranya. The Gods for this misadventure had to suffer a surse form the Rishipatni and to undergo the purification process, before they could be restored to their former glory. It is said that Thanumalaya Swamy temple is the only shrine dedicated to the Trinity in India. The present structure of the temple is the work of a number of persons spread over a number of centuries. It is a complex of many beautiful structures constructed at various times and is one of the best specimens and a store house of the Dravidian style of art and architecture.

(xii) **Mathoor Hanging Bridge.** The Mathoor Hanging Trough is the tallest as well as the longest trough bridge in Asia,having a height of 115 feet and a length of one kilometre. Constructed in 1966, this bridge has become a place of tourist importance and hundreds of tourists visit this place. This is situated in Mathoor, hamlet of Aruvikkarai revenue village in Thiruvattar Panchayat Union.

(xiii) **St. Xavier Church.** St.Xavier an outstanding and dedicated priest visited the coastal areas of Tamil Nadu from Goa, he never missed the opportunity of visiting Kottar in Kanniyakumari district which was a celebrated commercial centre at that time. During his stay at Kottar, he used to worship St. Mary in the small temple. He was popularly known as —Valiya Pandaram‖ among the people of Kottar. While he was at Kottar, he averted the invasion of Padagas on the people of Venad which was appreciated by the king, who became closer to the Priest. In recognition of Xavier's services, the king allotted a land to him for the purpose of constructing a catholic church at Kottar.

(xiv) **Padmanabhapuram Palace.** The ancient historical town Padmanabhapuram is one of the four municipalities in the district is 55 Km. south of Trivandrum, about two km. east of Thuckalay and 35 km.from Kanniyakumari on the Trivandrum-Cape Comerin road. This town is surrounded by a fort with an area of 187 acres. The ancient capital of Travancore might be constructed before AD 1601. The palace with an area of seven acres, is situated in the very centre on the Padmanabhapuram Fort, amidst hills, dales and rivers. The palace which is situated in Kanniyakumari District is under the control of a Curator of the Archaeological Department of Kerala Government.

(xv) **Peer Mohammed Durha.** Peer Mohamed Oliyullah Durha' at Thuckalay named after the great philosopher Mohamed Appa, who was born in Tenkasi of Tirunelveli District. After spending sometime in spiritual pursuits in Peermedu of Kerala State he came and stayed at Thuckalay. Being a Tamil poet of great eminence, he wrote many books on philosophy. He had intimate relationship with the Kings of Chera dynasty. It is said that he laid foundation stone for the Padmanabhapuram Granite Fort.

(xvi) **Pechiparai Dam.** About 43 km. from Nagercoil this dam has been constructed. This dam in Kalkulam Taluk, was built during the days of the Maharaja Sri Moolam Thirunal across the river Kodayar. The construction of the dam was designed on the pattern of the Periyar dam in the Madurai district. The length of the dam is 425.1 mts. It has a catchment area of 204.8 sq.km. There is a camp shed provided at the dam side for the visitors. The weather is very pleasant and hence attracts a large number of tourists.

(xvii) **Tirparappu Water Falls.** The Kodayar makes its descend at Tirparappu and the water fall at this place is about 13km. from Pechiparai dam. The river bed is rocky and about 300 feet in length. The water falls from a height of nearly 50 feet and the water flows

for about seven months in a year. The whole bed above the falls is one rocky mass which extends up to a distance of about quarter of a kilometer upstream where the famous Thirparappu weir has been constructed for supplying water to the paddy fields. On either side of the river, on the left bank of the river in between the water falls and the weir, there is a temple dedicated to Siva enclosed by strong fortification. The District Administration has recently constructed a swimming pool for children over here which is very popular among the children.

(xviii) **Chitharal.** Chitharal is a small village situated at a distance of 7 Kms., from Marthandam and 45 Kms, from Kanniyakumari. It is famous for the Rock-cut temple. Hillock at Chitharal has a cave containing Rock-cut sculptures of Thirthankaras and attendent deities carved inside and outside dating back to 9th Century A.D. It was converted into Bagavathy Temple in the 13th Century A.D. Cars and Vans can go upto the foot of the hill. One has to walk for about 10 minutes to reach the temple. The Jain images have been preserved Central Archeological Survey of India

(xix) **Muttom Beach.** The famous beach at Muttom is located about 16 kms from Nagercoil and 32 kms from Kanniyakumari. Muttom is famous for its beautiful landscaping and high rocks dipping into the sea at the beach-side. The sun set view point at Muttom is one of the most Panoramic view points in the district. Another attraction of Muttom is the century old light-house built by the British. However so far this beautiful beach has always been unsafe for the tourists since the rocks on which tourists go to see the sea view are slippery and a number of fatal accidents have occurred over the past few years

(xx) **MUKKADAL.** This is a natural dam constructed by T. Chitirai Maharaja. If supplies water to Nagercoil Municipality and it is also proposed to get water from here for Suchindrum and Kanniyakumari. It is very picturesque spot and ideal for picnics by groups.

(xxi) **BAY WATCH (Water Theme Amusement Park), Kanniyakumari.** The water theme amusement park at sunset point offers a unique way to experience the exotic grandeur of Kanniyakumari in its integrals. Baywatch comes up with a wholesome family entertainment saga of rapturous experience, which leaves you at a point of nonstop excitement in a thrilling and bewitching water world.

3. Area Population

143. The people are the human resource of the District. Their culture, religion, aptitude, habits, beliefs, talents etc have a bearing on how the district presents itself to others. Tamil and Malayalam are the main languages of this district. Hindus and Christians form a sizeable percentage of the population of the district and there are a number of Muslims dominated belts in the district. The caste system in the Society has weakened to a great extent especially after independence because of growth of education and improvements in transport and communication. Some of the communities in the district are Nadars, Nanjil Nadu Vellalars, Paravas, Mukthavas, Vilakki Thalanayar, Kammalar or Asari, Nairs, Chackarevars, Kerala Mudalis etc. Rice is the staple food of the rich and poor alike in the district. Some among the poorer section also use tapioca. Beverages like tea and coffee are widely spread even in to the rural area of the district.

4. Languages

144. The Official language of Kanyakumari is Tamil. Since it lies on the border with Kerala, Malayalam is also spoken by the residents of the city. Due to tourism in the city, English and Hindi, the national language of India, are also understood in the city.

5. Sanitation and Sewage Disposal

145. Nagercoil is a special grade Municipality. The Area of the town is 49.10 Sq.Km. Population of Nagercoil Municipality as per 2001 Census is 208149. To provide UGSS to
Nagercoil Municipality, Administrative approval was accorded vide G.O.M.S. No. 37/MAWS(MA3) Dept./dt. 30-3-2012 for Rs.7604.00 lakhs to install and Rs.190.00 lakhs to maintain annually.

146. Nagercoil Municipality consists of 52 wards. At present 35 wards are covered as Phase I, of which 18 wards are covered fully and 17 wards covered partially. The Scheme is designed for the base year (2015) population of 127977 with an intermediate and Ultimate year of 2030 and 2045 with population as 153571 and 181399 respectively.

147. The Sewage Contribution is adopted as 115 lpcd. The Sewage generated is 17.66 mld and 20.86 mld respectively for intermediate and ultimate stages.

148. The town is divided in to 9 Zones based on the topography of the area. It is proposed to implement sewage scheme to the zone II which is the core area of the Municipality. The Sewage is to be Collected from all the streets by sewer lines of pipes ranging from 150 mm to mm (SW/RCC) to a total length of 118866 m with 4794 no. of Manholes, and 1 no. of pumping station.

149. The Sewage is to be collected at Sewage Treatment Plant (EASP technology) located at Valampurivilai in SF No. M7/9-2.. The Sewage Treatment Plant is designed for the Intermediate stage i.e 17.66 mld. Total No. of HSC to be given is 21974. The date of commencement of work is 23-01-2013 and the work is in progress. The expected date of completion is 1/2015.

6. Solid Waste Management

150. The Sewage Contribution is adopted as 115 lpcd. The Sewage generated is 17.66 mld and 20.86 mld respectively for intermediate and ultimate stages.

151. The town is divided in to 9 Zones based on the topography of the area . It is proposed to implement sewage scheme to the zone II which is the core area of the Municipality. The Sewage is to be Collected from all the streets by sewer lines of pipes ranging from 150 mm to
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7. Site Details

153. The site is free from encumbrances and is freely available with the Government of Tamil Nadu. Further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with the present manager of the Site. The site details are given in the Table 2(b) below along with the proposed site layout in Figure 4(b).

Table 3(b): Site Details

	Description	**Yes / No**
1	Protected area	No
2	Archaeological site	No
3	Forest area	No
4	CRZ area	No

Notes: Protected Area includes wildlife sanctuary, bird sanctuary, or national park; CRZ=Coastal Regulation Zone

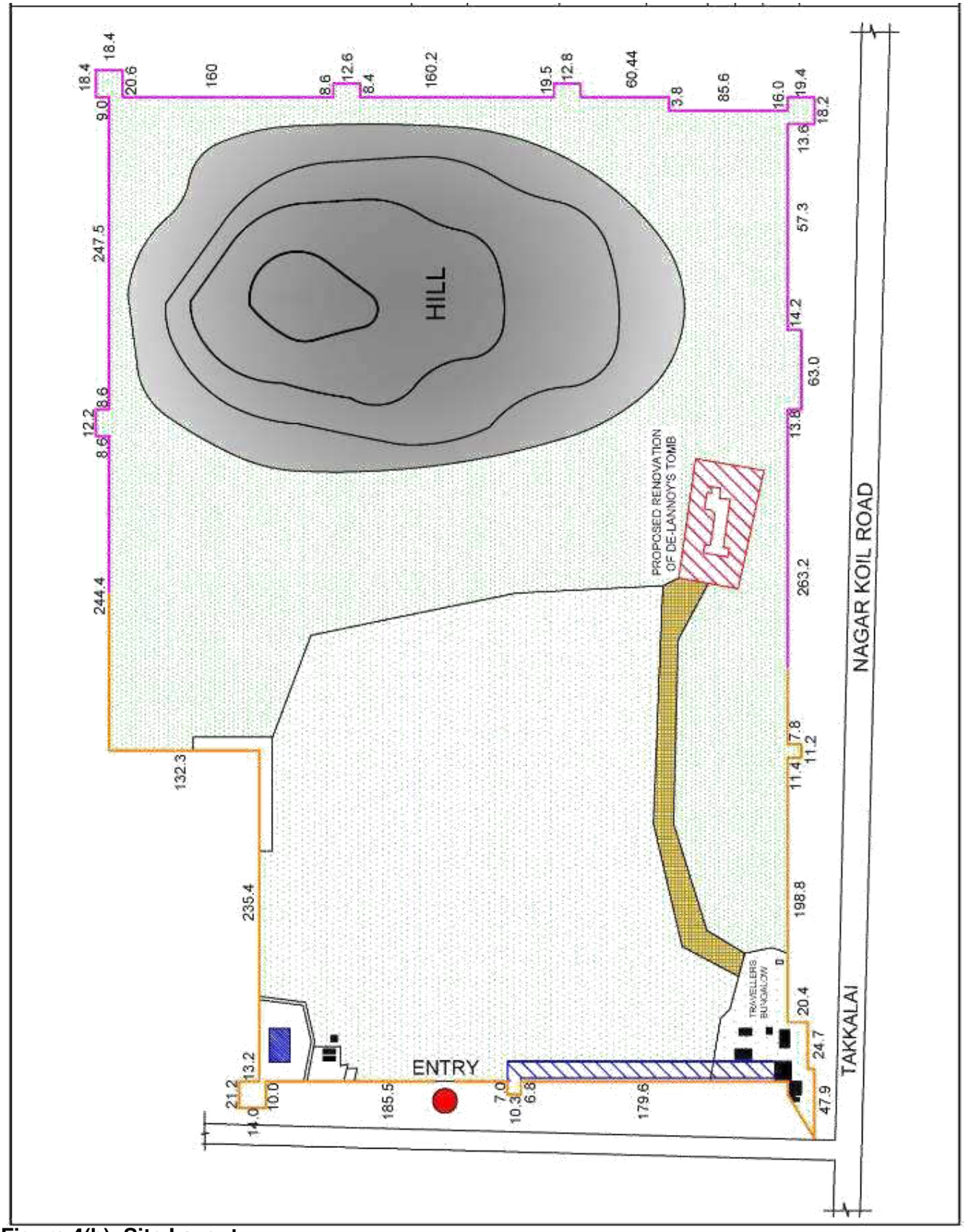


Figure 4(b): Site Layout

(c) Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at Thirumalai Naicker Mahal, Madurai District:

A. Physical Environment

154. The structure was constructed using foliated brickwork and the surface details and finish in exquisite stucco called chunnam using chunnam (shell lime) and (Mixed with egg white) to obtain a smooth and glossy texture. The steps leading up to the hall were formerly flanked by two equestrian statues of excellent workmanship.

155. The pillars supporting the arches are 13m tall and are again joined by foliated brickwork that carries a valance and an entablature rising up to a height of 20 m. The decoration is done, (shell lime). The pavilions topped with finials that were covered with gold are on either side of the courtyard.

1. Climate

156. Madurai district receives rainfall during NE monsoon (47%) , SW monsoon (32%), summer (17%) and winter (4%).

2. Geographical features

157. The Palace is located in the eastern side of the city, around 1.2 km South East of the Meenakshi Amman Temple in the city of Madurai.

3. Accessibility

158. Madurai being a popular tourist center is well connected by railways and has daily flights to Colombo (Sri Lanka), Mumbai Banglore and Chennai.

4. Geomorphology

159. The prominent geomorphic units in the district are structural and denudated land forms such as structural and denudational hills, residual wells, linear ridges, uplands and barried pediments.

5. Soil

160. The district is characterized by Red soil, Black clayey soil and Alluvial soil. Red soil is found in all the blocks of the district while black clayey soil is found in Tirumangalam, Usilampatti and Peraiyur blocks of the district and alluvial soil is found along the courses of the river.

6. Hydrogeology

161. The district is underlain predominantly by crystalline formations and alluvium is found along the courses of the river. Ground water occurs under phreatic conditions in weathered residuum and interconnected shallow fractures and under semi-confined to confined conditions in deeper fractures.

7. Groundwater Quality

162. Ground water in phreatic aquifer in general is colorless, odourless and alkaline in nature. The specific electrical conductance of ground water in phreatic zone during May 2006 varied between 632 -6520 µs/cm at 25°C and in major part of the state it is less than 2200 µs/cm.

163. It is observed that ground water is suitable for drinking and domestic uses in respect of all constituents except TH and NO3. It is found to be excess of permissible limit in 34% of sample analysed in respect of TH and in about 66% in respect of NO3. The high incidence of TH can be attributed to geogenic causes while NO3 excess may be due to either excess use of fertilisers or due to improper waste disposal.

8. Natural Disaster / Hazard

164. According to GSHAP data, the state of Tamil Nadu falls mostly in a region of low seismic hazard with the exception of western border areas that lie in a low to moderate hazard zone. Puducherry lies in a low hazard region. As per the 2002 Bureau of Indian Standards (BIS) map, Tamil Nadu and Puducherry fall in Zones II and III. Historically, parts of this region have experienced seismic activity in the M5.0 range.

9. Ambient Air and Noise Quality

165. The air environment of the subproject areas is generally found to be good and is free from industrial pollution. The ambient air quality in Thirumalai Naicker Mahal, Madurai District is perceived to be within acceptable standards. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period. Impacts on air quality (if any) during construction stage are due to operation of various construction equipment and transport vehicles. Consequently, although emissions of common air contaminants (CAC) and fugitive dust may be elevated in proximity to the active work sites, this impact will be of short-term and localized to the immediate vicinity of the project site.

166. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land filling of residual wastes). Given the subproject‘s relatively minor contribution to CAC and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible during construction.

167. Most of the subproject area is in a quiet environment. Noise intensive industrial operations are not observed in the project influence area. Present ambient noise levels, both in the day and night time, are perceived to be well within permissible levels. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period.

168. Noise levels in the immediate proximity of most work sites are expected to increase during construction. The duration of this exposure will be relatively brief. This exposure represents temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the subproject operations will be largely imperceptible as civil works will be confined in relatively small sites within the district proper.

169. Since the subproject will be built in existing infrastructure, it will not conflict with existing or planned land use. However, traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads, sidewalk closures, traffic delays and detours, parking modifications, and increased volumes of construction–related traffic. There should be improved traffic movement along the access routes once construction is completed. During operations of the improved infrastructure and services, added residential developments, commercial

and business facilities and increased densities are expected to develop and enhance the subproject area. This can be considered a long-term cumulative benefit of the subproject. (Refer Environmental Management plan for Subproject Specific impacts and their mitigation measures).

170. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and CAC emissions will occur in proximity to subproject work sites during construction, due to their short term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The subproject operations will benefit the general public by contributing to the long-term improvement of tourism in Tamil Nadu and livelihood opportunities to the local people.

B. Socio-economic and Cultural Environment

1. Trade and Commerce

171. Presently, the economy is solely dependent on tourism business and competition from other towns and other states has altered the potentials of the town leading to reduced growth rates and inflow of floating population.

2. Administration

172. Madurai district comprises 13 talukas and revenue blocks, same names same boundaries. Under the gram panchayat system rural administration or the district is done by panchayat villages and the taluka headquarters. The revenue blocks are further sub-divided by firkas. The last three taluks, Tiruparankundram, Madurai West and Madurai East, were created in February 2014. [9] The thirteen talukas/blocks

173. Important places to visit in Madurai:

(i) **Thirumalai Nayak Mahal** was constructed way back in the 17th century. Several buildings and temples had been constructed by him in the region and they have all been splendid both in terms of construction location and spirituality.

(ii) Madurai Meenakshi Amman Temple.

This is a historic Hindu temple located on the southern bank of the Vaigai River, Madurai, Tamil Nadu. It is primarily dedicated to Parvati, known as Meenakshi, and her spouse, Shiva. That makes this temple different than the others is the fact that both God and Goddess are worshipped together.

(iii) **Alagarkoil temple** Alagar Koil is an exquisite temple situated in the north east of Madurai. The temple is the rest place of Lord Vishnu and is the sacred place for several followers of Lord Vishnu in the region.

(iv) **Vaigai Dam** Vaigai Dam, a magnificent man-made structure, is constructed over River Vaigai near Andipatti, Theni District in the South Indian State of Tamil Nadu.

(v) Gandhi Muesuem he Gandhi Memorial Museum serves as a remembrance and tribute to the efforts of our very own father of the nation, Mahatma Gandhi. Established in 1959 in his cherished memory, eleven years after his demise, it is one of the few Gandhi Museums in the country.

3. Area population

174. The area covered under the Madurai Municipal Corporation had a population of 1,017,865

with a sex-ratio of 999 females for every 1,000 males, much above the national average of 929. A total of 100,324 were under the age of six, constituting 51,485 males and 48,839 females. Scheduled Castes and Scheduled Tribes accounted for 6.27% and .31% of the population respectively. The average literacy of the city was 81.95%, compared to the national average of 72.99%. The urban agglomeration of Madurai had a population of 1,465,625, and is the third largest in Tamil Nadu

4. Languages

175. In addition to the Tamil language, English, Urdu are also spoken by the local People. Due to its proximity to the neighboring states and it being a popular tourist spot, English, Kannada and Malayalam are also spoken and understood to an extent.

5. Sanitation and Sewage Disposal

176. The current sewerage system for disposal of sullage is through septic tanks and public conveniences. The same shall be maintained for this site.

6. Solid Waste Management

177. No formal collection system from the municipality is present. The solid waste is being dumped in dump yards and / or is being incinerated in the open.

7. Site Details

178. The site is free from encumbrances and is freely available with the Government of Tamil Nadu. Further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with the present manager of the Site. The site details are given in the Table 2(c) below along with the proposed site layout in Figure 4(c).

Table 4(c): Site Details

	Description	**Yes / No**
1	Protected area	No
2	Archaeological site	No
3	Forest area	No
4	CRZ area	No

Notes: Protected Area includes wildlife sanctuary, bird sanctuary, or national park; CRZ=Coastal Regulation Zone.

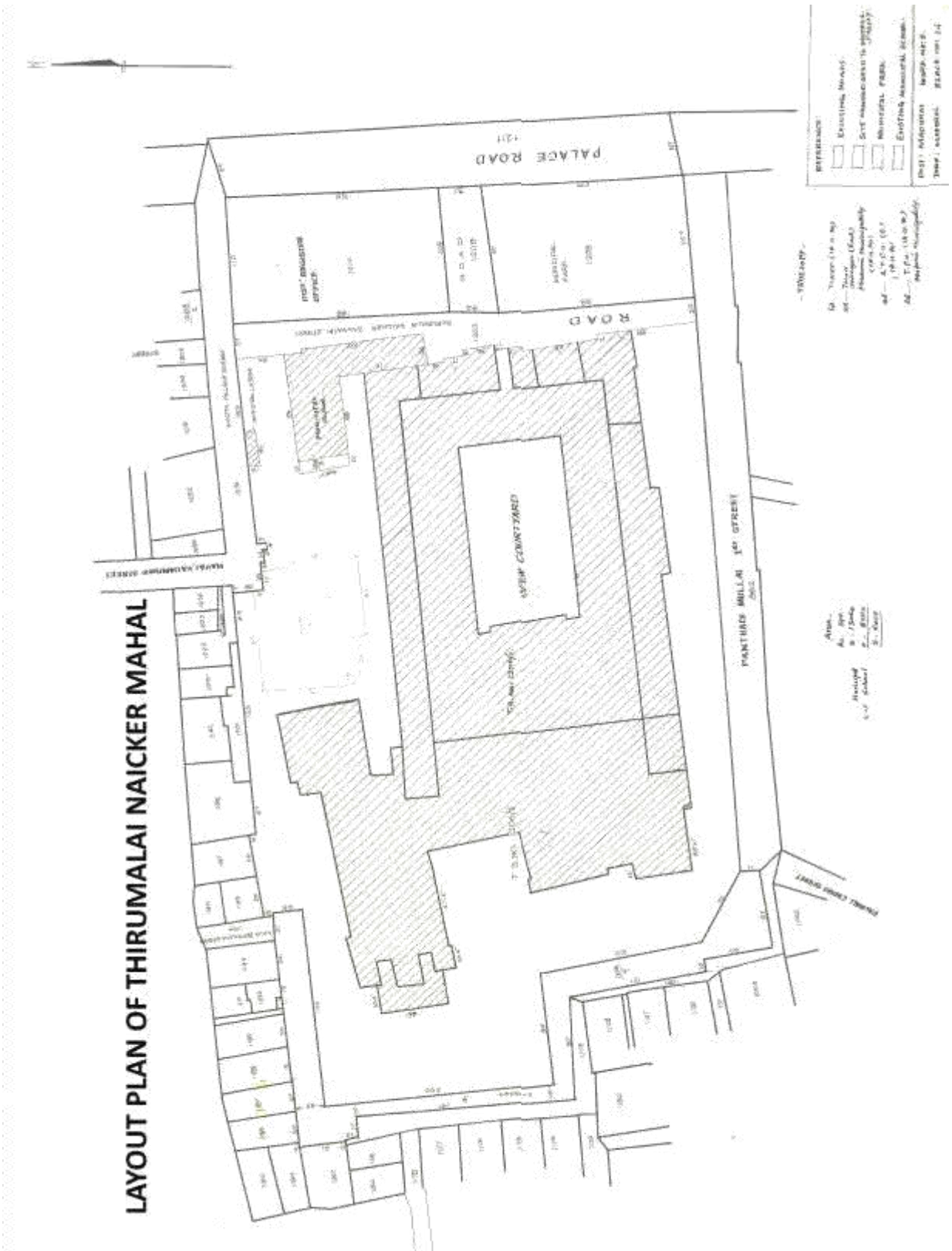


Figure 4(c): Site Layout

(d) Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at Marudhupandiyar Fort, Sivagangai District:

A. Physical Environment

179. The district experiences a very dry and hot climate with low degree of humidity. Normally the temperature varies from 22 C to 39 C. During the year 1999-2000, this district experienced 9561.8 mm of rainfall. Soil Soil of the district is predominantly black. Part of Sivaganga district has the red soil also. The classification of soil in the Sivaganga district is given below: Soil Classification Sl.No. Type of Soil Place in the District. 1 Lateritic soil and red sterile soil Western part of Devakottai, Karaikudi and Entire Thiruppathur. 2 Black soil Western part of Sivaganga, Manamadurai in North West. 4 3 Alluvium soil Eastern part of Devakottai, Northern part of Ilayangudi. 4 Red soil Central part of Sivaganga, Northern part of Manamadurai, Southern portion of Ilayangudi. Rivers There are no perennial rivers in the district. The river Vaigai is the only major one which enters the district near Tiruppuvanam and flows through Sivaganga taluk. The other seasonal rivers minor streams flowing through the district are Sarugani, Bambar, Kottagudi, Manimuthar, Uppar, Uppargundam and Thenar in Trippathur taluk.

180. The river Vaigai is the only major one which enters the district near Tiruppuvanam and flows through Sivaganga taluk. The subproject site is a barren land in the possession of the Department of TamilNadu Archeological Department and thus the site does not require any land acquisition. No protected species have been recorded in this site. No natural or critical habitats being impacted by the subproject and no loss of biodiversity. Site is located in or immediately adjacent to habitats altered for human use (open yards, existing facilities, roadsides, pathways, etc.). Civil works are limited on existing structures.

1. Climate

181. The district experiences a very dry and hot climate with low degree of humidity. Normally the temperature varies from 22 C to 39 C. The mean average humidity recorded was 44.5% with mean maximum humidity of 93% and mean minimum of 41.0%. Mean average wind speed was observed to be 19 m/hour.

2. Geographical features

182. Sivagangai district of Tamil Nadu spreads over 4,189 km². This constitutes 3.22 percent of the area of the State. The geographical position of Sivagangai district is between. 9° 43' and 10° 2' North Latitude and between 77° 47' and 78° 49' East Longitude.

3. Accessibility

183. Madurai is the nearest airport. 40 km from Sivagangai. Rail : Karaikudi, Manamadurai is a main Railway Stations in Sivagangai district. Road : Due to its close proximity to Madurai, Sivaganga is easily accessible to the tourists. Buses and taxis are easily available from Madurai.

4. Geomorphology

184. The elevation of the area ranges from 80 to 120 m above MSL. It is interpreted landforms such as alluvial plain, water body, piedmont zone, plateau, structural hills and habitation mask.

185. Sivagangai District is an administrative district of Tamil Nadu state in southern India. The city of Sivagangai is the district headquarters. It is bounded by Pudukkottai district on the Northeast, Tiruchirapalli district on the North, Ramanathapuram district on South East, Virudhunagar district on South West and Madurai District on the West.

5. Soil

186. Soil of the district is predominantly black. Part of Sivaganga district has the red soil also.

6. Hydrogeology

187. The normal annual rainfall over the district varies from about 861.8 mm. to about 988.6 mm. The normal south west monsoon rainfall varies from 275.8 to 401.1 mm while during NE monsoon the normal seasonal rainfall varies from 382.5 to 442.8 mm. A perusal of the rainfall pattern shows that in general the rainfall increases towards east.

7. Groundwater Quality

188. Net Groundwater Availability (in MCM). 985.89. Existing Gross Groundwater draft for all users (in MCM) 157.16. Stage of Groundwater development (in %). 16 %. Categorization of District. Safe.

189. Groundwater Quality of phreatic aquifer in Sivagangai district is in general, colorless, odorless and slightly alkaline in nature. The electrical conductivity of groundwater in phreatic zone during May 2006 was in the range of 410 to 5110 µS/cm and major parts are having electrical conductivity below 1600 µS/cm. It is observed that the groundwater is suitable for drinking and domestic uses in respect of all constituents except in and around Chettinadu. About 50% samples are having higher concentration of NO3 more than the BIS permissible limit.

Natural Disaster / Hazard

190. Sivagangai District was highly affected by Floods and 2012 and 2013 due to Short–Fall of rains the District was highly affected by Drought During the above periods the public and Cattle was affected. The district experienced heavy Rain Fall and flood during November 2005. During that Monsoon period, out of 521 Revenue villages, 148 villages were marooned. About
282 kms of Highway Road 72 kms of Municipal Road and 1901 kms., of panchayat road were Damaged.

9. Ambient Air and Noise Quality

191. The air environment of the subproject areas is generally found to be good and is free from industrial pollution. The ambient air quality in Sivagangai District is perceived to be within acceptable standards. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period. Impacts on air quality (if any) during construction stage are due to operation of various construction equipment and transport vehicles. Consequently, although emissions of common air contaminants (CAC) and fugitive dust may be elevated in proximity to the active work sites, this impact will be of short-term and localized to the immediate vicinity of the project site.

192. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land filling of residual wastes). Given the subproject‘s relatively minor contribution to CAC and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible during construction.

193. Most of the subproject area is in a quiet environment. Noise intensive industrial operations are not observed in the project influence area. Present ambient noise levels, both in the day and night time, are perceived to be well within permissible levels. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period.

194. Noise levels in the immediate proximity of most work sites are expected to increase during construction. The duration of this exposure will be relatively brief. This exposure represents temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the subproject operations will be largely imperceptible as civil works will be confined in relatively small sites within the district proper.

195. Since the subproject will be built in existing infrastructure, it will not conflict with existing or planned land use. However, traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads, sidewalk closures, traffic delays and detours, parking modifications, and increased volumes of construction–related traffic. There should be improved traffic movement along the access routes once construction is completed. During operations of the improved infrastructure and services, added residential developments, commercial and business facilities and increased densities are expected to develop and enhance the subproject area. This can be considered a long-term cumulative benefit of the subproject. (Refer Environmental Management plan for Subproject Specific impacts and their mitigation measures).

196. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and CAC emissions will occur in proximity to subproject work sites during construction, due to their short term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The subproject operations will benefit the general public by contributing to the long-term improvement of tourism in Tamil Nadu and livelihood opportunities to the local people.

B. Socio-economic and Cultural Environment

1. Trade and Commerce

197. Sivagangai consisted mostly of farmers and agro-based company workers. The constituency was impacted by the erratic monsoons and demanded industries in the district as an alternate source of income.

2. Administration

198. The District of Sivagangai District is an administrative district of Tamil Nadu state in southern India. The district has 6 taluks in 2 revenue division.

199. Important places to visit in Sivagangai District:

(i) **Pilliarpatti.** It is 15 kms west of karaikudi and 8 Kms east of Thirupattur. Karpaka Vinayagar Temple, world famous Vinayagar temple visited by millions of devotees is located here. Nagaraththar of Chettinad maintain the temple activities. The village gets its name from the temple. Six feet Presiding Deity is called as Karpaga Vinayagar [valampuri posture]. Ganesh Chathurthi festival during August-September is the main festival of the temple. Sankata Hara Chathurthy every month is also celebrated with a festival look**.**

(ii) **Kundrakudi.** Kundram means Hillock and Kudi means village. Hence this village is called Kundrakudi. This is an abode of Lord Murugan called —Shanmugaǁ with six faces. The Main festivals are: Thai *poosam* [Jan-Feb], Panguni *Uththiram* [Mar-Apr], *Visakam* in May, Adi *Kirthigai* [Jul-Aug], karthigai month Skandha *Sashti* [oct –nov]. This temple attracts large number of pilgrims throughout the year. Kundrakudi Adigalar Tamil saint lived, served the religion and the society. He attained Samadhi here. This mutt has a successor now.

(iii) **Karaikudi :** Karaikudi is the taluk headquarters of Karaikudi taluk. It is situated enroute to Rameswaram. Karaikudi is famous for its temple. During May-June 10 days **Visakam festival** is conducted in the **Koppudaiyanayaki Amman Temple**. It is 143 kms from Rameswaram. It is well connected by rail and road to important towns in the state. Mannargudi (22 km). This is also called as Rajamannargudi. It is said that Mannargudi Temple and Temple tank are two inseparable and beautiful features of the town. Kulothunga Cholan Vinnagaram or the Rajagopalaswamy temple is called as the King of Temples. Here, Lord Vishnu is called as Rajagopalan or Rajamannar. The 24 shrines, 18 vimanams, 16 majestic towers, 7 splendid big halls and a 154 ft towering Rajagopuram are the special features of this large temple complex.

(iv) **Kalaiyar Koil :** Kalaiyar Koil was called as **Kaanapair** during sangam period. Kalaiyar Koil was the strong hold of Sivaganga Rulers with a well built extensive fort. It is 15 Kms from Sivagangai. It derived its name from Kaleswaran Temple here. A lofty 150 ft *Rajagopuram* and a *grand tank **[Teppakkulam]***named *Aanai Madu* are two special features of this temple. **Saints Gnanasambandar,**

(v) **Sundarar, Appar and Arunagirinathar** have visited this temple and have sung hymns in praise of the Lord. **Vaikasi Visakam** [May-June] and *Thai poosam* [Jan-Feb] are the important festivities of this temple. During these festivals, pilgrims in and around converge in thousands to enjoy the festivities. **Samadhi of Marudhu is opposite to the old entrance on the eastern side.**

(vi) **Thirukoshtiyur :** It is 24 kms from Sivagangai on Tirupaththur-Sivaganga Road. It is a popular Vaishnavite Temple popularly called **Sri Sowmiya Narayana Perumal Koil** *[utsavar].* This word **THIRU - KOSHTI - UR means place of the assembly of the Sacred.** Temple tower is 85 ft tall. The *Golden Kalasam* is 5 ft festivals throughout the year. To mention a few: *Masi* February-March; *Vaikunda Ekadasi*in December-January and *Purattasi Navarathri* in September-October are the important festivals of the temple.

(vii) **Nattarasan Kottai :** It is 9 kms from Sivagangai on the **Madurai -Thondi Road.** Kannudaya Nayaki amman Temple is the famous temple located here. The temple is efficiently managed by the village Nagarathars. The famous poet Kambar, who wrote Ramanayam in Tamil, spent his last days in Nattarasankottai and his tomb is located here.

(viii) **Kollangudi :** It is 10 kms on the East of Sivagangai on Madurai – Thondi Road. ***Kollan** in tamil means Blacksmith, **Kudi*** means village. **This is the village where arms, warfare equipments were made for Marudhu,** hence derived its name Kollan Kudi. This village is famous for Vettudaiya Kaliamman Temple. The Annual festival of this temple falls in the month of Apr-May.

(ix) **Vettangudi Bird Sanctuary:** It is near ***Tiruppathur***. ***The Vettangudi birds sanctuary*** is the natural Habitat of winter migratory birds. This is a safe place for ***roosting, breeding and feeding.*** There is a considerable diversity in their nesting and feeding behavior. This sanctuary is in an area of 40 hectares and covers the tanks of **Vettangudi, Periyakollukudi and Chinna Kollukkudi villages in the area of operation**. This Sanctuary is located near Thirupathur and Madurai.

(x) **Thayamangalam :** It is 20 kms from Sivagangai and 20 Kms from Paramakudi. This town has a temple popularly known as Muthumariamman kovil. **Saint Thirugnanasambandhar worshipped God and Goddess by singing Kolaru Padhipaggam poems meant to get relieved of planetary ill effects.**

(xi) **Madapuram :** Madapuram is a small village on the banks of Vaigai River. Even though it is near Madurai, it is a part of Sivagangai District. **The famous Madapuram Badhrakali Amman and Ayyanar temple under HR&CE**administration are important temples. **Madapuram kali was the Kaval Deivam of Madurai king.** Madapuram kali is 12 ft tall statue, with no roof and large number of tourists visit the temple on the *New Moon day.*

(xii) **Chettinad.** It is the land of Heritage and devotion. Chettinad is the home of the Nattukottai Chettiars [Nagarathar], a prosperous banking and business community. It is also known for its local cuisine, architecture, and religious temples. Even today, much of Chettinad's daily activities are centered around the festivities of the temple. **Vairavan Kovil, Iraniyur, Karpaga Vinayakar, Kundrakudi Murugan, Kottaiyur Sivan, and Kandanur Sivan temples** are some important temples of this zone.

(xiii) **Piranmalai.** This village is at the foot hill of 2500ft Hillock. It is 58 Kms from Sivagangai and 24 kms from Thirpathur. **Piravar Temple and Sheikh Abdullah Mosque** are two important places of worship in this town.

(xiv) **Thirupathur.** A town in Sivagangai District is 27 km from Sivagangai. The **Thiruthalinathar and Sivakama Sundari** temple attracts scores of pilgrims and tourists. **Sri Ninra Narayanaperumal Temple, Angalaparameswari Amman temple, Konrai Sithar Samadhi, Sri Veeramaakaaliamman** are some places of worship in this area.

3. Area population

200. Sivagangai is a district with Population Census 2011and has a population of 1339101 of which 668672 are males while 670429 are females. Average Sex Ratio of Sivagangai district is 1003. In 2011, literacy rate of Sivagangai district is 965782 of total population. In Sivagangai district out of total population, 461102 were engaged in work activities. Of 461102 workers 117030 engaged in Cultivation, 122166 were Agricultural Laborers, 9864 in household industry, while 212042 were involved in otherworks.

4. Languages

201. Tamil is spoken by a majority of the people in Sivagangai, spoken in its pure form with hardly any influences from other languages. Due to its proximity to the neighboring states and it being a popular tourist spot, English, Kannada and Malayalam are also spoken and understood to an extent.

5. Sanitation and Sewage Disposal

202. The current sewerage system for disposal of sullage is through septic tanks and public

conveniences. The same shall be maintained for this site.

6. Solid Waste Management

203. No formal collection system from the municipality is present. The solid waste is being dumped in dump yards and / or is being incinerated in the open.

7. Site Details

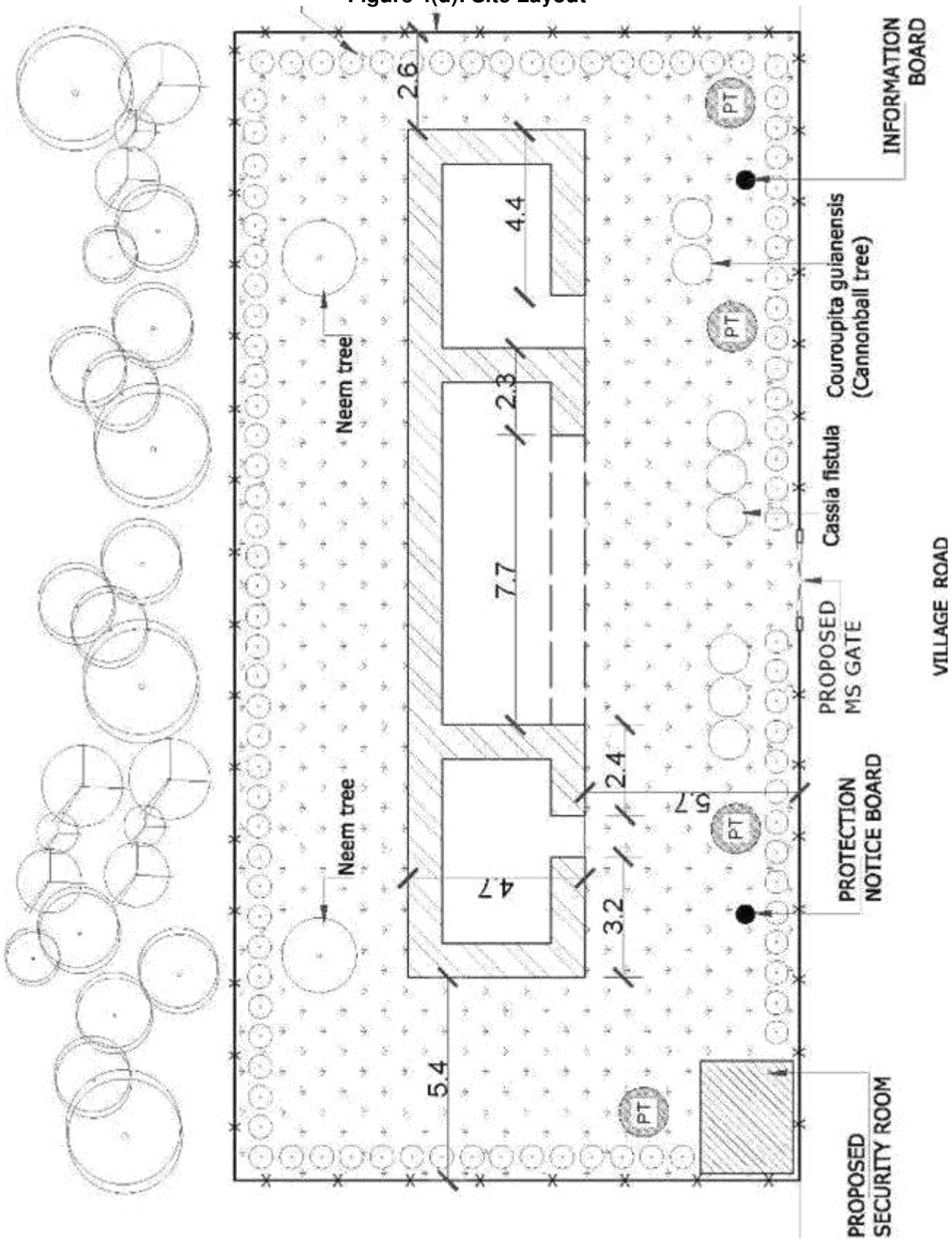
204. The site is free from encumbrances and is freely available with the Government of Tamil Nadu. Further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with the present manager of the Site. The site details are given in the Table 2(d) below along with the proposed site layout in Figure 4(d).

Table 5(d): Site Details

	Description	**Yes / No**
1	Protected area	No
2	Archaeological site	No
3	Forest area	No
4	CRZ area	No

Notes: Protected Area includes wildlife sanctuary, bird sanctuary, or national park; CRZ=Coastal Regulation Zone.

Figure 4(d): Site Layout



(e) Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at Koolamandal Gangaikonda choleeswarer Temple, Tiruvanamalai District:

A. Physical Environment

205. Koolamandal has a plain terrain of alluvial soil consisting of sand, silt and clay. Cheyyaru, the tributaries of Palar are the major water bodies around the town. Surface water canals contribute 89% to irrigation, while the rest 11% is accounted by dug wells and tube wells. Paddy is the major crop while the others being black gram, green gram, ground nut and gingily.

206. The subproject site is Located on the State Highways 116. The subproject site is a barren land in the possession of the Department of State Archaeological Department of the Government of Tamil Nadu and thus the site does not require any land acquisition. No protected species have been recorded in this site. No natural or critical habitats being impacted by the subproject and no loss of biodiversity. Site is located in or immediately adjacent to habitats altered for human use (open yards, existing facilities, roadsides, pathways, etc.). Civil works are limited on existing structures.

1. Climate

207. Tiruvannamalai has a tropical climate. The summers are much rainier than the winters in Tiruvannamalai. This location is classified as Aw by Köppen and Geiger. The average annual temperature is 28.2 °C in Tiruvannamalai.

2. Geographical features

208. The town is located at 12°N 79.05° E at distance 27 kilometers from the Bay of Bengal.

3. Accessibility

209. The nearest airport to Koolamandal is Civil Airport (TRZ) at Tiruchirappalli, Tamil Nadu, which is 263 km away from Koolamandal and is 78.6 km away from Chennai Airport (MAA), Chennai, Tamil Nadu. Kanchipuram Railway Station is about 20.5 km from Koolamandal. There are frequent bus services to and from Chennai, Tiruvannamalai, Kanchipuram, Villupuram and Vellore.

4. Geomorphology

210. Geomorphology is a tool for searching ground water resources in different geomorphologic land forms and basement rocks formation, plays an important role in the water resources study. The geomorphology map is prepared with the help of satellite imaginaries and aerial photographs in the scale 1:50000. Topographically, this area is generally undulating terrain and flat with a gentle slope towards Southeast.

211. There are number of residual hills and isolated hillocks in the central part of the basin with the maximum elevation of 447m above the mean sea level. There are numerous tanks in the depressed parts of the area, which is mainly rain fed. The drainage is comprised of Cheyyar river. Major geomorphic landform is noticed are pediment, buried pediment shallow, buried pediment deep.

5. Soil

212. The district has mainly consisting of sandy, Red soil, clay.

6. Hydrogeology

213. Groundwater occurs under water table conditions in weathered, fractured, jointed and faulted portions of crystalline rocks. Groundwater recharge, flow and discharge of the basin are controlled by the basin geomorphology, geology and structural pattern. Crystalline formation comprises composite gneisses and charnockites. Groundwater occurrence is higher in gneissic rocks than in charnockite because the intensity of weathering, joint, fracture is quite higher in gneissic rocks rather than in charnockite.

7. Groundwater Quality

214. Groundwater occurs both under water table and semi-confined conditions and developed through dug-cum-bore wells and tube wells mostly in the southern part of the basin. In the study area an unconfined aquifer of small patch running from Melolakkkur village and towards Southern end and the depth of the bore wells are ranging from 6 m to 20 m. Groundwater developed in the hard rock regions by means of dug wells which are mostly tapping weathered zone and generally yield about 200 m 3 /day. Most of the wells are large diameter dug wells 7 to 10 m diameter with a depth of 9 m to 20 m depending on the weathering and a joint is feasible.

8. Natural Disaster / Hazard

215. According to GSHAP data, the state of Tamil Nadu falls mostly in a region of low seismic hazard with the exception of western border areas that lie in a low to moderate hazard zone. Puducherry lies in a low hazard region. As per the 2002 Bureau of Indian Standards (BIS) map, Tamil Nadu and Puducherry fall in Zones II and III. Historically, parts of this region have experienced seismic activity in the M5.0 range.

9. Ambient Air and Noise Quality

216. The air environment of the subproject areas is generally found to be good and is free from industrial pollution. The ambient air quality in Koolamandal, Tiruvanamalai District is perceived to be within acceptable standards. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period. Impacts on air quality (if any) during construction stage are due to operation of various construction equipment and transport vehicles. Consequently, although emissions of common air contaminants (CAC) and fugitive dust may be elevated in proximity to the active work sites, this impact will be of short-term and localized to the immediate vicinity of the project site.

217. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land filling of residual wastes). Given the subproject‘s relatively minor contribution to CAC and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible during construction.

218. Most of the subproject area is in a quiet environment. Noise intensive industrial operations are not observed in the project influence area. Present ambient noise levels, both in the day and night time, are perceived to be well within permissible levels. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period.

219. Noise levels in the immediate proximity of most work sites are expected to increase during

construction. The duration of this exposure will be relatively brief. This exposure represents temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the subproject operations will be largely imperceptible as civil works will be confined in relatively small sites within the district proper.

220. Since the subproject will be built in existing infrastructure, it will not conflict with existing or planned land use. However, traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads, sidewalk closures, traffic delays and detours, parking modifications, and increased volumes of construction–related traffic. There should be improved traffic movement along the access routes once construction is completed. During operations of the improved infrastructure and services, added residential developments, commercial and business facilities and increased densities are expected to develop and enhance the subproject area. This can be considered a long-term cumulative benefit of the subproject. (Refer Environmental Management plan for Subproject Specific impacts and their mitigation measures).

221. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and CAC emissions will occur in proximity to subproject work sites during construction, due to their short term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The subproject operations will benefit the general public by contributing to the long-term improvement of tourism in Tamil Nadu and livelihood opportunities to the local people.

B. Socio-economic and Cultural Environment

1. Trade and Commerce

222. Presently, the economy is solely dependent on tourism business and competition from other towns and other states has altered the potentials of the town leading to reduced growth rates and inflow of floating population.

2. Administration

223. The District of Tiruvanamalai was carved out as a separate district by detaching Valangaiman Taluk from Thanjavur District on 01.01.1997. There are 2 Revenue Divisions, 7 Taluks, 10 Blocks, 4 Municipalities and 7 Town Panchayats in Tiruvanamalai District. Tiruvanamalai was promoted to a first-grade municipality in 1978. The municipality has 30 wards and there is an elected councilor for each of those wards. The functions of the municipality are devolved into six departments: general administration/personnel, engineering, revenue, health, town planning and information technology (IT). All these departments are under the control of a municipal commissioner who is the executive head. The legislative powers are vested in a body of 30 members, one each from the 30 wards. The legislative body is headed by an elected Chairperson assisted by a Deputy Chairperson.

224. Important places to visit in Tiruvanamalai:

(i) **Annamalaiyar Temple** is a Tamil Hindu temple dedicated to the deity Shiva, located at the base of Annamalai hillsin the town of Thiruvannamalai in Tamil Nadu, India. It is significant to the Hindu sect of Saivism as one of the temples associated with the five elements, the Pancha Bhoota Stalas, and specifically the element of fire, or Agni. Shiva is worshiped as Annamalaiyar or Arunachaleswarar, and is represented by the lingam, with his idol referred to as Agni lingam. His consort Parvatiis depicted as Unnamalai Amman. The presiding deity is revered in the 7th century Tamil Saiva

canonical work, the Tevaram, written by Tamil saint poets known as the nayanars and classified as Paadal Petra Sthalam. The 9th century Saiva saint poet Manikkavasagar composed the Tiruvempaavai here.

(ii) **Virupaksha Cave** is unique cave aashram is in the shape of the Hindu symbol OM. The cave is situated atop a small peak in the Arunachala Hill, nearly 200 feet below the Skandasram cave. There are sever sacred springs on the slope of the hill. The caves seem to be named after the renowned 13th century saint named Virupaksha Deva, who apparently spent most of his life here. It is believed that his body turned to ashes after his samsdhi. These ashed are preserved here and worshiped everyday

(iii) **Arunachala** refers to the holy hill at Tiruvannamalai in Tamil Nadu. The hill is also known by the names Arunagiri, AnnamalaiHill, Arunachalam, Arunai, Sonagiri and Sonachalam.It is one of the five main shaivite holy places in South

(iv) **India.** The Annamalaiyar Temple, a temple of Lord Shiva is located at the base of the hill. Every year in the Tamil month of Karthigai (November-December), the Karthigai Deepam (Light) is lit atop the hill.It is also an important place for devotees of Sri Ramana Maharshi, with Sri Ramana Ashram situated at its foothills.

3. Area population

225. The population plays an important role for the further development of the water resources and agricultural activities. The population density of this basin is 457 persons per sq km which is well known the Tamil Nadu state has the average of 480 persons/sq km. The depth bar graph in Figure 4.9 has shown the rural and urban population distribution of Tiruvannamalai and Villupuram district. From the bar graph Figure 4.9 that the 82% people living in the rural and 18% of people livng in urban settlement of Tiruvannalai District and in the Villupuram District 86% of the people living in the rural and 14% people living in the urban as per 2001 census. Due to the growth of rural population in the recent decades increase pressure on the groundwater, drainage and sewage, intensive cultivation. From the Table 4.8 shows the ratio of females to males in a population and also defined as the proportion of males in the population of the districts.

4. Languages

226. Tamil is the only official language spoken in this city. Being a small town, people from other states and ethnicities aren't seen. Some people connected to the temple tourism industry may speak a bit of English for the convenience of tourists but it will be very limited.

5. Sanitation and Sewage Disposal

227. There is no underground drainage system in Tiruvannamalai Municipality. Disposal of Night Soil is normally by way of individual facilities and liquid waste (Sullage and Kitchen Waste) is through the open drains.

228. The main mode of individual disposal in the town is through septic tanks, low Cost Sanitation units and through public conveniences. A phenomenal 38% of the population do not have access to safe disposal systems 3. Forty five percent of the population has resorted to private arrangements, in the form of septic tanks.

6. Solid Waste Management

229. Tiruvannamalai town generates 52 Tons of Solid Waste per day out of this nearly 40 MT of the Solid Waste being collected, transported and disposed daily, which works to per capita generation

of 250 gms./day. The efficiency of the present mechanism is able to collect 75% of the total waste generated in the town. The Urban Local Body also carry out weekly mass waste cleaning programme to clear the left out wastes by making extra vehicle trips in the town. The total garbage collected constitutes 48% of the domestic wastes 42% commercial wastes and 10% of construction wastes

7. Site Details

230. The site is free from encumbrances and is freely available with the Government of Tamil Nadu. Further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with the present manager of the Site. The site details are given in the Table 2(e) below along with the proposed site layout in Figure 4(e).

Table 6(e): Site Details

	Description	**Yes / No**
1	Protected area	No
2	Archaeological site	No
3	Forest area	No
4	CRZ area	No

Notes: Protected Area includes wildlife sanctuary, bird sanctuary, or national park; CRZ=Coastal Regulation Zone.

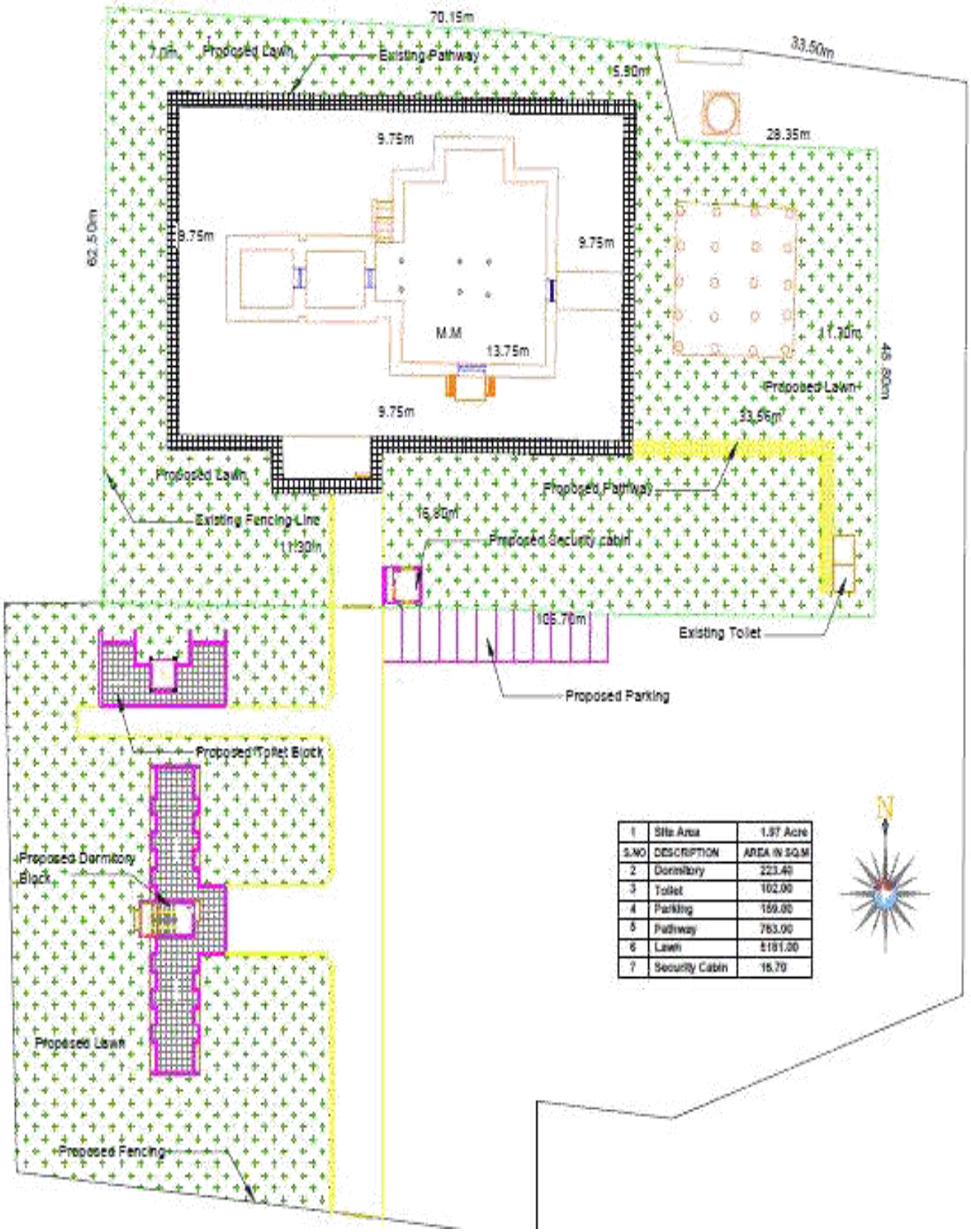


Figure 4(e): Site Layout

(f) Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at Alamparai Fort, Kanchipuram District:

A. Physical Environment

231. According to the census of India 2011, Kanchipuram district covers an area of 4433Sq. km. surrounded by Vellore and Thiruvannamalai district in west, in the north by Thiruvallur district and Chennai district, in the south by Villuppuram district in the east by Bay of Bengal.

1. Climate

232. The weather is hot during March to May. Entire district is tropical in nature; temperature is bound to be high having a temperature within the limit of 21°C to 37°C.Monsoon is from June to September, and it brings heavy pouring rains in the area coupled with cool breeze. Monsoon Winters are much cooler in comparison with other places in Southern India. The temperature varies between19°C to 29°C.

2. Geographical features

233. Kancheepuram district is situated on the North East coast of Tamil Nadu. It is bound by Bay of Bengal in the East, Vellore and Thiruvannamalai districts in the west, Thiruvallur and Chennai districts in the north, and Villuppuram district in the south. It lies between 11° 00' to 12° 00' latitudes and 77° 28' to 78° 50' longitudes. The district has a total geographical area of 4,43,210 hectares and a coastline of 57 km. The table below shows the maximum and minimum temperatures experienced in the district during different seasons.

3. Accessibility

234. **Kanchipuram** is located at12.98°N 79.71°E, 72 km (45 mi) south-west of Chennai on the banks of the Vegavathi River, a tributary of the Palar River.

4. Geomorphology

235. The prominent geomorphic units identified in the district through interpretation of satellite imagery) Chingleput-Tirukkalukkunram Surface (Erosional) ii) Palar Surface (fluvial and iii) Mamallapuram (Mahabalipuram) surface (Marina) etc.

5. Soil

236. Soils have been classified into 1) clayey soil, 2) red sandy or red loamy soil 3) Red sandy brown clayey soil and 4) Alluvial soil. Of the above soils brown clayey soil is the most predominant, covering more than 71 percent of the areal extent of Kancheepuram district. 98 Alluvial soils are found on the banks of Palar, Cheyyar and other rivers. The river alluvium is transported and is seen in coastal area of this district. Sandy coastal alluvial (arenaceous soil) occurs along the seacoast as a narrow belt.

6. Hydrogeology

237. The district is underlain by both sedimentary and fissured formations. The important aquifer system in the district are constituted by 1) unconsolidated and semi consolidated formations and 2) weathered, fissured and fractured crystalline rocks.

7. Groundwater Quality

238. Ground water in phreatic aquifers in Kancheepuram in general, is colorless, odorless and slightly alkaline in nature. The specific electrical conductance of ground water in phreatic zone (in Microsiemens at 25°C) during May 2006 was in the range of 240 to 4220 in the district. It is between 750 and 2250 µS/cm at 25°C in the major part of the district. Conductance below
750 µS/cm has been observed in ground water in parts of Chunampet, Mahabalipuram and Oragadam, where conductance exceeding 2250 µS/cm has been observed in Melmukuttu road.

239. It is observed that the ground water is suitable for drinking and domestic uses in respect of all the constituents except total hardness and nitrate. The Total Hardness as CaCO3 is observed to be in excess of permissible limits of 7% sample analyzed whereas Nitrate is found in excess of 45 mgl/l in about 25 percent samples. The incidence of high total hardness is attributed to the composition of litho units constituting the aquifers in the district, whereas the Nitrate pollution is most likely due to the use of pesticides and fertilizers for agriculture.

8. Natural Disaster / Hazard

240. According to GSHAP data, the state of Tamil Nadu falls mostly in a region of low seismic hazard with the exception of western border areas that lie in a low to moderate hazard zone. Puducherry lies in a low hazard region. As per the 2002 Bureau of Indian Standards (BIS) map, Tamil Nadu and Puducherry fall in Zones II and III. Historically, parts of this region have experienced seismic activity in the M5.0 range.

9. Ambient Air and Noise Quality

241. The air environment of the subproject areas is generally found to be good and is free from industrial pollution. The ambient air quality in Alamparai Fort, Kanchipuram District is perceived to be within acceptable standards. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period. Impacts on air quality (if any) during construction stage are due to operation of various construction equipment and transport vehicles. Consequently, although emissions of common air contaminants (CAC) and fugitive dust may be elevated in proximity to the active work sites, this impact will be of short-term and localized to the immediate vicinity of the project site.

242. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land filling of residual wastes). Given the subproject‘s relatively minor contribution to CAC and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible during construction.

243. Most of the subproject area is in a quiet environment. Noise intensive industrial operations are not observed in the project influence area. Present ambient noise levels, both in the day and night time, are perceived to be well within permissible levels. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period.

244. Noise levels in the immediate proximity of most work sites are expected to increase during construction. The duration of this exposure will be relatively brief. This exposure represents temporary, localized, adverse residual effect of low to moderate significance for affected receptors.

While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the subproject operations will be largely imperceptible as civil works will be confined in relatively small sites within the district proper.

245. Since the subproject will be built in existing infrastructure, it will not conflict with existing or planned land use. However, traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads, sidewalk closures, traffic delays and detours, parking modifications, and increased volumes of construction–related traffic. There should be improved traffic movement along the access routes once construction is completed. During operations of the improved infrastructure and services, added residential developments, commercial and business facilities and increased densities are expected to develop and enhance the subproject area. This can be considered a long-term cumulative benefit of the subproject. (Refer Environmental Management plan for Subproject Specific impacts and their mitigation measures).

246. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and CAC emissions will occur in proximity to subproject work sites during construction, due to their short term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The subproject operations will benefit the general public by contributing to the long-term improvement of tourism in Tamil Nadu and livelihood opportunities to the local people.

B. Socio-economic and Cultural Environment

1. Trade and Commerce

247. Presently, the economy is solely dependent on tourism business and competition from other towns and other states has altered the potentials of the town leading to reduced growth rates and inflow of floating population.

2. Administration

248. Kancheepuram, the temple town is the district headquarters. For administrative reasons, the district has been divided into 4 revenue divisions comprising of 11 taluks with 1137 revenue villages. For development reasons, it is divided into 13 development blocks with 648 Village Panchayats.

249. Important places to visit in Kanchipuram:

(i) **Kamakshiamman Temple** Southern India is well-known for its cultural heritage, and the Kamakshi Amman Temple represents an important gem from the past. Set in the midst of Kanchipuram, also known as the City of Temples, this place of worship is home to the divine Goddess Kamakshi, who is believed to be an incarnation of Parvati, the Hindu goddess of love, fertility and strength. Visitors claim to experience a formidable energy in the air that can only be felt in the presence of the deity. This makes the shrine a popular destination for devotees and culture buffs.

(ii) **Varadharajar Temple**. The marvelous Varadaraja Temple was built during the 10th century by the Vijayanagar kings. There is a big outer wall that covers or as the locals say, protect this fine temple.

(iii) **Muttukadu :** Muttukadu **is** a large lake formed out of the backwaters from Bay of Bengal. It has boating and wind surfing facilities. It is located at a distance of 80 km from Kanchipuram. The backwaters of Muttukkadu have been developed by the Tamil Nadu Tourism Development Corporation to serve as a picnic spot and a center for

water sports. Training and demonstration programmes are also organised for beginners.

(iv) **Ekkambaraseswarar temple** The Ekambaranatha Temple is the largest temple in Kanchipuram. It covers a massive area of 20 acres. This temple is dedicated to Lord Shiva, and was built by the Pallavas and then in turn was renovated by both the Cholas and the Rayas.

(v) **Vaikunda Perumal temple**. The Vaikunda Perumal Temple was built by the Pallava king Nadivarman II during the 7th century. This is particular temple is dedicated to Lord Vishnu.

(vi) **Mahabalipuram**. Mahabalipuram was a flourishing port town during the time of Pallavas. This is one of the main tourist places in Kanchipuram. The monuments of Mahabalipuram are an excellent specimen of Dravidian temple architecture and Pallava art. The group of sculptures in Mahabalipuram are listed out by UNESCO as World Heritage Sites.

3. Area population

250. Kancheepuram had population of 3,998,252 of which male and female were 2,012,958 and 1,985,294 respectively. In 2001 census, Kancheepuram had a population of 2,877,468 of which males were 1,457,242 and remaining 1,420,226 were females.

4. Languages

251. The early Pallava royal inscriptions are either in Prakrit or in Sanskrit Kanchipuram is a cosmopolitan city with people speaking several languages. Other than the native Tamil, languages like Telugu, Kannada, and Saurashtra are also prevalent in the city. Tamil is the mother tongue for about 84.5 percent, Telugu 8.7percent, Kannada 2.6 percent, Urdu 1.8 percent, Malayalam 1.4 percent and Gujerati 0.5 percent. Maximum population belong to the Hindus 88.9 percent, 5.8 percent are Christians. 5.2 percent are Muslims 0.1 percent is other religion like Jains.

5. Sanitation and Sewage Disposal

252. The current sewerage system for disposal of sullage is through septic tanks and public conveniences. The same shall be maintained for this site.

6. Solid Waste Management

253. About 90 tons of solid waste are generated every day and they are transported by 6 mini lorries, 6 power tillers and 10 carts. The wastes are dumped at a place called Vaiyavur which lies just outside the Local Planning Authority.

7. Site Details

254. The site is free from encumbrances and is freely available with the Government of Tamil Nadu. Further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with the present manager of the Site. The site details are given in the Table 2(f) below along with the proposed site layout in Figure 4(f).

Table 7(f): Site Details

	Description	**Yes / No**
1	Protected area	No
2	Archaeological site	No
3	Forest area	No
4	CRZ area	No

Notes: Protected Area includes wildlife sanctuary, bird sanctuary, or national park; CRZ=Coastal Regulation Zone.

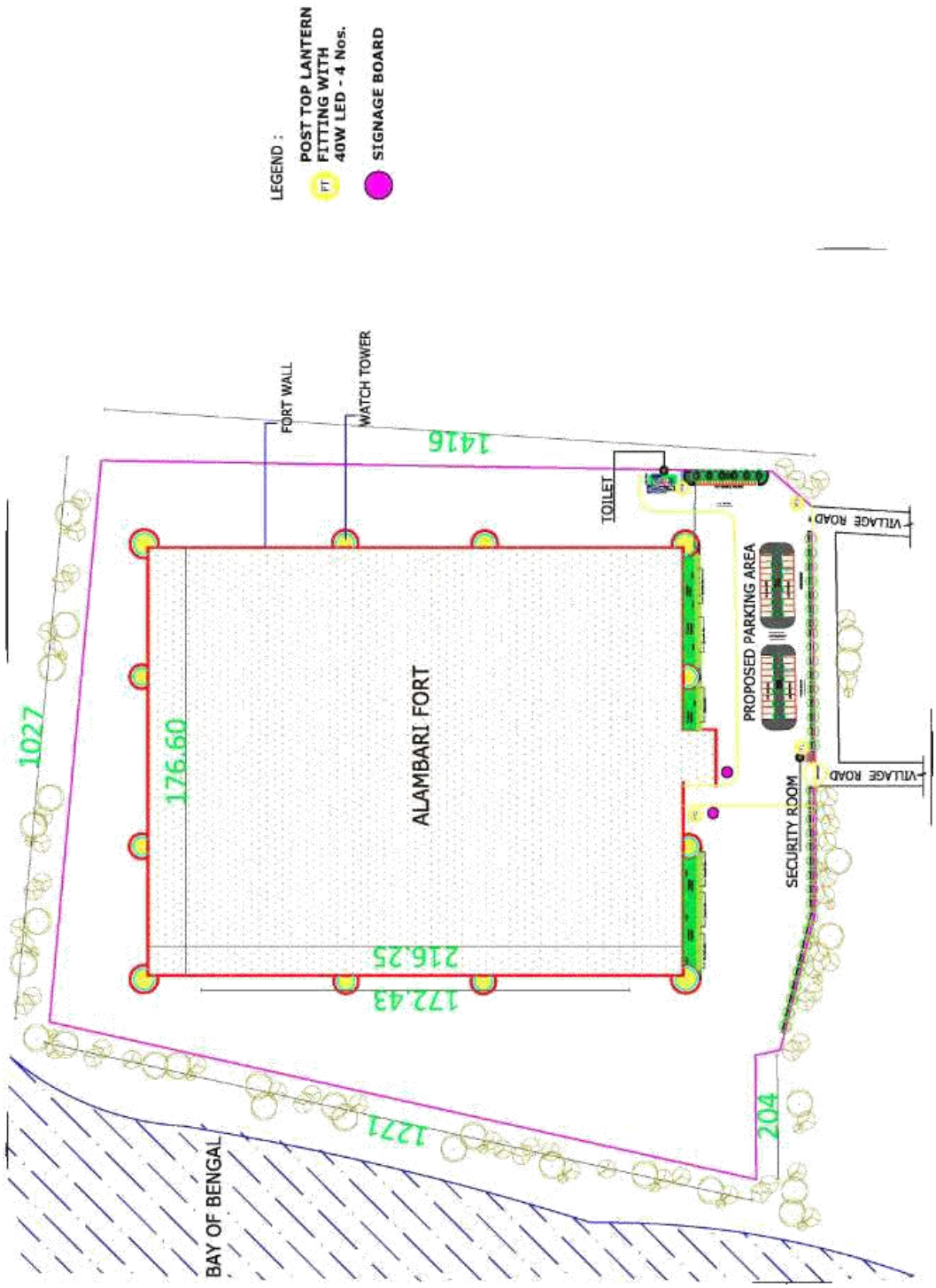


Figure 4(f): Site Layout

(g) Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at Poondi Arugar Temple, Tiruvanamalai District:

A. Physical Environment

255. Tiruvanamalai district is one of the 32 districts in the Tamilnadu State of India and occupies an area of 6191 km². According to 2011 census, Tiruvanamalai district had a population of 2,464,875. Major towns are Tiruvanamalai, Arani, Chengam, Polur, Thandarampattu, Vandavasi, Kalasapakkam, Chetpet, Cheyyar, and Vembakkam. Koolamandal Gangaikonda choleeswarer Temple, a Hindu temple dedicated to Lord Shiva located in the village of Koolamandal in the Cheyyar Taluk of Tiruvanamalai.The temple complex covers 1.92 acres. The temple is maintained and administered by the State Archaeological Department of the Government of Tamil Nadu.

256. The subproject site is Located on the banks of the Vegavathy river. The subproject site is a barren land in the possession of the Department of HRandCE and thus the site does not require any land acquisition. No protected species have been recorded in this site. No natural or critical habitats being impacted by the subproject and no loss of biodiversity. Site is located in or immediately adjacent to habitats altered for human use (open yards, existing facilities, roadsides, pathways, etc.). Civil works are limited on existing structures.

1. Climate

257. Tiruvannamalai has a tropical climate. The summers are much rainier than the winters in Tiruvannamalai. This location is classified as Aw by Köppen and Geiger. The average annual temperature is 28.2 °C inTiruvannamalai.

2. Geographical features

258. The town is located at 12°N 79.05° E.

3. Accessibility

259. The nearest airport to Poondi Arugar Temple is Civil Airport at Chennai, Tamil Nadu, which is 143 km away from Poondi Arugar temple, Tamil Nadu. Tiruvannamalai Railway Station is about 66 km from Poondi Arugar temple. There are frequent bus services to and from Chennai,Vellore,Salem Cuddalore, Pondicherry, Tiruchirappalli, Vellankanni, and Nagapttinam.

4. Geomorphology

260. Geomorphology is a tool for searching ground water resources in different geomorphologic land forms and basement rocks formation, plays an important role in the water resources study. The geomorphology map is prepared with the help of satellite imaginaries and aerial photographs in the scale 1:50000. Topographically, this area is generally undulating terrain and flat with a gentle slope towards Southeast.

261. There are number of residual hills and isolated hillocks in the central part of the basin with the maximum elevation of 1710 m above the mean sea level. There are numerous tanks in the depressed parts of the area, which is mainly rain fed. The drainage is comprised of Tondiar

river. Major geomorphic landform is noticed are pediment, buried pediment shallow, buried pediment

deep.

5. Soil

262. The district has mainly consisting of sandy Red soil, clay.

6. Hydrogeology

263. Groundwater occurs under water table conditions in weathered, fractured, jointed and faulted portions of crystalline rocks. Groundwater recharge, flow and discharge of the basin are controlled by the basin geomorphology, geology and structural pattern. Crystalline formation comprises composite gneisses and charnockites. Groundwater occurrence is higher in gneissic rocks than in charnockite because the intensity of weathering, joint, fracture is quite higher in gneissic rocks rather than in charnockite.

7. Groundwater Quality

264. Groundwater occurs both under water table and semi confined conditions and developed through dug-cum-bore wells and tube wells mostly in the southern part of the basin. In the study area an unconfined aquifer of small patch running from Melolakkkur village and towards Southern end and the depth of the bore wells are ranging from 6 m to 20 m. Groundwater developed in the hard rock regions by means of dug wells which are mostly tapping weathered zone and generally yield about 200 m 3 /day. Most of the wells are large diameter dug wells 7 to
10 m diameter with a depth of 9 m to 20 m depending on the weathering and a joint is feasible.

8. Natural Disaster / Hazard

265. According to GSHAP data, the state of Tamil Nadu falls mostly in a region of low seismic hazard with the exception of western border areas that lie in a low to moderate hazard zone. Tiruvannamalai lies in a low hazard region. As per the 2002 Bureau of Indian Standards (BIS) map, Tamil Nadu and Puducherry fall in Zones II and III. Historically, parts of this region have experienced seismic activity in the M5.0 range.

9. Ambient Air and Noise Quality

266. The air environment of the subproject areas is generally found to be good and is free from industrial pollution. The ambient air quality in Poondi Arugar temple,Tiruvannamalai District is perceived to be within acceptable standards. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period. Impacts on air quality (if any) during construction stage are due to operation of various construction equipment and transport vehicles. Consequently, although emissions of common air contaminants (CAC) and fugitive dust may be elevated in proximity to the active work sites, this impact will be of short-term and localized to the immediate vicinity of the project site.

267. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land filling of residual wastes). Given the subproject‘s relatively minor contribution to CAC and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible during construction.

268. Most of the subproject area is in a quiet environment. Noise intensive industrial operations

are not observed in the project influence area. Present ambient noise levels, both in the day and night time, are perceived to be well within permissible levels. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period.

269. Noise levels in the immediate proximity of most work sites are expected to increase during construction. The duration of this exposure will be relatively brief. This exposure represents temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the subproject operations will be largely imperceptible as civil works will be confined in relatively small sites within the district proper.

270. Since the subproject will be built in existing infrastructure, it will not conflict with existing or planned land use. However, traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads, sidewalk closures, traffic delays and detours, parking modifications, and increased volumes of construction–related traffic. There should be improved traffic movement along the access routes once construction is completed. During operations of the improved infrastructure and services, added residential developments, commercial and business facilities and increased densities are expected to develop and enhance the subproject area. This can be considered a long-term cumulative benefit of the subproject. (Refer Environmental Management plan for Subproject Specific impacts and their mitigation measures).

271. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and CAC emissions will occur in proximity to subproject work sites during construction, due to their short term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The subproject operations will benefit the general public by contributing to the long-term improvement of tourism in Tamil Nadu and livelihood opportunities to the local people.

B. Socio-economic and Cultural Environment

1. Trade and Commerce

272. Presently, the economy is solely dependent on tourism business and competition from other towns and other states has altered the potentials of the town leading to reduced growth rates and inflow of floating population.

2. Administration

273. The Tiruvanamalai district is one of the 32 districts in the Tamilnadu State of India and occupies an area of 6191 km². According to 2011 census,Tiruvanamalai district had a population of 2,464,875. Major towns are Tiruvanamalai, Arani, Chengam, Polur, Thandarampattu, Vandavasi, Kalasapakkam, Chetpet, Cheyyar, and Vembakkam. Koolamandal Gangaikonda choleeswarer Temple, a Hindu temple dedicated to Lord Shiva located in the village of Koolamandal in the Cheyyar Taluk of Tiruvanamalai.The temple complex covers 1.92 acres. The temple is maintained and administered by the State Archaeological Department of the Government of Tamil Nadu.

274. Important places to visit in Tiruvannamalai District:

(i) **Sathanur Dam :** It is located on the *Pennar River,* 35 Km from Tiruvannamalai. It is a quiet and beautiful location for tourists. Exotic landscape, Children Park with a mini-zoo and a Crocodile farm run by the State Forest Department are some added

attraction to the Dam area for both Children and Elders as well. Public Transport facilities are available from Tiruvannamalai .

(ii) **Ramana Ashram** : Raman Maharishi, the 20th century saint lived here and taught simple way of life. This Ashram developed and maintained by Sri Ramana Maharishi's disciples attracts tourists from all over the world. Sri Ramana Maharishi [1879 – 1950] is a 20th Century Saint. He was named as Venkatraman by his parents. Enlightened in the year 1986 at the age of 16, soon attracted devotees into his cult. His simple and effective meditation practices and divine sermons to understand humanity and divinity

(iii) attracted devotees. They grew In numbers and strength as the days and years passed by and started addressing him as Maharishi. He attained mukthi in the year 1950. Kandashramam, where Ramana Maharishi meditated during his earlier days is on the Girivalam path.

(iv) **Javadu Hills :** It is located at an altitude averaging between 3,600–3,800 feet and 75 Km away from Tiruvannamalai, on the Northwestern Part and forms a part of *Eastern Ghats.* The cliffs and precipices of hills allure and excite tourists. **Beema falls, Komutteri Lake, Kavalur Observatory, Amirthi Forest and the Glass House**are some places of interest on this hill zone.

(v) **Kavalur Observatory :** It is 11 Km from Jamunamarathur near the Vellore border. This is the biggest observatory in Asia under the control of Government of India. **Astronomy, Stargazing and research on stars are the main** activities of this observatory. Scientists from all over the country and abroad visit this research centre for their studies. Computer controlled Big telescope attracts the tourists in numbers and strength

3. Area population

275. The population plays an important role for the further development of the water resources and agricultural activities. The population density of this basin is 457 persons per sq km which is well known the Tamil Nadu state has the average of 480 persons/sq km. The depth bar graph in Figure 4.9 has shown the rural and urban population distribution of Tiruvannamalai and Villupuram district. From the bar graph Figure 4.9 that the 82% people living in the rural and 18% of people livng in urban settlement of Tiruvannalai District and in the Villupuram District 86% of the people living in the rural and 14% people living in the urban as per 2001 census. Due to the growth of rural population in the recent decades increase pressure on the groundwater, drainage and sewage, intensive cultivation. From the Table 4.8 shows the ratio of females to males in a population and also defined as the proportion of males in the population of the districts.

4. Languages

276. Tamil is the only official language spoken in this city. Being a small town, people from other states and ethnicities aren't seen. Some people connected to the temple tourism industry may speak a bit of English for the convenience of tourists but it will be very limited.

5. Sanitation and Sewage Disposal

277. There is no underground drainage system in Tiruvannamalai Municipality. Disposal of Night Soil is normally by way of individual facilities and liquid waste (Sullage and Kitchen Waste) is through the open drains.

278. The main mode of individual disposal in the town is through septic tanks, low Cost Sanitation units and through public conveniences. A phenomenal 38% of the population do not

have access to safe disposal systems 3. Forty five percent of the population has resorted to private arrangements, in the form of septic tanks.

6. Solid waste Management

279. Tiruvannamalai town generates 52 Tons of Solid Waste per day out of this nearly 40 MT of the Solid Waste being collected, transported and disposed daily, which works to per capita generation of 250 gms./day. The efficiency of the present mechanism is able to collect 75% of the total waste generated in the town. The Urban Local Body also carry out weekly mass waste cleaning programme to clear the left out wastes by making extra vehicle trips in the town. The total garbage collected constitutes 48% of the domestic wastes 42% commercial wastes and 10% of construction wastes

7. Site Details

280. The site is free from encumbrances and is freely available with the Government of Tamil Nadu. Further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with the present manager of the Tamil Nadu Hotel. Site. The site details are given in the Table 2(g) below along with the proposed site layout in Figure 4(g).

Table 8(g): Site Details

	Description	**Yes / No**
1	Protected area	No
2	Archaeological site	No
3	Forest area	No
4	CRZ area	No

Notes: Protected Area includes wildlife sanctuary, bird sanctuary, or national park; CRZ=Coastal Regulation Zone.

Figure 4(g): Site Layout

(h) Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at Kattabomman kottai at Panchalankurichi, Tuticorin District:

A. Physical Environment

281. Panchalankurichi has a plain terrain of alluvial soil consisting of sand, silt and clay. Surface water canals contribute 89% to irrigation, while the rest 11% is accounted by dug wells and tube wells. Paddy is the major crop while the others being black gram, green gram, ground nut and gingily.

282. The subproject site is a barren land in the possession of the Department of State Archaeological and thus the site does not require any land acquisition. No protected species have been recorded in this site. No natural or critical habitats being impacted by the subproject and no loss of biodiversity. Site is located in or immediately adjacent to habitats altered for human use (open yards, existing facilities, roadsides, pathways, etc.). Civil works are limited on existing structures.

1. Climate

283. The site location experiences tropical **climatic** conditions characterized with immensely hot summer, gentle winter and frequent rain showers. Summer extends between March and June when the climate is very humid. district registers the maximum temperature of 39 °C (102 °F) and the minimum temperature of 32 °C (90 °F).

2. Geographical features

284. The town is located at 8°48′N 78°8′E at a distance 3 kilometers from the Bay of Bengal.

3. Accessibility

285. The nearest airport is Civil Airport (TCR) at Tuticorin, Tamil Nadu, which is 30 km away from Panchalankurichi and is 147 km away from Madurai Airport (IXM), Madurai, Tamil Nadu. Railway Station is about 30 km from Panchalankurichi. There are frequent bus services to and from Thootukudi, Thirunelveli, Kovilpatti, Chennai.

4. Geomorphology

286. The district is a plain terrain with a gentle slope towards east in the northern and central parts and towards south in the southern part. The maximum surface elevation is about 30 m a msl in the western part of the district.

287. The prominent geomorphic units identified in the district through interpretation of Satellite imagery are: (i) deltaic plain, (ii) pediment and buried pediment, (iii) natural levee-swale, (iv) lagoon/backwater coastal plain, and (v) beach and beach ridges.

288. Major part of the district including. Sedimentary plain consisting various landforms like natural levee, swale and marshy area, lagoon/back water coastal plain and beach ridges are seen in the southern part of the district.

5. Soil

289. The district has mainly alluvial soil consisting of sand, silt and clay.

6. Hydrogeology

290. The entire district is covered by semi-consolidated formations consisting of sand, silt and clays (Plate-II). Ground water occurs under water table, semi-confined and confined conditions. The important aquifer systems in the district are: (i) Lower Miocene deeper aquifers, and (ii) Pliocene Quaternary shallow aquifers. The Lower Miocene Deeper Aquifers are the deeper aquifer system which can be divided into two hydraulically interconnected aquifers namely; (i) Lower Orathanadu aquifer zone, and (ii) the upper of main flowing aquifer zone.

7. Groundwater Quality

291. Ground water in phreatic aquifer in district, in general, is colorless, odorless and slightly alkaline in nature. The specific electrical conductance of ground water in phreatic (in Micro Seimens/centimeter at 25º C).

292. It is observed that the ground water is suitable for drinking and domestic uses, in general, and all the constituents are within the permissible limits for domestic use.

8. Natural Disaster / Hazard

293. According to GSHAP data, the state of Tamil Nadu falls mostly in a region of low seismic hazard with the exception of western border areas that lie in a low to moderate hazard zone.

Ambient Air and Noise Quality

294. The air environment of the subproject areas is generally found to be good and is free from industrial pollution. The ambient air quality in Panchalankurichi, District is perceived to be within acceptable standards. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period. Impacts on air quality (if any) during construction stage are due to operation of various construction equipment and transport vehicles. Consequently, although emissions of common air contaminants (CAC) and fugitive dust may be elevated in proximity to the active work sites, this impact will be of short-term and localized to the immediate vicinity of the project site.

295. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land filling of residual wastes). Given the subproject‘s relatively minor contribution to CAC and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible during construction.

296. Most of the subproject area is in a quiet environment. Noise intensive industrial operations are not observed in the project influence area. Present ambient noise levels, both in the day and night time, are perceived to be well within permissible levels. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period.

297. Noise levels in the immediate proximity of most work sites are expected to increase during construction. The duration of this exposure will be relatively brief. This exposure represents temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the subproject operations will be largely imperceptible as civil works will be confined in relatively small sites within the district proper.

298. Since the subproject will be built in existing infrastructure, it will not conflict with existing or planned land use. However, traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads, sidewalk closures, traffic delays and detours, parking modifications, and increased volumes of construction–related traffic. There should be improved traffic movement along the access routes once construction is completed. During operations of the improved infrastructure and services, added residential developments, commercial and business facilities and increased densities are expected to develop and enhance the subproject area. This can be considered a long-term cumulative benefit of the subproject. (Refer Environmental Management plan for Subproject Specific impacts and their mitigation measures).

299. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and CAC emissions will occur in proximity to subproject work sites during construction, due to their short term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The subproject operations will benefit the general public by contributing to the long-term improvement of tourism in Tamil Nadu and livelihood opportunities to the local people.

B. Socio-economic and Cultural Environment

1. Trade and Commerce

300. Presently, the economy is solely dependent on tourism business and competition from other towns and other states has altered the potentials of the town leading to reduced growth rates and inflow of floating population.

2. Administration

301. The District of was carved out as a separate district. There are 3 Revenue Divisions, 8 Taluks, 10 Blocks, 2 Municipalities and 19 Town Panchayats in District.

302. Important places to visit in :

(i) **Kalakkad wildlife sanctuary**. The Kalakkad Wildlife sanctuary is one of the few national parks in South India that house the Tiger. Lion tailed macaque, Nilgiri langur, bonnet macaque, langur, Nilgiri tahr, sambar, sloth bear, gaur, elephant, flying squirrel, panther, wild dog and pangolin are some of the other animals found here.

(ii) **Kalukumalai.** Kalugumalai got its name from the hill of the same name which translates to "Hill of Vultures." It is a small panchayat town of district but is visually beautiful and has rich historical ties. It is believed to be an important Jain settlement where Lord Mahavir used to preach and be worshipped. A must visits
for Jains. It is famous mainly for its rock cut Kalugasalamoorthy Temple, monolithic Vettuvan Koil and Kalugumalai Jain Beds.

(iii) **Fort**. It is Tuticorin Port, one of the major trading ports in India, is located in Tuticorin

in the South Indian state of Tamil Nadu. Today, the port is known as the V.O.Chidambaranar Port. It is an artificial port and hence is one of the best engineering marvels ever created in India. With its massive size, it takes the second place in the list of the largest ports in India. This port also is the fourth largest container terminal in the country. The operations and the management of the port make it the Nation's Premier Port after Sethusamudram Shipping Canal Project. It is most often compared with the Port of Singapore which is the second-busiest ports in the world. V.O.Chidambaranar Port was declared to be a major port in India on 11 July 1974. The port functions all through the year. In Tamil Nadu, it is the third International Port and the second All-Weather Port. Tuticorin is famously known as the City of Pearls and is also famously known for its Ports. The location of the port is a strategically planned on the south-eastern coast of India and lies close to the east-west International sea route in Gulf of Mannar. With India to its west and Sri Lanka to its south-east, the Tuticorin Port is quite well protected from cyclonic winds and storms. It is the only port in South India that provides weekly direct container services to the United States of America and Europe

(iv) **Beach**. Although Tuticorin has so much more to offer than just the beach, it still is a beach town and not going to the beach might make you miss out on the fun. The beach, especially post sunset, is buzzing with people, both tourists and local residents. A lot of small vendors are selling different kinds of snacks, coconut water etc. The sunset at the Tuticorin beach is as mesmerizing as any other.

3. Area Population

303. As of 2001 India census, Panchalankurichi had a population of 17,527. Males constitute 51% of the population and females 49%. Panchalankurichi has an average literacy rate of 68%, higher than the national average of 59.5%; with 53% of the males and 47% of females literate. 13% of the population is under 6 years of age.

304. This village is 30 km from Tuticorin city. A narrow road between Spic Nagar and Muthaiyapuram takes you to this beautiful village. Either side of the road you can find beautiful greenery. "As far as Panchalankurichi is concerned, banana plantation is the main occupation."

4. Languages

305. In addition to the Tamil language, English, Urdu are also spoken by the local People. Due to its proximity to the neighboring states and it being a popular tourist spot, English, Kannada and Malayalam are also spoken and understood to an extent.

5. Sanitation and Sewage Disposal

306. The current sewerage system for disposal of sullage is through septic tanks and public conveniences. The same shall be maintained for this site.

6. Solid Waste Management

307. No formal collection system from the municipality is present. The solid waste is being dumped in dump yards and / or is being incinerated in the open.

7. Site Details

308. The site is free from encumbrances and is freely available with the Government of Tamil

Nadu. Further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with the present manager of the Site. The site details are given in the Table 2(h) below along with the proposed site layout in Figure 4(h).

Table 9(h): Site Details

	Description	**Yes / No**
1	Protected area	No
2	Archaeological site	Yes
3	Forest area	No
4	CRZ area	No

Notes: Protected Area includes wildlife sanctuary, bird sanctuary, or national park; CRZ=Coastal Regulation Zone.

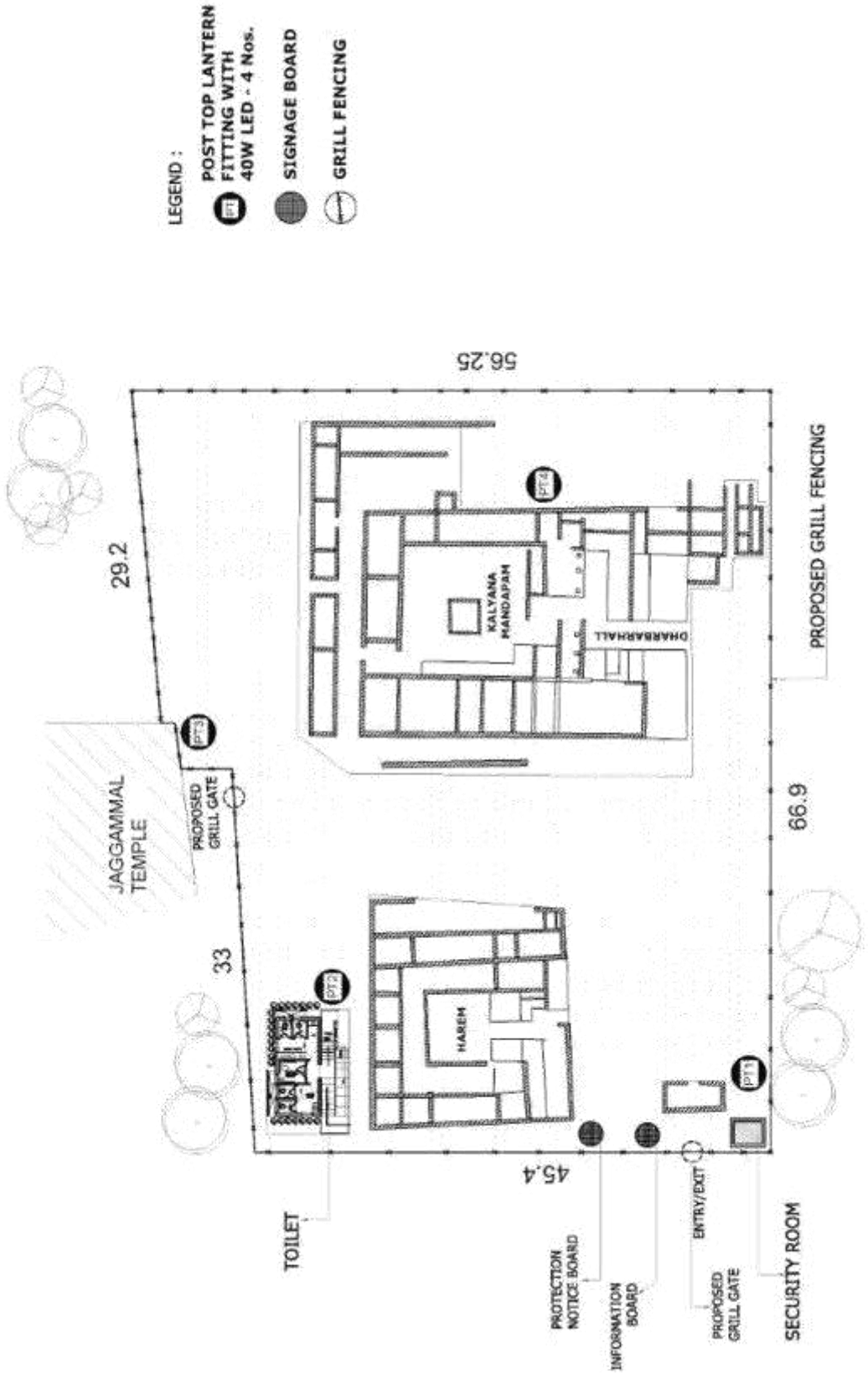


Figure 4(h): Site Layout Plan

(i) Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at Dutch Dome, Nagapattinam District:

A. Physical Environment

309. Sandy coastal alluvium and black soil types cover 88.71% and 6.58% respectively in this district. The other soils in the district comprise 4.71%. The soil of the district is mostly alluvial but varies greatly in quality. The rich soil is found in the north and the south of the railway line between Mayiladuthurai and Thiruthuraippundi. The saline soil is found in the Tirutturaippundi and Nagapattinam taluks where the drainage is very defective..

310. One of the major economic activities of the district, agriculture contributes a higher share of rice production in the State. Important crops in the district include rice, groundnut, pulses, gingelly, sugarcane and cotton.

Details of important crops in district

Sl.No.	Name of the crop	Area in ha
1	Rice	1,54,945
2	Sugar cane	8,824
3	Cotton	650
4	Groundnut	5,820
5	Gingerly	2,950
6	Green gram	17,130
7	Black gram	48,400
8	Vegetables	746
9	Coconut	3,116

1. Climate

311. The average maximum temperature of the district as a whole is about 320 C and the average minimum temperature is 24.60C. Dust storms whirl winds and dusty winds blow from various quarters towards the end of May. The Southwest winds sets in during April, it is the strongest in June and continues till September. Northeast monsoon starts during the month of October and blow till January. Cyclonic storm with varying wind velocity affects once in 3 or 4 years during the months of November-December. The storms affect the plantation crop. During Southwest monsoon the air is calm and undisturbed. The Northeast monsoon which starts in October and ends in December contributes about 60% of the total annual rainfall. The southwest monsoon rains occur from June to September.

2. Geographical features

312. Nagapattinam lies between Northern Latitude 10.7906 degrees and 79.8428 degrees Eastern longitude. The district spreads over an area of 2,715.83 sq.km

3. Accessibility

313. The nearest airport to Nagapattinam is Civil Airport (TRZ) at Tiruchirappalli, Tamil Nadu, which is 140 km away from Nagapattinam. There are frequent bus services to and from Chennai, Cuddalore, Pondicherry, Mayiladuthurai ,Thiruvarur and Vellankanni,.

4. Geomorphology

(i) The present geomorphic set up in the district is the result of action of the major rivers with their distinct tributaries, oscillations in the sea level, tidal effects of Bay of Bengal and forces of wind. The landforms are delineated under erosional and depositional regime. The depositional regime comprises of a coastal plain under marine influence, a flood plain of fluvial regime with an intermixing section of both fluvial and marine influence. The entire area is a peneplained terrain with a gentle slope towards east and southeast. The maximum elevation is about 21 m above mean sea level in the west.

Soil

(ii) The major part of the district is covered by black clay and isolated patches of brown clay loam in the area bordering the NE boundary of Karaikal Region is seen. Some patches of Arenaceous soils are also found along the coastal line.

6. Hydrogeology

316. The entire district covered by semi-consolidated formations consisting of sand, silt and clays (Plate-II). Ground water occurs under water table, semi-confined and confined conditions. The important aquifer systems in the district are i) Lower Miocene deeper aquifers and ii) Pliocene – Quaternary shallow aquifers.

7. Groundwater quality

317. Ground water in phreatic aquifers, in general, is colourless, odourless and predominantly alkaline in nature. In more than 50% of the samples, pH value is >8.00. The specific electrical conductance of groundwater in the phreatic zone during May 2006 was in the range of 714 to 3640 micro Siemens at 25° C, in the district. Conductance below 750 has been observed only in select pockets of the district. Saline ground waters (EC>10,000) are observed at southern part of the district.

318. It is observed that the ground water is suitable for drinking and domestic uses in respect of all the constituents except total hardness and nitrate in about 83% of samples. The hardness as CaCO3 as well as nitrate is observed to be in excess of permissible limits of drinking water standard of BIS, in about 17% of samples. The incidence of high total hardness is attributed to the composition of litho units constituting the aquifers in the district, whereas nitrate pollution is most likely due to the use of fertilizers for agriculture and other improper waste disposal practices. With regard to irrigation suitability based on specific electrical conductance and Sodium Adsorption Ration (SAR), it is observed that ground water in the phreatic zone may cause high to very high Salinity hazard and medium to very high alkali hazard when used for irrigation. Proper soil management strategies are to be adopted in the major part of the district while using ground water for irrigation.

8. Natural Disaster / Hazard

319. A disaster is not bowed by political, social, economic or geographic boundaries. When it occurs, it impacts all. The impacts such as a calamity do not remain confined to its physical components, but transcends beyond it and impacts the social-economic conditions of affected persons and places. Hence, disaster management to be holistic should not remain in the domain of relief centric approach, but go beyond and before to assess the risk factors from available past experiences to create a rent paradigm to plan for future social risk management. Fuzzy logic approach could be only the best ways of Risk Management.

9. Ambient Air and Noise Quality

320. The air environment of the subproject areas is generally found to be good and is free from industrial pollution. The ambient air quality in Nagapattinam District is perceived to be within acceptable standards. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period. Impacts on air quality (if any) during construction stage are due to operation of various construction equipment and transport vehicles. Consequently, although emissions of common air contaminants (CAC) and fugitive dust may be elevated in proximity to the active work sites, this impact will be of short-term and localized to the immediate vicinity of the project site.

321. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land filling of residual wastes). Given the subproject‘s relatively minor contribution to CAC and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible during construction.

322. Most of the subproject area is in a quiet environment. Noise intensive industrial operations are not observed in the project influence area. Present ambient noise levels, both in the day and night time, are perceived to be well within permissible levels. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period.

323. Noise levels in the immediate proximity of most work sites are expected to increase during construction. The duration of this exposure will be relatively brief. This exposure represents temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the subproject operations will be largely imperceptible as civil works will be confined in relatively small sites within the district proper.

324. Since the subproject will be built in existing infrastructure, it will not conflict with existing or planned land use. However, traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads, sidewalk closures, traffic delays and detours, parking modifications, and increased volumes of construction–related traffic. There should be improved traffic movement along the access routes once construction is completed. During operations of the improved infrastructure and services, added residential developments, commercial and business facilities and increased densities are expected to develop and enhance the subproject area. This can be considered a long-term cumulative benefit of the subproject.

325. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and CAC emissions will occur in proximity to subproject work sites during construction, due to their short term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The subproject operations will benefit the general public

by contributing to the long-term improvement of tourism in Tamil Nadu and livelihood opportunities to the local people.

B. Socio-economic and Cultural Environment

1. Trade and Commerce

326. Presently, the economy is solely dependent on tourism business and competition from other towns and other states has altered the potentials of the town leading to reduced growth rates and inflow of floating population.

2. Administration

327. District Collector, Nagapattinam is the supreme authority of the district. He controls the Revenue unit and Panchayat Development units of the district administration through his Personal Assistants, General and Panchayat Development at his Head Quarters. District Supply officer, manages the Public Distribution System in co-ordination with the Joint Registrar of Co-operatives, while the Special Deputy Collector for Public Grievance Redressed Cell, attends to the grievances submitted to the Collector. District Collector is having two district level officers, one for the welfare of the Adi Dravidar and another for the Backward Classes and Minorities.

328. District Revenue Officer, Nagapattinam is assisting the District Collector in all his responsibilities. He is the authority for the land matters of the district. Revenue Collection in the district is regulated by the District Revenue Officer. The DRO grants various licenses, in the capacity of Additional District Magistrate.

329. The Public Health system in the district and the maintenance of Government Hospitals are supervised by the District Collector through the Joint Director of Public Health, Nagapattinam.

330. The Deputy Director of Public Health, Nagapattinam is maintaining the rural health system and Primary Health Centres available at the villages under the supervision of the District Collector. The District Collector monitors the Agricultural and Animal Husbandry activities in this district through the Joint Director of Agriculture and Assistant Director of Animal Husbandry respectively at Nagapattinam.

331. **Important places to visit in Nagapattinam:**

(i) Abirami Amman Temple- It is a Thirukadaiyur based temple.
(ii) Murugan Temple- This temple is devoted to Lord Murugan and is based in Ettukudi.
(iii) Our Lady of Good Health- This church is positioned in Velankanni.
(iv) Point Calimere Wildlife Sanctuary- This sanctuary is located in Kodikkarai and is the home to a number of mammal species like spotted deer and semi wild ponies and water birds such as flamingos and herons.
(v) Saneeswara Baghawan Temple- This temple of Nagapattinam is situated in Thirunallar.
(vi) Saraswathi Amman Temple
(vii) Shri Naganatha Swami Temple- Based in Keelaperumpallam this temple is the abode of Kedhu.
(viii) Singaravelan Temple- Situated at Sikkal this temple is dedicated to Lord Murugan and its pillars are adorned with exquisite and intricate carvings as well as colored paintings belonging to the historical time.
(ix) Tharangambadi Fort- Located in Tranquebar this is a Dutch fort that even houses a museum and is maintained by the Archeological Department of the State Government of Tamil Nadu.

(x) Thiru Kayarohana Udanurai Neelayadakshi Amman Temple- This temple of Lord Shiva houses the idol that portrays one of the seven forms of dance performed by Lord Shiva.
(xi) Thirumullaivasal- This place is known for the panoramic natural beauty of its sea beach and the ancient Arulmigu Mullaivananathar Temple.
(xii) Thiru Soundararaja Perumal Temple- This is the 19th Divya Desam or Vishnu temple.
(xiii) Vaitheeswarankoil- Even called Pullirukkuvellur this temple is the seat of God Vaithiyanathan and Goddess Thaiyalnayagi.
(xiv) Velankanni- Being the location of the Velankanni Basilica or the Arokiya Madha Church this place is among the famous Christian pilgrimage centers in the country.
(xv) Mini Museum
(xvi) Nagore Dargah
(xvii) Shri Arulmigu Sattanatha Swami Temple at Sirkazh
(xviii) Varadharaja Perumal Koil
(xix) Vedaranyam Temple

3. Area Population

332. As per provisional reports of Census India, population of Nagapattinam in 2011 is 102,905; of which male and female are 50,793 and 52,112 respectively.

4. Languages

333. In addition to the Tamil language, English, Urdu are also spoken by the local People. Due to its proximity to the neighboring states and it being a popular tourist spot, English, Kannada and Malayalam are also spoken and understood to an extent.

5. Sanitation and Sewage Disposal

334. The current sewerage system for disposal of sullage is through septic tanks and public conveniences. The same shall be maintained for this site.

6. Solid Waste Management

335. No formal collection system from the municipality is present. The solid waste is being dumped in dump yards and / or is being incinerated in the open.

7. Site Details

336. The site is free from encumbrances and is freely available with the Government of Tamil Nadu. Further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with the present manager of the Site. The site details are given in the Table 2(i) below along with the proposed site layout in Figure 4(i).

Table 10(i): Site Details

	Description	**Yes / No**
1	Protected area	No
2	Archaeological site	No
3	Forest area	No
4	CRZ area	No

Notes: Protected Area includes wildlife sanctuary, bird sanctuary, or national park; CRZ=Coastal Regulation Zone.

Figure 4(i): Site Layout

(j) Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at Governor House at Tharangambadi, Nagapattinam District:

A. Physical Environment

337. Tharangambadi has a sandy coastal alluvium and black soil types cover 88.71% and 6.58% respectively in this district. The other soils in the district comprise 4.71%. The soil of the district is mostly alluvial but varies greatly in quality. The rich soil is found in the north and the south of the railway line between Mayiladuthurai and Thiruthuraippundi. The saline soil is found in the Tirutturaippundi and Nagapattinam taluks where the drainage is very defective. The major part of the district is covered by black clay and isolated patches of brown clay loam in the area bordering the NE boundary of Karaikal Region are seen. Some patches of Arenaceous soils are also found along the coastal line.

338. The agricultural lands are brought under aquaculture use. The mushrooming and unregulated growth of aquaculture may lead to an alarming magnitude of pollution. In the eastern part of the district near the coast, a ground water is saline. The fresh water pocket in the sand dune areas are used for drinking purposes. The discharge of untreated wastewaters of aquaculture farms and chemicals used for the growing prawns will also affect the shallow fresh water pockets.

339. The subproject site is located at Tharangambadi is the headquarters of Tharangambadi taluk, Nagapattinam District. 15 km north of Karaikal, near the mouth of a15 km north of Karaikal, near the mouth of a distributaries of the Cauvery River. The subproject site is a barren land in the possession of the Department of Tamilnadu State Department of Archaeology and thus the site does not require any land acquisition No protected species have been recorded in this site. No natural or critical habitats being impacted by the subproject and no loss of biodiversity. Site is located in or immediately adjacent to habitats altered for human use (open yards, existing facilities, roadsides, pathways, etc.). Civil works are limited on existing structures.

1. Climate

340. Temperature in Nagapattinam district is in the range of Maximum 32.00˚C and Minimum 24.60˚C. Normal rainfall during North East Monsoon varies between 908.8 mm to 969.2 mm and during South West Monsoon it varies between 250.60 and 265.2 mm.

2. Geographical features

341. The town is situated on 11.03° north latitude and 79˚ 84‘ east longitude, 15 km north of Karaikal, near the mouth of a15 km north of Karaikal, near the mouth of a distributaries of the Cauvery River.

3. Accessibility

342. Tharangambadi is located on the National Highway (NH 45A) connecting Pondicherry and Nagapattinam. Tharangambadi is well connected with Nagapattinam, the district headquarters and Chennai, the state headquarters and with other towns of Karaikal, Cuddalore and Velankanni by road transport facilities. The main mode of transportation is buses operated mainly by Government Transport Corporation and by some private agencies. The nearest airport is located in Trichy at a distance of 128 Km. Tharangambadi itself has one railway station

connecting Tharangambadi and Mayiladurai but not in much usage as on today. Laying on the Coromandel Coast, Tranquebar is a Vestige of Danish Heritage in India. Distance from Major Settlements and important tourist destinations are given here under: • 277 kms from Chennai • 117 kms from Puducherry Distance from other important Tourist Destinations • 25 kms from Poompuhar • 52 kms from Chidambaram • 17 kms from Karaikal • 26 kms from Nagore, Nagapattinam.

4. Geomorphology

343. The present geomorphic set up in the district is the result of action of the major rivers with their distinct tributaries, oscillations in the sea level, tidal effects of Bay of Bengal and forces of wind. The landforms are delineated under erosional and depositional regime. The depositional regime comprises of a coastal plain under marine influence, a flood plain of fluvial regime with an intermixing section of both fluvial and marine influence. The entire area is a pene plained terrain with a gentle slope towards east and southeast. The maximum elevation is about 21 m above mean sea level in the west.

344. The prominent geomorphic units identified in the district through interpretation of Satellite imagery are: (i) deltaic plain, (ii) pediment and buried pediment, (iii) natural levee-swale, (iv) lagoon/backwater coastal plain, and (v) beach and beach ridges.

345. The major part of the district is covered by black clay and isolated patches of brown clay loam in the area bordering the NE boundary of Karaikal Region are seen. Some patches of Arenacious soils are also found along the coastal line.

5. Soil

346. Tharangambadi has a sandy coastal alluvium and black soil types cover 88.71% and 6.58% respectively in this district. The other soils in the district comprise 4.71%. The soil of the district is mostly alluvial but varies greatly in quality

6. Hydrogeology

347. Major water bearing formations - Lower Miocene deeper aquifers and Pliocene quaternary shallow aquifers 2. Pre- monsoon depth to water level (May 2006) - 2.0 – 9.45 m bgl 3. Post- monsoon depth to water level (Jan‘2007) - GL -2.641 m bgl 4. Long term water level trend in 10 years (1998-2007) (m/yr) Annual Rise - Min: Nil, Max: 0. 31 Annual falls - Min: 0.022, Max: 0. 29.

348. The hydrogeological environment in the Nagapattinam district has been subjected to pollution considerably. The eastern part of the district being tail end of the canal system, and due to inferior quality of ground water, the agricultural prosperity in the eastern part attained a setback. The agricultural lands are brought under aquaculture use. The mushrooming and unregulated growth of aquaculture may lead to an alarming magnitude of pollution.

349. In the eastern part of the district near the coast, a ground water is saline. The fresh water pocket in the sand dune areas are used for drinking purposes. The discharge of untreated wastewaters of aquaculture farms and chemicals used for the growing prawns will also affect the shallow fresh water pockets. Agriculture, which is the mainstay of the populace of the district, forms the chief socio-economic base. The environmental hazards may arise in two kinds. (1) Due to the infiltration of irrigation water saturated with chemicals, insecticides,

pesticides, fertilizers (2) the water of Cauvery is highly polluted with industrial effluents. The river water is reported to be polluted by the effluents discharged into the river by several textile processing industries in the upstream.

7. Groundwater Quality

350. Presence of chemical constituents more than permissible limit…TH as CaCO3 and NO3 ii. Type of wate NaCl, Mg HCO3 and NaHCO3 • Ground water in phreatic aquifers, in general, is colourless, odourless and predominantly alkaline in nature. In more than 50% of the samples, pH value is >8.00.

351. The specific electrical conductance of groundwater in the phreatic zone during May 2006 was in the range of 714 to 3640 micro Siemens at 25° C, in the district. Conductance below 750 has been observed only in select pockets of the district. Saline ground waters (EC>10,000) are observed at southern part of the district.

352. It is observed that the ground water is suitable for drinking and domestic uses in respect of all the constituents except total hardness and nitrate in about 83% of samples. The hardness as CaCO3 as well as nitrate is observed to be in excess of permissible limits of drinking water standard of BIS, in about 17% of samples. The incidence of high total hardness is attributed to the composition of litho units constituting the aquifers in the district, whereas nitrate pollution is most likely due to the use of fertilizers for agriculture and other improper waste disposal practices.

353. With regard to irrigation suitability based on specific electrical conductance and Sodium Adsorption Ration (SAR), it is observed that ground water in the phreatic zone may cause high to very high Salinity hazard and medium to very high alkali hazard when used for irrigation. Proper soil management strategies are to be adopted in the major part of the district while using ground water for irrigation. 1. It is observed that the ground water is suitable for drinking and domestic uses, in general, and all the constituents are within the permissible limits for domestic use, except at Muthupetai where Chloride is found to be in excess of the permissible limit, with regard to irrigation suitability based on specific electrical conductance and Sodium Absorption Ratio (SAR). It is observed, that the phreatic aquifer in a major part of the district has medium to high salinity. It is recommended that proper soil management strategies may be adopted.

8. Natural Disaster / Hazard

354. According to GSHAP data, the state of Tamil Nadu falls mostly in a region of low seismic hazard with the exception of western border areas that lie in a low to moderate hazard zone. Puducherry lies in a low hazard region. As per the 2002 Bureau of Indian Standards (BIS) map, Tamil Nadu and Puducherry fall in Zones II and III. Historically, parts of this region have experienced seismic activity in the M5.0 range.

9. Ambient Air and Noise Quality

355. The air environment of the subproject areas is generally found to be good and is free from industrial pollution. The ambient air quality in Tharangamnadi, Nagapattinam District is perceived to be within acceptable standards. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period. Impacts on air quality (if any) during construction stage are due to operation of various construction equipment and transport vehicles. Consequently, although

emissions of common air contaminants (CAC) and fugitive dust may be elevated in proximity to the active work sites, this impact will be of short-term and localized to the immediate vicinity of the project site.

356. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land filling of residual wastes). Given the subproject‘s relatively minor contribution to CAC and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible during construction.

357. Most of the subproject area is in a quiet environment. Noise intensive industrial operations are not observed in the project influence area. Present ambient noise levels, both in the day and night time, are perceived to be well within permissible levels. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period.

358. Noise levels in the immediate proximity of most work sites are expected to increase during construction. The duration of this exposure will be relatively brief. This exposure represents temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the subproject operations will be largely imperceptible as civil works will be confined in relatively small sites within the district proper.

359. Since the subproject will be built in existing infrastructure, it will not conflict with existing or planned land use. However, traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads, sidewalk closures, traffic delays and detours, parking modifications, and increased volumes of construction–related traffic. There should be improved traffic movement along the access routes once construction is completed. During operations of the improved infrastructure and services, added residential developments, commercial and business facilities and increased densities are expected to develop and enhance the subproject area. This can be considered a long-term cumulative benefit of the subproject. (Refer Environmental Management plan for Subproject Specific impacts and their mitigation measures).

360. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and CAC emissions will occur in proximity to subproject work sites during construction, due to their short term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The subproject operations will benefit the general public by contributing to the long-term improvement of tourism in Tamil Nadu and livelihood opportunities to the local people.

C. Socio-economic and Cultural Environment

1. Trade and Commerce

Major work force in Tharangambadi is still engaged in primary sector activity like fishing and agriculture and its dependency on primary sector is more when compared to district urban and state urban areas. Its economic base is again reflected in its dependency on other service
related activity like Tourism which is more or less equivalent to the Cuddalore district urban and state urban occupational figures.

2. Administration

362. Tharangambadi is selection grade town Panchayat and it is ruled by local selfgovernment in the form of elected body of councilors headed by the chairman. Citizens of Tharangambadi town elect the councilors and the chairman. There are total 18 wards and from each ward one councilor is elected. Governor‘s house is under the control of Tamilnadu State Department of Archaeology, Government of Tamil Nadu. The site Governor‘s house is being set-up and run by the Department.

363. **Important places to visit in Nagapattinam:**

Tharangambadi town has several places of interest for the tourism. The majestic Dansborg Fort, the New Jerusalem Church and the quaint Danish homes off King's Road in Tranquebar are popular sightseeing spots. The first building that welcomes the visitor at the entrance of the town is an old gateway with wooden doors, builtbytheDanishin1792.The arch leads to the main street of the town, called King Street. Along this grandly named Road is a memorial at the spot where the Danes landed.

(i) Danish Fort: It is a Danish 17th century fort facing the coast. The construction of the fort began immediately after the arrival of the first Danish trading expedition and the establishment of a treaty regulating trading rights between the NayakRaghunatha in Thanjavur and the Danish East India Company in 1620. Until the end of the 17th century the fort was used for residential and storage purposes; subsequent increase in population forced the Danes to move out and occupy surrounding areas as well. While it was previously crumbling away, the Fort has received substantial renovation efforts recently, by both Indian volunteers and Danish non-profit organizations. It houses a small museum inside that has some artifacts and a history of the Danish Settlement Construction of Fort Dansborg started in 1620. Most parts of the fort have been reconstructed several times. The rampart wall is a fairly large four sided structure, with bastions at each cardinal point. A single storied building was constructed along three inner sides of the rampart, with barracks, warehouse, kitchen and jail. The rooms on the southern side remain in good condition, but the rooms on the western and northern sides have been substantially damaged. On the eastern side of the fort, there was a two storied building facing the sea. It was the main building of the fort. The vaulted lower storey served as a magazine and a warehouse, while the vaulted upper storey contained the church and the lodging of the governor, the senior merchants and the chaplain. The sea on the eastern and western side protected the fort. The fort was surrounded by a moat, access to the fort being over a drawbridge. The moat has completely disappeared.

(ii) Danish Museum: The antiquities connected with the colonial period and Danish settlement at Tharangambadi is exhibited. The museum contains porcelain ware, Danish manuscripts, glass objects, Chinese tea jars, steatitle lamps, decorated terracotta objects, figurines, lamps, stones, sculptures, swords, daggers, spears, sudai (stucco) figurines and wooden objects. There is also part of a whale skeleton.

(iii) New Jerusalem Church: Situated on the King's Street was constructed in 1718 by Rev. Bartholomaeus Ziegenbalg, First protestant Missionary. This church was established after the arrival of German missionaries in India, as the existing church proved to be small for the rising Christian population. It was established mainly for the converted Indians. The church has a small cemetery that has tombstones belonging to the 18th century.

(iv) The Zion Church: Consecrated in 1701, it is the oldest protestant Church in India. Prominent with its combination of colonial and Indian architectural features, its construction together with the fortification of the town marked the moving out and

spreading of the Danish population into the surrounding settlement. The structure went through many reconstructions before it reached its present form.

3. Area Population

364. Tharangambadi is a Town Panchayat city in district of Nagapattinam, Tamil Nadu. The Tharangambadi city is divided into 18 wards for which elections are held every 5 years. The Tharangambadi Town Panchayat has population of 23,191 of which 11,061 are males while 12,130 are females as per report released by Census India 2011.

365. Population of Children with age of 0-6 is 2665 which is 11.49 % of total population of Tharangambadi (TP). In Tharangambadi Town Panchayat, Female Sex Ratio is of 1097 against state average of 996. Moreover Child Sex Ratio in Tharangambadi is around 984 compared to Tamil Nadu state average of 943. Literacy rate of Tharangambadi city is 87.87 % higher than state average of 80.09 %. In Tharangambadi, Male literacy is around 92.98 % while female literacy rate is 83.27 %.

366. Tharangambadi Town Panchayat has total administration over 5,482 houses to which it supplies basic amenities like water and sewerage. It is also authorize to build roads within Tharangambadi Town Panchayat limits and impose taxes on properties coming under its jurisdiction. Currently our website doesn't have information on schools and hospital located within Tharangambadi.

4. Languages

367. In addition to the Tamil language, English are also spoken by the local People. Due to its proximity to the neighboring states and it being a popular tourist spot, English, Kannada and Malayalam are also spoken and understood to an extent.

5. Sanitation and Sewage Disposal

368. The current sewerage system for disposal of sullage is through septic tanks and public conveniences. The same shall be maintained for this site.

6. Solid Waste Management

369. No formal collection system from the municipality is present. The solid waste is being dumped in dump yards and / or is being incinerated in the open.

7. Site Details

370. The site is free from encumbrances and is freely available with the Government of Tamil Nadu. Further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with the present manager of the Site. The site details are given in the Table 2(j) below along with proposed site layout in Figure 4(j).

Table 11(j): Site Details

	Description	**Yes / No**
1	Protected area	No
2	Archaeological site	Yes
3	Forest area	No
4	CRZ area	Yes

Notes: Protected Area includes wildlife sanctuary, bird sanctuary, or national park; CRZ=Coastal Regulation Zone.

Figure 4(j): Site Layout

(k) Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at Thadagapureeswarar Temple, Tiruvannamalai District:

A. Physical Environment

371. Thellar has a plain terrain of alluvial soil consisting of sand, silt and clay. Cheyyaru, the tributaries of Palar are the major water bodies around the town. Surface water canals contribute 89% to irrigation, while the rest 11% is accounted by dug wells and tube wells. Paddy is the major crop while the others being black gram, green gram, ground nut and gingily.

372. The subproject site is Located on the State Highways 116. The subproject site is a barren land in the possession of the Department of State Archaeological Department of the Government of Tamil Nadu and thus the site does not require any land acquisition. No protected species have been recorded in this site. No natural or critical habitats being impacted by the subproject and no loss of biodiversity. Site is located in or immediately adjacent to habitats altered for human use (open yards, existing facilities, roadsides, pathways, etc.). Civil works are limited on existing structures.

1. Climate

373. Tiruvannamalai has a tropical climate. The summers are much rainier than the winters in Tiruvannamalai. This location is classified as Aw by Koppen and Geiger. The average annual temperature is 28.2 °C in Tiruvannamalai.

2. Geographical features

374. The town is located at 12°N 79.05° E at distance 27 kilometers from the Bay of Bengal.

3. Accessibility

375. The nearest airport to Thadagapureeswarar temple is Civil Airport (TRZ) at Chennai Tamil nadu , which is 79 Km away from Thadagapureeswarar temple and is 264 km away from Trichy Airport, Tamil Nadu. Kanchipuram Railway Station is about 20.5 km from Thadagapureeswarar temple. There are frequent bus services from Chennai, Tiruvannamalai, Kanchipuram, Villupuram and Vellore.

4. Geomorphology

376. Geomorphology is a tool for searching ground water resources in different geomorphologic land forms and basement rocks formation, plays an important role in the water resources study. The geomorphology map is prepared with the help of satellite imaginaries and aerial photographs in the scale 1:50000. Topographically, this area is generally undulating terrain and flat with a gentle slope towards Southeast.

377. There are number of residual hills and isolated hillocks in the central part of the basin with the maximum elevation of 447m above the mean sea level. There are numerous tanks in the depressed parts of the area, which is mainly rain fed. The drainage is comprised of Cheyyar river. Major geomorphic landform is noticed are pediment, buried pediment shallow, buried pediment deep.

378. Major part of the district Thellar has a plain terrain of alluvial soil consisting of sand, silt and clay. Cheyyaru, the tributaries of Palar are the major water bodies around the town. Surface

water canals contribute 89% to irrigation, while the rest 11% is accounted by dug wells and tube wells. Paddy is the major crop while the others being black gram, green gram, ground nut and gingily.

5. Soil

379. The district has mainly consisting of sandy, Red soil, clay.

6. Hydrogeology

380. Groundwater occurs under water table conditions in weathered, fractured, jointed and faulted portions of crystalline rocks. Groundwater recharge, flow and discharge of the basin are controlled by the basin geomorphology, geology and structural pattern. Crystalline formation comprises composite gneisses and charnockites. Groundwater occurrence is higher in gneissic rocks than in charnockite because the intensity of weathering, joint, fracture is quite higher in gneissic rocks rather than in charnockite.

7. Groundwater Quality

381. Groundwater occurs both under water table and semi-confined conditions and developed through dug-cum-bore wells and tube wells mostly in the southern part of the basin. In the study area an unconfined aquifer of small patch running from Melolakkkur village and towards Southern end and the depth of the bore wells are ranging from 6 m to 20 m. Groundwater developed in the hard rock regions by means of dug wells which are mostly tapping weathered zone and generally yield about 200 m 3 /day. Most of the wells are large diameter dug wells 7 to 10 m diameter with a depth of 9 m to 20 m depending on the weathering and a joint is feasible.

382. It is observed that the ground water is suitable for drinking and domestic uses, in general, and all the constituents are within the permissible limits for domestic use, except at Muthupetai where Chloride is found to be in excess of the permissible limit, with regard to irrigation suitability based on specific electrical conductance and Sodium Absorption Ratio (SAR). It is observed, that the phreatic aquifer in a major part of the district has medium to high salinity. It is recommended that proper soil management strategies may be adopted.

8. Natural Disaster / Hazard

383. According to GSHAP data, the state of Tamil Nadu falls mostly in a region of low seismic hazard with the exception of western border areas that lie in a low to moderate hazard zone. Puducherry lies in a low hazard region. As per the 2002 Bureau of Indian Standards (BIS) map, Tamil Nadu and Puducherry fall in Zones II and III. Historically, parts of this region have experienced seismic activity in the M5.0 range.

9. Ambient Air and Noise Quality

384. The air environment of the subproject areas is generally found to be good and is free from industrial pollution. The ambient air quality in Thadagapureeswarar Temple, Tiruvannamalai District is perceived to be within acceptable standards. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period. Impacts

on air quality (if any) during construction stage are due to operation of various construction equipment and transport vehicles. Consequently, although emissions of common air contaminants (CAC) and fugitive dust may be elevated in proximity to the active work sites, this impact will be of short-term and localized to the immediate vicinity of the project site.

385. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land filling of residual wastes). Given the subproject‘s relatively minor contribution to CAC and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible during construction.

386. Most of the subproject area is in a quiet environment. Noise intensive industrial operations are not observed in the project influence area. Present ambient noise levels, both in the day and night time, are perceived to be well within permissible levels. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period.

387. Noise levels in the immediate proximity of most work sites are expected to increase during construction. The duration of this exposure will be relatively brief. This exposure represents temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the subproject operations will be largely imperceptible as civil works will be confined in relatively small sites within the district proper.

388. Since the subproject will be built in existing infrastructure, it will not conflict with existing or planned land use. However, traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads, sidewalk closures, traffic delays and detours, parking modifications, and increased volumes of construction–related traffic. There should be improved traffic movement along the access routes once construction is completed. During operations of the improved infrastructure and services, added residential developments, commercial and business facilities and increased densities are expected to develop and enhance the subproject area. This can be considered a long-term cumulative benefit of the subproject. (Refer Environmental Management plan for Subproject Specific impacts and their mitigation measures).

389. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and CAC emissions will occur in proximity to subproject work sites during construction, due to their short term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The subproject operations will benefit the general public by contributing to the long-term improvement of tourism in Tamil Nadu and livelihood opportunities to the local people.

D. Socio-economic and Cultural Environment

1. Trade and Commerce

Presently, the economy is solely dependent on tourism business and competition from other towns and other states has altered the potentials of the town leading to reduced growth
rates and inflow of floating population.

2. Administration

392. The District of Tiruvannamalai was carved out as a separate district by detaching Valangaiman Taluk from Villupuram District on 01.01.1997. There are 2 Revenue Divisions, 7 Taluks, 10 Blocks, 4 Municipalities and 7 Town Panchayats in Tiruvannamalai District. Tiruvannamalai was promoted to a first-grade municipality in 1978. The municipality has 30 wards and there is an elected councilor for each of those wards. The functions of the municipality are devolved into six departments: general administration/personnel, engineering, revenue, health, town planning and information technology (IT). All these departments are under the control of a municipal commissioner who is the executive head. The legislative powers are vested in a body of 30 members, one each from the 30 wards. The legislative body is headed by an elected Chairperson assisted by a Deputy Chairperson.

393. Important places to visit in Tiruvannamalai:

(i) **Annamalaiyar Temple** is a Tamil Hindu temple dedicated to the deity Shiva, located at the base of Annamalai hillsin the town of Tiruvannamalai in Tamil Nadu, India. It is significant to the Hindu sect of Saivism as one of the temples associated with the five elements, the Pancha Bhoota Stalas, and specifically the element of fire, or Agni. Shiva is worshiped as Annamalaiyar or

Arunachaleswarar, and is represented by the lingam, with his idol referred to as Agni lingam. His consort Parvatiis depicted as Unnamalai Amman. The presiding deity is revered in the 7th century Tamil Saiva canonical work, the Tevaram, written by Tamil saint poets known as the nayanars and classified as Paadal Petra Sthalam. The 9th century Saiva saint poet Manikkavasagar composed the Tiruvempaavai here.

(ii) **Virupaksha Cave** is unique cave aashram is in the shape of the Hindu symbol OM. The cave is situated atop a small peak in the Arunachala Hill, nearly 200 feet below the Skandasram cave. There are sever sacred springs on the slope of the hill. The caves seem to be named after the renowned 13th century saint named Virupaksha Deva, who apparently spent most of his life here. It is believed that his body turned to ashes after his samsdhi. These ashed are preserved here and worshiped everyday.

(iii) **Arunachala** refers to the holy hill at Tiruvannamalai in Tamil Nadu. The hill is also known by the names Arunagiri, Annamalai Hill, Arunachalam, Arunai,

Sonagiri and Sonachalam.It is one of the five main shaivite holy places in South India. The Annamalaiyar Temple, a temple of Lord Shiva is located at the base of the hill. Every year in the Tamil month of Karthigai (November-December), the Karthigai Deepam (Light) is lit atop the hill. It is also an important place for devotees of Sri Ramana Maharshi, with Sri Ramana Ashram situated at its foothills.

3. Area Population

393. The population plays an important role for the further development of the water resources and agricultural activities. The population density of this basin is 457 persons per sq km which is well known the Tamil Nadu state has the average of 480 persons/sq km. The depth bar graph in Figure 4.9 has shown the rural and urban population distribution of Tiruvannamalai and Villupuram district. From the bar graph Figure 4.9 that the 82% people living in the rural and 18% of people living in urban settlement of Tiruvannamalai District and in the Villupuram District

86% of the people living in the rural and 14% people living in the urban as per 2001 census. Due to the growth of rural population in the recent decades increase pressure on the groundwater, drainage and sewage, intensive cultivation. From the Table 4.8 shows the ratio of females to males in a population and also defined as the proportion of males in the population of the districts

4. Languages

394. Tamil is the only official language spoken in this city. Being a small town, people from other states and ethnicities aren't seen. Some people connected to the temple tourism industry may speak a bit of English for the convenience of tourists but it will be very limited.

5. Sanitation and Sewage Disposal

395. The current sewerage system for disposal of sullage is through septic tanks and public conveniences. The same shall be maintained for this site.

6. Solid Waste Management

396. Tiruvannamalai town generates 52 Tons of Solid Waste per day out of this nearly 40 MT of the Solid Waste being collected, transported and disposed daily, which works to per capita generation of 250 gms/day. The efficiency of the present mechanism is able to collect 75% of the total waste generated in the town. The Urban Local Body also carry out weekly mass waste cleaning programme to clear the left out wastes by making extra vehicle trips in the town. The total garbage collected constitutes 48% of the domestic wastes 42% commercial wastes and 10% of construction wastes

7. Site Details

397. The site is free from encumbrances and is freely available with the Government of Tamil Nadu. Further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with the present manager of the Site. The site details are given in the Table 2(k) below along with proposed site layout in Figure 4(k).

Table 12(k): Site Details

	Description	**Yes / No**
1	Protected area	No
2	Archaeological site	No
3	Forest area	No
4	CRZ area	No

Notes: Protected Area includes wildlife sanctuary, bird sanctuary, or national park; CRZ=Coastal Regulation Zone.

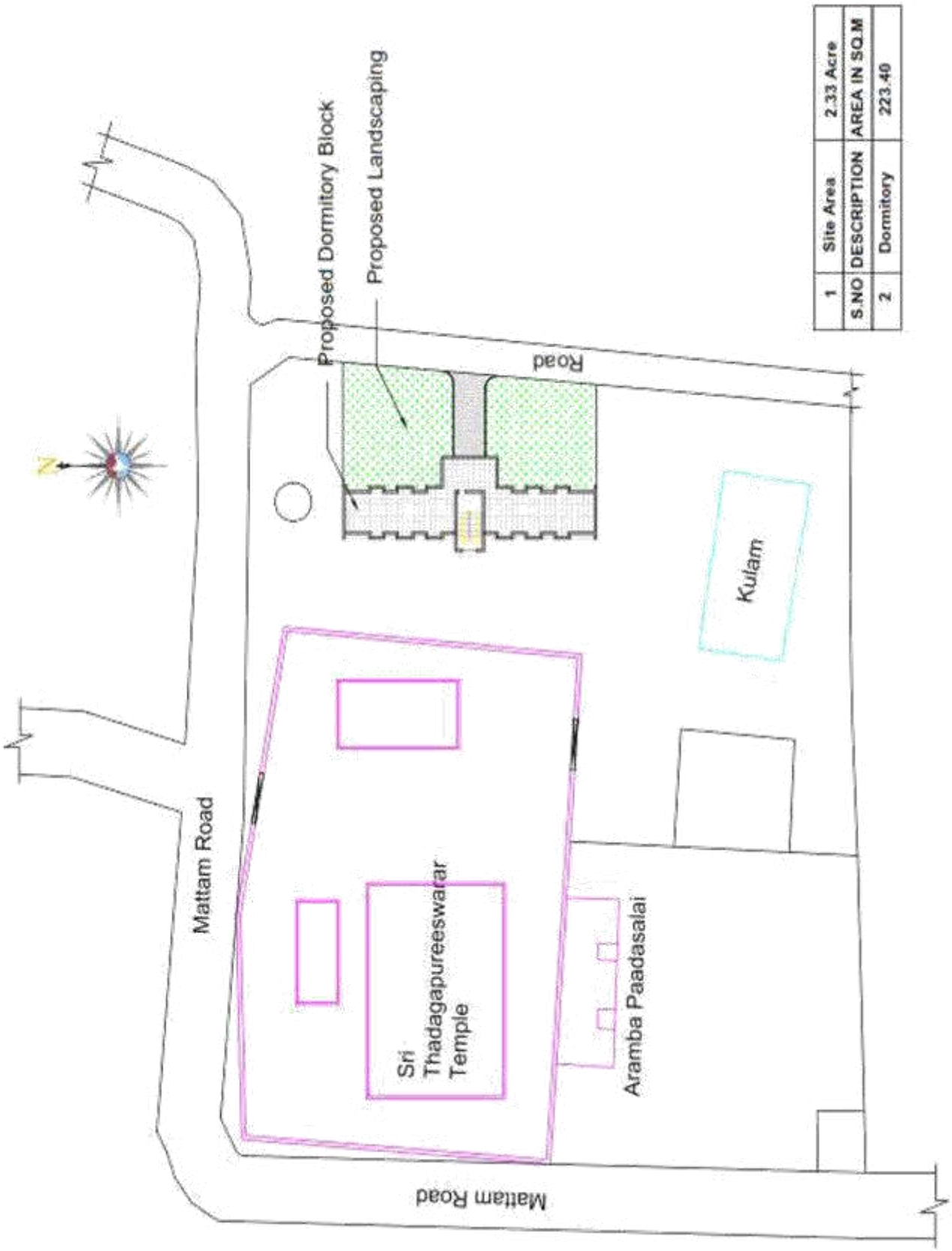


Figure 4(k): Site Layout Plan

(I) Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at Manora Fort,Thanjavur District:

A. Physical Environment

398. Manora Fort has a plain terrain of alluvial soil consisting of sand, silt and clay.Surface water canals contribute 89% to irrigation, while the rest 11% is accounted by dug wells and tube wells. Paddy is the major crop while the fishery makes a major role in the business.

399. The subproject site is Located on the shore of the Bay of Bengal . The subproject site is a barren land in the possession of the Department of State Archaeology and thus the site does not require any land acquisition. No protected species have been recorded in this site. No natural or critical habitats being impacted by the subproject and no loss of biodiversity. Site is located in or immediately adjacent to habitats altered for human use (open yards, existing facilities, roadsides, pathways, etc.). Civil works are limited on existing structures.

1. Climate

400. Mean average temperature recorded for summer season was 31.3°C with mean maximum temperature of 36.1°C and mean minimum of 27.4°C. The mean average humidity recorded was 66.5% with mean maximum humidity of 81.5% and mean minimum of 48.0%. Mean average wind speed was observed to be 3.0 km/hour.

2. Geographical features

401. The town is located at 10.2689° N, 79.3049° E at a distance of 100m from the Bay of Bengal.

3. Accessibility

402. The nearest airport to Manora Fort is Civil Airport (TRZ) at Tiruchirappalli, Tamil Nadu, which is 111km away from Manora Fort. Thanjavar Railway Station is about 55 km from Manora Fort. There are frequent bus services to and from Chennai, Cuddalore, Pondicherry, Tiruchirappalli, Tuticorin and Nagapttinam.

4. Geomorphology

403. Thanjavur District is one of the important Rice bowl of Tamil Nadu. The South Indian Ganges called Cauvery is flowing across the Thanjavur District .The major economical sources of Thanjavur District is agriculture; hence I have a lengthy irrigation canal. Thanjavur District is broadly classified into two major division namely deltaic regions and NonDeltaic Regions. The Regions which lie along the Cauvery bed are Deltaic regions. For Such Deltaic Regions the water can be obtained from the Cauvery Rivers. The Regions with hills (or) Sea shores are said to be Non-Deltaic Regions .

404. The prominent geomorphic units identified in the district through interpretation of Satellite imagery are: (i) deltaic plain, (ii) pediment and buried pediment, (iii) natural levee-swale, (iv) lagoon/backwater coastal plain, and (v) beach and beach ridges.

405. Major part of the district including Kumbakonam, Papanasam, Swamimalai, Pattukottai, Thiruvidaimudur and Peravurani taluks is occupied by delta plain. Sedimentary high land having

pediment and buried pediment landforms are observed in Thiruvaiyaru. Sedimentary plain consisting various landforms like natural levee, swale and marshy area, lagoon/back water coastal plain and beach ridges are seen in the southern part of the district.

5. Soil

406. The district has mainly alluvial soil consisting of sand, silt and clay.

6. Hydrogeology

407. The entire district is covered by semi-consolidated formations consisting of sand, silt and clays (Plate-II). Ground water occurs under water table, semi-confined and confined conditions. The important aquifer systems in the district are: (i) Lower Miocene deeper aquifers, and (ii) Pliocene Quaternary shallow aquifers. The Lower Miocene Deeper Aquifers are the deeper aquifer system which can be divided into two hydraulically interconnected aquifers namely; (i) Lower Orathanadu aquifer zone, and (ii) the upper of main flowing aquifer zone.

7. Groundwater Quality

408. Ground water in phreatic aquifer in Thanjavur district, in general, is colorless, odorless and slightly alkaline in nature. The specific electrical conductance of ground water in phreatic (in Micro Seimens/centimeter at 25º C) during May 2007 was in the range 620 (Alankottai) to 4400 (Muthupetai) in the district. It is between 750 and 2250 µs/cm at 25º C in the major part of the district, whereas, conductance exceeding 2250 µs/cm at 25º C has been observed in parts of Pattukoittai block.

409. It is observed that the ground water is suitable for drinking and domestic uses, in general, and all the constituents are within the permissible limits for domestic use, except at Muthupetai where Chloride is found to be in excess of the permissible limit, with regard to irrigation suitability based on specific electrical conductance and Sodium Absorption Ratio (SAR). It is observed, that the phreatic aquifer in a major part of the district has medium to high salinity. It is recommended that proper soil management strategies may be adopted.

8. Natural Disaster / Hazard

410. According to GSHAP data, the state of Tamil Nadu falls mostly in a region of low seismic hazard with the exception of western border areas that lie in a low to moderate hazard zone. Puducherry lies in a low hazard region. As per the 2002 Bureau of Indian Standards (BIS) map, Tamil Nadu and Puducherry fall in Zones II and III. Historically, parts of this region have experienced seismic activity in the M5.0 range.

(i) Ambient Air and Noise Quality

411. The air environment of the subproject areas is generally found to be good and is free from industrial pollution. The ambient air quality in Alangudi, Thiruvarur District is perceived to be within acceptable standards. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year

subsequently for the entire construction period. Impacts on air quality (if any) during construction stage are due to operation of various construction equipment and transport vehicles. Consequently, although emissions of common air contaminants (CAC) and fugitive dust may be elevated in proximity to the active work sites, this impact will be of short-term and localized to the immediate vicinity of the project site.

412. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land filling of residual wastes). Given the subproject‘s relatively minor contribution to CAC and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible during construction.

413. Most of the subproject area is in a quiet environment. Noise intensive industrial operations are not observed in the project influence area. Present ambient noise levels, both in the day and night time, are perceived to be well within permissible levels. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period.

414. Noise levels in the immediate proximity of most work sites are expected to increase during construction. The duration of this exposure will be relatively brief. This exposure represents temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the subproject operations will be largely imperceptible as civil works will be confined in relatively small sites within the district proper.

415. Since the subproject will be built in existing infrastructure, it will not conflict with existing or planned land use. However, traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads, sidewalk closures, traffic delays and detours, parking modifications, and increased volumes of construction–related traffic. There should be improved traffic movement along the access routes once construction is completed. During operations of the improved infrastructure and services, added residential developments, commercial and business facilities and increased densities are expected to develop and enhance the subproject area. This can be considered a long-term cumulative benefit of the subproject. (Refer Environmental Management plan for Subproject Specific impacts and their mitigation measures).

416. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and CAC emissions will occur in proximity to subproject work sites during construction, due to their short term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The subproject operations will benefit the general public by contributing to the long-term improvement of tourism in Tamil Nadu and livelihood opportunities to the local people.

E. Socio-economic and Cultural Environment

1. Trade and Commerce

417. Presently, the economy is solely dependent on tourism business and competition from

other towns and other states has altered the potentials of the town leading to reduced growth rates and inflow of floating population.

2. Administration

418. Thanjavur district is in the east coast of Tamil Nadu. The district lies between 78° 45‘ and 70° 25' of the Eastern longitudes and 9° 50' and 11° 25' of the Northern Latitudes.. Thanjavur is situated in the Cauvery delta, at a distance of 314 km (195 mi) south-west of Chennai and 56 km (35 mi) east of Tiruchirappalli. The District is bound by Coloroon on the North which separates it from Ariyalur and Tiruchirapalli district; Thiruvarur and Nagapattinam districts on the east; Palk Strait and Pudukottai on the South and Pudukottai and Tiruchirapalli on the West..

419. The nearest seaport is Nagapattinam which is 84 km (52 mi) east of Thanjavur. The nearest airport is Tiruchirapalli International Airport, located at a distance of 56 km (35 mi). The city has an elevation of 57 m (187 ft) above mean sea level. The area of the district isn 3396.57Sq.Km

420. Thanjavur District is one of the 32 districts of the state of Tamil Nadu. It is divided into 3 revenue sub divisions and 9 Taluks for administrative convenience.

421. Important places to visit in Thiruvarur:

(i) **Peruvudaiyar Kovil** is a Hindu temple dedicated to Shiva that is located in the city of Thanjavur in the Indian state of Tamil Nadu. It is an important example of Tamil architecture achieved during the Chola dynasty. It is also known as Periya Kovil, Brihadeshwara Temple, RajaRajeswara Temple and Rajarajeswaram, It is one of the largest temples in India and one of India's most prized architectural sites. Built by emperor Raja Raja Chola I and completed in 1010 AD, Peruvudaiyaar Temple, also popularly known as the 'Big Temple', turned 1000 years old in 2010. The temple is part of the UNESCO World Heritage Site known as the "Great Living Chola Temples"

(ii) **Kumbakoam,** Kumbakonam is a temple town with many Hindu temples located in and around it. Majority of the temples are dedicated to Lord Vishnu and LordShiva.12 Shiva temples are connected with Mahamaham festival which happens once in 12 years in Kumbakonam. They are Kasi Viswanathar Temple, Kumbeswarar Temple, Nageswara Temple, Someswarar Temple, Koteeswarar Temple, Kahahasteeswarar Temple, Gowthameswarar Temple, Amirthakalasanathar Temple, Banapuriswarar Temple, Abimukeswarar Temple, Kambatta Visvanathar Temple and Ekambareswarar Temple. Of them 10 temples are in Kumbakonam. Likewise five Vishnu temples are connected with Mahamaham. They are Sarangapani Temple, Chakrapani Temple, Ramaswamy Temple, Rajagopalaswamy Temple, and Varahaperumal Temple. All these temples are found in Kumbakonam

3. Area Population

Manora is a large village located in Pattukkottai taluk of Thanjavur district. Pattukkottai Taluka of Thanjavur district has total population of 396,236 as per the Census 2011. Out of which 191,332 are males while 204,904 are females. In 2011 there were total 100,914 families residing in Pattukkottai Taluka. The Average Sex Ratio of Pattukkottai Taluka is 1,071. As per Census 2011 out of total population, 30.4% people lives in Urban areas while 69.6% lives in the Rural areas. The average literacy rate in urban areas is 87.9% while that in the rural areas is 77.3%. Also the

Sex Ratio of Urban areas in Pattukkottai Taluka is 1,043 while that of Rural areas is 1,083. The total literacy rate of Pattukkottai Taluka is 80.49%. The male literacy rate is 78.65% and the female literacy rate is 66.55% in Pattukkottai Taluka.

4. Languages

423. In addition to the Tamil language, English, Urdu are also spoken by the local People. Due to its proximity to the neighboring states and it being a popular tourist spot, English, Kannada and Malayalam are also spoken and understood to an extent.

5. Sanitation and Sewage Disposal

424. The current sewerage system for disposal of sullage is through septic tanks and public conveniences. The same shall be maintained for this site.

6. Solid Waste Management

425. No formal collection system from the municipality is present. The solid waste is being dumped in dump yards and / or is being incinerated in the open.

7. Site Details

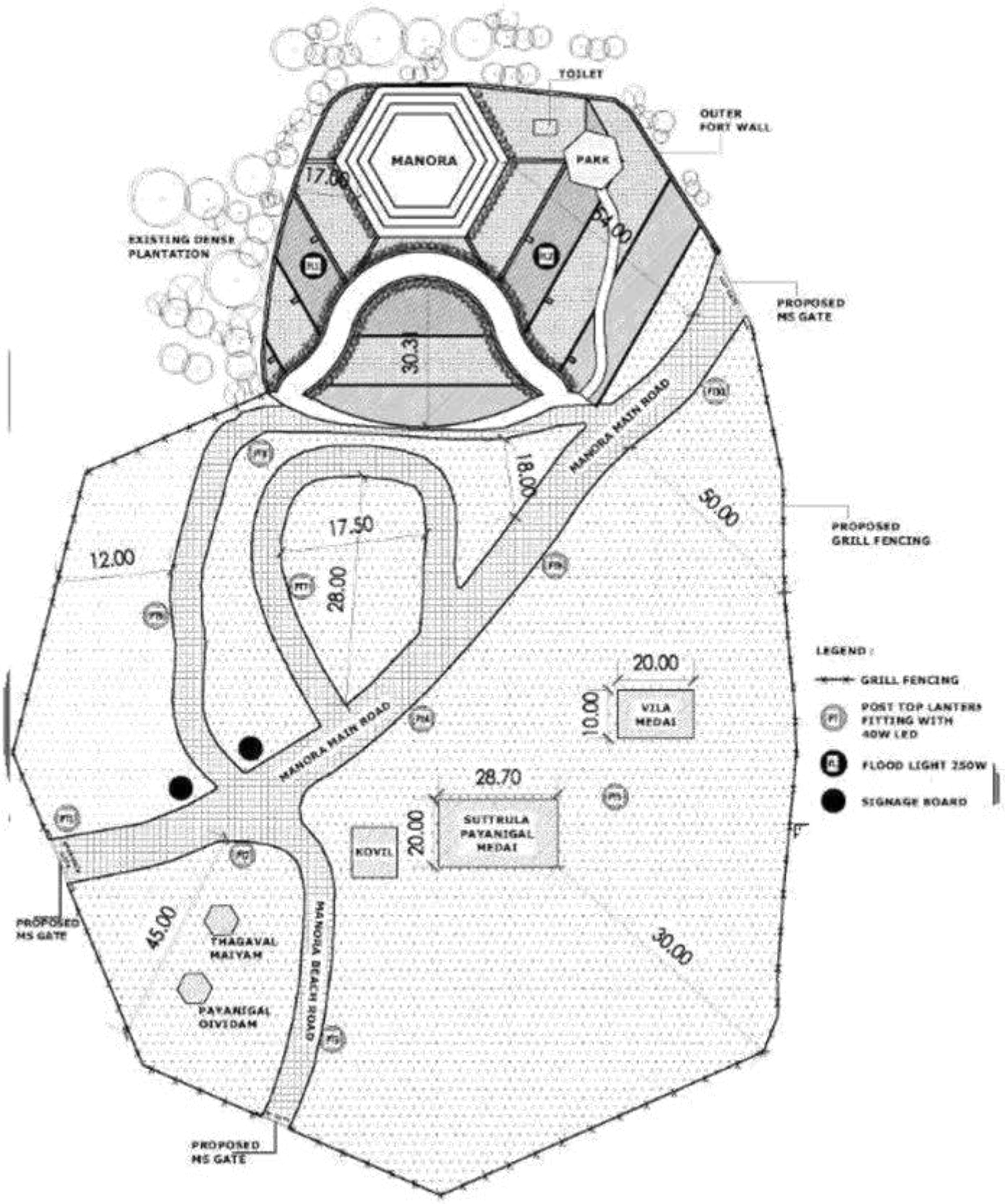
426. The site is free from encumbrances and is freely available with the Government of Tamil Nadu. Further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with the present manager of the Site. The site details are given in the Table 2(l) below along with proposed site layout in Figure 4(l).

Table 13(l): Site Details

	Description	**Yes / No**
1	Protected area	No
2	Archaeological site	Yes
3	Forest area	No
4	CRZ area	Yes

Notes: Protected Area includes wildlife sanctuary, bird sanctuary, or national park; CRZ=Coastal Regulation Zone.

Figure 4(i): Site Layout



(m) Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at Chinnayankulam in Chinnayanpettai, Tiruvanamalai:

A. Physical Environment

427. Chinnayanpettai has a plain terrain of alluvial soil consisting of sand, silt and clay. Cheyyaru, the tributaries of Palar are the major water bodies around the town. Surface water canals contribute 89% to irrigation, while the rest 11% is accounted by dug wells and tube wells. Paddy is the major crop while the others being black gram, green gram, ground nut and gingily.

428. The subproject site is Located on the Tiruvannamalai – Harur road. The subproject site is a barren land in the possession of the Department of State Archaeological Department of the Government of Tamil Nadu and thus the site does not require any land acquisition. No protected species have been recorded in this site. No natural or critical habitats being impacted by the subproject and no loss of biodiversity. Site is located in or immediately adjacent to habitats altered for human use (open yards, existing facilities, roadsides, pathways, etc.). Civil works are limited on existing structures.

1. Climate

429. Tiruvannamalai has a tropical climate. The summers are much rainier than the winters in Tiruvannamalai. This location is classified as Aw by Köppen and Geiger. The average annual temperature is 28.2 °C inTiruvannamalai.

2. Geographical features

430. The town is located at 12°N 79.05° E at a distance 27 kilometers from the Bay of Bengal.

3. Accessibility

431. The nearest airport to Chinnayanpettai is Civil Airport (TRZ) at Tiruchirappalli, Tamil Nadu, which is 206 km away from Chinnayanpettai and is 209 km away from Chennai Airport (MAA), Chennai, Tamil Nadu. Tiruvannamalai Railway Station is about 36.7 km from Chinnayanpettai. There are frequent bus services to and from Tiruvannamalai, Villupuram and Dharmapuri.

4. Geomorphology

432. Geomorphology is a tool for searching ground water resources in different geomorphologic land forms and basement rocks formation, plays an important role in the water resources study. The geomorphology map is prepared with the help of satellite imaginaries and aerial photographs in the scale 1:50000. Topographically, this area is generally undulating terrain and flat with a gentle slope towards Southeast.

433. There are number of residual hills and isolated hillocks in the central part of the basin with the maximum elevation of 447m above the mean sea level. There are numerous tanks in the depressed parts of the area, which is mainly rain fed. The drainage is comprised of Cheyyar river. Major geomorphic landform is noticed are pediment, buried pediment shallow, buried pediment deep.

5. Soil

434. The district has mainly consisting of sandy, Red soil, clay.

6. Hydrogeology

435. Groundwater occurs under water table conditions in weathered, fractured, jointed and faulted portions of crystalline rocks. Groundwater recharge, flow and discharge of the basin are controlled by the basin geomorphology, geology and structural pattern. Crystalline formation comprises composite gneisses and charnockites. Groundwater occurrence is higher in gneissic rocks than in charnockite because the intensity of weathering, joint, fracture is quite higher in gneissic rocks rather than in charnockite.

7. Groundwater Quality

436. Groundwater occurs both under water table and semi confined conditions and developed through dug-cum-bore wells and tube wells mostly in the southern part of the basin. In the study area an unconfined aquifer of small patch running from Melolakkkur village and towards Southern end and the depth of the bore wells are ranging from 6 m to 20 m. Groundwater developed in the hard rock regions by means of dug wells which are mostly tapping weathered zone and generally yield about 200 m 3 /day. Most of the wells are large diameter dug wells 7 to
10 m diameter with a depth of 9 m to 20 m depending on the weathering and a joint is feasible.

8. Natural Disaster / Hazard

437. According to GSHAP data, the state of Tamil Nadu falls mostly in a region of low seismic hazard with the exception of western border areas that lie in a low to moderate hazard zone. Puducherry lies in a low hazard region. As per the 2002 Bureau of Indian Standards (BIS) map, Tamil Nadu and Puducherry fall in Zones II and III. Historically, parts of this region have experienced seismic activity in the M5.0 range.

9. Ambient Air and Noise Quality

438. The air environment of the subproject areas is generally found to be good and is free from industrial pollution. The ambient air quality in Chinnayanpettai, Tiruvanamalai District is perceived to be within acceptable standards. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period. Impacts on air quality (if any) during construction stage are due to operation of various construction equipment and transport vehicles. Consequently, although emissions of common air contaminants (CAC) and fugitive dust may be elevated in proximity to the active work sites, this impact will be of short-term and localized to the immediate vicinity of the project site.

439. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land filling of residual wastes). Given the subproject‘s relatively minor contribution to CAC and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible during construction.

440. Most of the subproject area is in a quiet environment. Noise intensive industrial

operations are not observed in the project influence area. Present ambient noise levels, both in the day and night time, are perceived to be well within permissible levels. However, in absence of baseline ambient air quality data, it has been proposed to conduct pre-construction phase air quality monitoring and twice every year subsequently for the entire construction period.

441. Noise levels in the immediate proximity of most work sites are expected to increase during construction. The duration of this exposure will be relatively brief. This exposure represents temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the subproject operations will be largely imperceptible as civil works will be confined in relatively small sites within the district proper.

442. Since the subproject will be built in existing infrastructure, it will not conflict with existing or planned land use. However, traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented during construction to address temporary disruptions to land use, limitations on access to roads, sidewalk closures, traffic delays and detours, parking modifications, and increased volumes of construction–related traffic. There should be improved traffic movement along the access routes once construction is completed. During operations of the improved infrastructure and services, added residential developments, commercial and business facilities and increased densities are expected to develop and enhance the subproject area. This can be considered a long-term cumulative benefit of the subproject. (Refer Environmental Management plan for Subproject Specific impacts and their mitigation measures).

443. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and CAC emissions will occur in proximity to subproject work sites during construction, due to their short term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The subproject operations will benefit the general public by contributing to the long-term improvement of tourism in Tamil Nadu and livelihood opportunities to the local people.

B. Socio-economic and Cultural Environment

1. Trade and Commerce

444. Presently, the economy is solely dependent on tourism business and competition from other towns and other states has altered the potentials of the town leading to reduced growth rates and inflow of floating population.

2. Administration

445. The District of Tiruvanamalai was carved out as a separate district by detaching Valangaiman Taluk from Thanjavur District on 01.01.1997. There are 2 Revenue Divisions, 7 Taluks, 10 Blocks, 4 Municipalities and 7 Town Panchayats in Tiruvanamalai District. Tiruvanamalai was promoted to a first-grade municipality in 1978. The municipality has 30 wards and there is an elected councilor for each of those wards. The functions of the municipality are devolved into six departments: general administration/personnel, engineering, revenue, health, town planning and information technology (IT). All these departments are under

the control of a municipal commissioner who is the executive head. The legislative powers are vested in a body of 30 members, one each from the 30 wards. The legislative body is headed by

an elected Chairperson assisted by a Deputy Chairperson.

446. Important places to visit in Tiruvanamalai:

(i) **Annamalaiyar Temple** is a Tamil Hindu temple dedicated to the deity Shiva, located at the base of Annamalai hillsin the town of Thiruvannamalai in Tamil Nadu, India. It is significant to the Hindu sect of Saivism as one of the temples associated with the five elements, the Pancha Bhoota Stalas, and specifically the element of fire, or Agni. Shiva is worshiped as Annamalaiyar or Arunachaleswarar, and is represented by the lingam, with his idol referred to as Agni lingam. His consort Parvatiis depicted as Unnamalai Amman. The presiding deity is revered in the 7th century Tamil Saiva canonical work, the Tevaram, written by Tamil saint poets known as the nayanars and classified as Paadal Petra Sthalam. The 9th century Saiva saint poet Manikkavasagar composed the Tiruvempaavai here.

(ii) **Virupaksha Cave** is unique cave aashram is in the shape of the Hindu symbol OM. The cave is situated atop a small peak in the Arunachala Hill, nearly 200 feet below the Skandasram cave.There are sever sacred springs on the slope of the hill. The caves seem to be named after the renowned 13th century saint named Virupaksha Deva, who apparently spent most of his life here. It is believed that his body turned to ashes after his samsdhi. These ashed are preserved here and worshiped everyday.

(iii) **Arunachala** refers to the holy hill at Tiruvannamalai in Tamil Nadu. The hill is also known by the names Arunagiri, AnnamalaiHill, Arunachalam, Arunai, Sonagiri and Sonachalam.It is one of the five main shaivite holy places in South India. The Annamalaiyar Temple, a temple of Lord Shiva is located at the base of the hill. Every year in the Tamil month of Karthigai (November-December), the Karthigai Deepam (Light) is lit atop the hill.It is also an important place for devotees of Sri Ramana Maharshi, with Sri Ramana Ashram situated at its foothills.

3. Area population

447. The population plays an important role for the further development of the water resources and agricultural activities. The population density of this basin is 457 persons per sq km which is well known the Tamil Nadu state has the average of 480 persons/sq km. The depth bar graph in Figure 4.9 has shown the rural and urban population distribution of Tiruvannamalai and Villupuram district. From the bar graph Figure 4.9 that the 82% people living in the rural and 18% of people livng in urban settlement of Tiruvannalai District and in the Villupuram District 86% of the people living in the rural and 14% people living in the urban as per 2001 census. Due to the growth of rural population in the recent decades increase pressure on the groundwater, drainage and sewage, intensive cultivation. From the Table 4.8 shows the ratio of females to males in a population and also defined as the proportion of males in the population of the districts

4. Languages

448. Tamil is the only official language spoken in this city. Being a small town, people from

other states and ethnicities aren't seen. Some people connected to the temple tourism industry may speak a bit of English for the convenience of tourists but it will be very limited.

5. Sanitation and Sewage Disposal

449. There is no under ground drainage system in Tiruvannamalai Municipality. Disposal of Night Soil is normally by way of individual facilities and liquid waste (Sullage and Kitchen Waste) is through the open drains.

450. The main mode of individual disposal in the town is through septic tanks, low Cost Sanitation units and through public conveniences. A phenomenal 38% of the population do not have access to safe disposal systems 3. Forty five percent of the population has resorted to private arrangements, in the form of septic tanks.

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6. Solid Waste Management

451. Tiruvannamalai town generates 52 Tons of Solid Waste per day out of this nearly 40 MT of the Solid Waste being collected, transported and disposed daily, which works to per capita generation of 250 gms./day. The efficiency of the present mechanism is able to collect 75% of the total waste generated in the town. The Urban Local Body also carry out weekly mass waste cleaning programme to clear the left out wastes by making extra vehicle trips in the town. The total garbage collected constitutes 48% of the domestic wastes 42% commercial wastes and 10% of construction wastes

7. Site Details

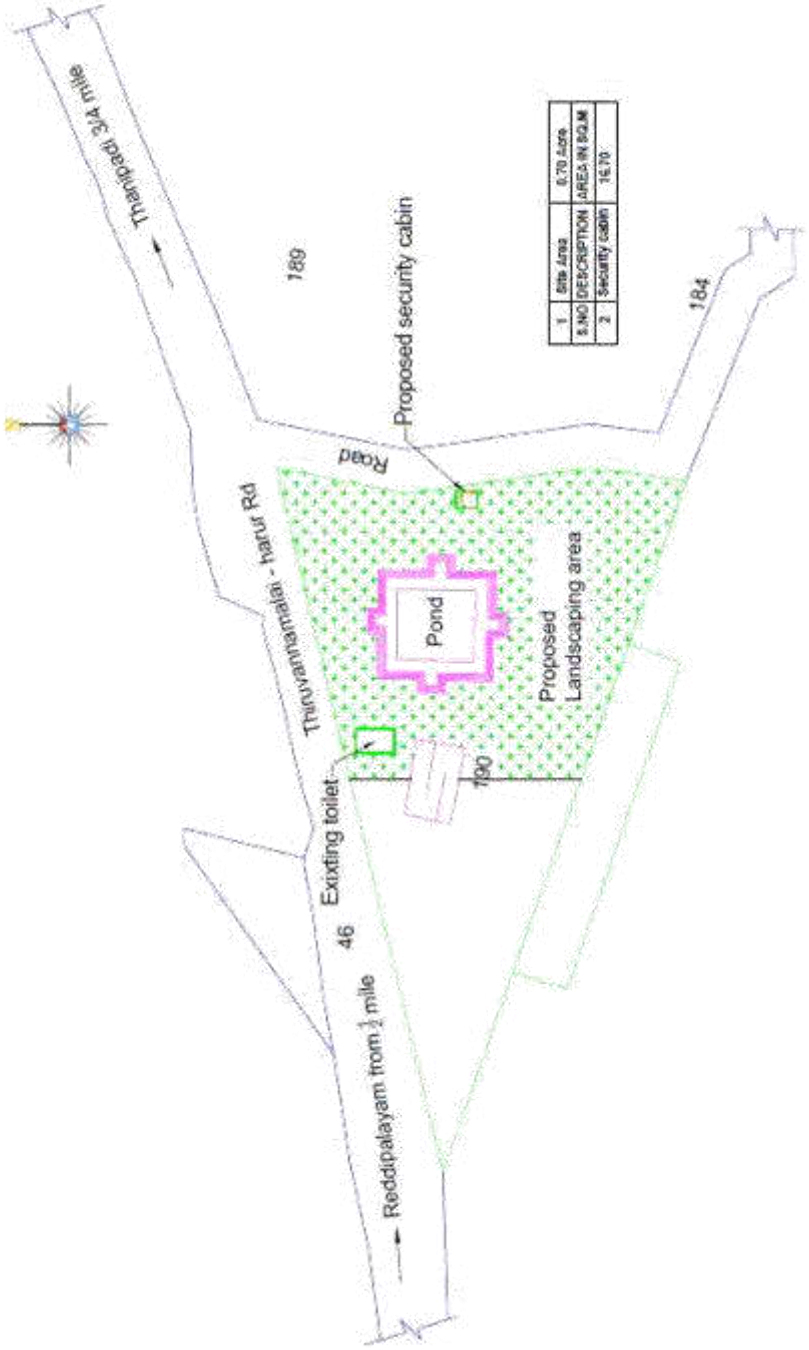
452. The site is free from encumbrances and is freely available with the Government of Tamil Nadu. Further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with the present manager of the Site. The site details are given in the Table 2(m) below along with proposed site layout in Figure 4(m).

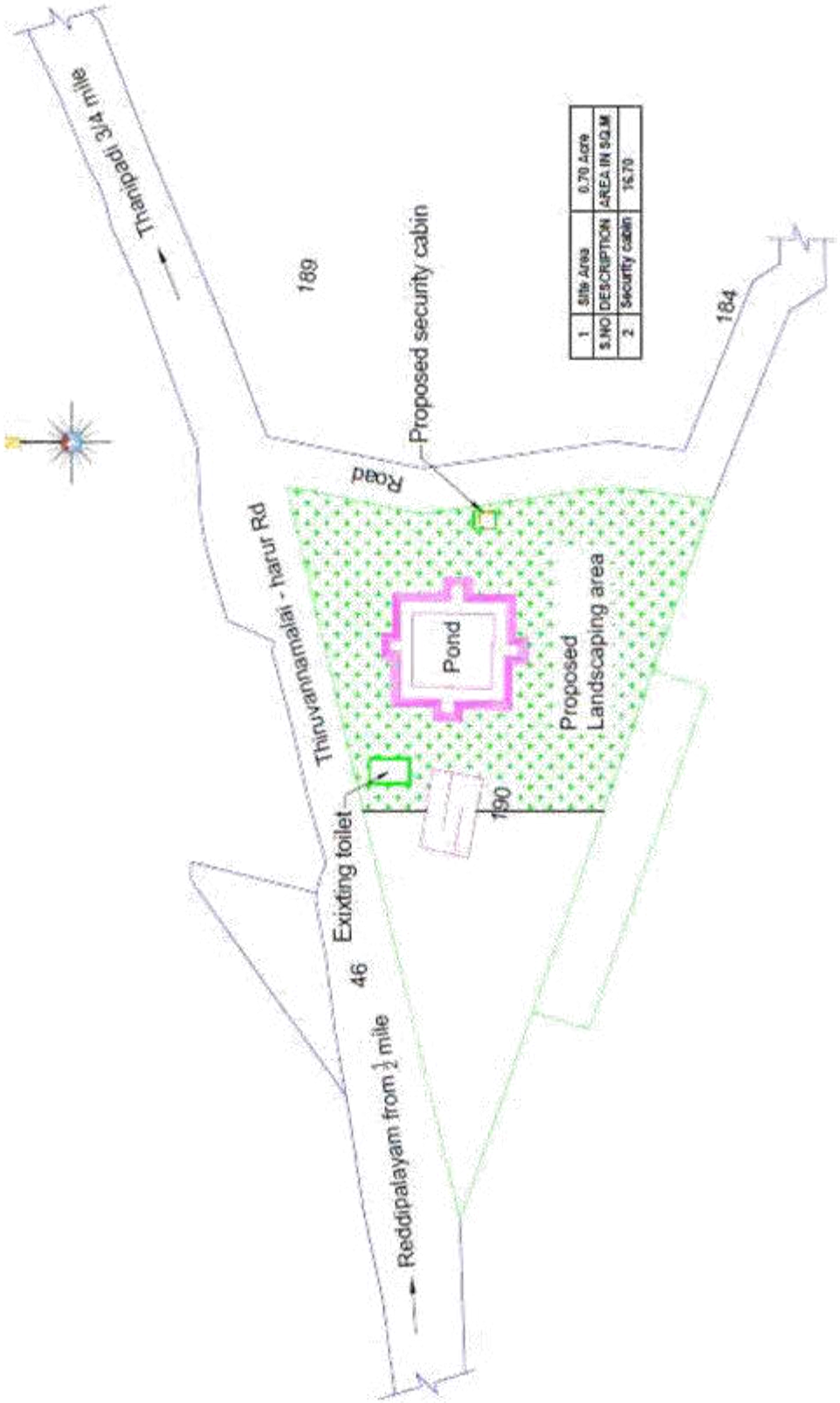
Table 14(m): Site Details

	Description	**Yes / No**
1	Protected area	No
2	Archaeological site	No
3	Forest area	No
4	CRZ area	No

Notes: Protected Area includes wildlife sanctuary, bird sanctuary, or national park; CRZ=Coastal Regulation Zone.

Figure 4(m): Site Layout




Thanipadi 3/4 mile
189
Proposed security cabin
184
Road
Thiruvannamalai - harur Rd
Pond
Proposed
Landscaping area
Exixting toilet
190
46
Reddipalayam from ½ mile
1 Site Area 0.70 Acre
S.NO DESCRIPTION AREA IN SQ.M
2 Security cabin 16.70

V. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

453. The assessment for each of the subprojects has been carried out for potential impacts during the following stages of the project planning and implementation:

(i) Location impacts. Impacts associated with site selection, including impacts on environment and resettlement or livelihood related impacts on communities;

(ii) Design impacts. Impacts arising from project design, including the technology used, scale of operations, discharge standards, etc.;

(iii) Construction impacts. Impacts resulting from construction activities including site clearance, earthworks, civil works, etc.; and

(iv) O&M impacts. Impacts associated with the operation and maintenance of the infrastructure built in the project.

454. The proposal envisages medium scale construction activity onsite. This would result in some environmental impacts typical to building construction activity.

(i) Requisite permissions will be obtained before commencement of construction works on site. Identity cards and vehicle permits shall be provided by the contractor for all such movement to and from the site.

(ii) Other impacts related to construction activities such as generation of dust and noise, removal of construction debris and demolition wastes are anticipated. These shall be minimized and addressed by adopting safe engineering practices and appropriate building design. Caution will be exercised in planning for safe construction and operations phase to minimize disturbance to the adjoining existing activities.

(iii) Relocation of an existing manhole on site and fire hydrant shall be required at the time of execution of works.

(iv) Provision for water for construction will be made through tankers or collected rain water so as not to burden the existing Municipal water demand at the hotel.

455. **Land Acquisition and Resettlement**. The proposed subproject locations are within the lands available with the HR&CE Department of Tamil Nadu. There are no impacts anticipated on land acquisition or resettlement due to the proposed subproject components.

456. The locations considered for the subproject are within the areas designated for tourism support infrastructure development as part of developing Tamil Nadu‘s conservation, heritage, natural and cultural attractions, and are outside areas demarcated for habitat protection and conservation. The proposed infrastructure will not impact any environmentally-sensitive or protected areas. Rather, it will enhance the tourism experience and livelihood of the local people in total. The public, government and local bodies are very much keen into taking up these proposed works. This proposal suggests areas which do not trigger impacts. No non-titled street vendors are in the area. No displacement or shifting of non-titled street vendors will take place in the identified sites for subproject.

457. **Design Consideration to Avoid Environmental Impacts**. The following are design considerations to avoid environmental impacts:

(i) Incorporation of adequate drainage provisions;

(ii) Adoption of design compatible with the natural environment and suitable selection of materials to enhance the aesthetic appeal and blend with the natural surroundings.

(iii) Straight lines and simple geometry in the proposed lanPMSCape and architectural features.

(iv) Use of subtle colors and simple ornamentation in the structures.
(v) Natural tree species in the proposed landscape.
(vi) Use of local stone in the proposed walkways and built structures thus maintaining a rustic architectural character.

A. Assessment of Environmental Impacts

458. Determination of Area of Influence. The primary impact areas are (i) sites for proposed project components; (ii) main routes/intersections which will be traversed by construction vehicles; and (ii) quarries and borrow pits as sources of construction materials. The secondary impact areas are: (i) entire town area outside of the delineated primary impact area;

459. In the case of this subproject the components will involve straight forward construction and operation, and impacts will be mainly localized, short in duration and expected only during construction period.

B. Pre-construction Impacts and Mitigation Measures

460. **Consents, permits, clearances, no objection certificate (NOC), etc**. Failure to obtain necessary consents, permits, NOCs, etc. can result to design revisions and/or stoppage of works.

461. **Mitigation measures**. The following will be conducted during detailed design phase:
(i) Obtain all necessary consents, permits, clearance, NOCs, etc. prior to start of civil works.
(ii) Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc.
(iii) Include in detailed design drawings and documents all conditions and provisions if necessary

462. **Erosion control.** Most of the impacts will occur due to excavation and earth movements during construction phase. Prior to commencement of civil works, the contractor will be required to:
(i) Develop an erosion control and re-vegetation plan to minimize soil loss and reduce sedimentation to protect water quality.
(ii) Minimize the potential for erosion by balancing cuts and fills to the extent feasible.
(iii) Identify and avoid areas with unstable slopes and local factors that can cause slope instability (groundwater conditions, precipitation, seismic activity, slope angles, and geologic structure).
(iv) Minimize the amount of land disturbed as much as possible. Use existing roads, disturbed areas, and borrow pits and quarries when possible. Minimize vegetation removal. Stage construction to limit the exposed area at any one time.

463. **Utilities**. Interruption of services (water supply, toilets, bathing areas, etc.) will be scheduled and intermittently related to localized construction activities. To mitigate impacts, PIU/PMSC will:
(i) Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during the construction phase.
(ii) Require contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services.
(iii) Require contractor to obtain from the PIU and/or PMSC the list of affected utilities and operators;
(iv) If relocations are necessary, contractor along with PIU/PMSC will coordinate with

the providers/line agencies to relocate the utility.

464. **Social and cultural resources**. There is a risk that any work involving ground disturbance can uncover and damage archaeological and historical remains. Although no such sites have been identified. For this subproject, excavation will occur in and around existing sites, ROWs and specified government land so no risk is foreseen to these structures. Nevertheless, the PIU/PMSC will:

(i) Consult Archaeological Survey of India and/or State Department of Archaeology to obtain an expert assessment of the archaeological potential of the site.
(ii) Consider alternatives if the site is found to be of medium or high risk.
(iii) Include state and local archaeological, cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available.
(iv) Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognized, and measures are taken to ensure they are protected and conserved.

465. **Sites for construction work camps and areas for stockpile, storage and disposal**. The contractor will be required to meet the following criteria for the sites:

(i) Will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems, etc.
(ii) Residential areas will not be considered so as to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime).
(iii) Disposal will not be allowed near sensitive areas which will inconvenience the community.
(iv) The construction camp, storage of fuel and lubricants should be avoided at the river bank. Any construction camp site will be finalized in consultation with PMSC and PIU.

466. **Sources of construction materials**. Significant amounts of gravel, sand, and cement will be required for this subproject. Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution. The contractor will be required to:

(i) Use quarry sites and sources permitted by government.
(ii) Verify suitability of all material sources and obtain approval from PIU/PMSC.
(iii) If additional quarries are required after construction has started, obtain written approval from PIU/PMSC.
(iv) Submit to PIU/PMSC on a monthly basis documentation of sources of materials.

467. It will be the construction contractor‘s responsibility to verify the suitability of all material sources and to obtain the approval of PIU/PMSC. If additional quarries are required after construction is started, then the contractor obtains written approval of PIU.

468. **Access**. Hauling of construction materials and operation of equipment on-site can cause traffic problems and conflicts in ROWs. Construction traffic will access most work areas from the existing roads therefore potential impacts will be of short-duration, localized and can be mitigated. The contractor will need to adopt the following mitigation measures:

(i) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites.
(ii) Schedule transport and hauling activities during non-peak hours.

(iii) Locate entry and exit points in areas where there is low potential for traffic congestion.
(iv) Keep the site free from all unnecessary obstructions.
(v) Drive vehicles in a considerate manner.
(vi) Coordinate with the Traffic Police Department for temporary road diversions and for provision of traffic aids if transportation activities cannot be avoided during peak hours.
(vii) Notify affected sensitive receptors by providing sign boards with information about the nature and duration of construction works and contact numbers for concerns/complaints.
(viii) Provide free access to households and businesses/shops along the ROWs during the construction phase.

469. Summary of pre-construction activities is presented in Table 3. The responsibilities, monitoring program and costs are provided in detail in the EMP. The contractor is required to update the information during detailed design phase. Sample waste/spoils management plan, traffic management plan, etc. are attached as Appendixes 3 and 4.

Table 3: Summary of Pre-Construction Mitigation Measures

Parameters	Mitigation Measures
Consents, permits, clearances, no objection certificate (NOC), etc.	• Obtain all necessary consents, permits, clearance, NOCs, etc. prior to start of civil works. • Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. • Include in detailed design drawings and documents all conditions and provisions if necessary
Erosion control	• Develop an erosion control and re-vegetation plan to minimize soil loss and reduce sedimentation to protect water quality. • Minimize the potential for erosion by balancing cuts and fills to the extent feasible. • Identify and avoid areas with unstable slopes and local factors that can cause slope instability (groundwater conditions, precipitation, seismic activity, slope angles, and geologic structure). • Minimize the amount of land disturbed as much as possible. Use existing roads, disturbed areas, and borrow pits and quarries when possible. Minimize vegetation removal. Stage construction to limit the exposed area at any one time.
Utilities	• Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during the construction phase. • Require contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. • Obtain from the Project Implementation Unit (PIU) and/or Project Management and Supervision Consultant (PMSC) the list of affected utilities and operators; • Prepare a contingency plan to include actions to be done in case of unintentional interruption of services. • If relocations are necessary, contractor will coordinate with the providers to relocate the utility.

Parameters	Mitigation Measures
Social and Cultural Resources	• Consult Archaeological Survey of India or State Department of Archaeology to obtain an expert assessment of the archaeological potential of the site. • Consider alternatives if the site is found to be of medium or high risk. • Include state and local archaeological, cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available. • Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved.
Sites for construction work camps, areas for stockpile, storage and disposal	• Will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems, etc. • Residential areas will not be considered so as to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). • Disposal will not be allowed near sensitive areas which will inconvenience the community. • The construction camp, storage of fuel and lubricants should be avoided at the river bank. The construction camp site for intake well should be finalized in consultation with PMSC and PIU.
Sources of construction materials	• Use quarry sites and sources permitted by government. • Verify suitability of all material sources and obtain approval from PIU/PMSC. • If additional quarries are required after construction has started, obtain written approval from PIU/PMSC. • Submit to PMSC on a monthly basis documentation of sources of materials.
Access	• Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. • Schedule transport and hauling activities during non-peak hours. • Locate entry and exit points in areas where there is low potential for traffic congestion. • Keep the site free from all unnecessary obstructions. • Drive vehicles in a considerate manner. • Coordinate with the Traffic Police Department for temporary road diversions and for provision of traffic aids if transportation activities cannot be avoided during peak hours. • Notify affected sensitive receptors by providing sign boards with information about the nature and duration of construction works and contact numbers for concerns/complaints. • Provide free access to households and businesses/shops along ROWs during the construction phase.

C. Anticipated Construction Impacts and Mitigation Measures

470. The impacts during the construction of the sub project components are generic to the construction activities and not expected to be significant. The EMP specifies the necessary mitigation measures to be strictly followed by the contractor and supervised by the PMSC. Key impacts during construction are envisaged on the following aspects: (i) transportation of materials, (ii) dust generation, air and noise from construction activities, (iii) handling of construction materials at site and, (iv) adoption of safety measures during construction.

471. Construction Schedule and Method. Per preliminary design, construction activities will cover approximately 18 months. The exact implementation schedule will be updated during detailed design phase and will be reflected in this IEE.

472. The infrastructure will be constructed manually according to design specifications. Trenches will be dug by backhoe digger, supplemented by manual digging where necessary. Excavated soil will be placed nearby. Demolished materials will be reused to the maximum extent possible. Materials will be brought to site by trucks and will be stored on unused areas within the temple complexes and nearby vacant areas. Any excavated road will be reinstated. The working hours will be 8 hours daily, the total duration of each stage depends on the soil condition and other local features. Night works may be considered in commercial areas and high day-time traffic as per prevailing conditions at the time of construction.

473. There is sufficient space for a staging area, construction equipment, and stockpiling of materials. However, the contractor will need to remove all construction and demolition wastes on a daily basis.

474. Although construction of these project components involves quite simple techniques of civil work, the invasive nature of excavation and the subproject sites in built-up areas where there are a variety of human activities, will result to impacts to the environment and sensitive receptors such as residents, businesses, and the community in general. These anticipated impacts are short-term, site-specific and within relatively small areas.

475. **Erosion Hazards**. The sites are in the built-up area of the town therefore risk of erosion is low, limited during construction activities and not expected to have any negative impact on the drainage and hydrology of the area. Runoff will produce a highly variable discharge in terms of volume and quality, and in most instances, will have no discernible environmental impact. The contractor will be required to:

(i) Save topsoil removed during excavation and use to reclaim disturbed areas, as soon as it is possible to do so.
(ii) Use dust abatement such as water spraying to minimize windblown erosion.
(iii) Provide temporary stabilization of disturbed/excavated areas that are not actively under construction.
(iv) Apply erosion controls (e.g., silt traps) along the drainage leading to the water bodies.
(v) Maintain vegetative cover within road ROWs to prevent erosion and periodically monitor ROWs to assess erosion.
(vi) Clean and maintain catch basins, drainage ditches, and culverts regularly.
(vii) Conduct routine site inspections to assess the effectiveness of and the maintenance requirements for erosion and sediment control systems.

476. **Impacts on Water Quality**. Excavated materials may end up in drainages and water bodies adjacent to the subproject sites, particularly during monsoon season. Other risks of water pollution may be caused by: (i) poorly managed construction sediments, wastes and hazardous substances; and (ii) poor sanitation practices of construction workers. The contractor will be required to:

(i) Schedule civil works during non-monsoon season, to the maximum extent possible.
(ii) Ensure drainages and water bodies within the construction zones are kept free of obstructions.
(iii) Keep loose soil material and stockpiles out of drains, flow-lines and watercourses.
(iv) Avoid stockpiling of excavated and construction materials (sand, gravel, cement, etc.) unless covered by tarpaulins or plastic sheets.
(v) Re-use/utilize, to maximum extent possible, excavated materials.

(vi) Dispose any residuals at identified disposal site (PIU/PMSC will identify approved sites).

(vii) Dispose waste oil and lubricants generated as per provisions of Hazardous Waste (Management and Handling) Rules, 1989.

(viii) Develop a spill prevention and containment plan, educate workers about the plan, and have the necessary materials on site prior to and during construction.

(ix) Refuel equipment within the designated refuelling containment area away from drainages, nallahs, or any water body.

(x) Inspect all vehicles daily for fluid leaks before leaving the vehicle staging area, and repair any leaks before the vehicle resumes operation.

477. **Impacts on Air Quality**. There is potential for increased dust particularly during summer/dry season due to stockpiling of excavated materials. Emissions from vehicles transporting workers, construction materials and debris/materials to be disposed may cause increased in air pollutants within the construction zone. These are inherent impacts which are site-specific, low magnitude, short in duration and can be easily mitigated. The contractor will be required to:

(i) Conduct regular water spraying on earth piles, trenches and sand piles.

(ii) Conduct regular visual inspection along alignments and construction zones to ensure no excessive dust emissions.

(iii) Spreading crushed gravel over backfilled surfaces if re-surfacing of disturbed areas cannot be done immediately.

(iv) Maintain construction vehicles and obtain —pollution under controlll certificate from TNSPCB.

(v) Obtain consent for establishment (CFE) and consent for operation (CFO) for hot mix plants, crushers, diesel generators, etc., if to be used in the project.

478. **Noise and Vibration Impacts**. Noise and vibration-emitting construction activities include earthworks, rock crushing, concrete mixing, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates. The significance of noise and vibration impacts will be high in areas where noise-sensitive institutions such as health care and educational facilities are situated. These impacts will be temporary, short-term, intermittent, and expected to be in the range of 80 to 100 dB(A) as per Table 4 (typical noise levels of principal construction equipment).

Table 4: Typical Noise Levels of Principal Construction Equipment

Clearing		**Structure Construction**	
Bulldozer	80	Crane	75-77
Front end loader	72-84	Welding generator	71-82
Jack hammer	81-98	Concrete mixer	74-88
Crane with ball	75-87	Concrete pump	81-84
		Concrete vibrator	76
EXCAVATION and EARTH MOVING		Air compressor	74-87
Bulldozer	80	Pneumatic tools	81-98
Backhoe	72-93	Bulldozer	80
Front end loader	72-84	Cement and dump trucks	83-94
Dump truck	83-94	Front end loader	72-84
Jack hammer	81-98	Dump truck	83-94
Scraper	80-93	Paver	86-88
GRADING AND COMPACTING		LANPMSCAPING AND CLEAN-UP	
Grader	80-93	Bulldozer	80
Roller	73-75	Backhoe	72-93
		Truck	83-94

PAVING		Front end loader	72-84
Paver	86-88	Dump truck	83-94
Truck	83-94	Paver	86-88
Tamper	74-77	Dump truck	83-94

Source: U.S. Environmental Protection Agency. Noise from Construction Equipment and Operations. Building Equipment and Home Appliances. NJID. 300.1. December 31. 1971

480. The contractor will be required to:

(i) Limit construction activities in temple complexes and other important sites to daytime only.

(ii) Plan activities in consultation with the PIU/PMSC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance.

(iii) Minimize noise from construction equipment by using vehicle silencers and fitting jackhammers with noise-reducing mufflers.

(iv) Avoid loud random noise from sirens, air compression, etc.

(v) Require drivers that horns not be used unless it is necessary to warn other road users or animals of the vehicle‘s approach.

(vi) If specific noise complaints are received during construction, the contractor may be required to implement one or more of the following noise mitigation measures, as directed by the project manager:

(vii) Locate stationary construction equipment as far from nearby noise-sensitive properties as possible.

(viii) Shut off idling equipment.

(ix) Reschedule construction operations to avoid periods of noise annoyance identified in the complaint.

(x) Notify nearby residents whenever extremely noisy work will be occurring.

(xi) Follow Noise Pollution (Regulation and Control) Rules, day time ambient noise levels should not exceed 65 dB(A) in commercial areas, 55 dB(A) in residential areas, and 50 dB(A) in silence zone.2

(xii) Ensure vehicles comply with Government of India noise limits for vehicles. The test method to be followed shall be IS:3028-1998.

481. **Impacts on Flora and Fauna**. As per preliminary design, tree-cutting is not required. This will be reassessed during detailed design phase. There are no protected areas in the direct and indirect impact zones and no diverse ecological biodiversity is found within project area . Therefore, no mitigation measures are required from construction works. To safeguard the interest of this facility and because of its recreation value for the tourists, it is proposed to take adequate noise and sound insulation features in the proposed building to prevent the internal noise from reaching outside and causing any disturbance. This is also recommended to prevent

[2] Day time shall mean from 6.00 am to 10.00 pm. Silence zone is an area comprising not less than 100 meters around hospitals, educational institutions, courts, religious places or any other area which is declared as such by TNSPCB. Mixed categories of areas may be declared as one of the above-mentioned categories by TNSPCB.

disturbance to resident visitors at the adjoining hotel and guest house accommodation. In general, the contractor will be required to:

(i) Conduct site induction and environmental awareness.

(ii) Limit activities within the work area.

(iii) Replant trees in the area using minimum ratio of 2 new trees for every 1 tree cut, if any. Replacement species must be approved by District Forest Department.

(iv) Provide sound barriers towards the Aviary site and restrict noisy activities in day

time only and use silencers/mufflers in noise producing equipment.

(v) Impacts on Physical and Cultural Resources. There may be inconvenience to tourists, residents, businesses, and other road users due to construction activities in the temple complexes and slower flow of traffic in areas with narrow roads. This potential impact is site-specific, short-term and can be mitigated. The contractor will be required to:

(vi) Ensure no damage to structures/properties near construction zone.

(vii) Provide walkways and metal sheets where required to maintain access of people and vehicles.

(viii) Provide sign boards to inform nature and duration of construction works and contact numbers for concerns/complaints.

(ix) Increase the workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools;

(x) Implement good housekeeping. Remove wastes immediately. Prohibit stockpiling of materials that may obstruct/slow down pedestrians and/or vehicle movement.

(xi) Ensure workers will not use nearby/adjacent areas as toilet facility.

(xii) Coordinate with PMSC for transportation routes and schedule. Schedule transport and hauling activities during non-peak hours. Communicate road detours via visible boards, advertising, pamphlets, etc.

(xiii) Ensure heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites.

(xiv) Provide instructions on event of chance finds for archaeological and/or ethno-botanical resources. Works must be stopped immediately until such time chance finds are cleared by experts.

481. **Impact due to Waste Generation**. Demolished structures will be reused to the maximum extent possible. Construction activities will produce excess excavated soils, excess construction materials, and solid wastes (such as removed concrete, wood, trees and plants, packaging materials, empty containers, oils, lubricants, and other similar items). These impacts are negative but short-term and reversible by mitigation measures. The contractor will need to adopt the following mitigation measures:

(i) Prepare and implement a waste management plan.

(ii) Manage solid waste according to the following hierarchy: reuse, recycling and disposal. Include in waste management plan designated/approved disposal areas.

(iii) Coordinate with Municipal Authorities for beneficial uses of excavated soils/silts/sediments or immediately dispose to designated areas.

(iv) Recover used oil and lubricants and reuse; or remove from the sites.

(v) Avoid stockpiling and remove immediately all excavated soils, excess construction materials, and solid waste (removed concrete, wood, trees and plants, packaging materials, empty containers, oils, lubricants, and other similar items).

(vi) Prohibit disposal of any material or wastes (including human waste) into drainage, nallah, or watercourse.

482. Impacts on Occupational Health and Safety. Residential accommodation for workers is not proposed. Workers need to be mindful of occupational hazards which can arise from excavation works in high-traffic and busy areas. Exposure to work-related chemical, physical, biological and social hazard is typically intermittent and of short duration, but is likely to reoccur. Potential impacts are negative and long-term but reversible by mitigation measures. Overall, the contractor should comply with IFC Environmental, Health and Safety (EHS) Guidelines on Occupational Health and Safety (this can be downloaded from (http://www1.ifc.org/wps/wcm/connect/9aef2880488559a983acd36a6515bb18/2%2BOccupational%2BHealth%2Band%2BSafety.pdf?MOD=AJPERES). The contractor will be required to:

(i) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.

(ii) Develop comprehensive site-specific health and safety (H&S) plan. The overall objective is to provide guidance to contractors on establishing a management strategy and applying practices that are intended to eliminate, or reduce, fatalities, injuries and illnesses for workers performing activities and tasks associated with the project.

(iii) Include in H&S plan measures such as: (i) type of hazards during excavation works; (ii) corresponding personal protective equipment for each identified hazard; (iii) H&S training for all site personnel; (iv) procedures to be followed for all site activities; and (v) documentation of work-related accidents.

(iv) Provide H&S orientation training to all new workers to ensure that they are apprised of the rules of work at the site, personal protective protection, and preventing injury to fellow workers.

(v) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site as well as at construction camps.

(vi) Provide medical insurance coverage for workers.

(vii) Secure construction zone from unauthorized intrusion and accident risks.

(viii) Provide supplies of potable drinking water.

(ix) Provide clean eating areas where workers are not exposed to hazardous or noxious substances.

(x) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted.

(xi) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas.

(xii) Ensure moving equipment is outfitted with audible back-up alarms.

(xiii) Mark and provide sign boards in the construction zone, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate.

483. **Impacts on Socio-Economic Activities**. Manpower will be required during the 18 months construction phase. This can help generate contractual employment and increase in local revenue. Thus, potential impact is positive and long-term. As per preliminary design, land acquisition and closure of roads are not required. However, construction activities may impede access of residents and customers to shops. The potential impacts are negative and moderate but short-term and temporary. The contractor will need to adopt the following mitigation measures:

(i) Leave space for access between mounds of soil.

(ii) Provide walkways and metal sheets where required to maintain access to shops/businesses along trenches.

(iii) Consult businesses and institutions regarding operating hours and factoring this in to work schedules.

(iv) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.

(v) Employ at least 50% of the labor force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available.

484. **Summary of Mitigation Measures during Construction**. Table 5 provides summary of mitigation measures to be considered by the contractor during construction phase. The

detailed mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related implementation arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators are provided in the EMP.

Table 5: Summary of Mitigation Measures during Construction Phase

Potential Impact	Mitigation Measures
Erosion hazards	• Save topsoil removed during excavation and use to reclaim disturbed areas, as soon as it is possible to do so. • Use dust abatement such as water spraying to minimize windblown erosion. • Provide temporary stabilization of disturbed/excavated areas that are not actively under construction. • Apply erosion controls (e.g., silt traps) along the drainage leading to the water bodies. • Maintain vegetative cover within road right-of-ways (ROWs) to prevent erosion and periodically monitor ROWs to assess erosion. • Clean and maintain catch basins, drainage ditches, and culverts regularly. • Conduct routine site inspections to assess the effectiveness of and the maintenance requirements for erosion and sediment control systems.
Impacts on water quality	• Schedule civil works during non-monsoon season, to the maximum extent possible. • Ensure drainages and water bodies within the construction zones are kept free of obstructions. • Keep loose soil material and stockpiles out of drains, flow-lines and watercourses. • Avoid stockpiling of excavated and construction materials (sand, gravel, cement, etc.) unless covered by tarpaulins or plastic sheets. • Re-use/utilize, to maximum extent possible, excavated materials. • Dispose any residuals at identified disposal site (PIU/PMSC will identify approved sites). • Dispose waste oil and lubricants generated as per provisions of Hazardous Waste (Management and Handling) Rules, 1989. • Develop a spill prevention and containment plan, educate workers about the plan, and have the necessary materials on site prior to and during construction. • Refuel equipment within the designated refuelling containment area away from drainages, nallahs, or any water body. • Inspect all vehicles daily for fluid leaks before leaving the vehicle staging area, and repair any leaks before the vehicle resumes operation.
Impacts on air quality	• Conduct regular water spraying on earth piles, trenches and sand piles. • Conduct regular visual inspection along alignments and construction zones to ensure no excessive dust emissions. • Spreading crushed gravel over backfilled surfaces if re-surfacing of disturbed

Potential Impact	Mitigation Measures
	ROWs cannot be done immediately. • Maintain construction vehicles and obtain —pollution under controll certificate from TNSPCB. • Obtain CFE and CFO for hot mix plants, crushers, diesel generators, etc., if to be used in the project.
Noise and vibrations impacts	• Limit construction activities in temple complexes and other important sites to daytime only. • Plan activities in consultation with the PIU/PMSC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. • Minimize noise from construction equipment by using vehicle silencers and fitting

	jackhammers with noise-reducing mufflers. • Avoid loud random noise from sirens, air compression, etc. • Require drivers that horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach. • If specific noise complaints are received during construction, the contractor may be required to implement one or more of the following noise mitigation measures, as directed by the project manager: (i) locate stationary construction equipment as far from nearby noise-sensitive properties as possible; (ii) shut off idling equipment; (iii) reschedule construction operations to avoid periods of noise annoyance identified in the complaint; and/or (iv) notify nearby residents whenever extremely noisy work will be occurring. • Follow Noise Pollution (Regulation and Control) Rules, day time ambient noise levels should not exceed 65 dB(A) in commercial areas, 55 dB(A) in residential areas, and 50 dB(A) in silence zone.3 • Ensure vehicles comply with Government of India noise limits for vehicles. The test method to be followed shall be IS:3028-1998. • Provide sound barriers towards the Aviary site and restrict noisy activities in day time only
Impacts on flora and fauna	• Conduct site induction and environmental awareness. • Limit activities within the work area. • Replant trees in the area using minimum ratio of 2 new trees for every 1 tree cut, if any. Replacement species must be approved by District Forest Department • Provide sound barriers towards the Aviary site and restrict noisy activities in day time only and use silencers/mufflers in noise producing equipment.
Impacts on physical resources	• Ensure no damage to structures/properties near construction zone. • Provide walkways and metal sheets where required to maintain access of people and vehicles. • Provide sign boards to inform nature and duration of construction works and contact numbers for concerns/complaints. • Increase the workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools; • Implement good housekeeping. Remove wastes immediately. Prohibit stockpiling of materials that may obstruct/slow down pedestrians and/or vehicle movement. • Ensure workers will not use nearby/adjacent areas as toilet facility. • Coordinate with PIU/PMSC for transportation routes and schedule. Schedule transport and hauling activities during non-peak hours. Communicate road detours via visible boards, advertising, pamphlets, etc.

[3] Day time shall mean from 6.00 am to 10.00 pm. Silence zone is an area comprising not less than 100 meters around hospitals, educational institutions, courts, religious places or any other area which is declared as such by BSPCB. Mixed categories of areas may be declared as one of the above mentioned categories by BSPCB.

Potential Impact	Mitigation Measures
	• Ensure heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. • Provide instructions on event of chance finds for archaeological and/or ethno-botanical resources. Works must be stopped immediately until such time chance finds are cleared by experts.
Impacts on waste generation	• Prepare and implement a waste management plan. Manage solid waste according to the following hierarchy: reuse, recycling and disposal. Include in waste management plan designated/approved disposal areas. • Coordinate with Municipal Authorities for beneficial uses of excavated soils/silts/sediments or immediately dispose to designated areas. • Recover used oil and lubricants and reuse; or remove from the sites.

	• Avoid stockpiling and remove immediately all excavated soils, excess construction materials, and solid waste (removed concrete, wood, trees and plants, packaging materials, empty containers, oils, lubricants, and other similar items). • Prohibit disposal of any material or wastes (including human waste) into drainage, nallah, or watercourse.
Impacts on occupational health and safety	• Comply with IFC EHS Guidelines on Occupational Health and Safety • Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively. • Develop comprehensive site-specific health and safety (H&S) plan. The overall objective is to provide guidance to contractors on establishing a management strategy and applying practices that are intended to eliminate, or reduce, fatalities, injuries and illnesses for workers performing activities and tasks associated with the project. • Include in H&S plan measures such as: (i) type of hazards during excavation works; (ii) corresponding personal protective equipment for each identified hazard; (iii) H&S training for all site personnel; (iv) procedures to be followed for all site activities; and (v) documentation of work-related accidents. • Provide H&S orientation training to all new workers to ensure that they are apprised of the rules of work at the site, personal protective protection, and preventing injury to fellow workers. • Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site as well as at construction camps. • Provide medical insurance coverage for workers. • Secure construction zone from unauthorized intrusion and accident risks. • Provide supplies of potable drinking water. • Provide clean eating areas where workers are not exposed to hazardous or noxious substances. • Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted. • Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas. • Ensure moving equipment is outfitted with audible back-up alarms. • Mark and provide sign boards in the construction zone, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate.
Impacts on socio-	• Leave space for access between mounds of soil. • Provide walkways and metal sheets where required to maintain access to

Potential Impact	Mitigation Measures
economic activities	shops/businesses along trenches. • Consult businesses and institutions regarding operating hours and factoring this in to work schedules. • Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints. • Employ at least 50% of the labor force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available. • —Mobility Planll has to be chalked out in consultation with the District Administration prior to start of work.

485. The construction related impacts due to proposed subproject components are generic to construction activities, and are typical of building and other construction projects. The potential impacts that are associated with construction activities can be mitigated to standard levels without difficulty through incorporation or application of the recommended mitigation measures and procedures.

D. Post-Construction Impacts and Mitigation Measures

486. Site clean-up is necessary after construction activities. The contractor will be required to:

(i) Backfill any excavation and trenches, preferably with excess excavation material generated during the construction phase.
(ii) Use removed topsoil to reclaim disturbed areas.
(iii) Re-establish the original grade and drainage pattern to the extent practicable.
(iv) Stabilize all areas of disturbed vegetation using weed-free native shrubs, grasses, and trees.
(v) Restore access roads, staging areas, and temporary work areas.
(vi) Restore roadside vegetation.
(vii) Remove all tools, equipment, barricades, signs, surplus materials, debris, and rubbish. Demolish buildings/structures not required for O&M. Dispose in designated disposal sites.
(viii) Monitor success of re-vegetation and tree re-planting. Replace all plants determined to be in an unhealthy condition.
(ix) Request in writing from PIU/PMSC that construction zones have been restored.

E. Anticipated Operations and Maintenance Impacts and Mitigation Measures

487. Impacts on environmental conditions associated with the operations and maintenance (O&M) of the subproject components pertain to impacts related to increased tourists in the areas resulting to increased vehicular movement along the roads, increased demands for services, and increased solid waste generation. These impacts can be mitigated by:

(i) Increased vehicular movement along the roads - speed restrictions, provision of appropriate road signage and well-located rest points for pedestrians shall minimize impacts on safety of the people.
(ii) Increase demands for services – addressed through the subproject design.
(iii) Increase solid waste generation – Municipal Corporation to put in place solid waste management programs.

VI. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. ADB Disclosure Policy

488. Public consultation[1] was undertaken as per ADB SPS requirements. All the five principles of information dissemination, information solicitation, integration, coordination and engagement into dialogue were incorporated during the task. A framework of different environmental impacts likely from the project was prepared based on opinions of all those consulted, especially at the micro level, by setting up dialogues with the local people and fishermen from whom information on site facts and prevailing conditions were collected.

489. As per ADB safeguard requirement, public consultation is to be carried out before and after impact identification. Public consultation was therefore carried out twice, once at the time of start of work with the key stakeholders particularly with wild life authorities and NGOs, and secondly to discuss mitigating measures and get concurrence of stakeholders.

B. Process for Consultation Followed

490. During project preparation, consultations have been held with the TN Department of Tourism and culture, tourists of various districts and District administration, District Municipal Administration, local community representatives, tourism officers, and tourist guides/photographers regarding issues pertaining to the selection of subprojects and identification of key issues including addressing the current gaps in provision of basic services and improvement of tourist infrastructure. Records of the consultations are provided in Appendix 1.

C. Plan for Continued Public Participation

491. To ensure continued public participation, provisions to ensure regular and continued stakeholder participation, at all stages during the project design and implementation is proposed. A grievance redressal committee will be set up within the PIU to register grievances of the people regarding technical, social and environmental aspects. This participatory process will ensure that all views of the people are adequately reviewed and suitably incorporated in the design and implementation process. Further, to ensure an effective disclosure of the project proposals to the stakeholders and the communities in the vicinity of the subproject locations, an extensive project awareness campaigns will be carried out.

492. The implementing agency will submit to ADB the following documents for disclosure on ADB‘s website: (i) The final IEE; (ii) A new or updated IEE and corrective action plan prepared during project implementation, if any; and (iii) the environmental monitoring reports.

493. For the benefit of the community the Summary IEE will be translated in the local language (Tamil) and made available at: (i) Office of the PMU; and, (ii) Office of the District Collectors at the Dhramapuri district. These copies will be made available free of cost to any person seeking information on the same. Hard copies of the IEE will be available in the PMU/PIU as well as the district library at Dhramapuri District, and accessible to citizens as a means to disclose the document and at the same time creating wider public awareness. On demand, the person seeking

[1] Meaningful consultation will: (i) be carried out on an ongoing basis throughout the project cycle; (ii) involve timely disclosure of relevant information. Affected peoples and stakeholders will have access to relevant project information prior to any decision-making that will affect them; (iii) be conducted free of intimidation or coercion; and (iv) be gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups.

information can obtain a hard copy of the complete IEE document at the cost of photocopy from the office of the PMU/PIU, on a written request and payment for the same to the Project Director. Electronic version of the IEE will be placed in the official website of the Tourism Department and the website of ADB after approval of the documents by

Government and ADB. The PMU will issue Notification on the disclosure mechanism in local newspapers, ahead of the initiation of implementation of the project, providing information on the project, as well as the start dates, etc. The notice will be issued by the PMU in local newspapers one month ahead of the implementation works. This will create awareness of the project implementation among the public.

494. Posters designed to mass campaign the basic tenets of the IEE will be distributed to libraries in different localities that will be generating mass awareness.

VII. GRIEVANCE REDRESS MECHANISM

495. The executing agency will establish a mechanism to receive and facilitate resolution of affected peoples‘ concerns, complaints, and grievances about the Project‘s environmental performance. The project-specific grievance redress mechanism (GRM) is not intended to bypass the government‘s own redress process; rather it is intended to address affected people's concerns and complaints promptly, making it readily accessible to all segments of the affected people and is scaled to the risks and impacts of the Project.

496. The PMU and PIUs will make the public aware of the GRM through public awareness campaigns. Grievances can be filed in writing using the Complaint Register and Complaint Forms (Appendix 5) or by phone with any member of the PMU or PIU. The contact phone number of the PIUs and the PMU will serve as a hotline for complaints and will be publicized through the media and placed on notice boards outside their offices and at construction sites. The safeguard documents made available to the public in an accessible version will include information on the GRM and will be widely disseminated throughout the corridor by the safeguards officers in the PMU and PIUs with support from the NGO engaged to implement the Community Awareness Program.

497. The PIUs will convene Grievance Redress Committees (GRC) within one week of the voiced grievance at the project level consisting of members of local government, NGOs, project staff, and representatives of the affected people. Decisions on the grievance are to be made within 15 days voiced grievances. If the grievance cannot be solved, the PMU is notified to further advice on the situation with higher government and legal bodies.

498. The GRC will ensure rights of vulnerable and poor are included. The grievance mechanism will be scaled to the risks and adverse impacts of the Project. It will address affected people's concerns and complaints promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the affected people at no costs and without retribution. The mechanism developed will be in a manner that it shall not impede access to the existing judicial or administrative remedies. The affected people will be appropriately informed about the mechanism.

499. The PMU officers will be responsible for processing and placing all papers before the GRC, maintaining database of complaints, recording decisions, issuing minutes of the meetings and monitoring to see that formal orders are issued, and the decisions carried out. All costs involved in resolving the complaints (meetings, consultations, communication and reporting / information dissemination) will be borne by the PMU.

500. The safeguard monitoring reports will include the following aspects pertaining to progress on grievances:

(i) Number of cases registered with the GRC, level of jurisdiction (first, second and third tiers), number of hearings held, decisions made, and the status of pending cases; and

(ii) Lists of cases in process and already decided upon may be prepared with details such as Name, ID with unique serial number, date of notice, date of application, Date of hearing, decisions, remarks, actions taken to resolve issues, and status of Grievance (i.e., open, closed, pending).

501. The affected person/aggrieved party can give their grievance verbally or in written to the local grievances committee. Grievances of affected person will first be brought to the attention of the PIU who can resolve the issue at site level. If the matter is not solved within 7 days period by the PIU, it will be brought to the GRC constituted for the purpose in PIU. This GRC shall discuss the issue in its monthly meeting and resolve the issues within one month of time after receiving the grievance. If the matter is not resolved by GRC at PIU level within stipulated time, it shall be referred to GRC at PMU level by Executive Engineer of PIU.

502. GRC at PMU shall discuss the issue and try to resolve it and inform the PIU accordingly. If the matter is not resolved by the GRC at PMU level within one month of time, the aggrieved person/party can bring the matter to The Court of Law. The PIU shall keep records of all grievances received including contact details of complainant, date of receiving the complaint, nature of grievance, agreed corrective actions and the date these were affected and final outcome. The grievance redress process is shown below.

A. Composition and Functions of Grievance Redress Committee

503. Local Grievance Committee (LGC). In this LGC has worked with NGO, SHG, Line Agency, Special invitee.

504. GRC at PIU. In each PIU there shall be one GRC, which will include Project Manager (PIU), District Tourist Officer of Department of Tourism of Govt. of Tamil Nadu, Community Development Officer of PIU, nominated representative of District Magistrate and nominated representative committee shall be headed by Project Manager (PIU). The committee will meet at least once in every month. Agenda of meeting shall be circulated to all the members and affected persons/aggrieved party along with venue, date and time; informed in written at least 7 days in advance of meeting. The matters shall remain with GRC at PIU level for one month and if grievance is not resolved within this time period, the matter shall be referred to GRC at PMU.

505. GRC within Environmental and Social Management Cell (ESMC) at PMU. There shall be one GRC in PMU. The matters not resolved by the GRC at PIU level within one month shall come under GRC at PMU. GRC at PMU will include Community Development Expert of PMU, Safeguard Specialist of PMU and Additional Project Director (APD) of PMU. The Committee shall be headed by APD of PMU. This committee shall look the matters, which are referred to and not resolved by GRC at PIU level. If the matter is not resolved by the GRC at PMU level within one month of time, the aggrieved person/party can bring the matter to The Executive Committee/State Level Empowered Committee (SLEC). Sample Grievance Redress Form is attached as Appendix 5.

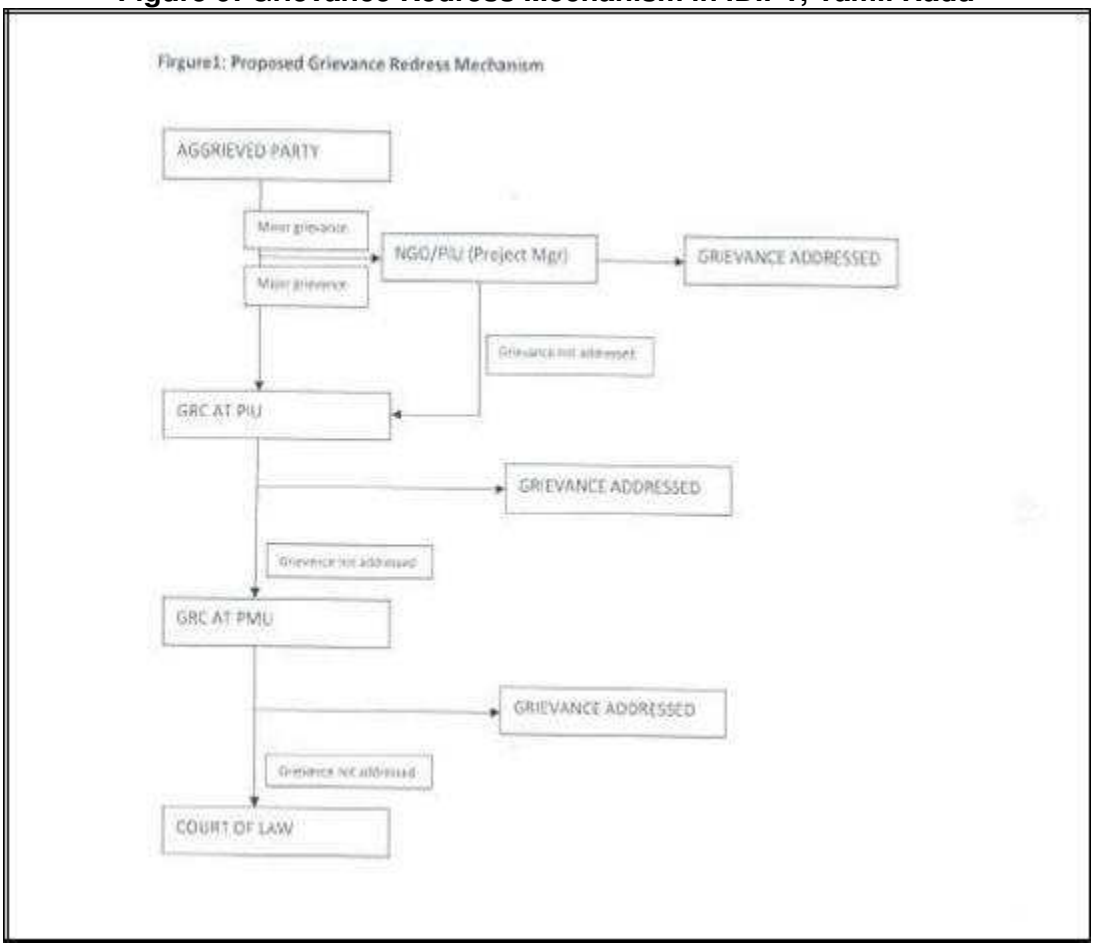
B. Approach to Grievance Redress Committee

506. Affected person/aggrieved party can approach to GRC for redress of his/their grievances through any of the following modes:

(i) **Web based:** A separate corner will be developed at the program website so that public / community/ affected person can register their complaint in the online column.

(ii) **Telecom based:** A toll free no. Will be issued by the PMU/ PIU so that general public can register their complaint through telephone / mobile phone to the PIU/PMU office.

Figure 9: Grievance Redress Mechanism in IDIPT, Tamil Nadu



Note: LGC -NGO, SHG, Line Agency, Representative of Gram Panchayat, Special invitee GRC – PM, CDO, Engineer, DFO, DTO, SDM GRC in Environment and Social Management Cell (ESMC) –PMU (APD, SS, CDS, FS), PMSC (EE, CDE)

C. Accountability Mechanism

People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make an effort in good faith to solve their problems by working with the concerned

ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.[2]

VIII. ENVIRONMENTAL MANAGEMENT PLAN

507. The purpose of the environmental management plan (EMP) is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of: (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with (Table 5).

A copy of the EMP must be kept on work sites at all times. This EMP will be included in the bid documents and will be further reviewed and updated during implementation. The EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

509. The contractor will be required to (i) establish an operational system for managing environmental impacts (ii) carry out all of the monitoring and mitigation measures set forth in the EMP; and (iii) implement any corrective or preventative actions set out in safeguards monitoring reports that PMU and PIU will prepare from time to time to monitor implementation of this IEE and EMP. The contractor shall allocate a budget for compliance with these EMP measures, requirements and actions.

A. Responsibilities for Environmental Management Plan Implementation

510. The following agencies will be responsible for EMP Implementation:

(i) Department of Tourism & Culture, Government of Tamil Nadu is the executing agency responsible for overall management, coordination, and execution of all activities funded under the loan;

(ii) PIU, Dhramapuri will be the Implementing Agency (IA) responsible for coordinating procurement and construction of the project. PIU through its Project Management Unit (PMU) at Chennai will be implementing the project;

(iii) The Project Management and Supervision Consultant (PMSC) assists PMU in managing the project including procurement and assures technical quality of design and construction;

(iv) The Project Management and Supervision Consultant (PMSC) will prepare the DPR of the project and will carry out construction supervision during project implementation. Their responsibility will also include EMP implementation supervision;

(v) A Project Implementation Unit (PIU) shall be established to look into progress and coordination of day to day construction works with the assistance of PMSC; and

(vi) The contractor will be responsible for execution of all construction works. The contractor will work under the guidance of the PIU Dhramapuri and PMSC. The environmental related mitigation measures will also be implemented by the contractor.

511. The contractor‘s conformity with contract procedures and specifications during

[2] Accountability Mechanism. http://www.adb.org/Accountability-Mechanism/default.asp.

construction will be carefully monitored by the PIU. Safeguard Specialists are deputed in PMU, and PMSC who will monitor the environmental performance of contractors. Terms of References of Safeguards Specialists are given in boxes below:

Box 1: Terms of Reference of Safeguards Specialist – PMU

- Review the IEE document and ensure adequacy under Safeguard Policy Statement, 2009 and identify any areas for improvement.
- Ensure that the project design and specification adequately reflect the IEE, co-ordinate the obtaining of requisite environmental clearances for the project
- Monitor construction activities to ensure that identified and appropriate control measures are effective and in compliance with the IEE and advise PIU for compliance with statutory requirements.
- Develop training programme for the PMU/PIUs staff, the contractors and others involved in the project implementation, in collaboration with the Environmental Specialist of the

Box 1: Terms of Reference of Safeguards Specialist – PMU

PMSC

- Review and approve the Contractor‘s Implementation Plan for the environmental measures, as per IEE.
- Liaise with the Contractors and Consultants on the implementation of the Environmental management measures proposed in the IEE
- Liaise with the various Government agencies on environmental and other regulatory matters
- Continuously interact with the NGOs and Community groups to be involved in the project
- Establish dialogue with the affected communities and ensure that the environmental concerns and suggestions are incorporated and implemented in the project.
- Review the environmental performance of the project through an assessment of the periodic environmental monitoring reports submitted by the PMSC; provide a summary of the same to the Project Director, and initiate necessary follow-up actions
- Provide support and assistance to the Government Agencies and the Asian Development Bank to supervise the implementation of the IEE during the construction as well as operation stage of the project
- Document the good practices in the project on incorporation and integration of environmental issues into engineering design and on implementing measures in the construction, and dissemination of the same

Box 2: Terms of Reference of Safeguards Specialist (Environment) of PMSC

- Review the IEE document and ensure adequacy under ADB SPS, 2009.
- Interact on a regular basis with the sector specialists of the PMSC and integrate environmentally sound practices into the detailed design of project components.
- Advise PMU/PIU for compliance with statutory clearances.
- Work out the site specific mitigation measures for components as required and integrate the same into contractual provisions.
- Develop, organize and deliver environmental training programmes and workshops for the staff of the PIU and Contractors and in accordance to the Capacity Building Programme as specified in the IEE.
- Preparation of Activity Plans as identified in IEE (these include Site Management Plans, Waste Management Plans, Sludge Management and Disposal Plans, Occupational Safety Plans etc.).
- Supervise the implementation of the Environmental provisions by the Contractors.
- Review and approve site specific environmental enhancement/mitigation designs worked

out by the Contractor. Hold regular consultation meetings with the Environmental specialist of the PMU

- Review the Contractors' Environmental Implementation Plans to ensure compliance with the IEE.
- Develop good practice construction guidelines to assist the contractors in implementing the provisions of IEE.
- Prepare and submit regular environmental monitoring and implementation progress reports.
- Assist Environmental Specialist of the PMU to prepare good practice dissemination notes based on the experience gained from site supervision.

Box 3: Terms of Reference of Safeguards Specialist (Environment) of PMSC

Support and Advice the PMU and Consultants team in-

Box 3: Terms of Reference of Safeguards Specialist (Environment) of PMSC

- Best Environmental Practices for responding to environmental issues involved with implementation of the projects on a sustainable basis
- Assistance and advice on institutional strengthening and capacity building at the PMU and PIU levels in regards to environmental practices.
- Ensure that baseline surveys, environmental monitoring plans and programs, initial environmental examinations (IEE) as may be required are carried out.
- Preparation of ADB procedure compliant environmental safeguard actions including impact assessment if any during the design stage
- Management plan and mitigation measures
- Oversight of implementation of environmental standards and safeguards as part of project implementation
- Participate in preparation of Master Plan for additional sites and contribute to the environmental safeguards to the plan and sub components
- Preparation of performance monitoring reports

512. Responsibility for updating IEE during detailed design. PMSC will be responsible for preparation of IEE and updating it time to time, when required during detailed design and implementation phase.

513. Responsibility for monitoring. During construction, PMSC's Environmental Specialist and the designated representative engineer of the PIU will monitor the contractor's environmental performance on day to day basis while PMSC expert will randomly monitor the performance for corrective measures if required. During the operation phase, monitoring will be the responsibility of the Municipal Authority and Department of Tourism.

514. Responsibility for Reporting. PIU in coordination with PMSC will submit monthly, quarterly and semi-annually monitoring report to PMU. On the basis of it PMU will submit to ADB semi-annual monitoring reports on implementation of the EMP and will permit ADB to field environmental review missions which will review in detail the environmental aspects of the project. Any major accidents having serious environmental consequences will be reported immediately. PMSC environmental expert will help in preparation and finalization of quarterly, semi-annual and annual progress reports. The sample environmental monitoring template is attached as Appendix 4.

B. Environmental Management Plan Tables

515. Tables 6 to 8 show the potential adverse environmental impacts, proposed mitigation

measures, responsible parties, and cost of implementation. This EMP will be included in the bid documents and will be further reviewed and updated during implementation.

Table 6: Pre-Construction Environmental Management Plan Table

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds to Implement Mitigation Measures
Consents, permits, clearances, no objection certificate (NOC), etc.	Obtain all necessary consents, permits, clearance, NOCs, etc. prior to start of civil works.	Consents, permits, clearance, NOCs, etc.	Project Management Unit (PMU)	Executing agency to report to ADB in environmental monitoring report (EMR)	check consent for establishments (CFEs), permits, clearance, prior to start of civil works	PMU
	Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc.	Records and communications	PMU	Executing agency to report to ADB in EMR	Acknowledge upon receipt Send report as specified in CFE, permits, etc.	PMU
	Include in detailed design drawings and documents all conditions and provisions if necessary	Detailed design documents and drawings	Contractor	PMU and PMSC PIU and Project Management and Supervision Consultant	Upon submission by contractor	Contractor
Establishment of baseline environmental conditions prior to start of civil works	Conduct documentation of location of components, areas for construction zone (camps, staging, storage, stockpiling, etc.) and surroundings (within direct impact zones). Include photos and GPS coordinates	Records	Contractor	PMU PIU and PMSC	to be included in updated Initial Environmental Examination (IEE) report	PMU
Erosion control	Develop an erosion control and re-vegetation plan to minimize soil loss and reduce sedimentation to protect water quality. Minimize the potential for	Erosion control and re-vegetation plan covering construction phase	Contractor	PMU, PIU and PMSC	to be included in updated IEE report	Contractor

Parameters	Mitigation Measures	Parameter/ Indicator of	Responsible for Implementation	Responsible for	Frequency of Monitoring	Source of Funds to

		Compliance		**Supervision**		**Implement Mitigation Measures**
	erosion by balancing cuts and fills to the extent feasible. Identify and avoid areas with unstable slopes and local factors that can cause slope instability (groundwater conditions, precipitation, seismic activity, slope angles, and geologic structure). Minimize the amount of land disturbed as much as possible. Use existing roads, disturbed areas, and borrow pits and quarries when possible. Minimize vegetation removal. Stage construction to limit the exposed area at any one time. Minimize the amount of land disturbed as much as possible. Use existing roads, disturbed areas, and borrow pits and quarries when possible. Minimize vegetation removal. Stage construction to limit the exposed area at any one time.					
Utilities	Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during the construction phase. Require contractors to prepare a contingency plan to include actions to be done in case of	List and maps showing utilities to be shifted Contingency plan for services disruption	- PMSC to prepare preliminary list and maps of utilities to be shifted - During detailed design phase, contractor to (i) prepare list and	PMU and PMSC PIU and PMSC	to be included in updated IEE report	PMSC – preliminary design stage Contractor – implementation stage

Parameters	**Mitigation Measures**	**Parameter/ Indicator of Compliance**	**Responsible for Implementation**	**Responsible for Supervision**	**Frequency of Monitoring**	**Source of Funds to Implement Mitigation**

						Measures
	unintentional interruption of services. Obtain from the PIU and/or PMSC the list of affected utilities and operators; If relocations are necessary, contractor will coordinate with the providers to relocate the utility.		operators of utilities to be shifted; (ii) contingency plan			
Social and Cultural Resources	Consult Archaeological Survey of India (ASI) or TN State Archaeology Department to obtain an expert assessment of the archaeological potential of the site. Consider alternatives if the site is found to be of medium or high risk. Include state and local archaeological, cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available. Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved.	Chance find protocol	- PMSC to consult ASI or TN State Archaeology Department - PMSC to develop protocol for chance finds	PMU	to be included in updated IEE report	PMSC
Sites for construction	Will not promote instability and result in destruction of property,	List of pre-approved sites for	- PMSC to prepare list of	PMU	to be included in updated IEE	Contractor

Parameters	**Mitigation Measures**	**Parameter/ Indicator of Compliance**	**Responsible for Implementation**	**Responsible for Supervision**	**Frequency of Monitoring**	**Source of Funds to Implement Mitigation Measures**
work camps,	vegetation, irrigation, and	construction work	potential sites	PIU	report	

areas for stockpile, storage and disposal	drinking water supply systems, etc. Residential areas will not be considered so as to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). Disposal will not be allowed near sensitive areas which will inconvenience the community. The construction camp, storage of fuel and lubricants should be avoided at the river bank. The construction camp site for intake well should be finalized in consultation with PMSC and PIU.	camps, areas for stockpile, storage and disposal Waste management plan	PMSC to inspect sites proposed by contractor if not included in pre-approved sites			
Sources of construction materials	Use quarry sites and sources permitted by government. Verify suitability of all material sources and obtain approval from PIU. If additional quarries are required after construction has started, obtain written approval from PIU. Submit to PMSC on a monthly basis documentation of sources of materials.	Permits issued to quarries/sources of materials	Contractor PMSC and PMSC to verify sources (including permits) if additional is requested by contractor	PMU PIU	Upon submission by contractor	Contractor
Access	Plan transportation routes so	Traffic	Contractor	PIU and	to be included in	Contractor

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds to Implement Mitigation Measures
	that heavy vehicles do not use narrow local roads, except in the immediate vicinity of	management plan		PMSC	updated IEE report	

	delivery sites. Schedule transport and hauling activities during non-peak hours. Locate entry and exit points in areas where there is low potential for traffic congestion. Keep the site free from all unnecessary obstructions. Drive vehicles in a considerate manner. Coordinate with the Traffic Police Department for temporary road diversions and for provision of traffic aids if transportation activities cannot be avoided during peak hours. Notify affected sensitive receptors by providing sign boards with information about the nature and duration of construction works and contact numbers for concerns/complaints. Provide free access to households along the alignments of raw and clear water transmission routes during the construction phase.					
Occupational health and safety	Comply with IFC EHS Guidelines on Occupational Health and Safety	Health and safety (H&S) plan	Contractor	PMU and PMSC	to be included in updated IEE report	Contractor

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds to Implement Mitigation Measures
	Develop comprehensive site-specific health and safety (H&S) plan. The overall objective is to provide guidance to contractors on establishing a management			PIU and PMSC		

	strategy and applying practices that are intended to eliminate, or reduce, fatalities, injuries and illnesses for workers performing activities and tasks associated with the project. Include in H&S plan measures such as: (i) type of hazards in the intake wells site; (ii) corresponding personal protective equipment for each identified hazard; (iii) H&S training for all site personnel; (iv) procedures to be followed for all site activities; and (v) documentation of work-related accidents. Provide medical insurance coverage for workers.					
Public consultations	Continue information dissemination, consultations, and involvement/participation of stakeholders during project implementation.	- Disclosure records - Consultations	PMU and PMSC PIU and PMSC Temple administrators Contractor	PMU and PMSC	- During updating of IEE Report - During preparation of site- and activity-specific plans as per EMP - Prior to start of construction - During construction	PMU Contractor to allocate funds to support

Table 7: Environment Management Plan for Construction Phase

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
Erosion hazards	• Save topsoil removed during excavation and use to reclaim disturbed areas, as soon as it is possible to do so. • Use dust abatement such as water spraying to minimize windblown erosion. • Provide temporary	Erosion control and re-vegetation plan	Contractor	PIU and PMSC PIU to submit EMP monitoring report to PMU	- daily visual inspection by contractor supervisor and/or environment specialist - weekly visual	Contractor

	stabilization of disturbed/excavated areas that are not actively under construction. • Apply erosion controls (e.g., silt traps) along the drainage leading to the water bodies. • Maintain vegetative cover within road ROWs to prevent erosion and periodically monitor ROWs to assess erosion. • Clean and maintain catch basins, drainage ditches, and culverts regularly. • Conduct routine site inspections to assess the effectiveness of and the maintenance requirements for erosion and sediment control systems.				inspection by PMSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMSC and/or PMSC	
Impacts on water quality	• Schedule construction activities during non-monsoon season, to the maximum extent possible.	Work schedule	Contractor	PIU and PMSC PIU to submit EMP monitoring	- daily inspection by contractor supervisor and/or environment	
	• Ensure drainages and water bodies within the	Visual inspection				

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	construction zones are kept free of obstructions.			report to PMU	specialist - weekly visual	
	• Keep loose soil material and stockpiles out of drains and flow-lines.	Visual inspection			inspection by PMSC (more frequent during monsoon season and if corrective action is required) - random	
	• Avoid stockpiling of excavated and construction materials (sand, gravel, cement, etc.) unless covered by tarpaulins or plastic sheets.	Visual inspection				
	• Re-use/utilize, to maximum extent possible,	condition in waste management plan				

	excavated materials.				inspection by PMU, PIU, PMSC and/or PMSC	
	• Dispose any residuals at identified disposal site (PIU/PMSC will identify approved sites).	condition in waste management plan				
	• Dispose waste oil and lubricants generated as per provisions of Hazardous Waste (Management and Handling) Rules, 1989.	condition in waste management plan				
	• Refuel equipment within the designated refuelling containment area away from drainages, nallahs, or water body.	condition in list of pre-approved sites for construction work camps, areas for stockpile, storage and disposal				
	• Inspect all vehicles daily for fluid leaks before leaving the vehicle staging area, and repair any leaks before the vehicle resumes operation.	Vehicle inspection report				

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
Impacts on air quality	• Conduct regular water spraying on stockpiles.	- Visual inspection - No complaints from sensitive receptors - Records	Contractor	PIU and PMSC	- daily inspection by contractor supervisor and/or environment specialist - weekly visual inspection by PMSC (more frequent during dry season and if corrective action is required) - random	Contractor
	• Conduct regular visual inspection in the construction zones to ensure no excessive dust emissions.	Visual inspection				
	• Maintain construction vehicles and obtain —pollution under controll certificate from BSPCB.	PUC certificates				
	• Obtain CFE and CFO for hot mix plants, crushers, diesel generators, etc., if to be used in	Consent to establish (CTE) and Consent to				

	the project.	operate (CTO)			inspection by PMU, PIU, PMSC and/or PMSC	
Noise and vibrations impacts	• Limit construction activities in temple complexes and other important areas to daytime only. • Plan activities in consultation with PIU/PMSC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance.	Work schedule	Contractor	PIU and PMSC	- daily inspection by contractor supervisor and/or environment specialist - weekly visual inspection by PMSC (more frequent during noise-generating activities and if corrective	Contractors
	• Minimize noise from construction equipment by using vehicle silencers and fitting jackhammers with noise-reducing	Report on ambient noise level monitoring within direct impact zones				

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	mufflers.				action is required)	
	• Avoid loud random noise from sirens, air compression, etc.	zero incidence			- random inspection by PMU, PIU, PMSC and/or PMSC	
	• Require drivers that horns not be used unless it is necessary to warn other road users or animals of the vehicle‘s approach.	feedback from receptors within direct and direct impact zone				
	• If specific noise complaints are received during construction, the contractor may be required to implement one or more of the following noise mitigation measures, as directed by the project manager: • Locate stationary construction equipment as far from nearby noise-sensitive properties, such as the hospital, as possible. • Shut off idling equipment. • Reschedule construction operations to avoid periods of noise annoyance identified in the complaint. • Notify nearby residents whenever extremely noisy work will be occurring.	- Complaints addressed satisfactory - Grievance Redress Mechanicm (GRM) records				
Impacts on flora and fauna	• Conduct site induction and environmental awareness.	Records	Contractor	PIU and PMSC	- daily inspection by contractor supervisor and/or environment specialist - weekly visual inspection by	Contractor
	• Limit activities within the work area.	Barricades along excavation works				
	• Replant trees in the area using minimum ratio of 2 new trees for every 1 tree cut. Replacement species must be approved by Chief Wildlife	-Number and species approved by Tamil Nadu State Forest Department				

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	Warden of Tamil Nadu State Forest Department. • Provide sound barriers towards existing aviary and restrict noisy activities during day time only.	-Sound barriers installed towards aviary			PMSC (more frequent if corrective action is required) - random inspection by PMU, PIU, PMSC and/or PMSC	
Impacts on physical cultural resources	• Ensure no damage to structures/properties adjacent to construction zone.	- Visual inspection - any impact should be addressed by project resettlement plan	Contractor In coordination with PIU and PMSC for any structures within WTP site and construction zone	PIU and PMSC	- daily inspection by contractor supervisor and/or environment specialist - weekly visual inspection by PMSC (more frequent if corrective action is required) - random inspection by PMU, PIU, PMSC and/or PMSC	Contractor
	• Provide sign boards to inform nature and duration of construction works and contact numbers for concerns/complaints.	- no complaints received - photo-documentation				
	• Increase the workforce in WTP components near the hospital and other sensitive receptors.	- Records of workers deployment - Work schedule				
	• Implement good housekeeping. Remove wastes immediately.	- Visual inspection - No stockpiled/ stored wastes				
	• Ensure workers will not use nearby/adjacent areas as toilet facility.	- No complaints received - Sanitation facilities for use of workers				
	• Coordinate with PIU/PMSC for transportation routes and schedule. Schedule	- Approved routes in traffic management plan				

Potential Impact	Mitigation Measures	Parameter/ Indicator of	Responsible for Implementation	Responsible for	Frequency of Monitoring	Source of Funds

		Compliance		**Supervision**		
	transport and hauling activities during non-peak hours. Communicate road detours via visible boards, advertising, pamphlets, etc. • Ensure heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites.					
	• Provide instructions on event of chance finds for archaeological and/or ethno-botanical resources. Works must be stopped immediately until such time chance finds are cleared by experts.	condition in chance find protocol				
Impact due to waste generation	• Prepare and implement a waste management plan. Manage solid waste according to the following hierarchy: reuse, recycling and disposal. Include in waste management plan designated/approved disposal areas. • Coordinate with PIU/PMSC for beneficial uses of excavated soils or immediately dispose to designated areas. • Recover used oil and lubricants and reuse; or remove from the site. • Avoid stockpiling and remove immediately all excavated soils, excess construction materials, and solid waste (removed concrete, wood, trees and plants, packaging materials,	condition in waste management plan	Contractor	PIU and PMSC	- daily inspection by contractor supervisor and/or environment specialist - weekly visual inspection by PMSC (more frequent if corrective action is required) - random inspection by PMU, PIU, PMSC and/or PMSC	Contractor

Potential Impact	**Mitigation Measures**	**Parameter/ Indicator of Compliance**	**Responsible for Implementation**	**Responsible for Supervision**	**Frequency of Monitoring**	**Source of Funds**
	empty containers, oils, lubricants,					

	and other similar items). • Prohibit disposal of any material or wastes (including human waste) into drainage, nallah, or watercourse.					
Impacts on occupational health and safety	• Comply with IFC Environmental, Health and Safety (EHS) Guidelines on Occupational Health and Safety (OHS)	- Visual inspection - Records	Contractor	PIU and PMSC	- daily inspection by contractor supervisor and/or environment specialist - weekly visual inspection by PMSC (more frequent if corrective action is required) - random inspection by PMU, PIU, PMSC and/or PMSC	Contractor
	• Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.	- Visual inspection - Work schedule - Noise level monitoring in work area				
	• Provide H&S orientation training to all new workers to ensure that they are apprised of the rules of work at the site, personal protective protection, and preventing injury to fellow workers.	- Records - Condition in Health and Safety (H&S) plan				
	• Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site as well as at construction camps.	- Visible first aid equipment and medical supplies - Condition in H&S plan				
	• Provide medical insurance coverage for workers.	Records				
	• Secure construction zone from unauthorized intrusion and accident risks.	- Area secured - Trenches barricaded				
	• Provide supplies of potable drinking water.	- Supply of water				
	• Provide clean eating areas where workers are not	- Workers area				

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds

	exposed to hazardous or noxious substances.					
	• Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted.	- Records - Condition in H&S plan				
	• Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas.	- Visual inspection - Condition in H&S plan				
	• Ensure moving equipment is outfitted with audible back-up alarms.	- Construction vehicles - Condition in H&S plan				
	• Mark and provide sign boards in the construction zone, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate.	- Visible and understandable sign boards in construction zone - H&S plan includes appropriate signs for each hazard present				
Impacts on socio-economic activities	• Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.	Visible and understandable sign boards in construction zone	Contractor	PIU and PMSC	- daily inspection by contractor supervisor - weekly visual inspection by PMSC (more frequent if corrective action is required) - random inspection by PMU, PIU, PMSC	Contractor
	• Employ at least 50% of the labor force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available.	Employment records				

Table 8: Environmental Management Plan for Post-Construction Phase

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
Solid waste (debris, excavated soils, etc.)	• Backfill any excavation and trenches, preferably with excess excavation material generated during the construction phase. • Use removed topsoil to reclaim disturbed areas. • Re-establish the original grade and drainage pattern to the extent practicable. • Stabilize all areas of disturbed vegetation using weed-free native shrubs, grasses, and trees. • Restore access roads, staging areas, and temporary work areas. • Restore roadside vegetation, if removed • Remove all tools, equipment, barricades, signs, surplus materials, debris, and rubbish. Demolish buildings/structures not required for O&M. Dispose in designated disposal sites.	Pre-existing condition Construction zone has been restored	Contractor	PIU and PMSC PIU to submit EMP monitoring report to PMU	- visual inspection by contractor supervisor and/or environment specialist	Contractor

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	• Monitor success of re-vegetation and tree re-planting. Replace all plants determined to be in an unhealthy condition. • Request in writing from PIU/PMSC that construction zones have been restored.					

Summary of Site- and Activity-Specific Plans as per EMP

516. Table 9 summarizes site and activity specific plans to be prepared as per EMP tables.

Table 9: Site- and Activity-Specific Plans/Programs as per EMP

To be Prepared During	Specific Plan/Program	Purpose	Responsible for Preparation	Responsible for Implementation
Detailed Design Phase	Environmental monitoring program as per detailed design	Indicate sampling locations, methodology and parameters	PMU/PIU and PMSC/PMSC	Contractor
Detailed Design Phase	Erosion control and re-vegetation plan	Mitigate impacts due to erosion	Contractor	Contractor
Detailed Design Phase	List and maps showing utilities to be shifted	Utilities shifting	PMSC during preliminary stage Contractor as per detailed design	Contractor
Detailed Design Phase	Contingency plan	Mitigate impacts due to interruption of services during utilities shifting	Contractor	Contractor
Detailed Design Phase	Chance find protocol	Address archaeological or historical finds	PMU and PMSC	Contractor
Detailed Design Phase	List of pre-approved sites	Location/s for work camps, areas for stockpile, storage and disposal	PIU and PMSC	Contractor
Detailed Design Phase	Waste management plan	Mitigate impacts due to waste generation	Contractor	Contractor
Detailed Design Phase	Traffic management plan	Mitigate impacts due to transport of materials and pipe laying works	Contractor	Contractor

To be Prepared During	Specific Plan/Program	Purpose	Responsible for Preparation	Responsible for Implementation
Detailed Design Phase	H&S plan	Occupational health and safety	Contractor	Contractor

C. Environmental Monitoring Plan

517. Through integration of mitigation measures in project design, impacts are mostly insignificant, temporary in nature and can be properly avoided or mitigated by following proposed mitigation measures given in the EMP of this IEE report.

518. Table 10 provides the indicative environmental monitoring program which includes relevant environmental parameters, with a description of the sampling stations, frequency of monitoring, applicable standards, and responsibility. This will be updated during detailed design to ensure EMP and monitoring program is commensurate to the impacts of the subproject.

519. Environmental monitoring will be done during construction in three levels; namely monitoring development of project performance indicators done by the PMSC Environmental Specialist, monitoring implementation of mitigation measures done by the Contractor; and overall regulatory monitoring of the environmental issues done by the PMSC/PMU Environmental Specialist. The monitoring carried out by the contractor through the approved agency will be supervised by the Safeguard Specialist of the Project Management and Supervision Consultant. The proposed monitoring of all relevant environmental parameters, with a description of the sampling stations, frequency of monitoring, applicable standards and responsible agencies are presented.

Table 10: Environmental Monitoring Plan

	Attributes	Stage	Parameters to be Monitored	Location	Frequency	Responsibility
1	Debris /Construction materials disposal	Construction Stage	Safe disposal of construction wastes	Major construction sites	Random checks	Contractor
2	Dust suppression	Construction Stage	No. of tankers for water sprinkling, Timing of sprinkling, Location of sprinkling, Log Book	Major construction sites	Random checks	Contractor
2	Ambient Air Quality	Construction Stage	RPM, SPM, SO2, NOx, CO	Major construction sites	Once in a season (except monsoons) for the entire construction period	Contractor, to be monitored by an agency engaged with approval using and under NABL Accreditation norms
4	Water quality	Construction stage	TDS, TSS, pH, DO,	Locations to be	Twice a year (pre-	Contractor, to be

	Attributes	Stage	Parameters to be Monitored	Location	Frequency	Responsibility
			BOD, COD, Faecal Coliform, Ammonia, Nitrogen	decided during detailed design	monsoon and post-monsoon) for the entire period of construction	monitored by an agency engaged with approval using and under NABL Accreditation norms
5	Noise Levels	Construction and Operation Stage	Equivalent Day and Night Time Noise Levels	All Construction sites	Once in a season during construction stage	Contractor, to monitor through approved Monitoring Agency
6	Supply of PPE	Construction Stage	Provision of PPE on site, adequacy of equipment	All Construction sites	Continuous	Contractor
7	Establishing Medical facilities	Construction Stage	Access to health facilities for the construction workers	All Construction sites	Continuous	Contractor
8	Accident record	Construction Stage	No. of fatal accidents, No. of injuries, No. of disabilities	All construction sites	Continuous	Contractor
9	Post construction clearance of site	Post construction	Whether temporary locations for workers camp, site office, and other construction locations are restored to pre-project conditions	All Construction sites	Post construction	Contractor

D. Capacity Building

The Environmental Specialist of the PMSC will provide the basic training required for environmental awareness followed by specific aspects of Infrastructure Improvement Projects along with Environmental implications for projects. Specific modules customized for the available skill set will be devised after assessing the capabilities of the members of the Training Progra mme and the requirements of the project. The entire training would cover basic principles of environmental assessment and management; mitigation plans and programmes, implementation techniques, monitoring methods and tools. The proposed training program along with the frequency of sessions is presented in Tables 11 & 12 below. This training program is intended for the entire destination and is not just specific to this package.

Table 151: Training Modules for Environmental Management (common for entire project)

Program	Description	Participants	Form of Training	Duration/ Location	Training Conducting Agency
A. Pre-Construction Stage					
• Sensitization Workshop	• Introduction to Environment: • Basic Concept of environment • Environmental Regulations and Statutory requirements as per Govt. of India and ADB	• Tourism/Forest/Roads/Culture Department Officials, Project Director and Environmental Specialist of the PMU/PIU	• Workshop	• ½ Working Day	• Environmental Specialist of the PMSC and PMU
B. Construction Stage					
• Module 1	• Roles and Responsibilities of officials/contractors/consultants towards protection of environment • Implementation Arrangements	• Engineers and staff of line depts. of GoTN, and PMU/PIU (including the Environmental Specialist)	• Lecture/Interactive Sessions	• ½ Working Day	• Safeguards Specialist of the PMSC and PMU
• Module 2	• Monitoring and Reporting System	• Engineers and staff of implementing agencies and PMU/ PIU (including ES)	• Lecture / Interactive Sessions	• ½ Working Day	• Safeguards Specialist of the PMSC and PMSC

Table 16 Training Modules for Environmental Management

Programme	Description	Participants	Form of Training	Duration/ Location	Training Conducting Agency
A. Pre-Construction Stage					
Sensitization Workshop	Introduction to Environment: Basic Concept of Environmental Regulations, Guidelines, EIA Notification, process and	Tourism /HR&CE Department Officials, Project Director and Environmental Specialist	Lectures cum interaction & Workshop	½ Working Day	Environmental Specialist of the PMSC

	methodology for IEE, EMPs and their use and Statutory requirements as per Government of India and ADB.	of the PMU/PIU and PMSC			
Session I					
Module I	Introduction to Environment: Basic Concept of Environment Safeguards	PMU/PIU (including the ES), PMSC and	Lecture	1 Working Day	Safeguards Specialist of the PMSC

Programme	**Description**	**Participants**	**Form of Training**	**Duration/ Location**	**Training Conducting Agency**
	Regulations and Statutory requirements as per Government of India and ADB guidelines on cultural resources, Environmental considerations in planning, design and implementing projects.	Engineering staff of the implementing Agencies			
Module II	Environmental components impacted in constructions and operation stages Activities causing pollution during Construction and Operation stages Environmental Management Environmental Provisions Implementation Arrangements Methodology of Assessment Good Engineering Practices to be integrated into Contract Documents.	PMU/PIU/PMSC (including the ES) and Engineering staff of Tourism Dept.	Workshop	¼ Working Day	Safeguards Specialist of the PMSC.
Module III	Implementation of EMPs: Basic features of an EMP, Planning, designing and execution of environmental mitigation and enhancement measures, monitoring and evaluation of environmental conditions – during construction and operation	PMU/PIU (including the ES) Engineering staff of Tourism/HR&CE Dept.	Lecture / Interactive sessions and site visits	2 Working Days	Safeguards Specialist of the PMSC with support from the conservation specialist of the PMSC.
Module IV	Improved co-ordination with other Departments: Statutory permissions – Procedural requirements co-operation and co- ordination with other Departments.	PMU/PIU (including the ES) Engineering staff of Tourism Dept. and PMSC	Lecture / Interactive sessions	1 Working Day	Safeguards Specialist of the PMSC.
Module V	Environmental principles of eco-	Local community groups,	Lecture /	½ Working	Institutes such as the

	tourism and training and awareness building	NGOs	Interactive sessions	Day	Wild Life Institute of India
B. Construction Stage					
Session II					

Programme	Description	Participants	Form of Training	Duration/ Location	Training Conducting Agency
Module VI	Role during Construction Roles and Responsibilities of Officials / Contractors / Consultants towards protection of Environment Implementation Arrangements Monitoring Mechanisms	Engineers and Staff of Line Departments of the Govt. of Tamil Nadu and PMU/PIU (including the ES)	Lecture / Interactive sessions	½ Working Day	Safeguards Specialist of the PMSC
Session III					
Module VI	Identification of birds species in Pong Wetland, habits of species, biology, ecology of important species, basic knowledge of reptiles of amphibians and fauna identification of plants, including medicinal plants orientation on wetland ecology, monitoring methods, use of instruments as binoculars, digital camera, GPS, etc.	Staff of Forest Department, Youth in the villages, periphery of the Wetland, and other NGOs in the District.	Site visits, Interactive sessions	5-7 working days	Institutes as the Wild Life Institute of India
Module VII	Skill up gradation on eco-tourism and nature guides dealing with tourists interpretational skills, micro planning, natural resources, management of self-help groups, etc.	Youth in the villages, periphery and other NGOs in the District	Site visits, Interactive sessions	5-7 Working Days	Tourism Department, and Institutes as the Wild Life Institute of India.
Module VIII	Monitoring Environmental Performance during Construction: Air, Water, Soil and Noise, tree survival Monitoring requirement and techniques, Evaluation and Review of results, Performance indicators	PIU/ PMSC/NGOs and community representatives	Lectures, Workshop and site visits	4 – 5 Working Days	Safeguards Specialist of the PMSC – During initial stage of Construction

	and their applicability, possible corrective actions, reporting requirements and mechanisms				

E. Environmental Management Plan Implementation Cost

521. As part of good engineering practices in the project, there have been several measures as safety, signage, dust suppression, procurement of personal protective equipment, provision of drains, etc. and the costs for which will be included in the design costs of specific subprojects. Therefore, these items of costs have not been included in the IEE budget. Only those items not covered under budgets for construction are considered in the IEE budget.

522. This is a small construction project and it is not expected to cause much significant air, water and noise pollution. The main EMP cost will arise from monitoring of environmental parameters (air, water and noise) and training.

523. The costs of water sprinkling for dust suppression and providing personal protective equipment's to construction workers shall borne by contractor as part of conditions of contract. In addition, the sources of funds for Mitigation measures during construction stage including monitoring during construction stage are also to be borne by the contractor. These are deemed to be included as part of the contract price amount quoted by the contractor for the works. The costs of components for monitoring in operation stage and the capacity building costs are to be funded by the PMU. The EMP cost is given in the Table 13 below.

Table 173: Indicative Environmental Management Plan Budget

	Particulars	Stages	Unit	Total Number	Rate (₹)	Cost (₹)	Source of Fund
A. Monitoring Measures							
1	Air quality monitoring	Detailed design	Per sample	1	10,000	10,000	PMU
2	Noise Levels – silence zones	Detailed design	Per location	1	4,000	4,000	PMU
3	Ambient Air Quality	Construction	Per Sample	4	10,000	40,000	Contractor budget
4	Ambient Noise Quality	Construction	Per Sample	6	4,000	24,000	Contractor budget
Sub- Total (A)						78,000	
B.	Capacity Building – Training cost						
1	Sensitization Workshop	Pre-Construction	L.S			1,50,000	PMU
2	Training Session I	Construction	L.S			1,50,000	PMU
3	Training Session II	Construction	L.S			1,50,000	PMU
Sub -Total (B)						4,50,000	
Total (A+B) (₹)						5,28,000	

IX. FINDINGS AND RECOMMENDATIONS

524. The proposed components as part of the package are in line with the sub-project selection criteria for the program. The subproject conforms to all Government of India and ADB regulations, policies, and standards including all necessary government permits and clearances. The proposed subproject components involve Development and Improvement of Infrastructure Facilities at (a) Arulmigu Kallalagar Thirukoil, Alagarkoil, Melur Taluk, Madurai District; (b) Arulmigu Abathsagayeswarar Temple at Alangudi Village, Thiruvarur District; (c) Arulmigu Kumaragiri Dhandayudhabani Swamy Thirukkoil at Ammapet in Salem District; (d) Arulmigu Kailasanathar Swamy Temple at Thingalur Village in Thanjavur District; (e) Naganatha Swamy Temple at Thirunageswarm, Thanjavur District; (f) Sri Swetharanyeswarar

Temple at Thiruvenkadu, Nagapattinam District; (g) Veerapur, Tiruchirappalli District; (h) Construction of Pilgrims rest house in Arulmigu Naganathaswamy Temple, Keelaperumpallam, Nagapattinam District. The selection of components in line with the subproject selection criteria laid down by ADB, and the recommendations of the Central Public Health and Environmental Engineering Organisation (CPHEEO) Sewerage Manual avoids any significant encroachment / direct impact on tourist attractions and the livelihood of the people in the area. Further, the siting of the components has been based on appropriate considerations to minimize environmental impacts. The subproject will conform to all Government of India/Tamil Nadu and ADB regulations, policies, and standards including all necessary government permits and clearances.

525. The significance of the environmental impacts will be primarily due to the construction related activities. The resultant potential impacts from these proposals can be offset through provision of proven mitigation measures during the design and adoption of good engineering practices during construction and implementation. Further, the provision of environmental infrastructure, including access to sanitation and waste management facilities within the proposed facilities will enhance the environmental conditions and minimize the pollution related aesthetic quality near the sites of the sub-project locations.

526. The specific management measures laid down in the IEE will effectively address any adverse environmental impacts due to the sub-project. The effective implementation of the measures proposed will be ensured through the building up of capacity towards environmental management within the PMU supplemented with the technical expertise of a Safeguards Specialist as part of the PMSC Consultants. Further, the environmental monitoring plans provide adequate opportunity towards course correction to address any residual impacts during construction or operation stages.

X. CONCLUSIONS

527. The IEE carried out for the subproject shows that the proposed Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at (a) Thyagadurgam Fort, Villupuram District; (b) Udhayagiri Fort, Kanyakumari District; (c) Thirumalai Naicker Mahal, Madurai District; (d) Marudhupandiyar Fort, Sivagangai District; (e) Koolamandal Gangaikonda choleeswarer Temple, Tiruvanamalai District; (f) Alamparai Fort, Kanchipuram District; (g) Poondi Arugar Temple, Tiruvanamalai District; (h) Kattabomman kottai at Panchalankurichi, Tuticorin District; (i) Dutch Dome, Nagapattinam District; (j) Governor House at Tharangambadi, Nagapattinam District; (k) Thadagapureeswarar Temple, Tiruvannamalai District; (l) Manora Fort,Thanjavur District; (m) Chinnayankulam in Chinnayanpettai, Tiruvanamalai will result in increasing tourist arrival to Tamilnadu, provide better facilities and comfort to the tourists with enhanced environmental benefits, and that any adverse environmental impact can be addressed through proper location, planning, and design of the proposed subproject; control of construction activity and mitigation measures. The EMP provides for mitigation of all identified impacts and the contract clauses for the environmental provisions will be part of the civil works contracts. Further, the proposed subproject elements have been consulted with the stakeholders and no significant issues requiring redressal in terms of environmental safeguards exist.

528. Based on the findings of the IEE, there are no significant impacts and the classification of the subproject as Category —Bll is confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS (2009).

APPENDIX 1(A) : PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Details of the Site: The site is free from encumbrances and is freely available with the Government of Tamil Nadu further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with various stake holders. The details of the site visit are given below:

Date of Visit: 25.03.2017

Name of the work: Conservation and Restoration of heritage monument at Thyagadurgam Village, Villupuram District

Name of the Person Visited the site: Mr. Anil Kumar Panda (Safeguard Specialist - Environmental and Social) and Mr. Loganathan (Field Engineer)

Description of the Site: The site is located 50 m away from the temple. The site is very close to the Bitumen concrete approach road. It is separated from the temple compound by cultivated land in between. This site is rocky and free from any encroachments. The property boundaries are clearly marked. This property is in the possession of the Department of State Archaeology, Government of Tamilnadu. Hence, there is no requirement for any land to be acquired. Some of the photos taken during the site visit are given as Figures-A & B below.

Soil sample collection: Soil samples have been collected at different depths in 2 locations at site.

The Public Consultation was held with the local people and department officials‘ participants. This is with reference to the need and justification for selecting these components with the scope to increase the inflow of tourists. During the discussion the IEE components and Social Safeguard issues (Water/Air/Soil/Noise/Flora/Fauna/Climate etc.) were explained and the following suggestions were received from the participants.

The participants concurred with the selection of components for the infrastructure development for Conservation and Restoration of heritage Works at Thyagadurgam.

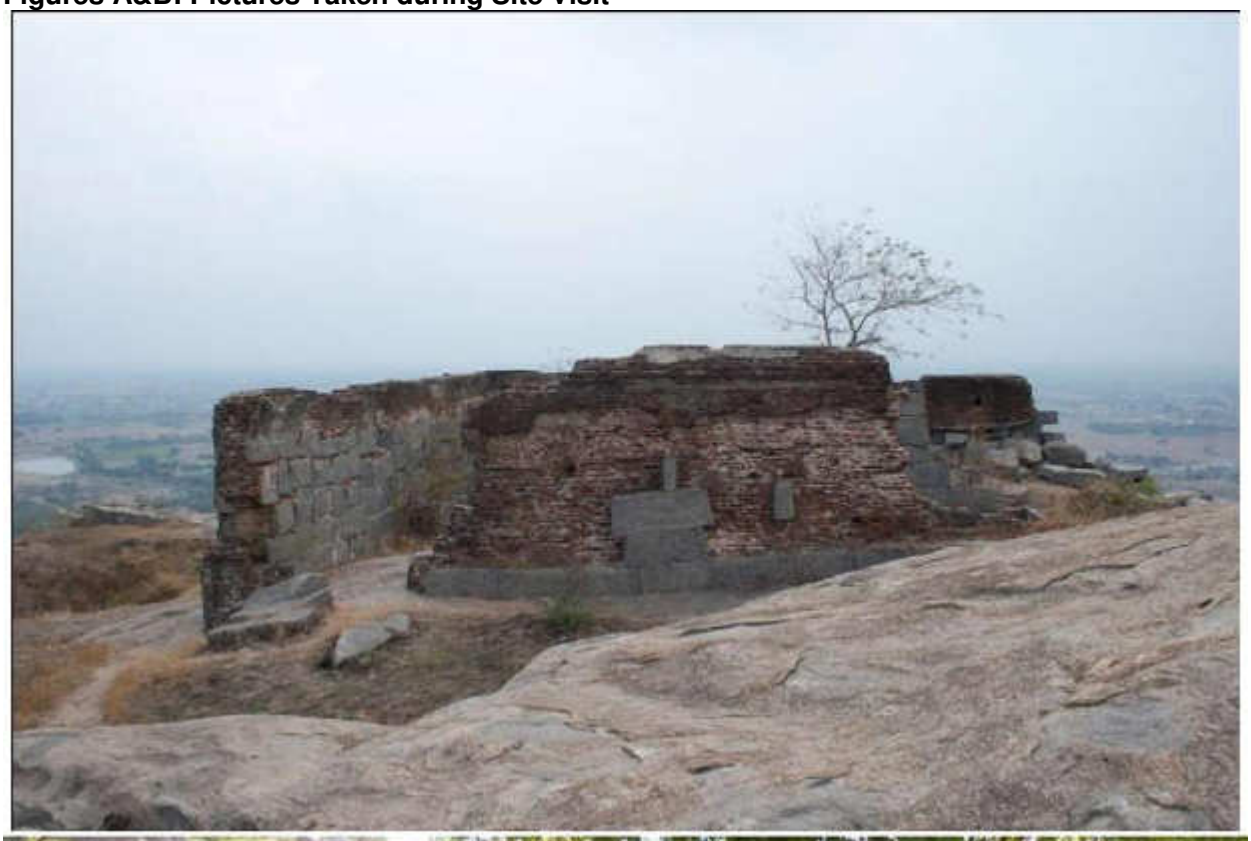
They also suggested the need for maintenance of the new components to be introduced need to be taken care by the line department with full participation with the local community. The local educated men/women at the age group of 15-35 with minimum qualification of Degree or 10+2 could be selected by the line Department for providing the need-based skill development for guides and volunteers and securities.

The local community members especially self-help groups could be given the entrepreneur training to manage the souvenir and mini restaurants to provide assistance to the Tourists.

The local community members are willing to take up training on the major components related to environmental enhancement so as to monitor —activities and its follow upll in the future.

Drinking water facility with treatment and adequate toilet facilities to be given priority. While laying road the present component of cement road could be replaced by the latest technology of paver blocks. Waste collection, segregation and final disposal need to be planned and implemented.

Figures A&B: Pictures Taken during Site Visit



Participants of Public Consultation

ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION HELD ON NOV 2017 FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT OF HERITAGE RESTORATIONAND CONSEVATION OF IMPORTANT MONUMENTS AT HILL FORT THYAGADURGAM, VILLUPURAM DISTRICT.

S.No.	Name of participant	Occupation	Contact Details	Signature
1	N. [illegible]		9487[illegible]2029	
2	M. LAKSHMANAN		9789[illegible]3078	
3	S. [illegible]		9443[illegible]	
4	K. Gugan		9659099821	
5	K. Karafuj		9843962825	
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Appendix 1 (b): PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Details of the Site: The site is free from encumbrances and is freely available with the Government of Tamil Nadu (HR&CE) further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with various stake holders. The details of the site visit are given below:

Date of Visit: 07.06.2017

Name of the work: Heritage Restoration and Conservation of Monuments (Renovation, Illuminationetc) at Udhayagiri Fort, Kanyakuamri District.

Name of the Person Visited the site: Mr. Anil Kumar Panda (Safeguard Specialist - Environmental and Social) and Mr. Loganathan (Field Engineer)

Description of the Site: The site is located 50 m away from the temple. The site is very close to the Bitumen concrete approach road. This site is barren and free from any encroachments. The property boundaries are clearly marked. This property is in the possession of the Government of Tamilnadu. Hence, there is no requirement for any land to be acquired. Figures-A & B given below were taken during the site visit.

Soil sample collection: Soil samples have been collected at different depths in 2 locations at site.

The Public Consultation was held with the local people and department officials‘ participants. This is with reference to the need and justification for selecting these components with the scope to increase the inflow of tourists. During the discussion the IEE components and Social Safeguard issues (Water/Air/Soil/Noise/Flora/Fauna/Climate etc.) were explained and the following suggestions were received from the participants.

The participants concurred with the selection of components for Heritage Restoration and Conservation of Important Monuments (Renovation, Illumination etc) at Udhayagiri Fort, Kanyakuamri District.

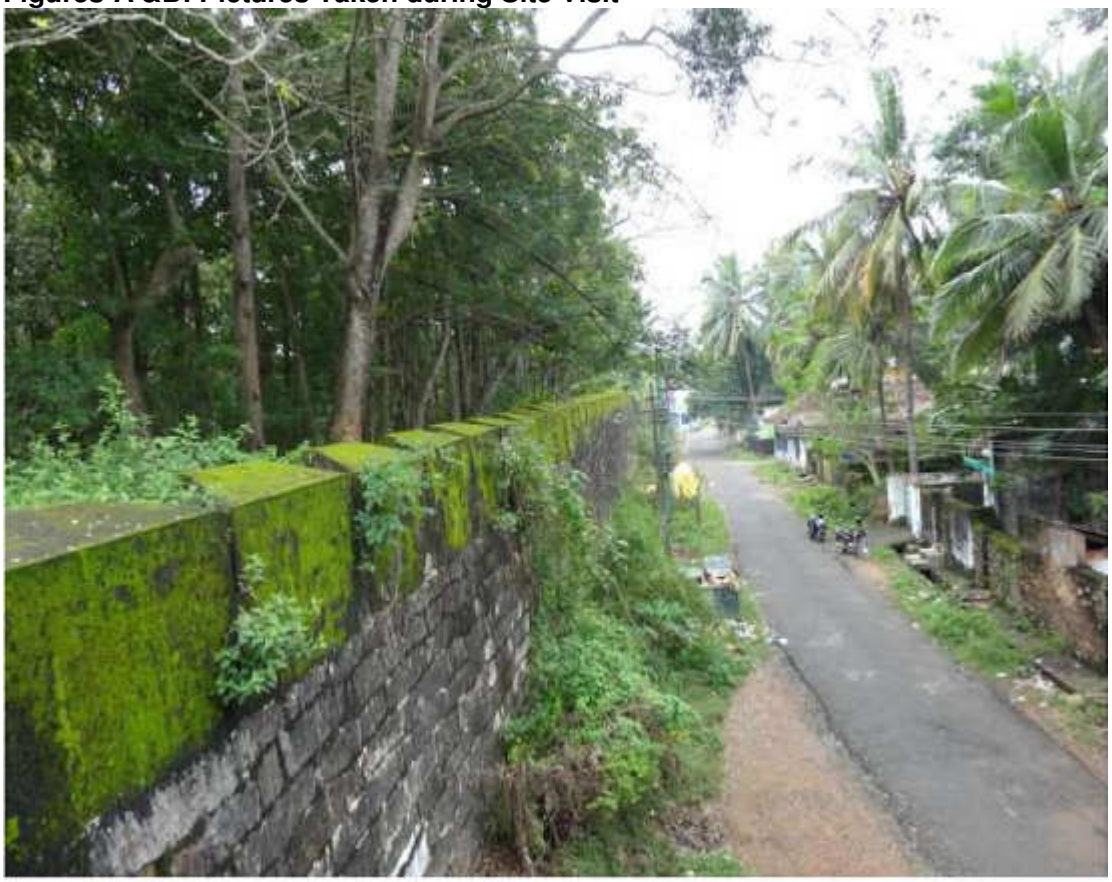
They also suggested the need for maintenance of the new components to be introduced need to be taken care by the line department with full participation with the local community. The local educated men/women at the age group of 15-35 with minimum qualification of Degree or 10+2 could be selected by the line Department for providing the need based skill development for guides and volunteers and securities.

The local community members especially self-help groups could be given the entrepreneur training to manage the souvenir and mini restaurants to provide assistance to the Tourists.

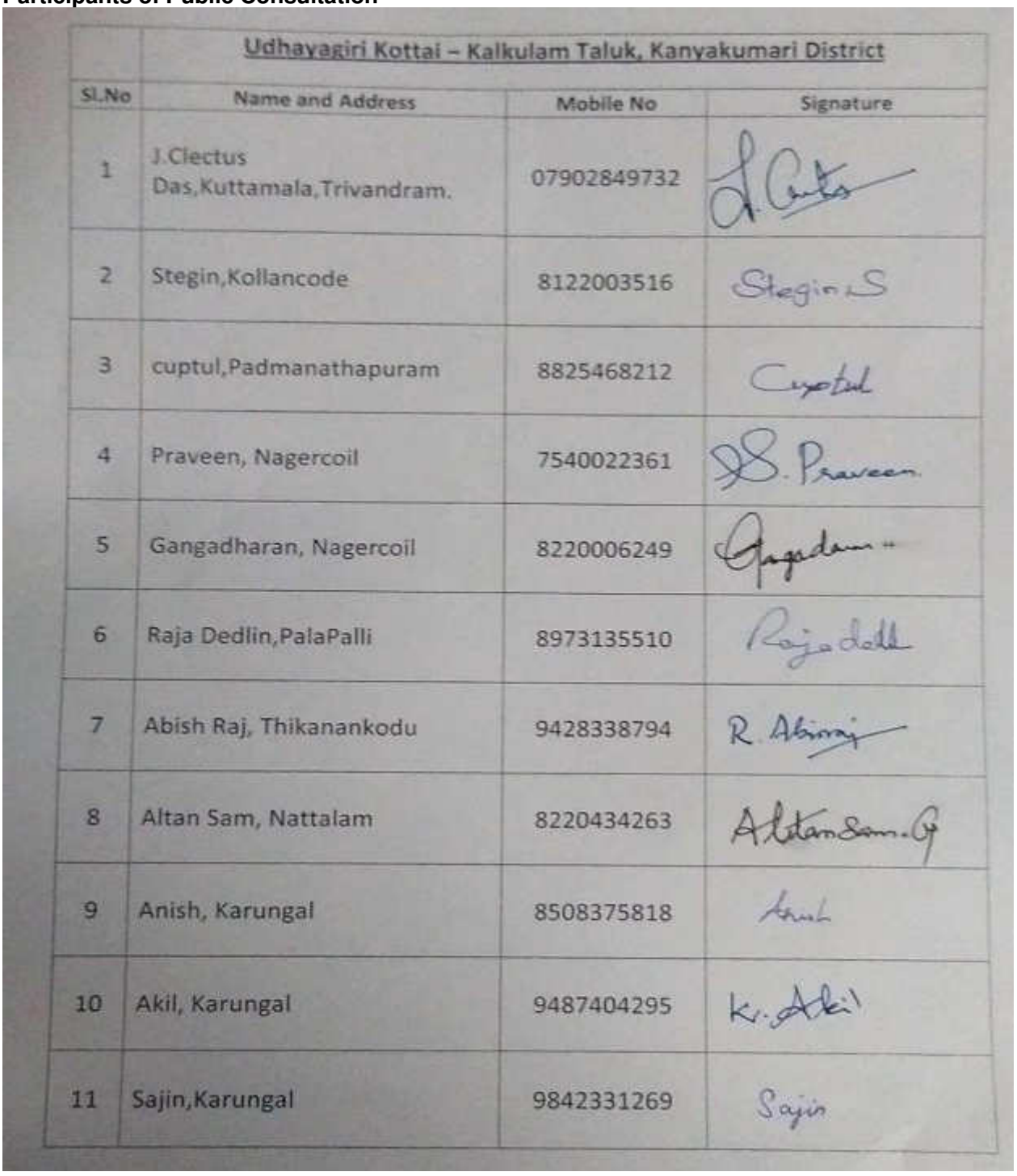
The local community members are willing to take up training on the major components related to environmental enhancement so as to monitor —activities and its follow up‖ in the future.

Drinking water facility with treatment and adequate toilet facilities to be given priority. While laying road the present component of cement road could be replaced by the latest technology of paver blocks. Waste collection, segregation and final disposal need to be planned and implemented.

Figures-A &B: Pictures Taken during Site Visit



Participants of Public Consultation



	Udhayagiri Kottai – Kalkulam Taluk, Kanyakumari District		
Sl.No	Name and Address	Mobile No	Signature
1	J.Clectus Das,Kuttamala,Trivandram.	07902849732	
2	Stegin,Kollancode	8122003516	
3	cuptul,Padmanathapuram	8825468212	
4	Praveen, Nagercoil	7540022361	
5	Gangadharan, Nagercoil	8220006249	
6	Raja Dedlin,PalaPalli	8973135510	
7	Abish Raj, Thikanankodu	9428338794	
8	Altan Sam, Nattalam	8220434263	
9	Anish, Karungal	8508375818	
10	Akil, Karungal	9487404295	
11	Sajin,Karungal	9842331269	

Appendix 1(c) : PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Details of the Site: As the first programme under the Madurai segment an inspection of the Tirumalai Naicker Mahal, under the Heritage Circuit was taken up for detailed inspection and implementation of improvement needs when the Design and Supervision Consultant, Tourist

officer- Madurai and Archaeological Engineers were also present on 29-03-2017. During the inspection the following were noted and suitable suggestions for improvements are made

Date of Visit: 29.03.2017

Name of the work: —Conservation and Restoration of Heritage works for Thirumalai Naicker Mahal at Madurai Districtǁ

Name of the Person Visited the site:
Mr. K.R.A.Narasiah (Principal Cultural Heritage Expert),
Mr. T.Thualsingam, Construction Manager, DSC,
Mr.S.M.Sri Balamurugan, Tourism Officer, Madurai,
Mr.T.Thangavel, AEE, Department of Archaeology Chennai,
Mr. Olimalik AEE(i/c), Department of Archaeology, Chennai,
Mr. D.Karthik, Field Engineer, DSC,
Mr. M.Balamurugan, Assitant Tourist Officer, Madurai

Description of the Site: Thirumalai Nayak Palace is a 17th-century palace erected in 1636 AD by King Thirumalai Nayak, a king of Madurai's Nayaka dynasty who ruled Madurai from 1623 – 59, in the city of Madurai, India. This Palace is a classic fusion of Dravidian and Rajput styles. The building, which can be seen today, was the main Palace, in which the king lived. The original Palace Complex was four times bigger than the present structure. In its heyday, Tirumalai Nayak Palace at Madurai was considered to be one of the wonders of the South. This palace is situated 2 km south east of the Meenakshi Amman Temple. Figures-A,B,C & D given below were taken during the site visit.

The Public Consultation was held with the local people and department officials‘ participants.

This is with reference to the need and justification for selecting these components with the scope to increase the inflow of tourists. During the discussion the IEE components and Social Safeguard issues (Water/Air/Soil/Noise/Flora/Fauna/Climate etc.) were explained and the following suggestions were received from the participants. The participants concurred with the selection of components for the infrastructure development for Thirumalai Naicker Mahal.

They also suggested the need for maintenance of the new components to be introduced need to be taken care by the line department with full participation with the local community. The local educated men/women at the age group of 15-35 with minimum qualification of Degree or 10+2 could be selected by the line Department for providing the need-based skill development for guides and volunteers and securities.

The local community members especially self-help groups could be given the entrepreneur training to manage the souvenir and mini restaurants to provide assistance to the Tourists. The local community members are willing to take up training on the major components related to environmental enhancement so as to monitor —activities and its follow upǁ in the future.

Drinking water facility with treatment and adequate toilet facilities to be given priority. While laying road the present component of cement road could be replaced by the latest technology of paver blocks. Waste collection, segregation and final disposal need to be planned and implemented.

Figures-A, B, C & D: Pictures Taken during Site Visit

During Public Consultation

Participants of Public Consultation

ATTENDANCE OF THE PARTICIPANTS FOR THE CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT: MADURAI

Name of Sub Project: Development and improvement of infrastructure facilities at Thirumalai Naicker Palace, Madurai.

Date: 28.02.2018

S.No.	Name	Occupation	Contact Details	Signature
1.	C.M. SRI BALAMURUGAN	TOURIST OFFICER	9176995865	
2.	R. CHANDRA [illegible]	Physical Education Teacher	9443361500	
3.	M. JAYAKARAN	TEACHER	7200179672	
4.	R. SIVA	Teacher	9442853216	
5.	V. Rajeshkannan	Teacher	98 [illegible]	
6.	A SIVA GURUNATHAN	TOUR GUIDE	9842198414	
7.	K VETRIVEL	Teacher	7667354230	
8.	S.R. AKILAMARY	B.T. Asst	9789370584	
9.	S Saraswathi	BT. Asst	9962280079	S. Saraswathi
10.	N. Anbarasu	Asst. Tourist Officer	8610777280	

Appendix 1(d) : PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Details of the Site: The site is free from encumbrances and is freely available with the Government of Tamil Nadu Archeological Department further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with various stake holders. The details of the site visit are given below:

Date of Visit: 09.09.17

Name of the work: Heritage Restoration and Conservation of Maruthupandiyar Fort at Sivagangai District

Name of the Person Visited the site: Mr. Anil Kumar Panda (Safeguard Specialist - Environmental and Social) and Mr. Loganathan (Field Engineer)

Description of the Site: Sivagangai is located about 448km from Chennai and about 48km from Madurai. It is an agricultural district. NH 85, NH 36, AND SH 34 pass through this district. This property is in the possession of the Tamilnadu Archeology Department, Government of Tamilnadu. Hence, there is no requirement for any land to be acquired. Figures-A & B given below were taken during the site visit.

The Public Consultation was held with the local people and department officials' participants.
This is with reference to the need and justification for selecting these components with the scope to increase the inflow of tourists. During the discussion the IEE components and Social Safeguard issues (Water/Air/Soil/Noise/Flora/Fauna/Climate etc.) were explained and the following suggestions were received from the participants.

The participants concurred with the selection of components for Heritage Restoration and Conservation of Maruthupandiyar Fort at Sivagangai District

They also suggested the need for maintenance of the new components to be introduced need to be taken care by the line department with full participation with the local community. The local educated men/women at the age group of 15-35 with minimum qualification of Degree or 10+2 could be selected by the line Department for providing the need-based skill development for guides and volunteers and securities.

The local community members especially self-help groups could be given the entrepreneur training to manage the souvenir and mini restaurants to provide assistance to the Tourists.

The local community members are willing to take up training on the major components related to environmental enhancement so as to monitor —activities and its follow upll in the future.

Drinking water facility with treatment and adequate toilet facilities to be given priority. While laying road the present component of cement road could be replaced by the latest technology of paver blocks. Waste collection, segregation and final disposal need to be planned and implemented.

Figures-A&B: Pictures Taken during Site Visit

Participants of Public Consultation

	MaruthuPandiyar Kottai – Aranmanai Siruvayal, Sivagangai District		
Sl.No	Name and Address	Mobile No	Signature
1	B.Dhanush,Vallam, Tanjavur.	7094567579	B. Dhanush
2	R.Malai,Kalkandar,Trichi.	9629749511	R. Malai
3	A.SanthoshKumar,T.K.Palli, Tanjavur.	8110984069	A. Santhosh kumar
4	S.SivaPrakash,Peravurani,Tanjavur.	9750454968	S. Sivaprakash
5	J.Bindo,Lines Town,Tutukudi	9751714128	J. Bindo
6	S.Vasanth,MelaKalKandar	8056690921	S. Vasanth
7	S.Muniasamy	8508371311	
8	K.Nagaraj,Musur City, Karnataka.	9845760030	K. Naga
9	S.Gayathri,Mysur	9845760030	S. Gayathri
10	S.Raja,Mysur	9902458352	S. Raja

Appendix 1(e) : PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Details of the Site: The site is free from encumbrances and is freely available with the Government of Tamil Nadu (state archaeological department of the government of tamil nadu) further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with various stake holders. The details of the site visit are given below:

Date of Visit: 19.02.2018

Name of the work: Construction and restoration of heritage monuments for Gangaikonda Choleeswarer Temple at Koolamandal Village, Tiruvanamalai District

Name of the Person Visited the site: Mr. Alexander (Architect), Mr. Murugesan (Field Engineer), Mr. Abdul Rahman (Field Engineer)

Description of the Site: The site is located 15m away from the temple. The site is very close to the Water Bound Macadem approach road. It is separated from the temple compound by cultivated land in between. A pictorial map has been provided in the following page. This site is barren and free from any encroachments. The property boundaries are clearly marked. This property is in the possession of the Department of state archaeological department of the government of tamil nadu, Hence, there is no requirement for any land to be acquired. Figures-A & B given below were taken during the site visit.

Soil sample collection: Soil samples have been collected at different depths in 2 locations at site.

The Public Consultation was held with the local people and department officials‘ participants.

This is with reference to the need and justification for selecting these components with the scope to increase the inflow of tourists. During the discussion the IEE components and Social Safeguard issues (Water/Air/Soil/Noise/Flora/Fauna/Climate etc.) were explained and the following suggestions were received from the participants.

The participants concurred with the selection of components for the infrastructure development for Construction and restoration of heritage monuments, Koolamandal.

They also suggested the need for maintenance of the new components to be introduced need to be taken care by the line department with full participation with the local community. The local educated men/women at the age group of 15-35 with minimum qualification of Degree or 10+2 could be selected by the line Department for providing the need-based skill development for guides and volunteers and securities.

The local community members especially self-help groups could be given the entrepreneur training to manage the souvenir and mini restaurants to provide assistance to the Tourists. The local community members are willing to take up training on the major components related to environmental enhancement so as to monitor —activities and its follow up‖ in the future.

Drinking water facility with treatment and adequate toilet facilities to be given priority. While laying road the present component of cement road could be replaced by the latest technology of paver blocks. Waste collection, segregation and final disposal need to be planned and implemented.

Figures-A&B: Pictures Taken during Site Visit

Participants of Public Consultation

ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT: Gangaikonda Cholaeswarar Temple, Kodaimandal.

Name of Sub-project:
Conservation and Restoration of heritage at Gangaikonda Cholaeswarar temple.

Sr. No.	Name	Occupation	Contact Details	Signature
1	M. [illegible]	[illegible]	7639867521	M. [illegible]
2	M. [illegible]	[illegible]	9382683276	[illegible]
3	E. [illegible]	[illegible]	9003259535	E. [illegible]
4	A. [illegible]	[illegible]	9092437649	A. [illegible]
5	B. [illegible]	[illegible]	[illegible]	B. [illegible]
6	A. Saminathan	A. K Printers	9003709114	A. [illegible]
7	G. [illegible]	Company Staff	9943148393	G. [illegible]
8	N. [illegible]	[illegible]	8940727929	[illegible]
9	V. [illegible]	[illegible]	7708084246	V. [illegible]
10	J. [illegible]	[illegible]	8940122563	J. Kavitha
11	[illegible]	[illegible]	9943149901	[illegible]
12	[illegible]	Company.	9094953808	[illegible]
13	P. [illegible]	Lotus Comm	9597803019	[illegible]
14	[illegible]	Drivar	8489094245	[illegible]
15	N. [illegible]	[illegible]	7639421681	[illegible]
	K [illegible]	[illegible]	8098515324	[illegible]

Appendix 1(f) : PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Details of the Site: As the first programme under the Kanchipuram segment an inspection of the Alamparai fort, under the Heritage Circuit was taken up for detailed inspection and implementation of improvement needs when the Design and Supervision Consultant, Tourist officer- Kanchipuram and Archaeological Engineers were also present on 25-03-2017. During the inspection the following were noted and suitable suggestions for improvements are made

Date of Visit: 29.03.2017

Name of the work: —Conservation and Restoration of Heritage and important Monuments at Alampara Fort, Kanchipuram Districtǁ

Name of the Person Visited the site:

1. Mr.T.R.V.Balakrishnan - Team Leader/DSC
2. Ms. RoopmathiAnand - Principal Conservation Architect/ DSC
3. Mr.T.Kumaraswamy - Civil Engineer/PMU
4. Mr.Thanagavel - Assistant Executive Engineer/Archeology Department
5. Mr.G.Murugesan - Field Engineer/DSC
6. Mr.M.Alexander - Architect/ DSC
7. Mr.Rajesh - JE/Archeology Department
8. Mr.M.J.A.Ranjinadoss - Community Development Specialist/ DSC
9. Mr.Rajaram - Tourist Officer/ Kancheepuram District

Description of the Site: The ruins of Alamparai Fort (also called Alampara) lie near Kadappakkam, a village 50 km from Mamallapuram on the land overlooking the sea. Constructed in the late 17th century during the Mughal era, the Alamparai Fort once had a 100 - metre long dockyard stretching into the sea, from which zari cloth, salt, and ghee were exported. During 1735 AD it was ruled by Nawab Doste Ali Khan. In 1750, for the services rendered by the famous French commander Duplex to Subedar Muzarfarzang, the fort was given to the French. When French were defeated by the British, the fort was captured and destroyed in 1760 AD. More recently the structure was damaged in the 2004 Indian Ocean earthquake. Figures-A & B given below were taken during the site visit.

The Public Consultation was held with the local people and department officials‘ participants. This is with reference to the need and justification for selecting these components with the scope to increase the inflow of tourists. During the discussion the IEE components and Social Safeguard issues (Water/Air/Soil/Noise/Flora/Fauna/Climate etc.) were explained and the following suggestions were received from the participants. The participants concurred with the selection of components for the infrastructure development for Alamparai Fort.

They also suggested the need for maintenance of the new components to be introduced need to be taken care by the line department with full participation with the local community. The local educated men/women at the age group of 15-35 with minimum qualification of Degree or 10+2 could be selected by the line Department for providing the need-based skill development for guides and volunteers and securities.

The local community members especially self-help groups could be given the entrepreneur training to manage the souvenir and mini restaurants to provide assistance to the Tourists. The local community members are willing to take up training on the major components related to environmental enhancement so as to monitor —activities and its follow upǁ in the future.

Drinking water facility with treatment and adequate toilet facilities to be given priority. While laying road the present component of cement road could be replaced by the latest technology of

paver blocks. Waste collection, segregation and final disposal need to be planned and implemented.

Figures-A&B: Pictures Taken during Site Visit

Participants of Public Consultation

ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION HELD ON NOV 2017 FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT OF HERITAGE RESTORATIONAND CONSEVATION OF IMPORTANT MONUMENTS AT ALMBARAI FORT, KANCHEEPURAM DISTRICT.

S.No.	Name of participant	Occupation	Contact Details	Signature
1	A. [illegible]		9943539833	A. [illegible]
2	R [illegible]		[illegible]	R [illegible]
3	S. [illegible]		9751724486	S. [illegible]
4	[illegible]			[illegible]
5	[illegible]			[illegible]
6	[illegible]			[illegible]
7	D. [illegible]		9943486691	D [illegible]
8	[illegible]			[illegible]
9	[illegible]			[illegible]
10	A. [illegible]			A. [illegible]
11	[illegible]			[illegible]
12				
13				
14				
15				

Appendix 1(g) : PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Details of the Site: The site is free from encumbrances and is freely available with the Government of Tamil Nadu (State Archaeology) further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with various stake holders. The details of the site visit are given below:

Date of Visit: 19.02.2018

Name of the work: Conservation and Restoration of poondi Arugar Temple,Tiruvannamalai District

Name of the Person Visited the site: Mr. Alexander (Architect),Mr. Murugesan (Field Engineer) Mr.Abdul Rahuman (Field Engineer)

Description of the Site: The site is located 20 m away from the temple. The site is very close to the WBM approach road. It is separated from the temple compound by cultivated land in between. A pictorial map has been provided in the following page. This site is barren and free from any encroachments. The property boundaries are clearly marked. This property is in the possession of the Department of State Archaeology, Government of Tamilnadu. Hence, there is no requirement for any land to be acquired. The figures-A&B given below were taken during public consultation.

Soil sample collection: No Soil samples collected

The Public Consultation was held with the local people and department officials' participants.

This is with reference to the need and justification for selecting these components with the scope to increase the inflow of tourists. During the discussion the IEE components and Social Safeguard issues (Water/Air/Soil/Noise/Flora/Fauna/Climate etc.) were explained and the following suggestions were received from the participants.

The participants concurred with the selection of components for the infrastructure development for Poondi Arugar Temple

They also suggested the need for maintenance of the new components to be introduced need to be taken care by the line department with full participation with the local community. The local educated men/women at the age group of 15-35 with minimum qualification of Degree or 10+2 could be selected by the line Department for providing the need based skill development for guides and volunteers and securities.

The local community members especially self-help groups could be given the entrepreneur training to manage the souvenir and mini restaurants to provide assistance to the Tourists.

The local community members are willing to take up training on the major components related to environmental enhancement so as to monitor —activities and its follow upll in the future.

Drinking water facility with treatment and adequate toilet facilities to be given priority. While laying road the present component of cement road could be replaced by the latest technology of paver blocks. Waste collection, segregation and final disposal need to be planned and implemented.

Figures-A&B: Pictures Taken during Site Visit

Participants of Public Consultation

ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT: Erumpedu - Poondi Ayugar Jain Temple

Name of Sub-project:
Conservation and Restoration of heritage and monuments of Poondi Arugar Temple, Erumpedu.

Sr. No.	Name	Occupation	Contact Details	Signature
1	C. APPANDAIRAJ	Business	9842329279	
2	C. GUNASEKARAN	Business	9443335474	
3	N. ASHOK KUMAR	Business	9600260480	
4	P. SIGAMANI.	Business.	9842992691	
5	A. GUBERAN	Work	9487349541.	
6	A. BASKARAN	TEACHER	9442225965	
7	S. BASKAR	Business	9842326521.	
8	B. AJEETHAN	WORK	8300200694	
9	P. JEEVAGAN	WORK	9894186682	
10	A. CHANDRAGUPTAN	WORK	9843344472	
11	A. PRABHU	Business	8778716756.	
12	B.Y.H. HARISNA KUMAR	Business.	9443328161	
13	V. NEMIRAJA	Business	9842319393	
14	A. SURENDIRAN	Business	9443287628	
15	D PADMADOSS	Business	9865157171.	
	G. GUNAMATH	B	9487505474	

Appendix 1(h) : PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Details of the Site: The site is free from encumbrances and is freely available with the Government of Tamil Nadu (HR&CE) further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with various stake holders. The details of the site visit are given below:

Date of Visit: 10.09.2017

Name of the work: Conservation and Restoration monuments of Kattabomman kottai at Panchalankurichi, District.

Name of the Person Visited the site:

1. Ms.RoopmathiAnand - Principal Conservation Architect/DSC
2. Mr.Jagadeeswaran - Construction Manager/DSC
3. Mr.M.Alexander - Architect/ DSC
4. Mr.Vijayrengan - Field Engineer/ DSC
5. Ms.Prabha - Junior Engineer/ State Archaeology
6. Mr.Murugesan – Fort Assistant Leader /State Archaeology
7. Mr.Velusamay – Fort Assistant Leader /State Archaeology
8. Mr.Srinivasan – Tourist Officer/Tourism Department
9. Mr.Bhoopathy – Temple Community President

Description of the Site: The site is located near Panchalankurichi village. The site is very close to the Bitumen concrete approach road. It is separated from the temple compound by cultivated land in between. The Pachai perumal Ayyanar Temple has been located South side of the Fort. A pictorial map has been provided in the following page. This site is barren and free from any encroachments. The property boundaries are clearly marked. This property is in the possession of the Department of State Archaeological, Government of Tamilnadu. Hence, there is no requirement for any land to be acquired. The figures-A&B given below were taken during public consultation.

Soil sample collection: Soil samples have been collected at different depths in 2 locations at site.

The Public Consultation was held with the local people and department officials‘ participants.

This is with reference to the need and justification for selecting these components with the scope to increase the inflow of tourists. During the discussion the IEE components and Social Safeguard issues (Water/Air/Soil/Noise/Flora/Fauna/Climate etc.) were explained and the following suggestions were received from the participants.

The participants concurred with the selection of components for Conservation and Restoration monuments of Kattabomman kottai at Panchalankurichi.

They also suggested the need for maintenance of the new components to be introduced need to be taken care by the line department with full participation with the local community. The local educated men/women at the age group of 15-35 with minimum qualification of Degree or 10+2 could be selected by the line Department for providing the need-based skill development for guides and volunteers and securities.

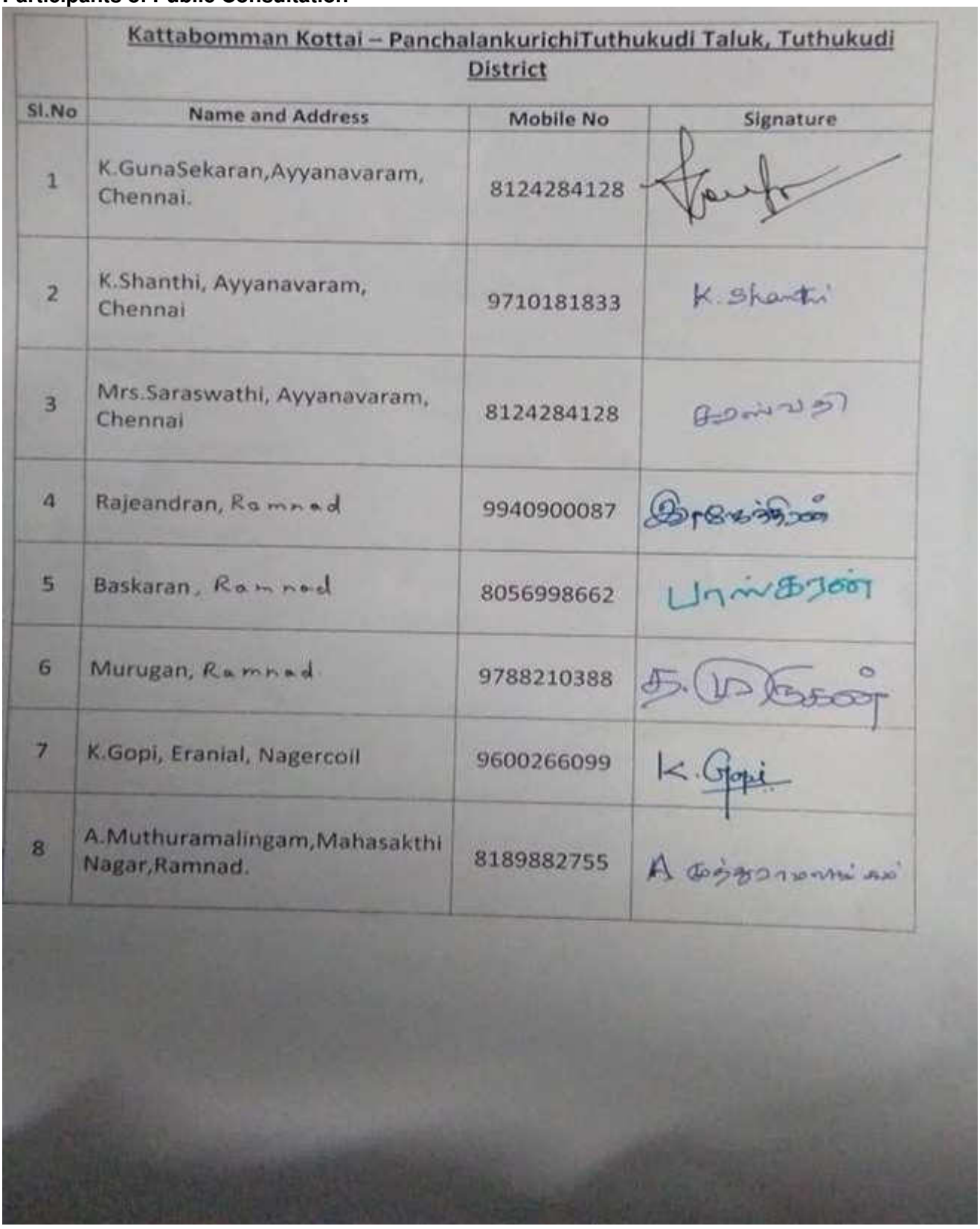
The local community members especially self-help groups could be given the entrepreneur training to manage the souvenir and mini restaurants to provide assistance to the Tourists.

The local community members are willing to take up training on the major components related to environmental enhancement so as to monitor —activities and its follow upll in the future.

Drinking water facility with treatment and adequate toilet facilities to be given priority. While laying road the present component of cement road could be replaced by the latest technology of paver blocks. Waste collection, segregation and final disposal need to be planned and implemented.

Figures-A&B: Pictures Taken during Site Visit

Participants of Public Consultation



	Kattabomman Kottai – PanchalankurichiTuthukudi Taluk, Tuthukudi District		
Sl.No	Name and Address	Mobile No	Signature
1	K.GunaSekaran,Ayyanavaram, Chennai.	8124284128	
2	K.Shanthi, Ayyanavaram, Chennai	9710181833	K. Shanthi
3	Mrs.Saraswathi, Ayyanavaram, Chennai	8124284128	
4	Rajeandran, Ramnad	9940900087	
5	Baskaran, Ramnad	8056998662	
6	Murugan, Ramnad	9788210388	
7	K.Gopi, Eranial, Nagercoil	9600266099	K. Gopi
8	A.Muthuramalingam,Mahasakthi Nagar,Ramnad.	8189882755	

Appendix 1(i) : PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Details of the Site: The site is free from encumbrances and is freely available with the Government of Tamil Nadu (State Archeology) further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with various stake holders. The details of the site visit are given below:

Date of Visit: 10 August 2016

Name of the work: Conservation and Reservation of heritage and important monuments of state archeology department in Nagapattinam

Name of the Person visited the site: Mr. Kumarasamy CE/PMU, Mr. Thulasingam CM/DSC, Mr. C.Manoj Kumar (Field Engineer)/DSC, Mr. Rama moorthy TO/DOT

Description of the Site: The site is located 1KM away from the Nagapattinam railway station. This site is barren and free from any encroachments. The property boundaries are clearly marked. This property is in the possession of the Department of State Archeology Department, Government of Tamilnadu. Hence, there is no requirement for any land to be acquired. The figures-A&B given below were taken during public consultation.

Soil sample collection: Here minor improvements constructing like landscaping, signage, lighting, car parking.

The Public Consultation was held with the local people and department officials‘ participants.

This is with reference to the need and justification for selecting these components with the scope to increase the inflow of tourists. During the discussion the IEE components and Social Safeguard issues (Water/Air/Soil/Noise/Flora/Fauna/Climate etc.) were explained and the following suggestions were received from the participants.

The participants concurred with the selection of components for the infrastructure development for Nagapattinam Dutch dome.

They also suggested the need for maintenance of the new components to be introduced need to be taken care by the line department with full participation with the local community. The local educated men/women at the age group of 15-35 with minimum qualification of Degree or 10+2 could be selected by the line Department for providing the need-based skill development for guides and volunteers and securities.

The local community members especially self-help groups could be given the entrepreneur training to manage the souvenir and mini restaurants to provide assistance to the Tourists.

The local community members are willing to take up training on the major components related to environmental enhancement so as to monitor —activities and its follow upll in the future.

Drinking water facility with treatment and adequate toilet facilities to be given priority. While laying road the present component of cement road could be replaced by the latest technology of paver blocks. Waste collection, segregation and final disposal need to be planned and implemented.

Figures-A&B: Pictures Taken during Site Visit

Participants of Public Consultation

ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT:Ducth Tomb

Name of Sub-project:Development and Improvement of Infrastructure Facilities at Ducth Tomb Nagai District

Sr. No.	Name	Occupation	Contact Details	Signature
1	S. PRADEEP	LAWYER	9047436324	[illegible]
2	T. VIJAYARAJ	Advocate.	7418310614	T. Vijay
3	N. [illegible]	[illegible]	9787203101	N. [illegible]
4	S. Vineth	Build Contractor	9942899907	S. Vineth
5	Muni Saravanthan	fisher man	9486963386	[illegible]
6	P. BASKAR	[illegible]	9786192978	P. Baskar
7	[illegible]	welder	7502857144	[illegible]
8	[illegible]	Fisher	8682001777	[illegible]
9	[illegible]	Fisher	9626444904	[illegible]
10	[illegible]	[illegible]	9443797848	[illegible]
11	R. Sathya	[illegible]	9786786605 9066	[illegible]
12	P. Rajesh.	[illegible]	9042619791	P. Raj
13	[illegible]	[illegible]	8489692223	[illegible]
14	[illegible]	[illegible]	9626260525	[illegible]
15	[illegible]	[illegible]	89921643	[illegible]

Appendix 1(j) : PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Details of the Site: The site is free from encumbrances and is freely available with the Government of Tamil Nadu State Department of Archaeology further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with various stake holders. The details of the site visit are given below:

Date of Visit: 16.04.2017

Name of the work: Conservation and restoration of monument at Governor‘s house at Tharangambadi, Nagapattinam District.

Name of the Person Visited the site: Mr. Alexander (Architect/DSC), and Mr.Abdul Rahuman (Field Engineer/DSC) , Mr. Ranjan Dass (Community Development/DSC), Mrs. Roopmathi Anand, (Conservation Architect/DSC)

Descriotion of the Site: The site is located at opposite of Danish fort. The site is very close to the Coastal area. All the land at the site either existing locations selected for the renovation / conservation of various components of sub projects and which are visited are available with the Archaeological department authority which is the responsible agency for this component. No Private land or Government land acquisition is required for the infrastructure programs. The government lands are free from any encroachments or encumbrance. A pictorial map has been provided in the following page. This site is barren and free from any encroachments. The property boundaries are clearly marked. This property is in the possession of the Tamilnadu State Department of Archaeology, Government of Tamilnadu. Hence, there is no requirement for any land to be acquired.. The figures-A&B given below were taken during public consultation.

Soil sample collection: Soil samples have been collected at different depths in 2 locations at site.

The Public Consultation was held with the local people and department officials‘ participants. This is with reference to the need and justification for selecting these components with the scope to increase the inflow of tourists. During the discussion the IEE components and Social Safeguard issues (Water/Air/Soil/Noise/Flora/Fauna/Climate etc.) were explained and the following suggestions were received from the participants.

The participants concurred with the selection of components for the Conservation and restoration of monuments at Tharangambadi.

They also suggested the need for maintenance of the new components to be introduced need to be taken care by the line department with full participation with the local community. The local educated men/women at the age group of 15-35 with minimum qualification of Degree or 10+2 could be selected by the line Department for providing the need skilled development for guides and volunteers and securities.

The local community members especially self-help groups could be given the entrepreneur training to manage the souvenir and mini restaurants to provide assistance to the Tourists. The local community members are willing to take up training on the major components related to environmental enhancement so as to monitor —activities and its follow up‖ in the future.

Drinking water facility with treatment and adequate toilet facilities to be given priority. While laying road the present component of cement road could be replaced by the latest technology of paver blocks. Waste collection, segregation and final disposal need to be planned and implemented.

Figures-A&B: Pictures Taken during Site Visit

Participants of Public Consultation

ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT: Governor bungalow

Name of Sub-project:Development and Improvement of Infrastructure Facilities at Governor bungalow in Nagapattinam District

Sr. No.	Name	Occupation	Contact Details	Signature
1	C. Arivazhagan	Business	9144908233	[signature]
2	N. Sasikumar	Business	96180671[illegible]	[signature]
3	[illegible]	[illegible]	7502971865	[signature]
4	P. KALIDOSS	MA HISTORY	8428923550	[signature]
5	V. Prabavathi	Business	7418310601	[signature]
6	G. Pavithra	Business	8698059202	[signature]
7	P. N. Ganesan	MA HISTORY	9626569181	[signature]
8	[illegible]	[illegible]	8220761924	[signature]
9	ARUNKUMAR	Business	8220614740	[signature]
10	B. [illegible]	[illegible]	9842859210	[signature]
11	S. [illegible]	Business	9626390253	[signature]
12	Senthil Kumar	professor	9962366291	[signature]
13	K. Ramesh	Police	9443391829	[signature]
14	M. [illegible]	Fisherman	9787805358	[signature]
15	[illegible]	[illegible]	9080720062	[signature]

Appendix 1(k) : PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Details of the Site: The site is free from encumbrances and is freely available with the Government of Tamil Nadu (Department of State archaeology, Government of Tamilnadu) further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with various stake holders. The details of the site visit are given below:

Date of Visit: 19.02.2018

Name of the work: Construction and restoration of heritage and monuments for Thadagapureeswarer Temple at Thellar Village, Tiruvannamalai District

Name of the Person Visited the site: Mr. Alexander (Architect/DSC), Mr. Murugesan (Field Engineer/DSC), Mr. Abdul Rahman (Field Engineer/DSC),

Description of the Site: The site is located 15m away from the temple. The site is very close to the Water Bound Macadem approach road. It is separated from the temple compound by cultivated land in between. A pictorial map has been provided in the following page. This site is barren and free from any encroachments. The property boundaries are clearly marked. This property is in the possession of the Department of state archaeology, Government of Tamil nadu, Hence, there is no requirement for any land to be acquired. The figures-A&B given below were taken during public consultation.

Soil sample collection: Soil samples have been collected at different depths in 2 locations at site.

The Public Consultation was held with the local people and department officials' participants.
This is with reference to the need and justification for selecting these components with the scope to increase the inflow of tourists. During the discussion the IEE components and Social Safeguard issues (Water/Air/Soil/Noise/Flora/Fauna/Climate etc.) were explained and the following suggestions were received from the participants.

The participants concurred with the selection of components for the infrastructure development for Construction and restoration of heritage monuments, Thellar.

They also suggested the need for maintenance of the new components to be introduced need to be taken care by the line department with full participation with the local community. The local educated men/women at the age group of 15-35 with minimum qualification of Degree or 10+2 could be selected by the line Department for providing the need-based skill development for guides and volunteers and securities.

The local community members especially self-help groups could be given the entrepreneur training to manage the souvenir and mini restaurants to provide assistance to the Tourists. The local community members are willing to take up training on the major components related to environmental enhancement so as to monitor —activities and its follow up‖ in the future.

Drinking water facility with treatment and adequate toilet facilities to be given priority. While laying road the present component of cement road could be replaced by the latest technology of paver blocks. Waste collection, segregation and final disposal need to be planned and implemented.

Figures-A&B: Pictures Taken during Site Visit

Participants of Public Consultation

ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT: Thellar - Thadagapureeswarar Temple.

Name of Sub-project:
Conservation and Restoration of heritage and monuments of Thadagapureeswarar Temple.

Sr. No.	Name	Occupation	Contact Details	Signature
1	S. Kumar	Koil Archagar	9677870588	S. Kumar
2	K Sambasivam	Trustee	9443131119	K. Sambasivam
3	[illegible]	[illegible]		[illegible]
4	L. LAKANATHAN	Former	7373895586	L. Lakanathan
5	E. Selvaperumal	Former	9746703518	E. Selvaperumal
6	[illegible]	[illegible]	8428019427	[illegible]
7	[illegible]	[illegible]		[illegible]
8	[illegible]	[illegible]	7502575882	[illegible]
9	[illegible]	[illegible]		[illegible]
10	[illegible]	[illegible]	8940510062	[illegible]
11	R. [illegible]	[illegible]	9688 284441	R. Selvaraj
12	R. [illegible]	[illegible]	8526088942	R. [illegible]
13	J. Muni Kandan	[illegible]	9841314054	J. Muni
14	M. Arunachalam	[illegible]	—	[illegible]
15				
16	K. Sundaram	Former	8220531257	K. Sundaram

Appendix 1(I) : PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Details of the Site: The site is free from encumbrances and is freely available with the Government of Tamil Nadu (State Archaeology) further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with various stake holders. The details of the site visit are given below:

Date of Visit: 15.04.2017

Name of the work: Conservation and Restoration of Heritage Monuments at Manoraz Fort Thanjavurur District

Name of the Person visited the site:
Mr.Alexander-(Architect/DSC)
Ms.Roopmathi Anand-(Conservation Architect/DSC)
Mr Abdul Rahuman-(Field Engineer/DSC)
Mr Ranjanidas-(Community Development Specialist/DSC)

Description of the Site: The site is located 50 m away from the sea shore. The site is very close to the Bitumen concrete approach road.. A pictorial map has been provided in the following page. This site is barren and free from any encroachments. The property boundaries are clearly marked. This property is in the possession of the Department of State Archaeology, Government of Tamilnadu. Hence, there is no requirement for any land to be acquired. The figures-A&B given below were taken during public consultation.

Soil sample collection: No Soil samples collected

The Public Consultation was held with the local people and department officials‘ participants.
This is with reference to the need and justification for selecting these components with the scope to increase the inflow of tourists. During the discussion the IEE components and Social Safeguard issues (Water/Air/Soil/Noise/Flora/Fauna/Climate etc.) were explained and the following suggestions were received from the participants.

The participants concurred with the selection of components for the infrastructure development for Manora Fort Thanjavur District..

They also suggested the need for maintenance of the new components to be introduced need to be taken care by the line department with full participation with the local community. The local educated men/women at the age group of 15-35 with minimum qualification of Degree or 10+2 could be selected by the line Department for providing the need based skill development for guides and volunteers and securities.

The local community members especially self-help groups could be given the entrepreneur training to manage the souvenir and mini restaurants to provide assistance to the Tourists. The local community members are willing to take up training on the major components related to environmental enhancement so as to monitor —activities and its follow up‖ in the future.

Drinking water facility with treatment and adequate toilet facilities to be given priority. While laying road the present component of cement road could be replaced by the latest technology of paver blocks. Waste collection, segregation and final disposal need to be planned and implemented.

Figures-A&B: Pictures Taken during Site Visit

Participants of Public Consultation

ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT: MANORA

Name of Sub-project:Development and Improvement of Infrastructure Facilities at Manora in Thanjavur District

Sr. No.	Name	Occupation	Contact Details	Signature
1	[illegible]	[illegible]	[illegible]	[illegible]
2	R.Kaliyammal	House wife	9688567965	R.Kaliyammal
3	[illegible]	[illegible]	9698953140	[illegible]
4	[illegible]	[illegible]	8610083837	[illegible]
5	[illegible]	[illegible]	8675281089	S.[illegible]
6	[illegible]	[illegible]	8879762362	[illegible]
7	[illegible]	[illegible]	9092394544	[illegible]
8	M.[illegible]	[illegible]	98842517[illegible]0	[illegible]
9	S.[illegible]	மீன்பிடி	6381521211	[illegible]
10	A.[illegible]	[illegible]	6381535[illegible]	A.[illegible]
11	P.[illegible]	[illegible]	9894443410	P.[illegible]
12	M.[illegible]	[illegible]	7397680259	M. Shyam
13	N.[illegible]	[illegible]	9443071561	[illegible]
14	P.[illegible]	[illegible]	9524805841	P.[illegible]
15	A SANKAR.	மீன்பிடி	8248435405	A [illegible]

Appendix 1(m) : PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Details of the Site: The site is free from encumbrances and is freely available with the Government of Tamil Nadu (STATE ARCHAEOLOGICAL DEPARTMENT OF THE GOVERNMENT OF TAMIL NADU) further, there is no necessity of any utility shifting and cutting of trees. The DSC has carried out a field visit and has interacted with various stake holders. The details of the site visit are given below:

Date of Visit: 19.02.2018

Name of the work: Heritage restoration and Conservation of monuments monuments for Chinnayan kulam at Chinnayanpettai Village, Tiruvanamalai District

Name of the Person Visited the site: Mr. Alexander (Architect), Mr. Murugesan (Field Engineer), Mr. Abdul Rahman (Field Engineer)

Description of the Site: The site is very close to the Bitumen approach road. A pictorial map has been provided in the following page. This site is barren and free from any encroachments. The property boundaries are clearly marked. This property is in the possession of the Department of State Archaeological Department of the Government of Tamil Nadu, Hence, there is no requirement for any land to be acquired. The figures-A&B given below were taken during public consultation.

Soil sample collection: Soil samples have been collected at different depths in 2 locations at site.

The Public Consultation was held with the local people and department officials‘ participants.

This is with reference to the need and justification for selecting these components with the scope to increase the inflow of tourists. During the discussion the IEE components and Social Safeguard issues (Water/Air/Soil/Noise/Flora/Fauna/Climate etc.) were explained and the following suggestions were received from the participants. The participants concurred with the selection of components for the infrastructure development for Heritage restoration and Conservation of monuments, Chinnayanpettai.

They also suggested the need for maintenance of the new components to be introduced need to be taken care by the line department with full participation with the local community. The local educated men/women at the age group of 15-35 with minimum qualification of Degree or 10+2 could be selected by the line Department for providing the need based skill development for guides and volunteers and securities.

The local community members especially self-help groups could be given the entrepreneur training to manage the souvenir and mini restaurants to provide assistance to the Tourists. The local community members are willing to take up training on the major components related to environmental enhancement so as to monitor —activities and its follow upll in the future.

Drinking water facility with treatment and adequate toilet facilities to be given priority: While laying road the present component of cement road could be replaced by the latest technology of paver blocks. Waste collection, segregation and final disposal need to be planned and implemented.

Figures-A&B: Pictures Taken during Site Visit

Participants of Public Consultation

ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT: Chinniyanpettai Kulam.

Name of Sub-project: Conservation and Restoration of Heritage and monuments of Chinniyanpettai Kulam.

Sr. No.	Name	Occupation	Contact Details	Signature
1	A. [illegible]	[illegible]	9841324119	
2	S. [illegible]	விவசாயம்	8012752659	
3	M. [illegible]	"	9442651499	
4	[illegible]	விவசாயம்	9659747475	
5	[illegible]	விவசாயம்	7639159707	
6	S. [illegible]	கூலி	9787737805	
7	[illegible]	[illegible]	[illegible]	
8	[illegible]	[illegible]	—	
9	[illegible]	[illegible]		
10	[illegible]	[illegible]		
11	[illegible]	"		
12	[illegible]	[illegible]	9176111601	
13	[illegible]	கூலி	9789101927	
14	[illegible]	"	8883336991	
15	V. [illegible]	விவசாயம்	8940969828	
16	[illegible]	கூலி		
17.	[illegible]	[illegible]		

APPENDIX 2: CONTRACT CLAUSES TO BE INTEGRATED INTO BID DOCUMENTS

A. Heritage Restoration and Conservation Works of Monuments (Renovation, Illumination etc) at (a) Thyagadurgam Fort, Villupuram District; (b) Udhayagiri Fort, Kanyakumari District; (c) Thirumalai Naicker Mahal, Madurai District; (d) Marudhupandiyar Fort, Sivagangai District; (e) Koolamandal Gangaikonda choleeswarer Temple, Tiruvanamalai District; (f) Alamparai Fort, Kanchipuram District; (g) Poondi Arugar Temple, Tiruvanamalai District; (h) Kattabomman kottai at Panchalankurichi, Tuticorin District; (i) Dutch Dome, Nagapattinam District; (j) Governor House at Tharangambadi, Nagapattinam District; (k) Thadagapureeswarar Temple, Tiruvannamalai District; (l) Manora Fort,Thanjavur District; (m) Chinnayankulam in Chinnayanpettai, Tiruvanamalai

1. Movement / Circulation Plan during Construction

For all construction activities in active tourist destinations, the Contractor will prior to initiation of construction activities, prepare and get approved by the Engineer, a construction plan including the staging, sequencing of construction activities, circulation plans to ensure smooth movement to pilgrims and tourists, including provision of alternative routes, etc. The plans will be disseminated at key entry points to these tourist locations.

2. Quarry and Borrowing

Considering the quantum of activities, it is envisaged that no borrow areas and quarry sites will be opened. Raw materials will be procured from licensed quarry owners. Similarly, no crusher sites will be opened by the contractor. Also, No borrow area shall be made available by the Employer for this work. The arrangement for the source of supply of the material for the civil works shall be the sole responsibility of the Contractor.

3. Debris Disposal

Dismantled material shall be stacked, collected and disposed at suitable locations so that no pollution arises out of this. Those shall be neatly piled at points designated by the Engineer with all lifts and leads. Materials, which can be used or auctioned, shall be stored in neat piles at locations designated by Engineer with all lifts and leads.

The contractor will identify potential sites for disposal of hazardous construction debris and general construction wastes prior to start of construction and dismantling operations. The contractor will obtain approval on identified sites from the Engineer of Supervision Consultant and disposal will be only after consent letter from the Engineer.

4. Precautions for Protection of Environmental Resources

The Contractor will ensure that construction activities do not result in any contamination of land or water by polluting substances.

Unless otherwise provided in the specifications, the Contractor will ensure that no trees or shrubs or waterside vegetation are felled or harmed except those required to be cleared for

execution of the works. The Contractor will protect trees and vegetation from damage to the satisfaction of the Engineer.

The Contractor will not use or permit the use of wood as a fuel for the execution of any part of the works and to the extent practicable, will ensure that fuels other than wood are used for cooking and heating in all camps and living accommodations. Any wood so used must be harvested legally, and the Contractor will provide the Engineer with copies of the relevant permits, if required.

The Contractor will take all precautions necessary to ensure that vegetation existing adjacent to the project site is not affected by fires arising from the execution of the contract. Should a fire occur in the natural vegetation or plantation adjacent to the project site for any reason, the Contractor will immediately suppress it. Areas of forest, shrub, or plantation damaged by fire considered by the Engineer to have been initiated by the Contractor‘s staff or laborers will be replanted or otherwise restored.

The Contractor will confine operations to the dry season, use silt traps and dispose spoils in locations approved by the Engineer that will not promote instability and result in destruction of property, vegetation, irrigation and water supply. Disposal near wetlands, protected areas, and other areas that will inconvenience or deprive local residents of their livelihood will not be allowed. Acidic and saline spoils will not be spread into agricultural land.

The Contractor will consult with local residents and local government before locating project offices, sheds, and construction plant.

The Contractor will maintain ecological balance by preventing felling of trees, water pollution and defacing of natural lanPMSCape.

In the conduct of cleaning activities and operation of equipment, the Contractor will utilize such practicable methods and devices as are reasonably available to control, prevent and otherwise minimize air/noise pollution.

5. Noise and Air Pollution

The Contractor will monitor the environmental parameters periodically as specified in the monitoring plan and report to the Engineer.

The Contractor will indemnify and keep indemnified the Employer from and against any liability for damages on account of noise or other disturbance created while carrying out the work, and from and against all claims, demands, proceedings, damages, costs, charges, and expenses, whatsoever, in regard or in relation to such liability.

6. Quality Assurance Plan / Manual

Post the signing of the contract and prior to commencement of civil works, the contractor shall produce the Quality Assurance Plan covering the following items:

(i) Names, roles, responsibilities of the key Personnel of the Contractor‘s staff responsible for overseeing each major activity;
(ii) Methodology and work plan for each subproject.

8. Utilities Diversion

For the utilities diversion and restoration, the lines Departments are to be consulted for planning and temporary diversion and final restoration.

8. Avoidance of Interference

The Contractor shall not interfere unnecessarily or improperly with the convenience of the public, or the access to and use and occupation of all roads and footpaths, irrespective of whether they are public or in the possession of the Employer or of others.

The Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from any such unnecessary or improper interference.

The Contractor shall be deemed to have been satisfied as to the suitability and availability of access routes to the Site. The Contractor shall use reasonable efforts to prevent any road or bridge from being damaged by the Contractor‘s traffic or by the Contractor‘s Personnel. These efforts shall include the proper use of appropriate vehicles and routes. Except as otherwise stated in these Conditions:

The Contractor shall (as between the Parties) be responsible for any maintenance which may be required for his use of access routes;

The Contractor shall provide all necessary signs or directions along access routes, and shall obtain any permission which may be required from the relevant authorities for his use of routes, signs and directions; All fossils, coins, articles of value or antiquity, and structures and other remains or items of geological or archaeological interest found on the Site shall be placed under the care and authority of the Employer.

The Contractor shall take reasonable precautions to prevent Contractor‘s Personnel or other persons from removing or damaging any of these findings. The Contractor shall, upon discovery of any such finding, promptly give notice to the Engineer, who shall issue instructions for dealing with it.

9. Utilities Diversion

For the utilities diversion and restoration, the lines Departments are to be consulted for planning and temporary diversion and final restoration

B. Provision of Street Furniture

The exact location of the Street Furniture shall be confirmed with Project Implementation Unit (PIU) and local municipal body.

Appropriate Stock yard to be arranged by the contractor for storage of the materials.

C. General

The Contractor will be responsible for implementation of environmental provisions outlined in the EMP, in addition to adhering to all environmental provisions in the applicable

specifications for the works will be adhered to as part of good engineering practices.

The contractor might be using DG sets for which the permission will be required under Air act 1981.

No fuel storage takes place in this project and for construction purposes, the fuel shall be procured from the existing petrol bunks

For labor accommodation, no labor camp will be established and for accommodation of labors nearby construction sites, rented houses will be engaged by the contractor. Further, labor license from the District Labor commissioner shall be provided by the contractor.

All works undertaken towards protection of environmental resources as part of the EMP and as part of good engineering practices while adhering to relevant specifications will be deemed to be incidental to works being carried out and no separate payment will be made unless otherwise specified explicitly. The costs towards environmental management as per EMP unless otherwise provided as a separate head, will be deemed to be part of the BOQ of the project. The scope of works of the contractor towards the implementation of the environmental provisions will be as follows:

(i) Abide by all existing Environmental regulations and requirements of the Government of India , during implementation;

(ii) Compliance with all mitigation measures and monitoring requirements set out in the Environmental Management Plan (EMP);

(iii) Submission of a method statement detailing how the subproject EMP will be complied with. This will include methods and schedule of monitoring.

(iv) Monitoring of project environmental performance and periodic submission of monitoring reports.

(v) Compliance of all safety rules at work, and Provision of adequate health and safety measures such as water, food, sanitation, personal protective equipment, workers insurance, and medical facilities.

The detailed provisions for specific environmental issues will be as outlined in the EMP table on impacts and mitigation measures.

Occupational Health And Safety During Construction. The Contractor will, in accordance with the safety and health provisions specified in the EMP, provide workers with a safe and healthy working environment, in the work areas, through application of preventive and protective measures consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group‘s Environment, Health and Safety Guidelines.

The borrower/client will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by:

(i) Providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; Providing appropriate equipment to minimize risks and requiring and enforcing its use;

(ii) Training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment;

(iii) Documenting and reporting occupational accidents, diseases, and incidents; and

(iv) Having emergency prevention, preparedness, and response arrangements in place.

Goggles and gas masks shall be worn at the time of dismantling. Leather gloves shall be worn by the workers. Screens made of G.I. Sheets shall be placed wherever necessary to prevent the flying pieces from injuring the workers.

(i) The Contractor shall comply with all applicable safety regulations by taking care for the safety of all persons entitled to be on the Site, Use reasonable efforts to keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons.

(ii) Provide fencing, lighting, guarding and watching of the Works until completion and taking over

(iii) Provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land.

Clause for Nonconformity to EMP - Protection of the Environment. The Contractor shall implement all mitigation measures for which responsibility is assigned to him as stipulated in the EMP Report. Any lapse in implementing the same will attract the damage clause as detailed below:

(i) All lapse in obtaining clearances / permissions under statutory regulations and violations of any regulations with regard to eco-sensitive areas shall be treated as a major lapse.

(ii) Any complaints of public, within the scope of the Contractor, formally registered with the PMSC, PMSC or with the PIU and communicated to the Contractor, which is not properly addressed within the time period intimated by the PMSC / PMSC, PIU shall be treated as a major lapse.

(iii) Non-conformity to any of the mitigation measures stipulated in the EMP Report (other than stated above) shall be considered as a minor lapse.

(iv) On observing any lapses, PMSC shall issue a notice to the Contractor, to rectify the same.

(v) Any minor lapse for which notice was issued and not rectified, first and second reminders shall be given after ten days from the original notice date and first reminder date respectively. Any minor lapse, which is not rectified, shall be treated as a major lapse from the date of issuing the second reminder.

(vi) If a major lapse is not rectified upon receiving the notice PMSC shall invoke reduction, in the subsequent interim payment certificate.

(vii) For major lapses, 10% of the interim payment certificate will be withheld, subject to a maximum limit of about 0.5% of the contract value.

(viii) If the lapse is not rectified within one month after withholding the payment, the amount withheld shall be forfeited.

Post Construction Clearance. On completion of work, wherever applicable, the Contractor will clear away and remove from the sites surplus materials, rubbish, scaffoldings, and temporary works of every kind and leave the whole of the sites and works in a clean condition to the satisfaction of the Engineer.

All temporary sedimentation and pollution control works, which are not provided in the Bill of Quantities, shall be deemed as incidental to the civil work and other items of work and as such no separate payment shall be made for the same.

Labor Welfare:

(i) The Contractor shall make arrangements for the engagement of all staff and labor,

local or otherwise, and for their payment, housing, feeding and transport.

(ii) The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labor with appropriate qualifications and experience from sources within the State/Country.

(iii) The Contractor shall pay rates of wages, and observe conditions of labor, which are not lower than those established for the trade or industry where the work is carried out. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.

(iv) The Contractor shall inform the Contractor‘s Personnel about their liability to pay personal income taxes in the Country in respect of such of their salaries, wages, allowances, and any benefits as are subject to taxes under the Laws of the Country for the time being in force, and the Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such Laws.

(v) The Contractor shall comply with all the relevant labor Laws applicable to the Contractor‘s Personnel, including Laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.

(vi) The Contractor shall require his employees to obey all applicable Laws, including those concerning safety at work. The Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor‘s Personnel

.No temporary dwelling units are envisaged to be built for the labor force accommodation but rented premises will utilized for the same with all basic amenities. The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor‘s Personnel.

(vii) In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the Site and at any accommodation for Contractor‘s and Employer‘s

Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.

(viii) The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Accident records are to be maintained at site for the Engineer‘s vigilance.

(ix) The contractor shall acquire appropriate labor license and labor insurance as per the labor act.

(x) The Contractor shall keep complete and accurate records of the employment of labor at the Site. The records shall include the names, ages, genders, hours worked and wages paid to all workers. These records shall be summarized on a monthly basis and shall be available for inspection by the Engineer during normal working hours.

(xi) The Contractor shall ensure that during continuance of the contract, the Contractor and his Sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made there under, regulations, Notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or Notification that may be issued in this respect in future by the State or Central Government or the local authority.

The Water (Prevention and Control of Pollution) Act, 1974. This provides for the prevention and control of water pollution and the maintaining and restoring of wholesomeness of

water.

The Air (Prevention and Control of Pollution) Act, 1981. This provides for prevention, control and abatement of air pollution. 'Air Pollution' means the presence in the atmosphere of any 'air pollutant', which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

The Environment (Protection) Act, 1986. This provides for the protection and improvement of environment and for matters connected therewith, and the prevention of hazards to human beings, other living creatures, plants and property. 'Environment' includes water, air and land and the interrelationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.

The Public Liability Insurance Act, 1991. This provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as hazardous substance under the Environment (Protection) Act 1986, and exceeding such quantity as may be specified by Notification by the Central Government.

Labor Enactments. The Contractor and his Sub-contractors shall abide at all times by all existing labor enactments and rules made there under, regulations, Notifications and bye laws of State or Central Government or local authority and any other labor law (including rules), regulations, bye laws that may be passed or Notification that may be issued under any labor law in future either by the State or the Central Government or the local authority.

The Contractor shall, if required by the Engineer, provide a return in detail of the employment of labor, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labor, employed by the Contractor on the Site, from time to time.

(i) **Workmen Compensation Act, 1923.** The Act provides for compensation in case of injury by accident arising out of and during the course of employment.

(ii) **Payment of Gratuity Act, 1972.** Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more or on death at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.

(iii) **Employees' PF and Miscellaneous Provisions Act, 1952**. The Act provides for monthly contributions by the employer plus workers@10% or 8.33%. The benefits payable under the Act are:

- Pension or family pension on retirement or death as the case may be.
- Deposit linked insurance on the death in harness of the worker.
- Payment of PF accumulation on retirement/death etc.

(iv) **Maternity Benefit Act, 1951**. The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.

(v) **Contract Labor (Regulation and Abolition) Act, 1970**. The Act provides for certain welfare measures to be provided by the Contractor to contract labor and in case the Contractor fails to provide, the same are required to be provided by the Principal Employer by Law. The principal employer is required to take Certificate of Registration

and the Contractor is required to take a License from the designated Officer. The Act is applicable to the establishments or Contractor of principal employer if they employ 20 or more contract labor.

(vi) **Minimum Wages Act, 1948**. The employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, and Runways are scheduled employment.

(vii) **Payment of Wages Act, 1936**. It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.

(viii) **Equal Remuneration Act, 1979**. The Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees in the matters of transfers, training and promotions etc.

(ix) **Payment of Bonus Act, 1965**. The Act is applicable to all establishments employing 20 or more workmen. The Act provides for payments of annual bonus subject to a minimum of 8.33 % of wages and maximum of 20 % of wages to employees drawing Rs. 3,500/- per month or less. The bonus to be paid to employees getting Rs. 2,500/- per month or above up to Rs.3, 500/- per month shall be worked out by taking wages as Rs.2,500/- per month only. The Act does not apply to certain establishments. The newly set up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of the Act.

(x) **Industrial Disputes Act, 1947**. The Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

(xi) **Industrial Employment (Standing Orders) Act, 1946**. It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the employer on matters provided in the Act and get the same certified by the designated Authority.

(xii) **Trade Unions Act, 1926**. The Act lays down the procedure for registration of trade unions of workmen and employees. The trade unions registered under the Act have been given certain immunities from civil and criminal liabilities.

(xiii) **Child Labor (Prohibition and Regulation) Act, 1986**. The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labor is prohibited in Building and Construction Industry.

(xiv) **Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979**. The Act is applicable to an establishment which employs 5 or more interstate migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The inter-state migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home up to the establishment and back, etc.

(xv) **The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996**. All the establishments who carry on any building or other construction work and employ 10 or more workers are covered under this Act. All such establishments are required to pay Cess at rate not exceeding 2% of the cost of construction as may be notified by the Government. The employer of the establishment is required to provide safety measures

at the Building or Construction work and other welfare measures, such as Canteens, First-aid facilities, Ambulance, Housing accommodation for Workers near the workplace etc. The employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

(xvi) **The Factories Act, 1948**. The Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.

(xvii) **The Apprentices Act, 1961**.The Contractor shall duly comply with the provisions of the Apprentices Act, 1961, the rules made there under and the orders that may be issued from time to time under the said Act and the said Rules and on his failure or neglect to do so, he shall be subject to all liabilities and penalties provided by the said

Act and the said Rules. The Contractor shall, if required by the Engineer, provide a return in detail of the employment of labor, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labor, employed by the Contractor on the Site, from time to time.' Safety and Welfare Provisions for labor to be employed by the Contractor.

All necessary personal safety equipment as considered adequate by the Engineer shall be available for use of persons employed on the Site and maintained in a condition suitable for immediate use; and the Contractor shall take adequate steps to ensure proper use of such equipment by those concerned All workmen at site shall be provided with safety helmets and yellow/orange jackets. Workmen required on site during night hours shall be provided with fluorescent yellow jackets with reflective lopes.

The Contractor shall provide all necessary fencing and lights to protect the public from accidents and shall be bound to bear the expenses of defending every suit, action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and costs which may be awarded in any such suit, action or proceedings to any such person or which may with the consent of the Contractor be paid to compromise any claim by any such person.

(i) First Aid-At every workplace, there shall be maintained, in a readily accessible place, first aid appliances including an adequate supply of sterilized dressings and sterilized cotton wool as prescribed in the Factory Rules of the State in which the work is carried on. The appliances shall be kept in good order and, in large work places; these shall be placed under the charge of a responsible person who shall be readily available during working hours.

(ii) Accommodation for Labor: The Contractor shall during the progress of the work provide, erect and maintain necessary temporary living accommodation (in rented premises) and ancillary facilities for labor at his own expense to standards and scales approved by the Engineer.

(iii) Drinking Water: In every workplace, there shall be provided and maintained at suitable places easily accessible to labor, a sufficient supply of cold water fit for drinking. Where drinking water is obtained from an intermittent public water supply each workplace shall be provided with storage tanks where drinking water shall be stored.

(The Environment Management Plan is an integral part of the contract and the contractor has the responsibility to implement it under the supervision of the Environmental officer of the Construction Supervision Consultant. All actions taken by the Environmental officer shall be deemed to have the concurrence of the —Engineer‖ as defined in the contract data. All management measures of the Environment and Management plan are deemed to be incidental to the work unless otherwise provided in the BOQ. No separate payments shall be made for implementing these measures.)

APPENDIX 3(A): RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

URBAN DEVELOPMENT

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the —without mitigation‖ case. The purpose is to identify potential impacts. Use the —remarks‖ section to discuss any anticipated mitigation measures.

Country/Project Title: —Conservation and Restoration of heritage works in Thyagadurgam Fort , in Villupuram District, TamilNadu‖

Sector Division: INRM

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site		√	
• Protected Area		√	The Land is owned by HR&CE Department and located in the heart of the city in populated areas.
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
• Ecological disturbances arising from the establishment of a plant or facility complex in or near sensitive habitats?		√	During construction, no tree felling is being felt necessitated.
• Eventual degradation of water bodies due to discharge of wastes and other effluents from plant or facility complex?		√	No water body is located adjacent to the proposed construction site.
• Serious contamination of soil and groundwater?		√	This issue is not envisaged in the proposed subproject activities.

• Aggravation of solid waste problems in the area?		√	Waste generated from demolition of the present structure will be disposed off in low lying areas and approved municipality dump yard. Liquid and solid waste generated at the structure will be disposed off in compliance with CPCB stipulations.
• Public health risks from discharge of wastes and poor air quality; noise and foul odour from plant emissions?		√	No discharge of liquid waste is envisaged during the construction phase. Temporary air emission and higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating daytime.
• Short-term construction impacts			
○ Soil erosion		√	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
○ Deterioration of water quality		√	No discharge of waste water is involved in the subproject activity.
○ Deterioration of air quality	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period.
○ Noise and vibration from construction equipment	√		Higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating period.
• dislocation or involuntary resettlement of people		√	Project will be erected on HR&CE owned land.
• Social conflicts arising from the influx of construction laborers from other areas?		√	Not envisaged as only local labor force will be preferably employed.
• Environmental degradation (e.g. erosion, soil and water contamination, loss of soil fertility, disruption of wildlife habitat) from intensification of agricultural		√	

land use to supply raw materials for plant operation;			
and modification of natural species diversity as a result of the transformation to monoculture practices?			
• Water pollution from discharge of liquid effluents?		√	No discharge of waste water is involved in the subproject activity.
• Air pollution from all plant operations?	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period .
• Gaseous and odour emissions to the atmosphere from processing operations?		√	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	√		An emergency handling procedure will be in place to meet such contingencies.
• Uncontrolled in-migration with opening of roads to forest area and overloading of social infrastructure?		√	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?		√	An emergency handling and management plan comprising of EHS procedures will be in place to meet such contingencies.
• Disruption of transit patterns, creation of noise and congestion, and pedestrian hazards aggravated by heavy trucks?		√	The subproject is confined to a clear cut boundarywall separating the location from it‘s surrounding.
• Disease transmission from inadequate waste disposal?		√	Adequate care will be taken so that waste is collected and disposed in a safe manner meeting the CPCB guidelines.

Appendix 3(b): RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

URBAN DEVELOPMENT

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the —without mitigation‖ case. The purpose is to identify potential impacts. Use the —remarks‖ section to discuss any anticipated mitigation measures.

Country/Project Title: **Heritage Restoration and Conservation of Important Monuments (Renovation, Illumination) at Udhayagiri Fort, Kanyakuamri District.**

Sector Division: INRM

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site		√	
• Protected Area		√	The Land is owned by HR&CE Department and located in the heart of the city in populated areas.
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
• Ecological disturbances arising from the establishment of a plant or facility complex in or near sensitive habitats?		√	During construction, no tree felling is being felt necessitated.
• Eventual degradation of water bodies due to discharge of wastes and other effluents from plant or facility complex?		√	No waterbody is located adjacent to the proposed construction site.
• Serious contamination of soil and groundwater?		√	This issue is not envisaged in the proposed subproject activities.
• Aggravation of solid waste problems in the area?		√	Waste generated from demolition of the present

			structure will be disposed off in low lying areas and approved municipality dump yard. Liquid and solid waste generated at the Udayagiri fort will be disposed off in compliance with CPCB stipulations.
• Public health risks from discharge of wastes and poor air quality; noise and foul odour from plant emissions?		√	No discharge of liquid waste is envisaged during the construction phase. Temporary air emission and higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating daytime.
• Short-term construction impacts			
○ Soil erosion		√	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
○ Deterioration of water quality		√	No discharge of waste water is involved in the subproject activity.
○ Deterioration of air quality	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period.
○ Noise and vibration from construction equipment	√		Higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating period.
• dislocation or involuntary resettlement of people		√	Project will be erected on TamilNadu Archeological department owned land.
• Social conflicts arising from the influx of construction laborers from other areas?		√	Not envisaged as only local labor force will be preferably employed.
• Environmental degradation (e.g. erosion, soil and water contamination, loss of soil fertility, disruption of wildlife habitat) from intensification of agricultural		√	

land use to supply raw materials for plant operation; and modification of natural species diversity as a result of the transformation to monoculture practices?			
• Water pollution from discharge of liquid effluents?		√	No discharge of waste water is involved in the subproject activity.
• Air pollution from all plant operations?	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period .
• Gaseous and odour emissions to the atmosphere from processing operations?		√	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	√		An emergency handling procedure will be in place to meet such contingencies.
• Uncontrolled in-migration with opening of roads to forest area and overloading of social infrastructure?		√	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?		√	An emergency handling and management plan comprising of EHS procedures will be in place to meet such contingencies.
• Disruption of transit patterns, creation of noise and congestion, and pedestrian hazards aggravated by heavy trucks?		√	The subproject is confined to a clear cut boundarywall separating the location from it‘s surrounding.
• Disease transmission from inadequate waste disposal?		√	Adequate care will be taken so that waste is collected and disposed in a safe manner meeting the CPCB guidelines.

Appendix 3(c) : RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

URBAN DEVELOPMENT

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the —without mitigation‖ case. The purpose is to identify potential impacts. Use the —remarks‖ section to discuss any anticipated mitigation measures.

Country/Project Title: —Conservation and Restoration of Heritage works for Thirumalai Naicker Mahal at Madurai District‖, TamilNadu‖

Sector Division: INRM

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site		√	
• Protected Area		√	The Land is owned by HR&CE Department and located in the heart of the city in populated areas.
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
• Ecological disturbances arising from the establishment of a plant or facility complex in or near sensitive habitats?		√	During construction, no tree felling is being felt necessitated.
• Eventual degradation of water bodies due to discharge of wastes and other effluents from plant or facility complex?		√	No waterbody is located adjacent to the proposed construction site.
• Serious contamination of soil and groundwater?		√	This issue is not envisaged in the proposed subproject activities.
• Aggravation of solid waste problems in the area?		√	Waste generated from demolition of the present

			structure will be disposed off in low lying areas and approved municipality dump yard. Liquid and solid waste generated at the structure will be disposed off in compliance with CPCB stipulations.
• Public health risks from discharge of wastes and poor air quality; noise and foul odour from plant emissions?		√	No discharge of liquid waste is envisaged during the construction phase. Temporary air emission and higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating daytime.
• Short-term construction impacts			
○ Soil erosion		√	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
○ Deterioration of water quality		√	No discharge of waste water is involved in the subproject activity.
○ Deterioration of air quality	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period.
○ Noise and vibration from construction equipment	√		Higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating period.
• dislocation or involuntary resettlement of people		√	Project will be erected on HR&CE owned land.
• Social conflicts arising from the influx of construction laborers from other areas?		√	Not envisaged as only local labor force will be preferably employed.
• Environmental degradation (e.g. erosion, soil and water contamination, loss of soil fertility, disruption of wildlife habitat) from intensification of agricultural land use to supply raw materials for plant operation; and modification of natural species diversity as a result		√	

of the transformation to monoculture practices?			
• Water pollution from discharge of liquid effluents?		√	No discharge of waste water is involved in the subproject activity.
• Air pollution from all plant operations?	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period .
• Gaseous and odour emissions to the atmosphere from processing operations?		√	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	√		An emergency handling procedure will be in place to meet such contingencies.
• Uncontrolled in-migration with opening of roads to forest area and overloading of social infrastructure?		√	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?		√	An emergency handling and management plan comprising of EHS procedures will be in place to meet such contingencies.
• Disruption of transit patterns, creation of noise and congestion, and pedestrian hazards aggravated by heavy trucks?		√	The subproject is confined to a clear cut boundarywall separating the location from it's surrounding.
• Disease transmission from inadequate waste disposal?		√	Adequate care will be taken so that waste is collected and disposed in a safe manner meeting the CPCB guidelines.

Appendix 3(d) : RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

URBAN DEVELOPMENT

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the —without mitigation‖ case. The purpose is to identify potential impacts. Use the —remarks‖ section to discuss any anticipated mitigation measures.

Country/Project Title: —Heritage Restoration and Conservation of Maruthupandiyar Fort, Sivagangai District, Tamil Nadu‖

Sector Division: INRM

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site		√	
• Protected Area		√	The Land is owned by State Archeological Department and located in the heart of the city in populated areas.
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
• Ecological disturbances arising from the establishment of a plant or facility complex in or near sensitive habitats?		√	During construction, no tree felling is being felt necessitated.
• Eventual degradation of water bodies due to discharge of wastes and other effluents from plant or facility complex?		√	No waterbody is located adjacent to the proposed construction site.
• Serious contamination of soil and groundwater?		√	This issue is not envisaged in the proposed subproject activities.
• Aggravation of solid waste problems in the		√	Waste generated from

area?			demolition of the present structure will be disposed off in low lying areas and approved municipality dump yard. Liquid and solid waste generated at the structure will be disposed off in compliance with CPCB stipulations.
• Public health risks from discharge of wastes and poor air quality; noise and foul odour from plant emissions?		√	No discharge of liquid waste is envisaged during the construction phase. Temporary air emission and higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating daytime.
• Short-term construction impacts			
○ Soil erosion		√	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
○ Deterioration of water quality		√	No discharge of waste water is involved in the subproject activity.
○ Deterioration of air quality	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period.
○ Noise and vibration from construction equipment	√		Higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating period.
• dislocation or involuntary resettlement of people		√	Project will be erected on TamilNadu Archeological Department owned land.
• Social conflicts arising from the influx of construction laborers from other areas?		√	Not envisaged as only local labor force will be preferably employed.
• Environmental degradation (e.g. erosion, soil and water contamination, loss of soil fertility, disruption of wildlife habitat) from intensification of agricultural		√	

land use to supply raw materials for plant operation; and modification of natural species diversity as a result of the transformation to monoculture practices?			
• Water pollution from discharge of liquid effluents?		√	No discharge of waste water is involved in the subproject activity.
• Air pollution from all plant operations?	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period .
• Gaseous and odour emissions to the atmosphere from processing operations?		√	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	√		An emergency handling procedure will be in place to meet such contingencies.
• Uncontrolled in-migration with opening of roads to forest area and overloading of social infrastructure?		√	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?		√	An emergency handling and management plan comprising of EHS procedures will be in place to meet such contingencies.
• Disruption of transit patterns, creation of noise and congestion, and pedestrian hazards aggravated by heavy trucks?		√	The subproject is confined to a clear cut boundarywall separating the location from it‘s surrounding.
• Disease transmission from inadequate waste disposal?		√	Adequate care will be taken so that waste is collected and disposed in a safe manner meeting the CPCB guidelines.

Appendix 3(e) : RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

URBAN DEVELOPMENT

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the —without mitigation‖ case. The purpose is to identify potential impacts. Use the —remarks‖ section to discuss any anticipated mitigation measures.

Country/Project Title: —Construction and restoration of Heritage for Gangaikonda Choleeswarer
temple at Koolamandal Village,Valangaiman Taluk,Tiruvanamalai District, TamilNadu‖
Sector Division: INRM

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site		√	
• Protected Area		√	The Land is owned by STATE ARCHAEOLOGICAL DEPARTMENT OF THE GOVERNMENT OF TAMIL NADU Department and located in the heart of the city in populated areas.
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
• Ecological disturbances arising from the establishment of a plant or facility complex in or near sensitive habitats?		√	During construction, no tree felling is being felt necessitated.
• Eventual degradation of water bodies due to discharge of wastes and other effluents from plant or facility complex?		√	No waterbody is located adjacent to the proposed construction site.

• Serious contamination of soil and groundwater?		√	This issue is not envisaged in the proposed subproject activities.
• Aggravation of solid waste problems in the area?		√	Waste generated from demolition of the present structure will be disposed off in low lying areas and approved municipality dump yard. Liquid and solid waste generated at the Construction and restoration of heritage monuments will be disposed off in compliance with CPCB stipulations.
• Public health risks from discharge of wastes and poor air quality; noise and foul odour from plant emissions?		√	No discharge of liquid waste is envisaged during the construction phase. Temporary air emission and higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating daytime.
• Short-term construction impacts			
○ Soil erosion		√	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
○ Deterioration of water quality		√	No discharge of waste water is involved in the subproject activity.
○ Deterioration of air quality	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period.
○ Noise and vibration from construction equipment	√		Higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating period.
• dislocation or involuntary resettlement of people		√	Project will be erected on

			STATE ARCHAEOLOGICAL
			DEPARTMENT OF THE GOVERNMENT OF TAMIL NADU owned land.
• Social conflicts arising from the influx of construction laborers from other areas?		√	Not envisaged as only local labor force will be preferably employed.
• Environmental degradation (e.g. erosion, soil and water contamination, loss of soil fertility, disruption of wildlife habitat) from intensification of agricultural land use to supply raw materials for plant operation; and modification of natural species diversity as a result of the transformation to monoculture practices?		√	
• Water pollution from discharge of liquid effluents?		√	No discharge of waste water is involved in the subproject activity.
• Air pollution from all plant operations?	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period .
• Gaseous and odour emissions to the atmosphere from processing operations?		√	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	√		An emergency handling procedure will be in place to meet such contingencies.
• Uncontrolled in-migration with opening of roads to forest area and overloading of social infrastructure?		√	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?		√	An emergency handling and management plan comprising of EHS procedures will be in place to meet such contingencies.
• Disruption of transit patterns, creation of noise and congestion, and pedestrian hazards aggravated by heavy trucks?		√	The subproject is confined to a clear cut boundarywall separating the location from it's surrounding.
• Disease transmission from inadequate waste disposal?		√	Adequate care will be taken so that waste is collected and disposed in a safe manner meeting the CPCB guidelines.

Appendix 3(f) : RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

URBAN DEVELOPMENT

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the —without mitigation‖ case. The purpose is to identify potential impacts. Use the —remarks‖ section to discuss any anticipated mitigation measures.

Country/Project Title: —Conservation and Restoration of Heritage Works Alampara Fort, Kanchipuram District, TamilNadu‖

Sector Division: INRM

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site		√	
• Protected Area		√	The Land is owned by HR&CE Department and located in the heart of the city in populated areas.
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
• Ecological disturbances arising from the establishment of a plant or facility complex in or near sensitive habitats?		√	During construction, no tree felling is being felt necessitated.
• Eventual degradation of water bodies due to discharge of wastes and other effluents from plant or facility complex?		√	No waterbody is located adjacent to the proposed construction site.
• Serious contamination of soil and groundwater?		√	This issue is not envisaged in the proposed subproject activities.
• Aggravation of solid waste problems in the area?		√	Waste generated from demolition of the present

			structure will be disposed off in low lying areas and approved municipality dump yard. Liquid and solid waste generated at the fort will be disposed off in compliance with CPCB stipulations.
• Public health risks from discharge of wastes and poor air quality; noise and foul odour from plant emissions?		√	No discharge of liquid waste is envisaged during the construction phase. Temporary air emission and higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating daytime.
• Short-term construction impacts			
○ Soil erosion		√	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
○ Deterioration of water quality		√	No discharge of waste water is involved in the subproject activity.
○ Deterioration of air quality	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period.
○ Noise and vibration from construction equipment	√		Higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating period.
• dislocation or involuntary resettlement of people		√	Project will be erected on HR&CE owned land.
• Social conflicts arising from the influx of construction laborers from other areas?		√	Not envisaged as only local labor force will be preferably employed.
• Environmental degradation (e.g. erosion, soil and water contamination, loss of soil fertility, disruption of wildlife habitat) from intensification of agricultural land use to supply raw materials for plant operation; and modification of natural species diversity as a result		√	

of the transformation to monoculture practices?			
• Water pollution from discharge of liquid effluents?		√	No discharge of waste water is involved in the subproject activity.
• Air pollution from all plant operations?	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period .
• Gaseous and odour emissions to the atmosphere from processing operations?		√	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	√		An emergency handling procedure will be in place to meet such contingencies.
• Uncontrolled in-migration with opening of roads to forest area and overloading of social infrastructure?		√	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?		√	An emergency handling and management plan comprising of EHS procedures will be in place to meet such contingencies.
• Disruption of transit patterns, creation of noise and congestion, and pedestrian hazards aggravated by heavy trucks?		√	The subproject is confined to a clear cut boundarywall separating the location from it's surrounding.
• Disease transmission from inadequate waste disposal?		√	Adequate care will be taken so that waste is collected and disposed in a safe manner meeting the CPCB guidelines.

Appendix 3(g) : RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

URBAN DEVELOPMENT

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the —without mitigation‖ case. The purpose is to identify potential impacts. Use the —remarks‖ section to discuss any anticipated mitigation measures.

Country/Project Title: —Conservation and Restoration of Poondi Arugar Temple,Tiruvannamalai District, TamilNadu‖
Sector Division: INRM

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site		√	
• Protected Area		√	The Land is owned by State Archaeology Department and located in the heart of the city in populated areas.
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
• Ecological disturbances arising from the establishment of a plant or facility complex in or near sensitive habitats?		√	During construction, no tree felling is being felt necessitated.
• Eventual degradation of water bodies due to discharge of wastes and other effluents from plant or facility complex?		√	No waterbody is located adjacent to the proposed construction site.
• Serious contamination of soil and groundwater?		√	This issue is not envisaged in the proposed subproject

			activities.
• Aggravation of solid waste problems in the area?		√	Waste generated from demolition of the present structure will be disposed off in low lying areas and approved municipality dump yard. Liquid and solid waste generated at the site will be disposed off in compliance with CPCB stipulations.
• Public health risks from discharge of wastes and poor air quality; noise and foul odour from plant emissions?		√	No discharge of liquid waste is envisaged during the construction phase. Temporary air emission and higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating daytime.
• Short-term construction impacts			
○ Soil erosion		√	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
○ Deterioration of water quality		√	No discharge of waste water is involved in the subproject activity.
○ Deterioration of air quality	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period.
○ Noise and vibration from construction equipment	√		Higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating period.
• dislocation or involuntary resettlement of people		√	Project will be erected on HR&CE owned land.
• Social conflicts arising from the influx of construction laborers from other areas?		√	Not envisaged as only local labor force will be preferably employed.
• Environmental degradation (e.g. erosion, soil and water contamination, loss of soil fertility, disruption		√	

of wildlife habitat) from intensification of agricultural land use to supply raw materials for plant operation; and modification of natural species diversity as a result of the transformation to monoculture practices?			
• Water pollution from discharge of liquid effluents?		√	No discharge of waste water is involved in the subproject activity.
• Air pollution from all plant operations?	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period .
• Gaseous and odour emissions to the atmosphere from processing operations?		√	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	√		An emergency handling procedure will be in place to meet such contingencies.
• Uncontrolled in-migration with opening of roads to forest area and overloading of social infrastructure?		√	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?		√	An emergency handling and management plan comprising of EHS procedures will be in place to meet such contingencies.
• Disruption of transit patterns, creation of noise and congestion, and pedestrian hazards aggravated by heavy trucks?		√	The subproject is confined to a clear cut boundarywall separating the location from it's surrounding.
• Disease transmission from inadequate waste disposal?		√	Adequate care will be taken so that waste is collected and disposed in a safe manner meeting the CPCB guidelines.

Appendix 3(h) : RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

URBAN DEVELOPMENT

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the —without mitigation‖ case. The purpose is to identify potential impacts. Use the —remarks‖ section to discuss any anticipated mitigation measures.

Country/Project Title: —Conservation and Restoration of heritage works in Kattabomman kottai at Panchalankurichi, Thoothukudi District, TamilNadu‖

Sector Division: INRM

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site		√	
• Protected Area		√	The Land is owned by HR&CE Department and located in the heart of the city in populated areas.
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
• Ecological disturbances arising from the establishment of a plant or facility complex in or near sensitive habitats?		√	During construction, no tree felling is being felt necessitated.
• Eventual degradation of water bodies due to discharge of wastes and other effluents from plant or facility complex?		√	No waterbody is located adjacent to the proposed construction site.
• Serious contamination of soil and groundwater?		√	This issue is not envisaged in the proposed subproject activities.
• Aggravation of solid waste problems in the		√	Waste generated from

area?			demolition of the present structure will be disposed off in low lying areas and approved municipality dump yard. Liquid and solid waste generated at the site will be disposed off in compliance with CPCB stipulations.
• Public health risks from discharge of wastes and poor air quality; noise and foul odour from plant emissions?		√	No discharge of liquid waste is envisaged during the construction phase. Temporary air emission and higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating daytime.
• Short-term construction impacts			
○ Soil erosion		√	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
○ Deterioration of water quality		√	No discharge of waste water is involved in the subproject activity.
○ Deterioration of air quality	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period.
○ Noise and vibration from construction equipment	√		Higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating period.
• dislocation or involuntary resettlement of people		√	Project will be erected on HR&CE owned land.
• Social conflicts arising from the influx of construction laborers from other areas?		√	Not envisaged as only local labor force will be preferably employed.
• Environmental degradation (e.g. erosion, soil and water contamination, loss of soil fertility, disruption of wildlife habitat) from intensification of agricultural land use to supply raw materials for plant operation;		√	

and modification of natural species diversity as a result of the transformation to monoculture practices?			
• Water pollution from discharge of liquid effluents?		√	No discharge of waste water is involved in the subproject activity.
• Air pollution from all plant operations?	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period .
• Gaseous and odour emissions to the atmosphere from processing operations?		√	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	√		An emergency handling procedure will be in place to meet such contingencies.
• Uncontrolled in-migration with opening of roads to forest area and overloading of social infrastructure?		√	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?		√	An emergency handling and management plan comprising of EHS procedures will be in place to meet such contingencies.
• Disruption of transit patterns, creation of noise and congestion, and pedestrian hazards aggravated by heavy trucks?		√	The subproject is confined to a clear cut boundarywall separating the location from it's surrounding.
• Disease transmission from inadequate waste disposal?		√	Adequate care will be taken so that waste is collected and disposed in a safe manner meeting the CPCB guidelines.

Appendix 3(i) : RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

URBAN DEVELOPMENT

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the —without mitigation‖ case. The purpose is to identify potential impacts. Use the —remarks‖ section to discuss any anticipated mitigation measures.

Country/Project Title: —Conservation and Restoration of Heritage Works in Douch domb at
Nagapattinam District department in Tamil Nadu‖
Sector Division: INRM

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site		√	
• Protected Area		√	The Land is owned by State Archeology Department and located in the heart of the city in populated areas.
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
• Ecological disturbances arising from the establishment of a plant or facility complex in or near sensitive habitats?		√	During construction, no tree felling is being felt necessitated.
• Eventual degradation of water bodies due to discharge of wastes and other effluents from plant or facility complex?		√	No waterbody is located adjacent to the proposed construction site.
• Serious contamination of soil and groundwater?		√	This issue is not envisaged in the proposed subproject

			activities.
• Aggravation of solid waste problems in the area?		√	Waste generated from demolition of the present structure will be disposed off in low lying areas and approved municipality dump yard.
• Public health risks from discharge of wastes and poor air quality; noise and foul odour from plant emissions?		√	No discharge of liquid waste is envisaged during the construction phase. Temporary air emission and higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating daytime.
• Short-term construction impacts			
○ Soil erosion		√	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
○ Deterioration of water quality		√	No discharge of waste water is involved in the subproject activity.
○ Deterioration of air quality	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period.
○ Noise and vibration from construction equipment	√		Higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating period.
• dislocation or involuntary resettlement of people		√	Project will be erected on State Archeology Department owned land.
• Social conflicts arising from the influx of construction laborers from other areas?		√	Not envisaged as only local labor force will be preferably employed.
• Environmental degradation (e.g. erosion, soil and water contamination, loss of soil fertility, disruption of wildlife habitat) from intensification of agricultural land use to supply raw materials for plant operation; and modification of natural species diversity as a result		√	

of the transformation to monoculture practices?			
• Water pollution from discharge of liquid effluents?		√	No discharge of waste water is involved in the subproject activity.
• Air pollution from all plant operations?	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period .
• Gaseous and odour emissions to the atmosphere from processing operations?		√	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	√		An emergency handling procedure will be in place to meet such contingencies.
• Uncontrolled in-migration with opening of roads to forest area and overloading of social infrastructure?		√	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?		√	An emergency handling and management plan comprising of EHS procedures will be in place to meet such contingencies.
• Disruption of transit patterns, creation of noise and congestion, and pedestrian hazards aggravated by heavy trucks?		√	The subproject is confined to a clear cut boundarywall separating the location from it's surrounding.
• Disease transmission from inadequate waste disposal?		√	Adequate care will be taken so that waste is collected and disposed in a safe manner meeting the CPCB guidelines.

Appendix 3(j) : RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

URBAN DEVELOPMENT

Instructions:

(iii) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(iv) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(v) Answer the questions assuming the —without mitigation‖ case. The purpose is to identify potential impacts. Use the —remarks‖ section to discuss any anticipated mitigation measures.

Country/Project Title: —Conservation and restoration heritage and monuments of Governor‘s house at Tharangambadi Taluk, Nagapattinam District, TamilNadu‖
Sector Division: INRM

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site		√	
• Protected Area		√	The Land is owned by Tamilnadu State Department of Archaeology and located in the heart of the city in populated areas.
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
• Ecological disturbances arising from the establishment of a plant or facility complex in or near sensitive habitats?		√	During construction, no tree felling is being felt necessitated.
• Eventual degradation of water bodies due to discharge of wastes and other effluents from plant or facility complex?		√	No waterbody is located adjacent to the proposed construction site.
• Serious contamination of soil and groundwater?		√	This issue is not envisaged in the
			proposed subproject

			activities.
• Aggravation of solid waste problems in the area?		√	Waste generated from demolition of the present structure will be disposed off in low lying areas and approved municipality dump yard. Liquid and solid waste generated at the Conservation and restoration of governors house will be disposed off in compliance with CPCB stipulations.
• Public health risks from discharge of wastes and poor air quality; noise and foul odour from plant emissions?		√	No discharge of liquid waste is envisaged during the construction phase. Temporary air emission and higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating daytime.
• Short-term construction impacts			
○ Soil erosion		√	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
○ Deterioration of water quality		√	No discharge of waste water is involved in the subproject activity.
○ Deterioration of air quality	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period.
○ Noise and vibration from construction equipment	√		Higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating period.
• dislocation or involuntary resettlement of people		√	Project will be erected on Tamilnadu State Department of Archaeology owned land.
• Social conflicts arising from the influx of		√	Not envisaged as only

construction laborers from other areas?			local labor force will be
			preferably employed.
• Environmental degradation (e.g. erosion, soil and water contamination, loss of soil fertility, disruption of wildlife habitat) from intensification of agricultural land use to supply raw materials for plant operation; and modification of natural species diversity as a result of the transformation to monoculture practices?		√	
• Water pollution from discharge of liquid effluents?		√	No discharge of waste water is involved in the subproject activity.
• Air pollution from all plant operations?	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period .
• Gaseous and odour emissions to the atmosphere from processing operations?		√	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	√		An emergency handling procedure will be in place to meet such contingencies.
• Uncontrolled in-migration with opening of roads to forest area and overloading of social infrastructure?		√	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?		√	An emergency handling and management plan comprising of EHS procedures will be in place to meet such contingencies.
• Disruption of transit patterns, creation of noise and congestion, and pedestrian hazards aggravated by heavy trucks?		√	The subproject is confined to a clear cut boundarywall separating the location from it‘s surrounding.
• Disease transmission from inadequate waste disposal?		√	Adequate care will be taken so that waste is collected and disposed in a safe manner meeting the CPCB guidelines.

Appendix 3(k) : RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

URBAN DEVELOPMENT

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the —without mitigation‖ case. The purpose is to identify potential impacts. Use the —remarks‖ section to discuss any anticipated mitigation measures.

Country/Project Title: —Construction and restoration of Heritage and Monuments of Thadagapureeswarar temple at Thellar Village, Valangaiman Taluk, Tiruvannamalai District, TamilNadu‖

Sector Division: INRM

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site		√	
• Protected Area		√	The Land is owned by HR&CE Department and located in the heart of the city in populated areas.
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
• Ecological disturbances arising from the establishment of a plant or facility complex in or near sensitive habitats?		√	During construction, no tree felling is being felt necessitated.
• Eventual degradation of water bodies due to discharge of wastes and other effluents from plant or facility complex?		√	No waterbody is located adjacent to the proposed construction site.
• Serious contamination of soil and groundwater?		√	This issue is not envisaged in the

			proposed subproject activities.
• Aggravation of solid waste problems in the area?		√	Waste generated from demolition of the present structure will be disposed off in low lying areas and approved municipality dump yard. Liquid and solid waste generated at the site will be disposed off in compliance with CPCB stipulations.
• Public health risks from discharge of wastes and poor air quality; noise and foul odour from plant emissions?		√	No discharge of liquid waste is envisaged during the construction phase. Temporary air emission and higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating daytime.
• Short-term construction impacts			
○ Soil erosion		√	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
○ Deterioration of water quality		√	No discharge of waste water is involved in the subproject activity.
○ Deterioration of air quality	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period.
○ Noise and vibration from construction equipment	√		Higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating period.
• dislocation or involuntary resettlement of people		√	Project will be erected on HR&CE owned land.
• Social conflicts arising from the influx of construction laborers from other areas?		√	Not envisaged as only local labor force will be preferably employed.
• Environmental degradation (e.g. erosion, soil		√	

and water contamination, loss of soil fertility, disruption of wildlife habitat) from intensification of agricultural			
land use to supply raw materials for plant operation; and modification of natural species diversity as a result of the transformation to monoculture practices?			
• Water pollution from discharge of liquid effluents?		√	No discharge of waste water is involved in the subproject activity.
• Air pollution from all plant operations?	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period.
• Gaseous and odour emissions to the atmosphere from processing operations?		√	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	√		An emergency handling procedure will be in place to meet such contingencies.
• Uncontrolled in-migration with opening of roads to forest area and overloading of social infrastructure?		√	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?		√	An emergency handling and management plan comprising of EHS procedures will be in place to meet such contingencies.
• Disruption of transit patterns, creation of noise and congestion, and pedestrian hazards aggravated by heavy trucks?		√	The subproject is confined to a clear cut boundary wall separating the location from its surrounding.
• Disease transmission from inadequate waste disposal?		√	Adequate care will be taken so that waste is collected and disposed in a safe manner meeting the CPCB guidelines.

Appendix 3(I) : RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

URBAN DEVELOPMENT

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the —without mitigation‖ case. The purpose is to identify potential impacts. Use the —remarks‖ section to discuss any anticipated mitigation measures.

Country/Project Title: —Construction and restoration of Heritage and Monuments of Manora FortVillage,Valangaiman Taluk,Thiruvarur District, TamilNadu‖

Sector Division: INRM

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site		√	
• Protected Area		√	The Land is owned by State Archaeolog Department and located in the heart of the city in populated areas.
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
• Ecological disturbances arising from the establishment of a plant or facility complex in or near sensitive habitats?		√	During construction, no tree felling is being felt necessitated.
• Eventual degradation of water bodies due to discharge of wastes and other effluents from plant or facility complex?		√	No water body is located adjacent to the proposed construction site.
• Serious contamination of soil and groundwater?		√	This issue is not envisaged in the proposed subproject activities.

• Aggravation of solid waste problems in the area?		√	Waste generated from demolition of the present structure will be disposed off in low lying areas and approved municipality dump yard. Liquid and solid waste generated at the site will be disposed off in compliance with CPCB stipulations.
• Public health risks from discharge of wastes and poor air quality; noise and foul odour from plant emissions?		√	No discharge of liquid waste is envisaged during the construction phase. Temporary air emission and higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating daytime.
• Short-term construction impacts			
○ Soil erosion		√	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
○ Deterioration of water quality		√	No discharge of waste water is involved in the subproject activity.
○ Deterioration of air quality	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period.
○ Noise and vibration from construction equipment	√		Higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating period.
• dislocation or involuntary resettlement of people		√	Project will be erected on State Archaeology owned land.
• Social conflicts arising from the influx of construction laborers from other areas?		√	Not envisaged as only local labor force will be preferably employed.
• Environmental degradation (e.g. erosion, soil and water contamination, loss of soil fertility, disruption		√	

of wildlife habitat) from intensification of agricultural land use to supply raw materials for plant operation; and modification of natural species diversity as a result of the transformation to monoculture practices?			
• Water pollution from discharge of liquid effluents?		√	No discharge of waste water is involved in the subproject activity.
• Air pollution from all plant operations?	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period .
• Gaseous and odour emissions to the atmosphere from processing operations?		√	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	√		An emergency handling procedure will be in place to meet such contingencies.
• Uncontrolled in-migration with opening of roads to forest area and overloading of social infrastructure?		√	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?		√	An emergency handling and management plan comprising of EHS procedures will be in place to meet such contingencies.
• Disruption of transit patterns, creation of noise and congestion, and pedestrian hazards aggravated by heavy trucks?		√	The subproject is confined to a clear cut boundary wall separating the location from it‘s surrounding.
• Disease transmission from inadequate waste disposal?		√	Adequate care will be taken so that waste is collected and disposed in a safe manner meeting the CPCB guidelines.

Appendix 3(m) : RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

URBAN DEVELOPMENT

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the —without mitigation‖ case. The purpose is to identify potential impacts. Use the —remarks‖ section to discuss any anticipated mitigation measures.

Country/Project Title: —Heritage restoration and Conservation of monuments for Chinnayan kulam at Chinnayanpettai Village,Valangaiman Taluk,Tiruvanamalai District, TamilNadu‖
Sector Division: INRM

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
• Cultural heritage site		√	
• Protected Area		√	The Land is owned by STATE ARCHAEOLOGICAL DEPARTMENT OF THE GOVERNMENT OF TAMIL NADU Department and located in the heart of the city in populated areas.
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
• Ecological disturbances arising from the establishment of a plant or facility complex in or near sensitive habitats?		√	During construction, no tree felling is being felt necessitated.
• Eventual degradation of water bodies due to discharge of wastes and other effluents from plant or		√	No waterbody is located adjacent to the proposed

facility complex?			construction site.
• Serious contamination of soil and groundwater?		√	This issue is not envisaged in the proposed subproject activities.
• Aggravation of solid waste problems in the area?		√	Waste generated from demolition of the present structure will be disposed off in low lying areas and approved municipality dump yard. Liquid and solid waste generated at the Construction and restoration of heritage monuments will be disposed off in compliance with CPCB stipulations.
• Public health risks from discharge of wastes and poor air quality; noise and foul odour from plant emissions?		√	No discharge of liquid waste is envisaged during the construction phase. Temporary air emission and higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating daytime.
• Short-term construction impacts			
○ Soil erosion		√	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
○ Deterioration of water quality		√	No discharge of waste water is involved in the subproject activity.
○ Deterioration of air quality	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period.
○ Noise and vibration from construction equipment	√		Higher noise level will be felt during the construction period and will be limited to 8/10 hours during operating period.

• dislocation or involuntary resettlement of people		√	Project will be erected on
			STATE
			ARCHAEOLOGICAL DEPARTMENT OF THE GOVERNMENT OF TAMIL NADU owned land.
• Social conflicts arising from the influx of construction laborers from other areas?		√	Not envisaged as only local labor force will be preferably employed.
• Environmental degradation (e.g. erosion, soil and water contamination, loss of soil fertility, disruption of wildlife habitat) from intensification of agricultural land use to supply raw materials for plant operation; and modification of natural species diversity as a result of the transformation to monoculture practices?		√	
• Water pollution from discharge of liquid effluents?		√	No discharge of waste water is involved in the subproject activity.
• Air pollution from all plant operations?	√		Temporary air emission will be experienced during the construction period which will be limited to 8/10 hours during operating period .
• Gaseous and odour emissions to the atmosphere from processing operations?		√	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	√		An emergency handling procedure will be in place to meet such contingencies.
• Uncontrolled in-migration with opening of roads to forest area and overloading of social infrastructure?		√	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?		√	An emergency handling and management plan comprising of EHS procedures will be in place to meet such contingencies.
• Disruption of transit patterns, creation of noise and congestion, and pedestrian hazards aggravated by heavy trucks?		√	The subproject is confined to a clear cut boundarywall separating the location from it‘s surrounding.
• Disease transmission from inadequate waste disposal?		√	Adequate care will be taken so that waste is collected and disposed in a safe manner meeting the CPCB guidelines.

APPENDIX 4: SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT TEMPLATE

- Overall project description and objectives
- Environmental category as per ADB Safeguard Policy Statement, 2009
- Environmental category of each subproject as per national laws and regulations
- Project Safeguards Team

Name	Designation/Office	Email Address	Contact Number
1. PMU			
2. PIUs			
3. Consultants			

- Overall project and sub-project progress and status
- Description of subprojects (package-wise) and status of implementation (preliminary, detailed design, on-going construction, completed, and/or O&M stage)

Package Number	Components/List of Works	Status of Implementation (Preliminary Design/Detailed Design/On-going Construction/Completed/O&M)[4]	Contract Status (specify if under bidding or contract awarded)	If On-going Construction	
				%Physical Progress	Expected Completion Date

[4] If on-going construction, include %physical progress and expected date of completion

COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS[5]

Package No.	Subproject Name	Statutory Environmental Requirements[6]	Status of Compliance[7]	Validity if obtained	Action Required	Specific Conditions that will require environmental monitoring as per Environment Clearance, Consent/Permit to Establish[8]

COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance	Action Required

COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT PLAN (REFER TO EMP TABLES IN APPROVED IEE/S)

- Confirm if IEE/s require contractors to submit site-specific EMP/construction EMPs. If not, describe the methodology of monitoring each package under implementation.

Package-wise Implementation Status

Package Number	Components	Design Status (Preliminary Design Stage/Detailed Design Completed)	Final IEE based on Detailed Design				Site-specific EMP (or Construction EMP) approved by Project Director? (Yes/No)	Remarks
			Not yet due (detailed design not yet completed)	Submitted to ADB (Provide Date of Submission)	Disclosed on project website (Provide Link)	Final IEE provided to Contractor/s (Yes/No)		

[5] All statutory clearance/s, no-objection certificates, permit/s, etc. should be obtained prior to award of contract/s. Attach as Appendix all clearance obtained during the reporting period. If already reported, specify in the —remarks‖ column.

[6] Specify (environmental clearance? Permit/consent to establish? Forest clearance? Etc.)

[7] Specify if obtained, submitted and awaiting approval, application not yet submitted

[8] *Example: Environmental Clearance requires ambient air quality monitoring, Forest*

Clearance/Tree-cutting Permit requires 2 trees for every tree, etc.

- Identify the role/s of Safeguards Team including schedule of on-site verification of reports submitted by consultants and contractors.
- For each package, provide name/s and contact details of contractor/s' nodal person/s for environmental safeguards.
- Include as Appendix all supporting documents including **signed** monthly environmental site inspection reports prepared by consultants and/or contractors.
- With reference to approved EMP/site-specific EMP/construction EMP, complete the Table below
- Provide the monitoring results as per the parameters outlined in the approved EMP (or site-specific EMP/construction EMP when applicable).
- In addition to the Table on EMP implementation, the main text of the report should discuss in details the following items:
  (i) **Grievance Redress Mechanism.** Provide information on establishment of grievance redress mechanism and capacity of grievance redress committee to address project-related issues/complaints. Include as Appendix Notification of the GRM (town-wise if applicable).
  (ii) **Complaints Received during the Reporting Period.** Provide information on number, nature, and resolution of complaints received during reporting period. Attach records as per GRM in the approved IEE. Identify safeguards team member/s involved in the GRM process. Attach minutes of meetings (ensure English translation is provided).

  - Confirm if any dust was noted to escape the site boundaries and identify dust suppression techniques followed for site/s.
  - Identify muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads.
  - Identify type of erosion and sediment control measures installed on site/s, condition of erosion and sediment control measures including if these were intact following heavy rain;
  - Identify designated areas for concrete works, chemical storage, construction materials, and refueling. Attach photographs of each area.
  - Confirm spill kits on site and site procedure for handling emergencies.
  - Identify any chemical stored on site and provide information on storage condition. Attach photograph.
  - Describe management of stockpiles (construction materials, excavated soils, spoils, etc.). Provide photographs.
  - Describe management of solid and liquid wastes on-site (quantity generated, transport, storage and disposal). Provide photographs.
  - Provide information on barricades, signages, and on-site boards. Provide photographs.
  - Provide information on
  - Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary of Environmental Monitoring Activities (for the Reporting Period)[9]

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase						

Pre-Construction Phase						
Construction Phase						
Operational Phase						

[9] Attach Laboratory Results and Sampling Map/Locations

Overall Compliance with CEMP/ EMP

No.	Sub-Project Name	EMP/ CEMP Part of Contract Documents (Y/N)	CEMP/ EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed and Additional Measures Required

APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

- Brief description on the approach and methodology used for environmental monitoring of each sub-project

MONITORING OF ENVIRONMENTAL IMPACTS ON PROJECT SURROUNDINGS(AMBIENT AIR, WATER QUALITY AND NOISE LEVELS)

- Brief discussion on the basis for monitoring
- Indicate type and location of environmental parameters to be monitored
- Indicate the method of monitoring and equipment to be used
- Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements

As a minimum the results should be presented as per the Tables below.

Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Site No.	Date of Sampling	Site Location	Parameters (Monitoring Results)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Noise Quality Results

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Government Standard)	
			Day Time	Night Time

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Monitoring Results)

			Day Time	Night Time

SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

- Summary of follow up time-bound actions to be taken within a set timeframe.

APPENDICES

- Photos
- Summary of consultations
- Copies of environmental clearances and permits
- Sample of environmental site inspection report
- Other

SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT

Project Name
Contract Number

NAME: _____ DATE: _____
TITLE: _____ DMA: _____
LOCATION: _____ GROUP: _____

WEATHER CONDITION:
_____

INITIAL SITE CONDITION: _____

CONCLUDING SITE CONDITION:

Satisfactory _____ Unsatisfactory _____ Incident _____ Resolved _____ Unresolved _____

INCIDENT: Nature
of incident:
_____

Intervention Steps:
_____

Incident Issues

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Inspection

Emissions	Waste Minimization			
Air Quality	Reuse and Recycling			
Noise pollution	Dust and Litter Control			
Hazardous Substances	Trees and Vegetation			
Site Restored to Original Condition	Yes		No	

Signature
_____

Sign off

_____
Name
Position

_____
Name
Position

APPENDIX 5: SAMPLE GRIEVANCE REGISTRATION FORM

(To be available in Local Language)

The Project welcomes complaints suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but prefer to keep the information‘s remain confidential, please inform us by typing *(CONFIDENTIAL)* above your name. Thank you.

Date	Place of registration	
Contact Information / Personal Details		
Name	Gender: _Male _Female	Age:
Home Address		
Village / Town		
District		
Phone no.		
E-mail		
Complaint / Suggestion / Comment / Question Please provide the details (who, what, where and how) of your grievance below: If included as attachment/note/letter, please tick here:		
How do you want us to reach you for feedback or update on your comment/grievance?		

FOR OFFICIAL USE ONLY

Registered by: (Name of official registering grievance)			
Verified thru:	Note/Letter	E-mail	Verbal/Telephonic
Reviewed by: (Names/Positions of Official(s) reviewing grievance)			
Action taken:			
Whether Action Taken Disclosed:	Yes	No	
Means of Disclosure:			