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— 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

Package No. IDIPT/TN/T4/NCB/08/2017

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
Gol	-	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, etc. are some of the proposed beneficiary tourist destination in Tamil Nadu under tranche IV of the Sub Project.

Kallalagar Temple in Alagar Koil, a village in the South Indian state of Tamil Nadu, is dedicated to the Hindu god Vishnu. Constructed in the Dravidian style of architecture, the temple is glorified in the Divya Prabandha, the early medieval Tamil canon of the Azhwar saints from the 6th–9th centuries AD. It is one of the 108 Divyadesam dedicated to Vishnu, who is worshipped as Kallalagar and his consort Lakshmi as Thirumamagal. Located 21 kilometers (km) Northwest of Madurai is a Vishnu Temple on a picturesque wooded hill. Here 'Vishnu' presides as Meenakshi's brother 'Azhgar'. During the Chitrai festival in April/May, when the celestial marriage of Meenakshi to Sundareswarar is celebrated, Azhagar travels to Madurai. A gold processional icon called the Sundararajar is carried by devotees in procession from Azhagar Kovil to Madurai for wedding ritual. Palamudhirsolai, one of the six abodes of Lord Subramanya is on the same hill, about 4 km above. A natural spring called Nuburagangai where pilgrims bath, is located here.

Alangudi is a small village under Alangudi Panchayat an Valangaimaan Taluk in Thiruvarur District of Tamil Nadu State, India. Located 33 km towards west from District headquarters Tiruvarur. It is 307 km from State capital Chennai Alangudi is surrounded by Nidamangalam Taluk towards South, Ammapettai Taluk towards west, Tiruvidaimarudur Taluk towards North, Kumbakonam Taluk towards North. Alangudi is renowned for its 'triglories' i.e Moorthy (The Presiding Deity), Sthalam (Place of divinity) and Theertham (The Holy Water).

Arulmigu Kumaragiri Dhandayudhabani Swamy Thirukkoil Sanyasikundu is situated on Kumaragiri Hills at Ammapet (now part of Salem city) in Salem District. The city Salem is surrounded by hills: Nagaramalai on the north, Jarugumalai on the south, Kanjamalai on the west, Godumalai on the east and the Shevaroy Hills on the northeast. Kariyaperumal Hill is in southwestern Salem. The Thirumanimutharu River flows through the city, dividing it in two. The fort area is the oldest part of Salem. The temple is located on a hill top and is dedicated to Lord Muruga. One needs to climb more than 700 steps to reach Kumaragiri hill top. Poojas are done as per Karana and Kameeka agamas. Arunagirinathar had praised this temple in his Thirupugazh Hymns.

Thingalur falls under Thiruvaiyaru taluk of Thanjavur district. It is located at a distance of 18 km from Thanjavur. It is one of the nine Navagraha Sthalas of the Cauvery Delta region and has a temple dedicated to the Moon god. Thiruvaiyaru is a Panchayat town in Thanjavur District in the Indian state of Tamil Nadu. Thiruvaiyaru is situated on the banks of the river Kaveri, 13 km from Thanjavur. Tiruvaiyaru is the headquarters of the Tiruvaiyaru taluk. Tiruvaiyaru is a small, quiet town. However, its modesty belies its importance as a pilgrim centre. On the highway from Tanjavur, you pass five bridges over the Vadavar, Vettar, Vennar, Kudamurutti and Cauvery, the five rivers from which Tiruvaiyaru gets its name (tiru = sacred; ai = five; aaru = river). Tiruvaiyaru is considered as holy as Varanasi and bathing in the Cauvery here is as guaranteed to rid devotees of sins as bathing in the Ganges.

Thirunageswaram is a panchayat town in Kumabakonam Thanjavur district in the Indian state of Tamil Nadu. Thirunageswaram is located 8 km east of Thanjavur. There are two major temples at Thirunageswaram. One of them is the famous Vaishnavite temple of Oppliyappan (Oppliyappan Sannadhi), the other the Thiru Nageswarar or Naganatha Swami temple for Shaivites. Naganatha Swami (Naga in Tamil/Sanskrit means Snake and Natha means God) is a temple dedicated to Lord Shiva. An important feature of Naganatha Swami temple is that of Rahu bhagawan (one of the nine celestial bodies) sannathi. It is the 29th in the series of Tevara Stalams located south of the river Kaveri. Here milk abhishekam is performed daily during Rahukaalam. At this time, the milk that is poured on the statue turns blue when it passes over the body and once again to white after it reaches the floor. This wonder is watched by many daily during the Raahu Kaalam. This is also the only place wherein one can view Rahu bhagawan with his consorts. The mythological serpents Aadi Seshan, Dakshan and Kaarkotakan worshipped Shiva here. Nala worshipped Shiva here.

Thiruvenkadu is a village panchayat located in the Nagapattinam district of Tamil-Nadu state, India. It is located around 220 km away from Chennai. The other nearest state/UT capital from Thiruvenkadu. is Pondicherry and its distance is 84.9 km. Thiruvenkadu. is located around 45.7 km away from its district head quarter Nagapattinam. Thiruvenkadu's nearest town/city/important place is Sirkali located at the distance of 10.3 km. Sri Swetharanyeswarar Temple is a Hindu temple located in the town of Thiruvenkadu, making it an important religious site.

Veerapur is a pilgrim spot in the southern region of Tiruchirapalli (Trichy) District. This ancient place, also called Veeramalai, is the region famed for Ponnar and Sankar who reigned over the region. Arulmigu Kannimariamman Vagaiyara Temple and Periyakandi Amman temple are the sacred shrines located here. The place celebrates an annual festival in Maasi month of Tamil Calendar, which falls between mid-February and mid-March.

Keelaperumpallam is a village panchayat situated on the south bank of the Kaveri River in Nagapattinam District, Tamil Nadu. The Naganatha Swamy Temple or Kethu Sthalam is a Hindu temple in the village of Keelaperumpallam, 2 km from Poompuhar. The presiding deity is Ketu, a shadow planet. However, the main idol in the temple is that of "Naganatha Swamy" or Shiva. The temple has a 2-tier rajagopuram surrounded by two prakaram (closed precincts of a temple). Keezhperumpallam is one of the nine Navagraha sthalas located in the Cauvery Delta region dedicated to shadow planet Ketu.

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 Hogenekal 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/08/2017 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 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) Pilarims rest house in Arulmigu Naganathaswamy Construction of Temple. Keelaperumpallam, Nagapattinam District

Proposed subproject - The primary objective of this sub-project is to provide Development and Improvement of Infrastructure Facilities at

- (i) Arulmigu Kallalagar Thirukoil, Alagarkoil, Melur Taluk, Madurai District: Providing Arch Type Steel Truss Shed for Dining facilities to the devotees inside the temple premises of Arulmigu Kallalagar Thirukoil, Alagarkoil, Melur Taluk, Madurai District
- (ii) Arulmigu Abathsagayeswarar Temple at Alangudi Village, Thiruvarur District:
 (a) Construction of Toilet block including water tank; (b) Flooring works; and (c) Construction of Retaining walls.
- (iii) Arulmigu Kumaragiri Dhandayudhabani Swamy Thirukkoil at Ammapet in Salem District: (a) Construction of Dormitory hall; (b) Construction of Toilet block; (c) Construction of 30,000 litres capacity Over Head Tank; and (d) Providing Bore well arrangements.
- (iv) Arulmigu Kailasanathar Swamy Temple at Thingalur Village in Thanjavur District: (a) Pilgrims' Rest House (G+1), (b) Septic Tank with dispersion trench (c) Provisions for landscaping (d) Provisions for Rain water harvesting system.
- (v) Naganatha Swamy Temple at Thirunageswarm, Thanjavur District: Provision of Paver blocks in the car parking area towards the west side of the temple.
- (vi) Sri Swetharanyeswarar Temple at Thiruvenkadu, Nagapattinam District: (a) Pilgrims' Rest House (G+1), (b) Toilet Block; (c) Overhead Tank; (d) Septic Tank with dispersion trench, (e) Provisions for landscaping, and (f) Provisions for Rain water harvesting system.
- (vii) Veerapur, Tiruchirappalli District: (a) Dormitory Hall; (b) Tonsure Hall; (c) Toilet Block; (d) Overhead Tank; (e) Septic Tank with Dispersion Trench, (f) Boreholes, and (g) Flooring.
- (viii) Construction of Pilgrims rest house in Arulmigu Naganathaswamy Temple, Keelaperumpallam, Nagapattinam District: (a) Pilgrim rest house (Dormitory Building); and (b) 10,000 litres capacity Over Head Tank.

Description of Environment: Alagarkovil, a village situated very near Madurai at the foot of the range of hills called Alagarmalai, is famous for its ancient Vaishnavite temple, and the beauty of exquisite sculptures in the hall and other 'mandapams' of the temple. The Alwars have sung in praise of the deity of the place and the hills. In addition, Nakkirar, the Tamil poet has composed several popular poems about this deity. As the place itself suggests, the temple is dedicated to Alagar who is popularly known as Sundararajar. It is said that Alagar kovil attracted pilgrims even in the early days of the Sangam age. Lots of devotees visit this temple to offer their prayers during festivals and the Temple offeres Annadhanam (an offering of food) for everyone. So, it is proposed to construct a Dining shed for the devotees. Since the existing place to serve this purpose is inadequate for the tourists, a dining shed is proposed to be constructed near the temple complex.

Thiruvarur district is one of the 32 districts in the Tamil Nadu State of India and occupies an area of 2161 square kilometers (km²). It lies between Nagapattinam district on the east and Thanjayur District on the west, and is bounded by the Palk Strait on the south. According

and Thanjavur District on the west, and is bounded by the Palk Strait on the south. According to 2011 census, Thiruvarur district had a population of 1,264,277. Major towns are Thiruvarur, Muthupettai, Mannargudi. Apatsahayesvarar Temple, Thiruthuraipoondi, Nachikulam, Alangudi or Guru Sthalam or Tiru Irum Poolaiis a Hindu temple dedicated to Lord Shiva located in the village of Alangudi in the Valangaiman taluk of Thiruvarur district, is a place of architectural interest and an important tourist centre. The temple complex covers two acres and it houses a two tier gateway tower known as gopurams, one facing the Apathsaheswarar shrine and other towards north. The temple is maintained and administered by the Hindu Religious and Charitable Endowments Department (HR&CE) of the Government of Tamil Nadu. The temple is counted as one of the Navagraha Temples for planet Guru (Jupiter). The temple is one of the most visited temples in the district.

The temple is located on a hill top and is dedicated to Lord Muruga. One needs to climb more than 700 steps to reach Kumaragiri hill top. Salem district is having administrative divisions of 9 taluks, 20 blocks, 376 Panchayats and 631 Revenue villages. The district receives the rain under the influence of both southwest and northeast monsoons. The northeast monsoon chiefly contributes to the rainfall in the district. Salem district forms part of the upland plateau region of Tamil Nadu with many hill ranges, hillocks and undulating terrain with a gentle slope towards east. Major part of the district is covered by Red insitu and Red Colluvial soils. Black soils are mostly seen in Salem, Attur, Omalur and sankari taluks.

Thanjavur is the headquarters of the Thanjavur District. The city is an important agricultural centre located in the Cauvery Delta and is known as the "Rice bowl of Tamil Nadu". Thanjavur is administered by a municipal corporation covering an area of 36.33 km2 (14.03 sq mi) and had a population of 222,943 in 2011. Roadways are the major means of transportation, while the city also has rail connectivity. The nearest airport is Tiruchirapalli International Airport, located 59.6 km (37.0 mi) away from the city. The nearest seaport is Karaikal Port, which is 94 km (58 mi) away from Thanjavur

Thirunageswaram is a panchayat town in Thanjavur district in the Indian state of Tamil Nadu. Thirunageswaram is located 8 km east of Thanjavur. Naganatha Swamy Temple at Thirunageshwaram is one of the 127 temples on the southern banks of river Cauvery. It is one of the Panchakrosa Stalas. It is also known as Raghu Stalam .Rahu Stalam is a Hindu temple dedicated to the deity Shiva, located in Tirunageswaram, a village in the outskirts of Thanjavur, a town in Tamil Nadu, India. It is significant to the Hindu sect of Saivism as one of the temples associated with the nine planet elements, the Navagraha Stalas, and specifically Rahu. Shiva is worshiped as Naganathar, and is represented by the lingam.

Sri Swetharanyeswarar Temple is a Hindu temple located in the town of Thiruvenkadu near Sirkazhi. The main deity is Shiva – Swetharanyeswarar ("lord of white forest") and the goddess is Brahma Vidya Ambal. There is a separate Sannidhi for Budha (mercury). The temple is quite large and all four important Saivite saints have sung in praise of this lord. Thiruvenkadu Swetharanyeswarar Temple is one of the Navagraha temples, which is dedicated to the planet Mercury (Budha). This is the 65th Devaram Paadal Petra Shiva Sthalam and 11th Shiva Sthalam on the north side of River Cauvery in Chozha Naadu. Moovar has sung hymns in praise of Lord Shiva of this Temple. The temple is maintained and administered by the Hindu Religious and Charitable Endowments Department (HR&CE) of the Government of Tamil Nadu. The temple is one of the most visited temples in the district.

Veerapor comes under Manapparai Taluk of Tiruchirapalli district. Manapparai is a town and a municipality in Tiruchirapalli district in the Indian state of Tamil Nadu. Manapparai is the headquarters of the Manapparai Taluk. Manapparai is famous for Murukku (snacks) and cattle market. Tiruchirapalli is an important educational centre in the state of Tamil Nadu, and houses nationally recognised institutions such as the Indian Institute of Management (IIMT). Indian Institute of Information Technology (IIIT) and National Institute of Technology (NITT). Industrial units such as Bharat Heavy Electricals Limited (BHEL), Golden Rock Railway Workshop and Ordnance Factory Tiruchirappalli (OFT) have their factories in Tiruchirappalli. The presence of a large number of energy equipment manufacturing units in and around the city has earned it the title of "Energy Equipment and Fabrication Capital of India". Tiruchirappalli is internationally known for a brand of cheroot known as the Trichinopoly cigar. which was exported in large quantities to the United Kingdom during the 19th century. The temple is maintained and administered by the Hindu Religious and Charitable Endowments Department (HR&CE) of the Government of Tamil Nadu. The temple is counted as one of the Navagraha Temples for planet Guru (Jupiter). The temple is one of the most visited temples in the district.

The Naganatha Swamy Temple or Kethu Sthalam is a Hindu temple in the village of Keelaperumpallam, 2 kilometers (km) from Poompuhar. Keezhperumpallam is one of the nine Navagraha sthalas located in the Cauvery Delta region dedicated to shadow planet Ketu. Chennai is the state capital for Keelaperumpallam village. It is located around 223.4 km away from Keelaperumpallam. The other nearest state capital from Keelaperumpallam is Pondicherry and its distance is 89.5 km. The other surrouning state capitals are Pondicherry 89.5 Km., Bangalore 320.5 km. Thiruvananthapuram 422.2 km. The nearest railway station to Keelaperumpallam is Sirkazhi which is located in and around 16.7 kilometer distance. Keelaperumpallam is located around 41.0 km away from its district head quarter nagapattinam. The other nearest district head quarters is karaikal situated at 24.8 km distance from Keelaperumpallam. Keelaperumpallam's nearest town/city/important place is Tharangambadi located at the distance of 12.1 km

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. Kallalagar Temple in Alagar Koil, a village in the South Indian state of Tamil Nadu, is dedicated to the Hindu god Vishnu. Constructed in the Dravidian style of architecture, the temple is glorified in the Divya Prabandha, the early medieval Tamil canon of the Azhwar saints from the 6th–9th centuries AD. It is one of the 108 Divyadesam dedicated to Vishnu, who is worshipped as Kallalagar and his consort Lakshmi as Thirumamagal. Located 21 km Northwest of Madurai is a Vishnu Temple on a picturesque wooded hill. Here 'Vishnu' presides as Meenakshi's brother 'Azhgar'. During the Chitrai festival in April/May, when the celestial marriage of Meenakshi to Sundareswarar is celebrated, Azhagar travels to Madurai. A gold processional icon called the Sundararajar is carried by devotees in procession from Azhagar Kovil to Madurai for wedding ritual. Palamudhirsolai, one of the six abodes of Lord Subramanya is on the same hill, about 4 km above. A natural spring called Nuburagangai where pilgrims bath, is located here.

5. Alangudi is a small village under Alangudi Panchayat an Valangaimaan Taluk in Thiruvarur District of Tamil Nadu State, India. Located 33 km towards west from District headquarters Tiruvarur. It is 307 km from State capital Chennai. Alangudi is surrounded by Nidamangalam Taluk towards South, Ammapettai Taluk towards west, Tiruvidaimarudur Taluk towards North, Kumbakonam Taluk towards North. Alangudi is renowned for its 'triglories' i.e Moorthy (The Presiding Deity), Sthalam (Place of divinity) and Theertham (The Holy Water).

6. Arulmigu Kumaragiri Dhandayudhabani Swamy Thirukkoil Sanyasikundu is situated on Kumaragiri Hills at Ammapet (now part of Salem city) in Salem District. The city Salem is surrounded by hills: Nagaramalai on the north, Jarugumalai on the south, Kanjamalai on the west, Godumalai on the east and the Shevaroy Hills on the northeast. Kariyaperumal Hill is in southwestern Salem. The Thirumanimutharu River flows through the city, dividing it in two. The

fort area is the oldest part of Salem. The temple is located on a hill top and is dedicated to Lord Muruga. One needs to climb more than 700 steps to reach Kumaragiri hill top. Poojas are done as per Karana and Kameeka agamas. Arunagirinathar had praised this temple in his Thirupugazh Hymns.

7. Thingalur falls under Thiruvaiyaru taluk of Thanjavur district. It is located at a distance of 18 km from Thanjavur. It is one of the nine Navagraha Sthalas of the Cauvery Delta region and has a temple dedicated to the Moon god. Thiruvaiyaru is a Panchayat town in Thanjavur District in the Indian state of Tamil Nadu. Thiruvaiyaru is situated on the banks of the river Kaveri, 13 km from Thanjavur. Tiruvaiyaru is the headquarters of the Tiruvaiyaru taluk. Tiruvaiyaru is a small, quiet town. However, its modesty belies its importance as a pilgrim centre. On the highway from Tanjavur, you pass five bridges over the Vadavar, Vettar, Vennar, Kudamurutti and Cauvery, the five rivers from which Tiruvaiyaru gets its name (tiru = sacred; ai = five; aaru = river). Tiruvaiyaru is considered as holy as Varanasi and bathing in the Cauvery here is as guaranteed to rid devotees of sins as bathing in the Ganges.

8. Thirunageswaram is a panchayat town in Kumabakonam Thanjavur district in the Indian state of Tamil Nadu. Thirunageswaram is located 8 km east of Thanjavur. There are two major temples at Thirunageswaram. One of them is the famous Vaishnavite temple of Oppliyappan (Oppliyappan Sannadhi), the other the Thiru Nageswarar or Naganatha Swami temple for Shaivites. Naganatha Swami (Naga in Tamil/Sanskrit means Snake and Natha means God) is a temple dedicated to Lord Shiva. An important feature of Naganatha Swami temple is that of Rahu bhagawan (one of the nine celestial bodies) sannathi. It is the 29th in the series of Tevara Stalams located south of the river Kaveri. Here milk abhishekam is performed daily during Rahukaalam. At this time, the milk that is poured on the statue turns blue when it passes over the body and once again to white after it reaches the floor. This wonder is watched by many daily during the Raahu Kaalam. This is also the only place wherein one can view Rahu bhagawan with his consorts. The mythological serpents Aadi Seshan, Dakshan and Kaarkotakan worshipped Shiva here.

9. Thiruvenkadu is a village panchayat located in the Nagapattinam district of Tamil-Nadu state, India. It is located around 220 km away from Chennai. The other nearest state/UT capital from Thiruvenkadu. is Pondicherry and its distance is 84.9 km. Thiruvenkadu. is located around 45.7 km away from its district head quarter Nagapattinam. Thiruvenkadu's nearest town/city/important place is Sirkali located at the distance of 10.3 km. Sri Swetharanyeswarar Temple is a Hindu temple located in the town of Thiruvenkadu, making it an important religious site.

10. Veerapur is a pilgrim spot in the southern region of Tiruchirapalli (Trichy) District. This ancient place, also called Veeramalai, is the region famed for Ponnar and Sankar who reigned over the region. Arulmigu Kannimariamman Vagaiyara Temple and Periyakandi Amman temple are the sacred shrines located here. The place celebrates an annual festival in Maasi month of Tamil Calendar, which falls between mid-February and mid-March.

11. Keelaperumpallam is a village panchayat situated on the south bank of the Kaveri River in Nagapattinam District, Tamil Nadu. The Naganatha Swamy Temple or Kethu Sthalam is a Hindu temple in the village of Keelaperumpallam, 2 kilometres from Poompuhar. The presiding deity is Ketu, a shadow planet. However, the main idol in the temple is that of "Naganatha Swamy" or Shiva. The temple has a 2-tier rajagopuram surrounded by two prakaram (closed precincts of a temple). Keezhperumpallam is one of the nine Navagraha sthalas located in the Cauvery Delta region dedicated to shadow planet Ketu. 12. 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).

13. **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 Development and Improvement of Infrastructure Facilities at

- (i) Arulmigu Kallalagar Thirukoil, Alagarkoil, Melur Taluk, Madurai District: Providing Arch Type Steel Truss Shed for Dining facilities to the devotees inside the temple premises of Arulmigu Kallalagar Thirukoil, Alagarkoil, Melur Taluk, Madurai District
- (ii) Arulmigu Abathsagayeswarar Temple at Alangudi Village, Thiruvarur District:
 (a) Construction of Toilet block incl. water tank; (b) Flooring works; and (c) Construction of Retaining walls.
- (iii) Arulmigu Kumaragiri Dhandayudhabani Swamy Thirukkoil at Ammapet in Salem District: (a) Construction of Dormitory hall; (b) Construction of Toilet block; (c) Construction of 30,000 litres capacity Over Head Tank; (d) Providing Bore well arrangements.
- (iv) Arulmigu Kailasanathar Swamy Temple at Thingalur Village in Thanjavur District: (a) Pilgrims' Rest House (G+1), (b) Septic Tank with dispersion trench (c) Provisions for landscaping (d) Provisions for Rain water harvesting system.
- (v) Naganatha Swamy Temple at Thirunageswarm, Thanjavur District: Provision of Paver blocks in the car parking area towards the west side of the temple.
- (vi) Sri Swetharanyeswarar Temple at Thiruvenkadu, Nagapattinam District: (a) Pilgrims' Rest House (G+1), (b) Toilet Block; (c) Overhead Tank; (d) Septic Tank with dispersion trench; (e) Provisions for landscaping; and (f) Provisions for Rain water harvesting system.
- (vii) Veerapur, Tiruchirappalli District: (a) Dormitory Hall; (b) Tonsure Hall; (c) Toilet Block; (d) Overhead Tank; (e) Septic Tank with Dispersion Trench, (f) Boreholes; and (g) Flooring.
- (viii) Construction of Pilgrims rest house in Arulmigu Naganathaswamy Temple, Keelaperumpallam, Nagapattinam District: (a) Pilgrim rest house (Dormitory Building); and (b) 10,000 litres capacity Over Head Tank.

14. 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.

15. 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).

16. Categorization. Subproject package IDIPT/TN/T4/NCB/08/2017 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.

17. 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.

18. 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.

19. 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.

20. 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 Development and Improvement of Infrastructure Facilities at

- (i) Arulmigu Kallalagar Thirukoil, Alagarkoil, Melur Taluk, Madurai District: Providing Arch Type Steel Truss Shed for Dining facilities to the devotees inside the temple premises of Arulmigu Kallalagar Thirukoil, Alagarkoil, Melur Taluk, Madurai District.
- (ii) Arulmigu Abathsagayeswarar Temple at Alangudi Village, Thiruvarur District:
 (a) Construction of Toilet block incl. water tank; (b) Flooring works; and (c) Construction of Retaining walls.
- (iii) Arulmigu Kumaragiri Dhandayudhabani Swamy Thirukkoil at Ammapet in Salem District: (a) Construction of Dormitory hall; (b) Construction of Toilet block; (c) Construction of 30,000 litres capacity Over Head Tank; and (d) Providing Bore well arrangements.
- (iv) Arulmigu Kailasanathar Swamy Temple at Thingalur Village in Thanjavur District: (a) Pilgrims' Rest House (G+1), (b) Septic Tank with dispersion trench

(c) Provisions for landscaping, and (d) Provisions for Rain water harvesting system.

- (v) Naganatha Swamy Temple at Thirunageswarm, Thanjavur District: Provision of Paver blocks in the car parking area towards the west side of the temple.
- (vi) Sri Swetharanyeswarar Temple at Thiruvenkadu, Nagapattinam District: (a) Pilgrims' Rest House (G+1), (b) Toilet Block; (c) Overhead Tank; (d) Septic Tank with dispersion trench, (e) Provisions for landscaping, and (f) Provisions for Rain water harvesting system.
- (vii) Veerapur, Tiruchirappalli District: (a) Dormitory Hall; (b) Tonsure Hall; (c) Toilet Block; (d) Overhead Tank; (e) Septic Tank with Dispersion Trench, (f) Boreholes, and (g) Flooring.
- (viii) Construction of Pilgrims rest house in Arulmigu Naganathaswamy Temple, Keelaperumpallam, Nagapattinam District: (a) Pilgrim rest house (Dormitory Building); and (b) 10,000 litres capacity Over Head Tank.

21. 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

22. Location: Alagarkoil, Madurai District. The exact location of the temple is 10.0747oN 78.2140oE. Alagar koil comes under Melur Taluk of Madurai district. Madurai is a major city in the Indian state of Tamilnadu. It is the administrative headquarters of Madurai District. Located on the banks of River Vaigai, Madurai has been a major settlement for two millennia. Madurai has been selected as one of the hundred Indian cities to be developed as a smart city under Prime Minister Narendra Modi's flagship Smart Cities Mission. The site map of Alagarkoil is given in Figure 1below.



Figure 1 : Site Map of Alagar Koil, Madurai

23. Location: Alangudi, Thiravarur District. Alangudi is a small village under Alangudi Panchayat an Valangaimaan Taluk in Thiruvarur District of Tamil Nadu State, India.Located 33

km towards west from District headquarters Tiruvarur. It is 307 km from State capital Chennai Alangudi is surrounded by Nidamangalam Taluk towards south, Ammapettai Taluk towards west, Tiruvidaimarudur Taluk towards north, Kumbakonam Taluk towards north. Thanjavur, Thiruvarur, Nanjikottai, Thiruthuraipoondi are the nearby cities to Alangudi. This place is in the border of the Thiruvarur District and Thanjavur District. Thanjavur District Kumbakonam is north towards this place. The site map of Alangudi is given in Figure 2 below.



Figure 2: Site Map of Alangudi

24. Location: Ammapet, Salem District. Ammapet is a large village/hamlet in Salem District of Tamil Nadu State, India. Arulmigu Kumaragiri Dhandayudhabani Swamy Thirukkoil Sanyasikundu is a Murugan temple at Ammapet (Atop Kumaragiri Hillock) in Salem District. Kumaragiri is 6 km far from Salem. Buses from Salem Old bus stand to Sanyasigundu pass through this place. Autos are available from Ammapettai also. Temple steps are very steep and it will take 20 min -30 min to the temple from the foothills. Nearest Railway Station is located at Salem. Nearest functioning Airport is located at Coimbatore & Trichy. The site map of Salem is given in Figure 3 below.



25. Location: Thingalur, Thanjavur District. Thingalur is located at 10.8969°N 78.1339°E. Thingalur falls under Thiruvaiyaru taluk of Thanjavur district. It is located at a distance of 18 kilometres from Thanjavur. 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. The District is bound by Ariyalur and Tiruchirapalli district on the North; Thiruvarur and Nagapattinam districts on the east; Palk Strait and Pudukottai on the South and Pudukottai and Tiruchirapalli on the West. The area of the district is 3396.57Sq.Km. It consists of nine Taluks- Thiruvidaimarudur, Kumbakonam, Papanasam, Pattukottai, Peravurani, Orathanadu, Thanjavur, Thiruvaiyaru and Budalur. The site map of Thingalur is given in Figure 4 below.

Figure 4: Site Map of Thingalur



26. Location: Thirunageswaram, Thanjavur District. Thirunageswaram is a panchayat town in Thanjavur district in the Indian state of Tamil Nadu. Thirunageswaram is located 8 km east of Thanjavur. Thirunageswaram is a panchayat town in Thanjavur district in the Indian state of

Tamil Nadu. Thirunageswaram is located 8 km east of Thanjavur. The site map of Thirunageswaram is given in Figure 5 below.



27. Location: Thiruvenkadu, Nagapattinam District. Thiruvenkadu is a village panchayat located in the Nagapattinam district of Tamil-Nadu state, India. It is located around 220 km away from Chennai. The other nearest state/UT capital from Thiruvenkadu. is Pondicherry and its distance is 84.9 km. Thiruvenkadu. is located around 45.7 km away from its district head quarter Nagapattinam. Thiruvenkadu's nearest town/city/important place is Sirkali located at the distance of 10.3 km. The temple is 10 kms from Sirkazhi on the Sirkali – Poompuhar road, 24 km east of Mayuram and 59 kms from Kumbakonam. It is situated 15 kilometers away from Vaitheeswaran Koil, on the Sirkali – Poompuhar road. The nearest railway station to Sri Swetharanyeswarar Temple is Mayiladuthurai railway station which is 19 Km from Sri Swetharanyeswarar Temple. Nearest airport to the temple is Trichy Airport which is 160 km away from Sirkazhi bus stand. The site map of Thiruvenkadu is given in Figure 6 below.



28. Location: Veerapur, Tiruchirappalli District. The exact location of the Veerapur Temple is 10.66°N 78.34°E. Tiruchirappali is located at 10.8050°N 78.6856°E. The city is at a distance of 325 km (202 mi) south-west of Chennai and 402 km (250 mi) north of Kanniyakumari on the National Highway NH 45 and 200 km (120 mi) south-east of Coimbatore and 128 km (80 mi) west from the Bay of Bengal coast. The city of Madurai is situated 161 km (100 mi) south of Tiruchirappalli. The site map of Veerapur is given in Figure 7 below.



Figure 7: Site Map of Veerapur

29. Location: Keelaperumpallam, Nagapattinam District. Keelaperumpallam is a village panchayat located in the Nagapattinam district of Tamil-Nadu state, India. The latitude 11.1351502 and longitude 79.8351145 are the geo-coordinate of the Keelaperumpallam. Chennai is the state capital for Keelaperumpallam village. It is located around 223.4 km away from Keelaperumpallam. The other nearest state capital from Keelaperumpallam is Pondicherry and its distance is 89.5 km. The other surrouning state capitals are Pondicherry 89.5 km, Bangalore 320.5 km, Thiruvananthapuram 422.2 km. The site map of Keelaperumpallam is given in Figure 8 below.



30. **Brief History**: Since the presiding deity is of the temple is Alagar (the beautiful), the temple is called Alagar Kovil. This is an important Vishnu temple, about 21 km northeast of Madurai, at Alagar Hill. This is one of the most ancient temples in India and round the temple are ruins of an ancient fortified town. The recently renovated gopurams of this temple look resplendent. The Mahabharata a says that this temple was visited by both Yudhisthira and Arjuna . It is said that Karudalwaar, the chief disciple of Ramanuja, regained his eyesight by worshipping the deity here. The temple is maintained and administered by the Hindu Religious and Charitable Endowments Department (HR&CE) of the Government of Tamil Nadu.

31. Solai malai Mandapam, one of the six abodes of Lord Subramanya is located atop the Alagar hills.

32. Thiruvarur district is one of the 32 districts in the Tamil Nadu State of India and occupies an area of 2161 square kilometers (km²). It lies between Nagapattinam District on the east and Thanjavur District on the west, and is bounded by the Palk Strait on the south. According to 2011 census, Thiruvarur district had a population of 1,264,277. Major towns are Thiruvarur, Thiruthuraipoondi, Nachikulam, Muthupettai, Mannargudi. Apatsahayesvarar Temple, Alangudi or Guru Sthalam or Tiru Irum Poolaiis a Hindu temple dedicated to Lord Shiva located in the village of Alangudi in the Valangaiman taluk of Thiruvarur District, is a place of architectural interest and an important tourist centre. The temple complex covers two acres and it houses a two tier gateway tower known as *gopurams*, one facing the Apathsaheswarar shrine and other towards North. The temple is maintained and administered by the Hindu Religious and Charitable Endowments Department(HR&CE) of the Government of Tamil Nadu.The temple is counted as one of the Navagraha Temples for planet Guru (Jupiter). The temple is one of the most visited temples in the district.

33. Alangudi is renowned for its 'triglories' i.e Moorthy (The Presiding Deity), Sthalam (Place of divinity) and Theertham (The Holy Water).

34. The temple is located on a hill top and is dedicated to Lord Muruga. One needs to climb more than 700 steps to reach Kumaragiri hill top in Salem district. Protesting against the decision of Lord Shiva on the Mango issue favoring Lord Ganapathi, Lord Muruga left his parents and settled in Palani. On his way to Palani, He relaxed at this place with his peacock vahanam. Later, a devotee on his way to Palani also relaxed here when a voice said "I am here as Dhandayuthapani". The devotee did not understand the voice and proceeded to Palani. Lord

Muruga came to him as a devotee, gave a begging bowl to this devotee and asked him to build a temple at this place. With the money collected through the bowl, he built this temple here. As Lord Muruga was angry on the Mango issue, this fruit is offered as Nivedhana to Lord here.

35. It is also believed that the grace of Muruga had made Salem famous for mango production. Devotees praise the Lord as Mambazha Murugan (Mango – Mambazham in Tamil).

36. The Chandiranaar Temple is a Hindu temple in the village of Thingalur, 33 km from Kumbakonam. The presiding deity is Soma (moon). However, the main idol in the temple is that of "Kailasanathar" or Shiva. Legend has it that there lived a merchant Appoodi Adikal, a nayanar in the village of Thingalur who was a devotee of lord Shiva. Appoodi Adikal held Appar in high regards and wanted to host him. The day arrived, but his son was killed by a venomous snake bite while the saint was being hosted. Appar, moved by Appoodi Adikal's devotion is said to have miraculously restored the lad to life. During the Tamil month of Purattasi (Sep - Oct) and Panguni (March - April), moon light falls directly on the image of the presiding deity.

37. Kailasanathar Swamy temple is one of the nine Navagraha sthalas located in the Cauvery Delta region dedicated to planet Moon, called Thingal in Tamil language. There is a separate shrine for Lord Moon.

38. Thirunageswaram is a panchayat town in Thanjavur district in the Indian state of Tamil Nadu. Thirunageswaram is located 8 km east of Thanjavur. Thirunageshwaram is one of the 127 temples on the southern banks of river Cauvery. It is one of the Panchakrosa Stalas. It is also known as Raghu Stalam. Rahu Stalam is a Hindu temple dedicated to the deity Shiva, located in Tirunageswaram, a village in the outskirts of Thanjavur, a town in Tamil Nadu, India. It is significant to the Hindu sect of Saivism as one of the temples associated with the nine planet elements, the Navagraha Stalas, and specifically Rahu. Shiva is worshiped as Naganathar, and is represented by the lingam.

39. The ablution of the image of Rahu during Rahukaalam with milk turning to blue colour in this temple is considered to be a miracle and attracts devotees from distant places

40. The Place Thiruvenkadu, one of the navagraha temple, is dedicated to the God Budhan (Planet Mercury). Thiruvenkadu - Sanskrit name is Shwetaranya and both literally mean "sacred white forest". This place is also called Adhi Chidambaram and the Chidambara Rahasyam is also here. As seen in Chidambaram Temple, lord Vishnu is near Shri Nataraja. It is a famous Hindu temple in Tamil Nadu. Here the Lord is Sri Shwetaranyeswarar and His consort is Shri Brahma Vidyambal. God Indran, Airavatam, Budhan, Suryan and Chandran are said to have worshipped lord Shiva here. Thiruvenkadu is one of the six places considered to be equivalent to Kasi. The lord Budha faces North East direction. God Budhan is said to bestow intellect and wisdom among nine planets. As the greatest among the wise, Budha or Mercury is considered. To Kasi, this place is similar with all the Snana Ghats. One can do all the karmas here, that is supposed to be done in kasi. This place is also called Adhi Chidambaram. As Hasti Natanam, Nataraja's dance here is known. In the three tanks Achuthagapanar bathed, worshiped Thiruvengadar and with a child he was blessed. As Meikandar, this child came to be known. Those who visit Thiruvengadu will find relief from Difficulties in studies, Mental instability, Puthira Dosham and Nervous disorders. For its unique incarnate of lord Shiva called "Shri Agora Murthi", this temple is especially known. It is said that Shri Agora Murthi was one of the furious incarnation of lord Shiva. Lord Shiva took his incarnation 'Shri Agora murthi' and killed the demon 'Padmasuran' under a tree (which is now in Thiruvengadu temple, back to the entrance of Agora murthi).

41. Thiruvenkadu Swetharanyeswarar Temple was said to be mostly contributed by the Chola kings Aditya Chola and Rajaraja Chola. Inscriptions from the time of Aditya Chola I (870-907), Raja Raja I (10th - 11th century) and his descendants speaking of endowments made by the Chola rulers to this temple are found here. Vikrama Cholan built the Vikramacholan Tirumandapam (1118-1135). The present structures of the temple as well as the beautiful bronze images in this temple are a contribution of the Great Chola emperor Raja Raja Chola I.

42. Veerapur - The legendary folklore Annanmar Kathai also called Ponnar-Shankar Kathai is set in the medieval period (600-1300 CE), post-sangam history of the Tamil country. This period saw the rise and fall of many kingdoms some of which were empires that exerted influence far and wide. This story is about the considered the unwritten epic of Gounder community. It is also named as a source of their cultural materials and traditions, transmitted orally from one generation to another either by messages or testimony or speech or song or street theatre and many other forms. In the temple, they find the three great kings, Chera King, Chola King and Pandya King sitting in front of the goddess and re-drawing their disputed trination borders as process to bring lasting peace and stability. They are in a conundrum and cannot agree borders. Kolaththa Gounder finds a solution that is agreeable to all the three kings and resolves the disputes fairly. Impressed with this skills and solution Chola King gifts him the lordship to sizeable territory which back in the day could be akin to a size of a small country. The granted as gift was called Konad. The temple is maintained and administered by the Hindu Religious and Charitable Endowments Department(HR&CE) of the Government of Tamil Nadu. The temple is counted as one of the Navagraha Temples for planet Guru (Jupiter). The temple is one of the most visited temples in the district. Veerapur is also famous for the Periyakandiyamman temple.

Nagapattinam district is one of the 32 districts in the Tamil Nadu State of India and 43. occupies an area of 17.92 km². Nagapattinam is bounded by Bay of Bengal in the east, Uppanar river in the south, Thiruvarur district in the west, Thanjavaur district in the north west and Karaikkal & Puducherry in the north. The town lies in the sea level. Nagapattinam is administered by a Selection-grade municipality covering an area of 17.92 km² and had a population of 102,905 as of 2011. Nagapattinam is connected with Chennai, Vellore, Coimbatore, Tiruchirapalli, Karaikal and other major towns of Tamil Nadu through the state highways SH 22 from Grand Anaicut to Kaveripoompattinam, SH 23 from Maviladuthurai to Thiruthuraipoondi, SH 64 from Kumbakonam to Sirkazhi, SH 67 from Nagore to Nachiyar Koil, SH 147 from Kumbakonam to Karaikkal, SH 148 from Nagore to Vettar. SH 149 from Sembanarkoil to Nalladai, SH 150 from Vaitheeswarankoil to Lower Anaicut and SH 151 from Kilvelur to Kachanam. Temple occupies an area of 630 feet South-North and 800ft East-West with adjacent sub lanes and four major streets around. There are four gateways with Gopuram in the big and high compound walls of the temple. Near to the compound walls there is the broad pathway (Praharam) with a flower garden on Northern side. On entering the Eastern gateway, one can find the Vinayaga temple, Balibeedam, Nandeeswarar Mandabam and Thwaja Sthambam (Flag post). On the southern side there is the water head with four Mandaps on around with a 100 pillar Mandap in a temple-car style. There are artistic features on its eastern wall. On remaining Area there is a big Car Parking available for the devotees. The temple is maintained and administered by the Hindu Religious and Charitable Endowments Department (HR&CE) of the Government of Tamil Nadu. The temple is one of the most visited temples in the district. Keezhaperumpallam is one of the nine Navagraha sthalas located in the Cauvery Delta region dedicated to shadow planet Ketu.

44. **Existing Conditions**. The Kallalagar Temple, located at Alagarkoil, Madurai District is an important tourist destination. Most of the tourists prefer to stay at Madurai considering that it is a bigger place or some small private places at Alagarkoil. Lots of devotees visit this temple to offer their prayers during festivals and the Temple offeres Annadhanam (an offering for food) for everyone. Considering this, it is proposed to construct a Dining shed for the devotees. Since the existing place to serve this purpose is inadequate for the tourists, a dining shed is proposed to be constructed near the temple complex. Considering this, Tamil Nadu Tourism Development Corporation is planning to provide a Dining shed to accommodate a large crowd during festivals needs to be constructed at Alagar Koil.

45. The Arulmigu Abathsahyeswarar Temple also known as Guru Temple, is located at Alangudi Valangaiman Taluk, Thiruvarur District. Most of the tourists prefer to stay at Thiruvarur considering that it is a bigger place or some small private places at Alangudi. Considering this, Tamil Nadu Tourism Development Corporation is planning to construct a Toilet Block and other facilities at Alangudi to cater to the demands of the tourists.

46. The Arulmigu Kumaragiri Dhandayudhabani Swamy Thirukkoil Sanyasikundu at Ammapet in Salem District is another important tourist destination. Most of the tourists prefer to visit at Kumaragiri temple considering that it is a bigger place. The dormitory has already provided accommodation for tourists from different economic backgrounds. Tourists have generally been satisfied with the hotel services and good hospitality facility. However, more accommodation with basic facilities at a reasonable cost is necessary. In this regard, new accommodation has to be added to the existing dormitory, complete with basic sanitary complex facilities at the Kumaragiri temple in Salem.

47. The Arulmigu Kailasanathar Swamy Temple is an important tourist destination. This is one of the Navagraha temples. Thingalur is the sthalam for Chandran. Thingal in Tamil means Chandran and hence the name Thingalur. Chandran is the Lord of Kadaga Rasi and he faces the South-East direction. Villagers commence the rice feeding of their infant children in the temples of their family deities. The affluent do this in the Guruvaayurappan temple. In Tamilnadu, Thingalur Kailasanathar temple is noted for this ritual. Before feeding the child with rice (Annaprasana) the child is shown the moon and a cow, thus bringing the blessings of Jaladevadha (Water God) and Oushadhi Devadha (God of medicines). It is believed that Jaladevadha would protect the child from cold, fever etc. and even if it so happens it would be cured by the Oushadhi Devatha. Most of the tourists prefer to stay at Thingalur since it has more space. Devotees visit this temple to offer their prayers. However, toilet facilities are insufficient in the temple complex. It was, therefore, proposed to construct separate toilets for males and females inside the rest hall. Since the existing place for accommodation is not enough for the tourists, a rest house is proposed to be constructed near the temple complex.

48. The Thirunageswaram temple is located on the southern bank of the river Kaveri, 8 km from Thanjavur Temple occupies an area of 630 feet South-north and 800ft with adjacent under East-west and four major streets around. There are four gateways with Gopuram (Tower) in the large and the round walls of the temple. Most tourists prefer to stay at Thirunageswaram as it is bigger. However, the existing car park is not enough to handle the influx of tourists. Instead, the tourists park at a private car park in Thirunageswaram at higher rates yet substandard facilities. Most of the private parking facilities are only after profit. However, since the proposed car park will be operated by a Government body, it is hoped that it will be more oriented towards customer service (reasonably priced and good standard facility), and not purely profit.

49. The Sri Shwetaranyeswarar Temple also known as Budhan Temple, located at Thiruvenkadu, Nagapattinam District is an important tourist destination. Most of the tourists prefer to stay at Sirkali considering as it is bigger, or some small private places at Thiruvenkadu. In this regard, Tamil Nadu Tourism Development Corporation plans to construct a Pilgrims' Rest House with other facilities, to provide accommodation for the tourists from different economic backgrounds. Tourists have generally been satisfied with the services and good hospitality facility at other hotels/rest houses and so the department of tourism envisages this project to do well. Most of the private hotels are profit oriented. But since this rest house is going to be operated by a Government body it will be service oriented, so it is essential to have this rest house at Thiruvenkadu operated by the Government body.

50. Veerapur - Trichy/Manapparai is another option when considering a bigger place to stay in for the pilgrims, despite the lack of basic infra structure facilities at the temple. Toilet facilities are insufficient in the temple. It has, therefore, been proposed to construct a toilet separately for males and females inside the rest hall. A dormitory will be constructed near the Periyakandiyamman temple complex to increase tourist accommodation.

51. The Arulmigu Naganathaswamy Temple, Keelaperumpallam located at Arulmigu Naganathaswamy temple (Arulmigu kethu sthalam) is in Keelaperumpallam village, Tharankampadi taluk, Nagapattinam District. Tourists stay here or in some small private accommodation in Keelaperumpallam. The existing infrastructure does not provide enough facility to the visitors, considering the available infrastructure for tourists in sub project area only has 02 Lodges (Private) for the tourists. Currently, there are no other existing facilities like a dormitory or rest house in the temple premises. Considering this, the Tamil Nadu Tourism Development Corporation is planning to construct a Pilgrim's Rest House at Keelaperumpallam to provide additional tourist accommodation. Tourists have generally been satisfied with the services and good hospitality facility at other Yatri Nivas's and so TTDC envisages this project to do well. Most of the private hotels are profit oriented. But since this hotel is going to be government-operated, it is hoped that the facility will provide good service and facilities at a reasonable price.

- 52. **Proposed Subproject.** Development and Improvement of Infrastructure Facilities at
 - (i) Arulmigu Kallalagar Thirukoil, Alagarkoil, Melur Taluk, Madurai District: Providing Arch Type Steel Truss Shed for Dining facilities to the devotees inside the temple premises of Arulmigu Kallalagar Thirukoil, Alagarkoil, Melur Taluk, Madurai District.
 - (ii) Arulmigu Abathsagayeswarar Temple at Alangudi Village, Thiruvarur District:
 - (a) Construction of Toilet block incl. water tank. A gents toilet and a ladies toilet are planned within the toilet block. The gents toilet has been planned with the following facilities: a) Bath room 3 Nos;b) Toilet 3 Nos (IWC); c) P.C Toilet 1 Nos (EWC); d) Urinals 4 Nos; e) Tub. The ladies toilet has been planned with the following facilities: a) Bath room 3 Nos; b) Toilet 5 Nos (IWC); c) P.C Toilet 1 Nos (EWC); d) Tub. An OHT of 8000 lit has been planned for the toilet blocks.
 - (b) Flooring works.
 - (c) Construction of Retaining walls.
 - (iii) Arulmigu Kumaragiri Dhandayudhabani Swamy Thirukkoil at Ammapet in Salem District:
 - (a) **Dormitory Hall.** This building serves the basic requirement of the site. It is a ground only building containing a ladies and a gents dormitory with a

ladies toilet (1 bath and 2 IWC) and a gents toilet (1 Bath and 2 EWC, Urinals) respectively. A separate terrace tank of 10000 lit has been proposed.

- (b) **Toilet Block.** A separate RCC toilet block is proposed on the route to the Hill temple. This block contains a ladies toilet (1 bath, 5 IWC and 2 EWC toilets) and a gents toilet (1 Bath, 3 IWC and 1 EWC Toilets, 4 Urinals). A separate terrace tank of 8000 lit has been proposed.
- (c) Provision for Overhead Tank of 30000 lit capacity; and (d) Provision for bore well (1no.) and external water supply.
- (iv) Arulmigu Kailasanathar Swamy Temple at Thingalur Village in Thanjavur District:
 - (a) Pilgrims' Rest House (G+1). The Ground floor is planned with an area of 309 Sq.mt. accommodating 70 devotees comprises a Dormitory Hall, 2 Cloak Rooms, Gents Toilet, Ladies Toilet, Portico and Staircase. The First floor is planned with an area of 190 Sq.mt. accommodating 8 devotees comprises 4 Double Bedrooms with attached toilets, Office Room and Waiting area.
 - (b) Provision for Septic Tank of capacity of 53000 litres with dispersion trench.
 - (c) Provision for landscaping
 - (d) Provision for Rain water harvesting system.
- (v) Naganatha Swamy Temple at Thirunageswarm, Thanjavur District: Provision of Paver blocks in the car parking area towards the west side of the temple.
- (vi) Sri Swetharanyeswarar Temple at Thiruvenkadu, Nagapattinam District:
 - (a) **Pilgrims' Rest House (G+1).** The Ground floor comprises a Reception, Office Room, Store Room, Dormitory Hall, 3 Toilets & Bathrooms. The First floor comprises of 10 Double Bedrooms with attached toilets, Office Room, Reception and Store Room.
 - (b) **Toilet Block.** The Toilet block contains a gents toilet and a ladies toilet. The gents toilet has the provisions of 1 bathroom, 3 EWC toilets and urinals. The ladies toilet has the provisions of 1 bathroom and 5 IWC toilets.
 - (c) Provision for Overhead Tank of capacity of 17000 litres.
 - (d) Provision for Septic Tank of capacity of 53000 litres with dispersion trench.
 - (e) Provision for landscaping.
 - (f) Provision for Rain water harvesting system.
- (vii) Veerapur, Tiruchirappalli District:
 - (a) **Dormitory Hall.** The dormitory hall is a ground only structure with a main hall and a cloak room.
 - (b) Tonsure Hall;
 - (c) Toilet Block;
 - (d) Provision of Overhead Tank of 30,000 litres capacity
 - (e) Provision of Septic Tank of capacity of 53,000 litres with Dispersion Trench
 - (f) Provision of Boreholes,
 - (g) Provision of Flooring.
- (viii) Construction of Pilgrims rest house in Arulmigu Naganathaswamy Temple, Keelaperumpallam, Nagapattinam District:
 - (a) Pilgrim rest house (Dormitory Building): The Building will be of length 15.3 m and clear width of 8.1 m length and floor height will be 3.5 m,

G:Reception,Office Room, Hall, Store room, Toilet - EWC- 03 No.'s, Bathroom- 03 No.'s G+1:Reception, Office Room, Store room, Rooms 1,2,3,4,5,6,7,8,9 and 10 with toilet for each room EWC-10 rooms

(b) 10,000 liter capacity Over Head Tank: The structural system adopted shall be based on the analysis and design. The tank will be of radius 3.00 m and the tank height will be 6.00 m.

53. 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 9. 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.

54. 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.



Coordinates : 10.074136°N 78.214356°E

Figure 9: Proposed Site Location - Alagarkoil



Figure 10: Proposed Site Plan - Alagarkoil



Coordinates : 10°22'N 78°58'E Figure 11: Proposed site Location - Alangudi



Figure 12: Proposed Site plan - Alangudi

Google map for Ammapet



Coordinates : 11.65°N 78.16°E Figure 13: Proposed site location – Ammapet



Figure 14: Proposed site Plan – Ammapet

Google map for Thingalur



St. Antony Chapel

Thingalur Siva Temple [Chandran temple]

Ch

Proposed Pilgrims Rest Hall

1.0 km Radius

Karaimel Alagar Hindu Temple

NCN050-Apathsat Temple, Thi

Coordinates : 10°53'12"N 79°7'32"E

Figure 15: Proposed site location – Thingalur



Figure 16: Proposed site Plan – Thingalur

Google map for Thirunageswaram

aram Library கஸ்வரம் நூலகம்

Balaji residency

831

Shiva Temple

Thirunageswaram

City Union Bank, hirunageswaram

1.0 km radius

IRIVIDAIMARUDHUR ிருவிடைமரு

Oppiliappan Temple Bus S

Proposed Parking area

Coordinates : 10°58'N 79°27'E Figure 17: Proposed site location – Thirunageswaram



Figure 18: Proposed site Plan – Thirunageswaram


Coordinates :11°10'31"N 79°48'34"E Figure 19: Proposed site location – Thiruvenkadu



Figure 20: Proposed site Plan – Thiruvenkadu

Google map for Veerapur



Coordinates : 10°37'9"N 78°23'9"E Figure 21: Proposed site location – Veerapur



Kaveri Bridge

Proposed Pilgrims Rest House

1.0 km radius

0

500.00 m

I ethu Temple

Lakshmi Narayana Perumal Temple Vanagiri Main Rd

Coordinates : 11.134°N 79.836°E

Figure 23: Proposed site location – Keelaperumpallam



Figure 24: Proposed site Plan – Keelaperumpallam

B. Implementation Schedule

55. 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.

56. 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

57. 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.

58. **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

59. **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.

60. **`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;
- (ii) Final or updated EIA and/or IEE upon receipt; and
- (iii) Environmental monitoring reports submitted by the Project Management Unit (PMU) during project implementation upon receipt.

61. During the design, construction, and operation of the project the pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the **World bank Environmental, Health, and Safety (EHS) Guidelines -General EHS Guidelines: Occupational, Health and safety** (www.ifc.org/ifcext/enviro.nsf/Content/ Environmental guidelines) and EHS Guidelines for water & sanitation will be followed (http://www.ifc.org/wps/wcm/connect/e22c050048855ae0875cd76a6515bb18/Final%2B-%2BWater%2Band%2BSanitation.pdf?MOD=AJPERE)

62. Employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. Preventive and protective measures should be introduced according to the following order of priority:

- (i). Eliminating the hazard by removing the activity from the work process. Examples include substitution with less hazardous chemicals, using different manufacturing processes, etc;
- (ii). Controlling the hazard at its source through use of engineering controls. Examples include local exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc;
- (iii). Minimizing the hazard through design of safe work systems and administrative or institutional control measures. Examples include job rotation, training safe work procedures, lock-out and tag-out, workplace monitoring, limiting exposure or work duration, etc.
- (iv). Providing appropriate personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE
- (v). Comply with: Child Labour (Prohibition and Regulation) Amendment Act, 2016; Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 as amended from time to time from appropriate authorities; Trade Unions Act, 1926; The Building and Other Construction Workers (Regulation of Employment and conditions of Service Act) 1996 and the Cess Act of 1996; The Factories Act, 1948; and Prohibition of Employment as Manual Scavengers and Their Rehabilitation Act 2013.

63. During the design, construction, and operation of the project, the borrower/client will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards, such as the World Bank Group's Environment, Health and Safety Guidelines.

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.

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

64. 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.

65. 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.

66. 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

¹All 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.

laws, regulations, policies etc. has been verified and their applicability matrix has been presented below.

67. 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.

	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 for the project development. 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

Table 1: Applicability of Acts and Rules

	Acts and Rules	Year	Compliance Criteria
			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
			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
			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

	Acts and Rules	Year	Compliance Criteria
7	Air (Prevention and	1981	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. The project requires consent to establish from
	Control of Pollution) Act		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.
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), Gol	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 TTDC 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.

68. 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.

69. 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.

70. 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.

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

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

73. 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.

74. 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.

75. 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

A. Physical Environment

76. Granite walls surround the temple, enclosing all its shrines. The temple has a seventiered Rajagopuram. The temple is surrounded by a large fort, part of which is dilapidated. Kallalagar is believed to have appeared sage Suthapava. The temple follows Thenkalai tradition of worship. Six daily rituals and many yearly festivals are held at the temple, of which the float festival during the Tamil month of Masi (February-March), Navrathri during September-October and Vaikunta Ekadasi during Margazhi (December-January) being the most prominent. In Alagar hills lord "Thirumal" is located in the name of "Alagar" and so it is called Alagar hills. This Vaishnavite temple has the unique reputation of the lord's revelation to the Pandya king Malayathuaja Pandian and Dharma Devashai. The episodes of Alvars have added to the honour of the temple. One hundred and twenty three vaisnavite hymns describe the glory of the temple. Even in the epic Silappathikaram of the classical epic age, the greatness of the temple is beautifully described. No less than Six Alvars, namely, Perialvar, Thirumangaiyalvar, Boothathalvar, Andal, Peyalvar, Nammalvar, have Sung the glory of the shrine. The golden canopy to the dome of temple was done in the 13th Century A.D. by the devoted king Sundara Pandian. Many such sacred dedicatory pieces of artistic additions were added by the king Thirumalai Naickar. A holy spring known as Noopurangangai is perennially sprouting up at the

top of the hillock. The subproject site is a barren land in the possession of the Department of HR&CE 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

77. Alangudi has a plain terrain of alluvial soil consisting of sand, silt and clay. Vennar and Vettar, the tributaries of Cauvery 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. 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 HR&CE 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.

78. The temple is located on a hill top and is dedicated to Lord Muruga. One needs to climb more than 700 steps to reach Kumaragiri hill top. Salem district is having administrative divisions of 9 taluks, 20 blocks, 376 Panchayats and 631 Revenue villages. The district receives the rain under the influence of both southwest and northeast monsoons. The northeast monsoon chiefly contributes to the rainfall in the district. Salem district forms part of the upland plateau region of Tamil Nadu with many hill ranges, hillocks and undulating terrain with a gentle slope towards east. Major part of the district is covered by Red insitu and Red Colluvial soils. Black soils are mostly seen in Salem, Attur, Omallur and sankari taluks. The subproject site is Located on the foothills of the Kumaragiri Hills. The subproject site is a barren land in the possession of the Department of HR&CE 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

79. Thingalur falls under Thiruvaiyaru taluk of Thanjavur district. It is located at a distance of 18 kilometres from Thanjavur. It is one of the nine Navagraha Sthalas of the Cauvery Delta region and has a temple dedicated to the Moon god. Thiruvaiyaru is a Panchayat town in Thanjavur District in the Indian state of Tamil Nadu. Thiruvaiyaru is situated on the banks of the river Kaveri, 13 km from Thanjavur. Tiruvaiyaru is the headquarters of the Tiruvaiyaru taluk. Tiruvaiyaru is a small, quiet town. However, its modesty belies its importance as a pilgrim centre. On the highway from Tanjavur, you pass five bridges over the Vadavar, Vettar, Vennar, Kudamurutti and Cauvery, the five rivers from which Tiruvaiyaru gets its name (tiru = sacred; ai = five; aaru = river). Tiruvaiyaru is considered as holy as Varanasi and bathing in the Cauvery here is as guaranteed to rid devotees of sins as bathing in the Ganges. The subproject site is a barren land in the possession of the Department of HR&CE 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.

80. Thirunageswaram has a plain terrain of alluvial soil consisting of sand, silt and clay. The town receives a lot of rainfall every year (220 cm) and is known for its extremely fertile land and

chief crops include Rice, Wheat and Corn. Coconut and Mango farms are also found in abundance. The subproject site is a barren land in the possession of the Department of HR&CE 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.

81. Swetharanyeswarar Temple is a Hindu temple located in the town of Thiruvenkadu near Sirkazhi. The main deity is Shiva - Swetharanyeswarar ("lord of white forest") and the goddess is Brahma Vidya ambal. There is a separate Sannidhi for Budha (mercury). The temple is quite large and all four important Saivite saints have sung in praise of this lord. This temple is especially known for its unique incarnate of Lord Shiva called "Agora Murthi". He is one of the main god who is being prayed in this village. Thiruvenkadu. village is also famous for its unique structure of pools in temples. This temple has 3 pools, 3 Gods. It is a belief that who takes bath in all these pools, the one will be free from their problems like diseases, delay in marriage, etc. The subproject site is Located on the banks of a branch of Kaveri river. The subproject site is a barren land in the possession of the Department of HR&CE 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.

82. Veerapur is 14 km from Manapparai of Trichy district. There is a strange intricate tale about the Goddess Periya Kandi Amman who has a temple here. The legendary folklore Annanmar Kathai also called Ponnar-Shankar story is set in the medieval period (600–1300 CE), post-sangam history of the Tamil country. This period saw the rise and fall of many kingdoms some of which were empires that exerted influence far and wide. Veerapur is a pilgrim spot in the southern region of Tiruchirapalli District. This ancient place, also called Veeramalai, is the region famed for Ponnar and Sankar who reigned over the region. Arulmigu Kannimariamman Vagaiyara Temple and Periyakandi Amman temple are the sacred shrines located here. The subproject site is a barren land in the possession of the Department of HR&CE 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.

83. Keelaperumpallam has a sandy coastal alluvium and black soil types cover 88.71% and 6.58% respectively. The other soils in the district comprise 4.71%. 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. 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. 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

84. Temperatures during summer in Alagarkoil generally reach a maximum of 40 °C and a minimum of 26.3 °C, although temperatures up to 42 °C are not uncommon. Winter temperatures range between 29.6 °C and 18 °C. The entire district experiences a declining trend in annual rainfall except at Melur, where a rising trend is noticed. The climate is subtropical and the temperature varies from 15 to 41°C in the district. The relative humidity varies from 45 to 85% and is high during NE monsoon.

85. Mean average temperature recorded for summer season in Alangudi 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.

86. Salem has a tropical savanna climate (Köppen climate classification Aw). January and February are generally pleasant; the hot summer begins in March, with the year's highest temperatures during April. Pre-monsoon thunderstorms occur during April and May. The Southwest monsoon season lasts from June to September. The northeast monsoon occurs from October to December.

87. Rainfall is intermittent within the Thanjavur district. The annual normal (1988 – 1996) varies partially from 1179 mm (Lower Anaicut) to 763 mm (Budalur). The rainfall is high on the eastern part of the district compared to the western part. The intensity decreases gradually towards west and the western most part of the district (Thiruvaiyaru-387 mm, Budalur-377 mm).

88. The climate is tropical in Thirunageswaram with temperatures ranging at an average between 25 °C and 38 °C (highest). In a year, the average rainfall is 1100 mm. The town receives a lot of rainfall every year (220 cm) and is known for its extremely fertile land.

89. The climate is on the warmer side in Thiruvenkadu with temperatures going upwards of 40°C in summer months. The best time to visit Thiruvenkadu is between October and March.

90. Tiruchirappalli experiences a tropical savanna climate—designated "Aw" under the Köppen climate classification—with no major change in temperature between summer and winter. The climate is generally characterised by high temperature and low humidity. With an annual mean temperature of 28.9 °C (84.0 °F) and monthly average temperatures ranging between 25 °C (77 °F) and 32 °C (90 °F), the city is one of the hottest in the state.

91. Mean average temperature recorded in Keelperumpallam for summer was 39.4° C, with a mean maximum temperature of 32.2° C and mean minimum of 24.6° C. The average annual rainfall is 1,125 mm. The climate is tropical in keelaperumpallam. The mean average humidity recorded was 66.5%. The relative humidity ranges from 70 - 77% and it is high during the period of October to November. Mean average wind speed was observed to be 2.87 km/hour.

2. Geographical features

92. The exact location of the temple is 10.0747° N 78.2140° E which is at a distance 21 kilometers from the city of Madurai. The geography of Madurai comprises of its location, altitude and area. This religious city falls within its namesake district, Madurai, and also acts as the district headquarters. The city of Madurai is situated on the banks of the river Vaigai. It is located between 9.93° North Longitude and 78.12° East Latitude. The city lies at an altitude of

330 feet or 101 meters above sea level. This religious town of Tamil Nadu stretches over an area of 22.6 square kilometers.

93. Alangudi town is located at 10.8328° N, 79.4071° E at a distance 27 kilometers from the Bay of Bengal.

94. Salem is located at 11.669437°N 78.140865°E, at an average elevation of 278 m (912 ft). The city is surrounded by hills: Nagaramalai on the north, Jarugumalai on the south, Kanjamalai on the west, Godumalai on the east and the Shevaroy Hills on the northeast. Kariyaperumal Hill is in southwestern Salem.

95. Thingalur is located at 10.8969°N 78.1339°E. Thingalur falls under Thiruvaiyaru taluk of Thanjavur district. It is located at a distance of 18 kilometres from Thanjavur. Thanjavur district is in the east coast of Tamil Nadu.

96. Thirunageswaram is located at 10.9684° N, 79.4277° E at a distance 45 kilometers from the Bay of Bengal.

97. Thiruvenkadu is located at 15.1756° N, 79.8096° E at a distance 5 kilometers from the Bay of Bengal.

98. The exact location of the Veerapur Temple is 10.66°N 78.34°E. Tiruchirappali is located at 10.8050°N 78.6856°E. The city is at a distance of 325 kilometres (202 mi) south-west of Chennai and 402 kilometres (250 mi) north of Kanniyakumari on the National Highway NH 45 and 200 kilometres (120 mi) south-east of Coimbatore and 128 kilometres (80 mi) west from the Bay of Bengal coast. The city of Madurai is situated 161 kilometres (100 mi) south of Tiruchirappalli.

99. Keelperumpallam is located at 11.10°N, 79.65°E Situated at a distance of 5 kilometers from the Bay of Bengal coast.

3. Accessibility

100. Alagar koil is about 20kms far from Madurai city along the SH 72A. The nearest airport to Madurai Airport, (IXM), Madurai, Tamil Nadu, which is 12 km away from Madurai City. Madurai Junction is about 22 km from Alagarkoil. There are frequent bus services to and from Chennai, Cuddalore, Pondicherry, Tiruchirappalli, Vellankanni, Salem, Nagapttinam, etc.

101. The nearest airport to Alangudi is Civil Airport (TRZ) at Tiruchirappalli, Tamil Nadu, which is 58 km away from Alangudi and is 108 km away from Madurai Airport (IXM), Madurai, Tamil Nadu. Thanjavar Railway Station is about 32 km from Alangudi. There are frequent bus services to and from Chennai, Cuddalore, Pondicherry, Tiruchirappalli, Vellankanni, and Nagapttinam.

102. Kumaragiri is 6 km far from Salem. Buses from Salem Old bus stand to Sanyasigundu pass through this place. Autos are available from Ammapettai also. Temple steps are very steep and it will take 20 min –30 min to temple from adivaram. Nearest Railway Station is located at Salem. Nearest Airport is located at Coimbatore & Trichy.

103. Thingalur is well connected with road and plenty of buses are available to reach the temple. Thingalur is around 18 km from Kumbakonam of Thiruvayaru, Kumbakonam road. The

nearest railway station to Thingalur Kailasanathar Temple is Ariyalur railway station which is 29 Km from the temple. The nearest airport to Thingalur Kailasanathar Temple is Thanjavur airport, which is 10 Km away from the temple. The National Highways 67, 45C, 226 and 226 Extend pass through Thanjavur. The city is well connected with Chennai and all major cities of the state.

104. Thanjavur railway station is the nearest rail station from Thirunageswaram. Trichy airport is very close to the place. The network for buses is also very good and travelers can avail bus services from Thanjavur to reach Thirunageswaram.

105. The nearest airport to reach Thiruvenkadu is at Pondicherry, which is located at a distance of about 105.4km. Regular flights are operated from this airport. The nearest railway station to Thiruvenkadu. is Sirkazhi which is located around 16.01 km away. The distance between Thiruvenkadu. and the next nearest airport, this is Tiruchirapalli Airport, is147.8 km.

106. Veerapur can be reached from Tiruchirapalli (45 km), Manapparai (12 km) and Vaiyampatti (20 km). Manaparai Railway Station serves the area. Nearest airport is Tiruchirapalli Airport.

107. The nearest railway station to Keelaperumpallam is Sirkazhi which is located in and around 16.7 kilometer distance. Keelaperumpallam_s nearest airport is Karaikal Airport situated at 23.3 Km distance. Keelaperumpallam is located around 41.0 Km away from its district head quarter Nagapattinam. The other nearest district head quarters is karaikal situated at 24.8 Km distance from Keelaperumpallam. There are frequent bus services to and from Chennai, Cuddalore, Pondicherry, Tiruchirappalli and Vellankanni.

4. Geomorphology

108. It has an average elevation of 101 metres. The city of Madurai lies on the flat and fertile plain of the river Vaigai, which runs in the northwest-southeast direction through the city, dividing it into two almost equal halves. The Sirumalai and Nagamalai hills lie to the north and west of Madurai. 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. The land in and around Madurai is utilised largely for agricultural activity, which is fostered by the Periyar Dam. Madurai lies southeast of the Western Ghats, and the surrounding region occupies the plains of South India and contains several mountain spurs.

109. Thiruvarur 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. 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. Major part of the district including Valangaiman, Nannilam, Thiruvarur and part of Thiruthuraipoondi taluks is occupied by delta plain. Sedimentary high land having pediment and buried pediment landforms are observed in Mannargudi and Needamangalam taluks. 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.

110. Salem district forms part of the upland plateau region of Tamil Nadu with many hill ranges, hillocks and undulating terrain with a gentle slope towards east. The prominent

geomorphic units identified in the district through interpretation of Satellite imagery are 1) Plateau, 2) Structural hills, 3) Bazada zone, 3) Valley fill, 4) Pediments, 5) Shallow Pediments and 6) Buried Pediments. A number of hill ranges are located in the northern and northeastern parts of the district, whereas the southern, western and eastern parts of the district are gently undulating and dotted with a few isolated hillocks. The important hill ranges in the district are Yercaud hills, Kanjamalai hills, Godumalai hills and Pachamalai hills.

111. Different geomorphic units like flood plain, delta plains, natural levees and sedimentary high ground are noticed in Thanjavur district. Sedimentary high ground ranging in elevation between 60 and 80 m amsl found in southern side of Thanjavur town mainly constitute laterites. Area north of Thanjavur had been fully covered by flood. Isolated levee complexes are found parallel to the Vennar river course.

112. The present geomorphic set up in Nagapattinam 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. The maximum elevation is about 21 m above mean sea level in the west.

113. The entire Tiruchirappalli district constitutes a peneplain. The Kolli Hills in the northwestern part and Pachchamalai Hills in the north-eastern parts of the district constitute the remnants of the denuded Eastern Ghats and rise to a height of more than 100 m above Mean Sea Level. From these hills, the land slopes gently toward east and forms a vast stretch of plain country. There are numerous small residual hillocks dotting the countryside, the most prominent one of which is the Rock Fort hill in Tiruchchirappalli town. The prominent geomorphic units identified in the district through interpretation of Satellite Imagery are 1) Alluvial Plains, 2) Valley Fills, 3) Buried Pediments, 4) shallow Pediments, 5) Pediments and 6) Structural Hills. Pediments, both shallow and deep, constitute the most prominent geomorphic unit in the district and are evenly distributed in the entire district. Structural hills, on the other hand, are confined to the northern and southwestern borders of the district.

114. Nagapattinam 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 8 - 11 m amsl in the western part of the district. 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. The Nagapattinam district is made up the 6 Taluks of Nagapattinam, Kilvellore, Vedaranniyam, Mayiladuthurai, Sirkali and Thrangampadi. The East Side faces the Bay of Bengal. The district is the most part of a flat plain, slopping very gently to the sea on the east. delta plain. Sedimentary high land having pediment and buried pediment landforms are observed in most taluks. 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

115. The soil type in central Madurai is predominantly clay loam, while red loam and black cotton types are widely prevalent in the outer fringes of the city.

116. Thiruvarur district has mainly alluvial soil consisting of sand, silt and clay.

117. The soils in Salem district can be broadly classified into 6 major soils types viz., Red in situ, Red Colluvial Soil, Black Soil, Brown Soil, Alluvial and Mixed Soil. Major part of the district is covered by Red in situ and Red Colluvial soils. Block soils are mostly seen in Salem, Attur, Omallur and sankari taluks. Brown Soil occupies major portion of Yercaud and parts of Salem and Omallur taluks and the Alluvial Soil is seen along the river courses in Omallur and Sankari taluks. Mixed soil is occurring only in Attur taluk.

118. Thanjavur district is occupied by different geological formations. The different types of soils are derived from the formations are: Quaternary, Pliocene, Miocene and Cretaceous.

119. The major part of Nagapattinam 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 Arenacious soils are also found along the coastal line.

120. The major soil types encountered in Trichy district are black cotton soils, red sandy to loamy soils and alluvial soils. A thin layer of red sandy soils overlies the western and southern parts of the district. Alluvial soils of considerable thickness occur in the central part, particularly in Tiruchchirappalli, Kulithalai, Musiri and Lalgudi taluks. Black cotton soils are observed in the northern part., whereas red loamy soils occur in the hilly regions.

6. Hydrogeology

121. Madurai district is underlain predominantly by crystalline formations and alluvium is found along the courses of the river. The depth of weathering varies from 20-25m bgl in Usilampatti, Sedapatti and Kottampatti area, while it varies from 30 to 40m bgl in remaining part of the district. The depth of dug wells varies from 10 - 20m with a yield of 45 - 135 lpm. In the exploration programme of Central Ground Water Board, 29% of the wells yielded less than 1 lps while 30% of the wells yielded between 1 - 3 lps. In general there are about 2 - 3 fracture zones less than 50m and about 2 - 3 fracture form beyond 100m also. The variations in the yield of bore wells are very high in the district. Potential fractures with high discharge have been established along Valandur-usilampatti- Timmarasanayakanur, Thirali-Peraiyur tract and Palkalainagar-Nilayur tract in the district.

122. The entire Thiruvarur 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.

123. Salem district is underlain entirely by Archaean Crystalline formations with recent alluvial and Colluvial deposits of limited areal extents along the courses of major rivers and foothills respectively. Weathered and fractured crystalline rocks and the Recent Colluvial deposits constitute the important aquifer systems in the district. Colluvial deposits represent the porous formations in the district. These deposits comprise boulders, cobbles, gravels, sands and silts and are seen in the foothills of all the major hill ranges. The thickness of these aquifers ranges from a few meters to as much as 25 m.

124. Thanjavur district is underlain by the various geological formations ranging in age from Archaean to Recent (Plate – II). Ground water occurs in six different aquifers in this district. They are Archaean aquifers, Cretaceous aquifers, Eocene Aquifers, Miocene Aquifers, Pliocene Aquifers and Quaternary Aquifers. Archaean aquifers: Ground water occurs to a limited extent in weathered and fractured rocks under unconfined and semi-confined to confined conditions respectively. The depth of weathered zone ranges from 10 to 12 m. The depth of dug wells is in the range of 8 to 12 m bgl and depth of the bore wells is in the range of 100 m bgl. The yield of dug wells ranges between <1 and 2 lps, while the yield of bore wells ranges from 1 and 2 lps.

125. The entire Nagapattinam 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; (ii) Pliocene. 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.

126. The major part of Trichy district is underlain by Archaean crystalline metamorphic complex. The important aquifer systems encountered in the district are classified into i) Fissured, fractured and weathered crystalline formations consisting of charnockites, Granite Gneisses and ii) Unconsolidated and semi-consolidated formations.

7. Groundwater Quality

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

128. It is observed that ground water in Madurai District 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. In reference to irrigation suitability based on EC and Sodium Absorption Ratio (SAR), the ground water in phreatic zone may cause medium to very high salinity hazard and medium to high alkali hazard. Hence proper soil management practices are to be adopted when the ground water from phreatic aquifer is to be used for irrigation purposes. In case of deeper fractures, the ground water is suitable for domestic and irrigation purposes. However, the data of State Ground & Surface Water Resources Data Centres shows that ground water in Pulipatti, Chinnalatalai, Usilampati and Vikramapuram have fluoride concentration more than the permissible limit..

129. Ground water in phreatic aquifer in Thiruvarur 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 25° C) during May 2007 was in the range 620 (Alankottai) to 4400 (Muthupetai) in the district. It is between 750 and 2250 μ s/cm at 25° C in the major part of the district, whereas, conductance exceeding 2250 μ s/cm at 25° C has been observed in parts of Muthupetai block.

130. It is observed that the ground water in Thiruvarur district 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.

131. Ground water in phreatic aquifers in Salem district, is in general colorless, odorless and slightly alkaline in nature. The specific electrical conductance of ground water in phreatic zone (in μ S at 25 o C) during May 2006 was in the range of 526 to 6040. In major part of the district the electrical conductivity is above 1000 μ S/cm, except in Yercaud, P.Goundanpalayam & Salem. Total Hardness is observed in 60% of the samples exceeds more than permissible limit. About 80% of the samples are having high concentration of Nitrate, which may be due to anthropogenic activities. 22% of the samples are having higher concentration of Fluoride (>1.5 mg/L), in parts of Edapadi, Attayampatti & Jalakandapuram.

132. It is observed that the majority of the samples in Salem district are characterized by higher concentration of NO3, SO4 and F than the BIS permissible limit. In general, groundwater can be categorized as High Salinity on the basis of SAR and hence proper soil management strategies are to be adopted for major parts of the District.

133. Ground water quality of phreatic aquifers in Thanjavur district is, in general, colourless, Odourless, and slightly alkaline nature. The electrical conductivity of ground water in phreatic zone during May 2006 was in the range of 279 to 12250 μ S/cm and major parts are having the electrical conductivity below 1500 μ S/cm at 25° C. It is observed that the ground water is suitable for drinking and domestic uses in respect of all constituents except total hardness, sulphate and nitrate. Around 50 percent samples are having higher concentration of NO3 than the BIS permissible limit. The incidence of high total hardness of attributed to the composition of lithounits constituting the aquifer in the district, whereas the nitrate pollution is more likely due to the use of fertilizers for agriculture.

134. With regards to irrigation suitability based on specific electrical conductance and Sodium Absorption Ratio (SAR), it observed that ground water in the phreatic zone, may cause medium to high salinity and alkali hazard. Proper soil management strategies are to be adopted while using ground water for irrigation.

135. Ground water in phreatic aquifers of Nagapattinam district, 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.

136. It is observed that the ground water of Nagapattinam district is suitable for drinking and domestic uses in respect of all the constituents except total hardness and nitrate in about 83% 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 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.

137. Ground water in phreatic aquifers in Tiruchchirappalli district, in general, is colourless, odourless and slightly alkaline in nature. The electrical conductivity of ground water in phreatic zone (in Microsiemens at 250 C) during May 2006 was in the range of 570 to 4550 μ S/cm and major parts of the district are having the electrical conductivity above 1700 μ S/cm.

138. It is observed that in general the ground water in Tiruchchirappalli district is suitable for drinking and domestic uses in respect of all the constituents except Fluoride of higher concentration at Siruganallur (1.85 mg/L) and at few places are having higher concentration of NO3 than BIS permissible limit

8. Natural Disaster / Hazard

139. 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

140. The air environment of the sub project areas is generally found to be good and is free from pollution. The ambient air quality is perceived to be within acceptable standards. However, in absence of baseline ambient air quality data, it has been proposed to conduct preconstruction 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.

141. 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.

142. Most of the sub project 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.

143. 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.

144. 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 Sub-project Specific impacts and their mitigation measures).

145. 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

146. Compared to other cities of Tamil Nadu, Madurai is a much faster developing city in terms of business and economy. There are various sectors like agriculture, banking, exports, information technology, airlines, real estate and manufacturing industry, which are making a steady business in Madurai. Due to increase in city's economy, the job opportunities are also very good. Moreover, people from other states in India migrate to Madurai for setting up their business for its business friendly environment. Being a popular tourist and Industrial city, the business and economy in Madurai is at great heights.

2. Administration

147. Arulmigu Kallalagar Thirukoil is operated and maintained by Hindu Religious & Charitable Endowments Department. The municipality of Madurai was constituted on 1st November 1866 as per the Town Improvement Act of 1865. The municipality was headed by a chairperson and elections were regularly conducted for the post except during the period 1891 to 1896, when no elections were held due to violent factionalism. During the early years of independent India, the Madurai municipality was dominated by reformists of the Indian National Congress. Madurai was upgraded to a municipal corporation on 1 May 1971 as per the Madurai City Municipal Corporation Act, 1971. It is the second oldest municipal corporation in Tamil Nadu, after Chennai. The functions of the municipality are devolved into six departments: General, Engineering, Revenue, Public Health, Town planning and the Computer Wing. All these departments are under the control of a Municipal Commissioner, who is the supreme executive head. The legislative powers are vested in a body of 100 members, one each from the 100 wards. The legislative body is headed by an elected Mayor assisted by a Deputy Mayor. The corporation received several awards in 2008 for implementing development works.

148. Important places to visit in Madurai:

- (i) Meenakshi Amman Temple is a historic Hindu temple located on the south side of the Vaigai River in Madurai and is one of the most prominent landmarks of the city. It is dedicated to Meenakshi and her consort, Sundareswarar. The complex houses 14 gopurams (gateway towers) ranges from 45–50 metres (148–164 ft) in height, the tallest being the southern tower, 51.9 metres (170 ft) high. There are also two golden sculptured vimana (shrines) over the sanctum of the main deities. The temple is a significant symbol for Tamils and has been mentioned since antiguity in Tamil literature, though the present structure was built between 1623 and 1655 CE. The temple attracts on average 15,000 visitors a day, which grows to around 25,000 on Fridays. There are an estimated 33,000 sculptures in the temple, and it was in the list of top 30 nominees for the "New 7 Wonders of the World". It is believed that the temple was originally constructed by the survivors of Kumari Kandam, which is a mythical lost continent, in the 6th century BC. Early in the 14th century, the temple was looted by the Mughal Muslim Commander Malik Kafur. Only the shrines of Meenakshi and Sundaresvara remained intact after the temple was pulled down by the commander. In the 16th century, Vishwanatha Nayakan rebuilt the temple. Built according to Shilpa Shastra, the ancient Indian building manual, the temple is the epicentre of the city. It is the largest temple complex in Tamil Nadu and is divided into a number of concentric guadrangular enclosures contained by high stonework walls.
- (ii) **Koodal Azhagar Temple** is a Vishnu temple located in the city. It has idols of the Navagraha (nine planet deities), which are otherwise found only in Shiva temples. The deity, Azhagar, is believed to be the brother of Meenakshi, the presiding deity at the Meenakshi temple.[23] The festival calendars of these two temples overlap during the Meenakshi Thirukalyanam festival.
- (iii) Pazhamudircholai, one of the other six abodes of the Hindu God Murugan, is located atop the Solaimalai hill. Tirupparankunram is a hill 8 kilometres (5.0 mi) away from Madurai where the Hindu God Murugan is said to have married Deivanai. The temple is the first among the Six Abodes of Murugan and is one of the most visited tourist spots in Madurai, next only to the Meenakshi Amman Temple. The temple has a wide range of Hindu gods carved on the walls.
- (iv) Kazimar Big Mosque is the oldest Islamic place of worship in the city. It was constructed under the supervision of Kazi Syed Tajuddin, who is a descendant of Islamic Prophet Muhammad and the Madurai Maqbara the grave of Meer Ahmad Ibrahim Periya Hazrat, Meer Amjad Ibrahim Chinna Hazrat and Syed Abdus Salam Ibrahim Saalim Hazrat is located inside the mosque. Kazi Syed Tajuddin came from Oman and received the piece of land as a gift from the Pandyan ruler Kulasekara Pandyan I, during the 13th century for the construction of the mosque.
- (v) Goripalayam Mosque is located in Gorippalayam, the name of which is derived from the Persian word gor ("grave") and the graves of erstwhile Sultanate rulers Alauddin, Shamsuddeen and Habibuddin are found here. Built in the 13th century, Goripalayam Mosque, which is also known as Hajha Syed Sultan Alaoudeen Syed Sultan Samsudeen Aouliya Dargah, is the largest mosque in Madurai. The mosque houses the tombs of two of the Muslim rulers of Madurai – Hazrat Sulthan Alauddin Badusha (Radiyallah) and Hazrat Sulthan Shamsuddin Badhusha (Radiyallah). An invisible grave of Hazrat Khaja Syed Sultan Habibuddin also known as Ghaibi Sulthan is also present in the mosque. The dargah sits on the bank of Vaigai River. It is believed that the dargah was built by Thirumalai Nayak. The most striking feature of the mosque is its dome, which is made of a single piece of stone and is 20 ft in height and 70 feet in diameter. The

anniversary Urs festival, which is held on the 15th night of Islamic month of Rabial-awwal by the hijri calendar, is the best time to visit this place.

- (vi) **Tirupparankunram Dargah** is located at the top of the Thiruparankundram hill where the cemetery of Sultan Sikandhar Badushah the then ruler of Jeddah and Madurai who travelled to India along with Sulthan Syed Ibrahim Shaheed of Ervadi during 12th century is located. **St. Mary's Cathedral** is the seat of the Roman Catholic Archdiocese of Madurai.
- (vii) Thirumalai Nayak Palace, which is considered a wonder of South India, was constructed by Thirumalai Nayak, King of Nayaka dynasty of Madurai, in 1636 AD. This grand palace is a fusion of Islamic and Dravidian architectural styles. The palace was originally four times bigger and it had two parts. The first part was Swargavilasa or the heavenly pavilion, meant for the King, and Ranka Vilasa for servants. The royal residence included palanquin place, apartments, theater, armory and garden. The palace was later demolished by Thirumalai Nayak's grandson, Chokkanatha Nayak. Most of the woodcarvings and jewels from the palace were removed by him and used to construct his own palace. The palace was partially restored by Lord Napier, the Governor of Madras from 1866 to 1872. Today, you get to see the courtyard surrounded by massive pillars, the entrance gate, the dance hall and the main hall. These structures give you a glimpse of the grandeur of the past era. The palace is now maintained by the Tamil Nadu Archaeological Department. Light and Sound shows are held in the evening.

3. Area Population

149. Madurai is the third largest city by population in Tamil Nadu, and is the 25th populated city in India. According to 2011 census based on per-expansion limits, the area covered under the Madurai Municipal Corporation had a population of 10,17,865 with a sex-ratio of 999 females for every 1,000 males, much above the national average of 929. A total of 1,00,324 were under the age of six, constituting 51,485 males and 48,839 females. 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 and the 31st in India. According to the religious census of 2011, Madurai had 85.8% Hindus, 8.5% Muslims, 5.2% Christians and 0.5% others. Roman Catholics in Madurai are affiliated with the Roman Catholic Diocese of Madurai, while Protestants are affiliated with the Madurai-Ramnad Diocese of the Church of South India.

4. Languages

150. The main language of Madurai is Tamil. It is spoken by the majority of the populace of Madurai. The form of Tamil spoken in Madurai is almost pure and does not have any influence of other languages. The other languages spoken in Madurai are English, Saurashtra, Telugu, Urdu and Hindi.

5. Sanitation and Sewage Disposal

151. 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

152. 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

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 Tamil Nadu Hotel. The site details are given in the Table 2 below along with the proposed site layout in Figure 25.

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

Table 2: Site Details

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



Figure 26: Site Layout

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C. Socio-economic and Cultural Environment

1. Trade and Commerce

154. 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

155. The District of Thiruvarur 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 Thiruvarur District. Thiruvarur 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.

- 156. Important places to visit in Thiruvarur:
 - (i) **Arulmigu Abathsagayeswarar Temple**. Alangudi is the holy abode of Jupiter and a divine place where one could propitiate Jupiter and it is a place where Lord Guru can be propitiated in the form of Sri Dakshinamurthy. The Arulmigu Abathsagayeswarar Temple at Alangudi, is well known for its unique natural environment, spiritual and traditional rituals. The Hindu way of life flows undisturbed and this is why pilgrims are attracted to the temple. Alangudi is renowned for its 'Triglories' i.e. Moorthy (The Presiding Deity), Sthalam (Place of divinity) and Theertham (The Holy Water). Lakhs of people throng this place, particularly on the day of Jupiter's transit to the next sign. Maximum number of tourists visit this temple in the months of March, April, May, October, November and December. The tourist inflow nearly 15,00,000 per annum.
 - (ii) **Muthupettai Mangrove Forest** / Lagoon (70 km). also called as the Alaiyathi Kadu, one of the largest of its kind located between Thirutturaipoondi and Pattukkotai. Paminiyaru, Koraiyaru, Kilai thaangi yaaru, Marakka koraiyaru; all these rivers form a lagoon before ending up at Kodiakarai [point calimere]. The lagoon is 8 kms from Muthupet in an area of 120 sq.km. Palanjur, Thamarankottai, Maravakkadu, Vadakadu, Thuraikadu and Muthupet reserve forests are the composition of mangrove forests. The collection of trees includes Thandal, Thillai, Narikanthal, Neermulli and so on. A 162 mts wooden causeway built across, provides an opportunity for a closer look at the mangrove forests. Variety of Migratory birds from Europe, Asia and Middle East flock to this area during season. It is a holistic, exotic and refreshing holiday option for nature lovers.
 - (iii) Vaduvur Bird Sanctuary (26 km). It is 25 kms from Thanjavur and 30 kms from Thiruvarur. Vaduvur Bird Sanctuary is located in the Vaduvur Lake area and was created in the year 1999. More than 20,000 birds of 40 different species of water birds visits this place during the season. The sanctuary has basic facilities for tourists to stay overnight and watch the birds from the two watch towers available here.

- (iv) 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.
- (v) Udayamarthandapuram Bird Sanctuary (58 km). It is a 45 km² protected area in the District of Tiruvarur. It was created in 1998 and more than 10,000 migratory Birds visit here during monsoon season. Notable among them are Painted Storks, Herons and Open Bill Storks. Best suitable months to visit this sanctuary are November, December, February and March.
- (vi) **Muthupettai Dargah (59 km)**: The seven hundred year old dargah here has many glorious aspects and traditional background. This dargah known as Andavar Shahul Dawood Khamil Oliyullh was built in Marattah style Architecture. Pilgrims beyond the barriers of Caste, creed and religion visit this holy Islamic place of worship.
- (vii) The city of temples has a lot more historically famous and architecturally rich temples to visit. Thiruvarur World Heritage Monument: The Thyagarajaswami Temple, dedicated to Lord Siva is located here. The biggest Temple Car [Chariot] called as "Aazhi Ther" in Tamil, is a specimen of magnificent workmanship and its beauty is still an attraction to many millions of pilgrims. The Car Festival of the temple is celebrated during March-April, every year. Kamalalayam Tank adjacent to the temple in a 25 acres area, is one of the largest temple tanks in the State. Muthupettai fulfills the blessings of Nature and the presence of Bird Sanctuaries in Udhayamarthandapuram and vaduvur attracts the tourist in large numbers. You can have a perfect holiday and have a great time enjoying the wealth of architectural expertise the ancestors possessed.

3. Area Population

157. Alangudi is a village with 650 families residing as per Population Census 2011 and has a population of 2541 of which 1228 are males while 1313 are females. Average Sex Ratio of Alangudi village is 1069 which is higher than Tamil Nadu state average of 996. In 2011, literacy rate of Alangudi village was 85.72 % compared to 80.09 % of Tamil Nadu. In Alangudi village, Schedule Caste constitutes 36.64 % of total population. In Alangudi village out of total population, 1088 were engaged in work activities. Of 1088 workers engaged in Main Work, 135 were cultivators (owner or co-owner) while 486 were Agricultural labors.

4. Languages

158. 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

159. 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

160. 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

161. 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. The site details are given in the Table 3 below along with the proposed site layout in Figure 27.

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

Table 3: Site Details

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



Figure 27: Site Layout

D. Socio-economic and Cultural Environment

1. Trade and Commerce

162. Salem is a major textile center in Tamil Nadu, with more than 125 spinning mills, weaving units, and garment units. The Salem region is rich in mineral ores, with some of the largest magnesite and bauxite deposits in India. Public and private magnesite factories include Burn Standard and Company, Dalmia Magnesites and Tata Refractories. The Leigh Bazaar is the region's largest market for agricultural products. The Tamil Nadu government and the Electronics Corporation of Tamil Nadu are planning a 160-acre (65 ha) IT park in the city. The Steel Authority of India is planning a 250-acre (100 ha) steel special economic zone in its Salem plant, and an electrical and electronics industrial estate is in the Suramangalam area of the city. Presently, the economy is also dependent on tourism business and competition from other towns and other states has altered the potentials of the city leading to reduced growth rates and reduced inflow of floating population.

2. Administration

163. Salem is the headquarters of Salem district. The town was constituted as a municipality in 1867, and was upgraded to a special-grade municipality in 1979 and to a municipal corporation on 1 April 1994. The Salem municipal corporation has 60 wards, each with an elected councilor. The functions of the municipal corporation are divided into six departments: general administration and personnel, engineering, revenue, public health, city planning and information technology (IT). All six departments are governed by a municipal commissioner. Legislative power is vested in the 60-member council, headed by an elected chairperson and assisted by a deputy chairperson. Law and order are maintained by the Salem City subdivision of the Tamil Nadu Police, headed by a Deputy superintendent. Special units include prohibition enforcement, district crime, social justice and human rights, district crime records and a district-level special branch headed by a superintendent of police.

- 164. Important places to visit in Salem:
 - (i) **Kottai Mariamman Temple**. The Kottai Mariamman Temple is one of the oldest pilgrimage centres of Salem City and is situated in the heart of the city and on the banks of River Tirumanimuthar. The presiding deity of his temple is Goddess Kottai Mariamman. The most popular feature of this temple is its Shevapet Mariamman Temple Car Festival, which is held at this temple every year, between the months of July and August and lasts for a week.
 - (ii) **Kalangi Siddhar Temple** is one of the 18 Tamil Siddha temples and is situated at the foot of Kanja Malai. Several perennial wells, small reservoirs and waterfalls are present around this temple; and it is said that the water of these wells have curative powers. On new moon and full moon days, special pujas are also held at this temple.
 - (iii) Yercaud is one of the most well known hill stations of Tamil Nadu, at a distance of 22 km from the city of Salem. These hills form a part of the Servarayan Range in the Eastern Ghats and are situated at an altitude of 1515 m above sea level. The area of these hills is also popular for coffee plantations and orange groves, along with an orchidarium, which is run by the Botanical Survey of India. The highest point at these hills is the site of the Servarayan Temple, due to which, these hills are also sometimes referred to as Shevaroy Hills. It is also home to the Murugar group of temples. The place also has a nearby lake, which is famous as a boating site, and also for its gardens.

- (iv) 1008 Lingam Temple is another popular temple of Salem. This temple is located in Ariyanoor and is under the control of a private department of the Vinayaga Mission. The main feature of this temple is the presence of 1008 Shiva Lingams, with Nandi in the 'Moolasthanam'.
- (v) Kandhasramam is a temple complex situated at a distance of 5 km from the city of Salem. It lies in the extreme northern end of the Jarugu Malai Mountain, on the banks of a stream called Kannimar Odai. This complex was constructed between the years 1970 and 1971, by Santhanandha Brahmendra Sarasvathi Adhyavadhutha Swamy. There are three main deities of this temple, namely Murugan, worshipped as Skandha Guru; Lakshmi, worshipped as Ashtabuja Mahalakshmi; and Parvati, worshipped as Durga Parameshvari.

3. Area Population

165. Salem had a population of 826,267 in the 2011 census. There were 987 females for every 1,000 males, significantly higher than the national average of 929. A total of 79,067 were under age six: 40,570 males and 38,497 females. The city's literacy rate was 76.37 percent, higher than the national average of 72.99 percent. Salem had 215,747 households and a total of 332,147 workers: 1,599 farmers, 3,040 agricultural labourers, 32,597 in household industries, 278,892 other workers, 16,019 part-time workers, 165 part-time farmers, 544 part-time agricultural workers, 1,937 part-time workers in household industries and 13,373 other part-time workers. As per the religious census of 2011, Salem had 89.79% Hindus, 7.48% Muslims, 2.36% Christians, 0.02% Sikhs, 0.01% Buddhists, 0.11% Jains, 0.2% following other religions and 0.02% following no religion or did not indicate any religious preference.

4. Languages

166. In addition to the Tamil language, English, Urdu and Telugu 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

167. The current sewerage system for disposal of sullage is through Underground sewage networks and partially through septic tanks and public conveniences. Salem city has its own sewerage treatment plant which caters to the needs of the entire city. The same shall be maintained for this site.

6. Solid Waste Management

168. A formal collection system from the municipality is present. The solid waste is being dumped collected everyday from different locations of the city and is being recycled. To a small extent the waste is being dumped in dump yards and / or is being incinerated in the open.

7. Site Details

169. 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. The site details are given in Table 4 below along with the proposed site layout in Figure 28.

Table 4: 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 28: Site Layout
E. Socio-economic and Cultural Environment

1. Trade and Commerce

170. Thanjavur district stands unique from time immemorial for its agricultural activities and is rightly acclaimed as the granary of South India lying in the deltaic region of the famous river Cauvery and criss-crossed by lengthy network of irrigation canals. Therefore this coastal district abounds in green paddy fields, tall coconut groves, vast gardens of mango and plantain trees and other verdant vegetation. The major portion of Thanjavur district is covered by Cauvery alluvium and reported to have potential for mineral wealth. Thanjavur is one of the 13 maritime district of Tamilnadu engaged in marine fishing and its fish production is about 5% of the total catch of the State. Presently, the economy is also 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

171. Arulmigu Thingalur Kailasanathar Templeis operated and maintained by Hindu Religious & Charitable Endowments Department. The municipality of Tanjore was created in 1866 as a third grade municipality as per Town Improvements Act 1865 and initially consisted of 12 members. The number was increased to 18 in 1879 and 24 in 1883. In 1897, the members were empowered to elect a Municipal Chairperson to lead them. Tanjore was upgraded to a second grade municipality in 1933 and first grade in 1943. Since 1983, Thanjavur has been a special grade municipality. As of 2008, the municipality covers an area of 36.33 km2 (14.03 sq mi) and has a total of 51 members. The legislative powers are vested in a body of 62 members, one each from the 62 wards. The legislative body is headed by an elected Chairperson assisted by a Deputy Chairperson.

- 172. Important places to visit in Thanjavur (Or Tanjore):
 - Big Temple. The Brihadeeswarar temple, called the Big Temple, is dedicated to (i) Lord Siva. It was built by the great Chola King, Raja Raja I (985-1012 A.D). It is an outstanding example of Chola architecture. Recognizing its unique architectural excellence, UNESCO has declared it a World Heritage Monument. The 64.8 m tall vimanam (tower ove the sanctum sanctorum) is testimony to the engineering skill of the Cholas. In keeping with the size of the temple, it has gigantic "Mahalingam" in the shrine, measuring 4m in height. A monolithic Nandhi chiseled out of a single rock, measures 5.94 m in length, 2.51 m in breadth and 3.66 m in height. It is the second largest Nandhi in India. The Nandhi or bull is the vehicle of Lord Siva. Beautiful Chola fresco paintings adorn the inner walls of the temple. One of the outstanding temples in South India, the Brihadeeswarar temple is the Chola dynast's finest contribution to Dravidian temple architecture. What makes the construction so unique is the variation from the usual temple building style of having a tall gopuram and smaller vimanam. At the Big Temple the vimanam soars high while the gopuram is smaller. The 64.8 m tall, 14 tier pyramid shaped vimanam is raised from a square base and topped by a huge monolithic cupola carved from an 81.3 tonnes block of granite. It was raised with the aid of a 6 km long inclined plane.
 - (ii) **Maratha Palace**. Just a kilometre away from the Brihadeeswarar Temple is a magnificent palace, surrounded by huge fort walls. Dating back to the 14th century A.D., it was built partly by the Nayaks and partly by the Marathas. The Maratha royal family resided in this palace. It is a fascinating building with huge

corridors, spacious halls, decorated rooms, tall observation towers, beautiful stucco works, wonderful fresco painted walls and ceilings, an underground tunnel and intricate carvings. The royal family's sacred "Chandra Mauleeshwarar Temple" is located within the palace walls.

- (iii) **Saraswathi Mahal Library**. The Thanjavur Maharaja Serfoji's Saraswathi Mahal Library is one among the few libraries in the world with texts of the medieval period. It is a treasure house of knowledge carefully fostered and nurtured by successive dynasties of Nayaks and the Marathas of Thanjavur. It contains a rare and valuable collection of manuscripts, books, maps and paintings on all aspects of Art, Culture and Literature, The Encyclopedia Britannica, in its survey of the Libraries of the world, describes it as "The most remarkable library". It was made a Public Library in 1918.
- (iv) Schwartz church The 18th-century Christ Church or Schwartz Church a legacy of Tanjore colonial past stands to the east of the Shivanganga Tank. This church was founded by the Danish Missionary, Reverend Frederik Christian Schwartz, in 1779. When he died in 1798, the enlightened Maratha ruler, Serfoji II, donated a striking marble tablet, made by John Flaxman and this has been placed at the western end of the church. It depicts the dying missionary blessing his royal patron, surrounded by ministers and pupils from the school that he established
- (v) Manora Fort. Rajah Serfoji built this 8 storey victory town in 1814 to commemorate the victory of the British over Napoleon Bonaparte at Waterloo. It is situated on the shore of Bay of Bengal in Sarabendrajanpathinam village about 20km South of Pattukottai town. This ancient fort Monument is styled 'Manora' a derivation from "Minors" of North Indian architecture. This historical monument majestically shooting up in air is 140 ft height. Manora is a pleasing blend of Roman pillar architecture. This hexogen shaped 10 storied fort represents the 19th Century architectural taste of Maratha king Serfoji of Thanjavur. The panoramic view of the sea, the floating boats, breezy coconut trees, scattered fisherman houses take different beautiful shapes at every storey
- (vi) Papanasam In Papanasam (30 km) there are two temples; the Pallaivanatha Swamy temple constructed by the Chola King and the other is the 108 Sivalayam temples. There is also a Granary (storehouse of paddy) which measure 86 ft in width and has a height of 36 ft with a capacity of 3,000 kalam (which is a measure). The Nayaks between 1600 and1634 constructed it. The State Archaeological Department declared it as a monument. One can see the 108 Sivalingams only in the temple in Papanasam.
- (vii) **Swamimalai** Swamimalai (32 km) is one of the six abodes or Arupadaiveedu dedicated to Lord Subramanya.
- (viii) **Uppliyappan Koil.** Uppliyappan Koil is situated at a distance of 6 km from Kumbakonam and 46 km from Thanjavur. Lord Venkatesaperumal like the Tirupathi Balaji is also called Oppiliapper.

3. Area Population

173. According to 2011 census, Thanjavur had a population of 2,22,943 with a sex-ratio of 1,042 females for every 1,000 males, much above the national average of 929. A total of 19,860 were under the age of six, constituting 10,237 males and 9,623 females. The average literacy of the city was 83.14%, compared to the national average of 72.99%. There were a total of 78,005 workers, comprising 803 cultivators, 2,331 main agricultural labourers, 2,746 in house hold industries, 65,211 other workers, 6,914 marginal workers, 110 marginal cultivators, 235

marginal agricultural labourers, 322 marginal workers in household industries and 6,247 other marginal workers.

4. Languages

174. Tamil is the widely spoken language, with the standard dialect being Central Tamil dialect. English, Telugu, Thanjavur Marathi and Saurashtra are other languages spoken in the city. Thanjavur is the cultural and political center of the Thanjavur Marathi people.

5. Sanitation and Sewage Disposal

175. 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

176. 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

177. 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. The site details are given in the Table 5 below along with the proposed site layout in Figure 29.

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

Table 4: Site Details

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



Figure 29: Site Layout

B (v) Socio-economic and Cultural Environment

1. Trade and Commerce

178. Thanjavur district stands unique from time immemorial for its agricultural activities and is rightly acclaimed as the granary of South India lying in the deltaic region of the famous river Cauvery and criss-crossed by lengthy network of irrigation canals. Therefore this coastal district abounds in green paddy fields, tall coconut groves, vast gardens of mango and plantain trees and other verdant vegetation. The major portion of Thanjavur district is covered by Cauvery alluvium and reported to have potential for mineral wealth. Thanjavur is one of the 13 maritime district of Tamilnadu engaged in marine fishing and its fish production is about 5% of the total catch of the State. Presently, the economy is also 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

179. Naganatha Swamy Temple at Thirunageswarm, Thanjavur District is operated and maintained by Hindu Religious & Charitable Endowments Department. The municipality of Tanjore was created in 1866 as a third grade municipality as per Town Improvements Act 1865 and initially consisted of 12 members. The number was increased to 18 in 1879 and 24 in 1883. In 1897, the members were empowered to elect a Municipal Chairperson to lead them. Tanjore was upgraded to a second grade municipality in 1933 and first grade in 1943. Since 1983, Thanjavur has been a special grade municipality. As of 2008, the municipality covers an area of 36.33 km2 (14.03 sq mi) and has a total of 51 members. The legislative powers are vested in a body of 62 members, one each from the 62 wards. The legislative body is headed by an elected Chairperson assisted by a Deputy Chairperson.

- 180. Important places to visit in Thirunageswaram:
 - (i) **Naganathaswamy Temple**. In the temple of Naganathaswamy, the main deity is Shiva who can be seen with his consort Goddess Parvati. The idol of Rahu can be seen in human form in this temple. It is said that malefic planetary effects of Rahu in one's birth chart can cause problems in life. Thus, by praying to Rahu at the Naganathaswamy Temple, one can overcome such misfortunes. The main highlight of the temple is Milk Abhishekam which is performed during Rahu Kalam.
 - (ii) **Oppiliyappan Temple**. Oppiliyappan temple is also a well known temple in Thirunageswaram which is visited by pilgrims all through the year. In this temple, Ramnavami is celebrated in a magnificently. On the last day of Ramnavami, Kanakibishekam and Thirukalyanam are performed on a royal and large scale and a large number of devotees throng to attend these 2 events.
 - (iii) All the 8 Navagraha Sthalas are situated close to Thirunageswaram (which is one amongst the nine Navagraha temples or Sthalas). Thirunallar (for Saturn or Lord Shani), Kanjanoor (for Venus or Lord Sukra), Suryanar Koil (Sun or Lord Surya), Thirunageswaram (Lord Budhan), Thingalur (for Moon or Lord Chandran), Keezhperumpallam (Lord Kethu), Alangudi for (Guru or Jupiter), Vaideeswaran koil (for Mars or Sevai) are located in proximity to Thirunageswaram.

3. Area Population

181. As of 2001 India census, Thirunageswaram had a population of 9,814. Males constitute 49% of the population and females 51%. Thirunageswaram has an average literacy rate of 72%, higher than the national average of 59.5%: male literacy is 79%, and female literacy is 65%. In Thirunageswaram, 11% of the population is under 6 years of age.

4. Languages

182. Tamil is the official language spoken by the local people. Apart from Tamil, English is spoken to an extent.

5. Sanitation and Sewage Disposal

183. 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

184. 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

185. 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. The site details are given in the Table 6 below along with the proposed site layout in Figure 30.

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

Table 5: Site Details

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



Figure 30: Site Layout

F. Socio-economic and Cultural Environment

1. Trade and Commerce

186. 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. The main occupation of Nagapattinam is fishing in the waters of Bay of Bengal. The fish are sold in the daily and weekly fish markets in the town. There is a large number of ice factories for preserving the fish. The industry suffered a setback after the tsunami that struck the coast on 26 December 2004. There is limited agricultural activity, but much agricultural commerce is conducted in the town. A majority of the people are employed in service industry, belonging to the tertiary sector. The town is also the centre of retail provisions trading for the towns and villages surrounding Nagapattinam. Tourism is a major economic driver with the presence of heritage and historic points like Nagore, Velankanni, Sikkal, Kodikkarai, Vedaranyam, Mannargudi and Tharangambadi.

2. Administration

187. Nagapattinam district is having administrative division of 5 taluks, 11 blocks, 434 village panchayats, 8 town panchayats, 4 municipality and 523 revenue villages.

188. Important places to visit in Thiruvenkadu:

(i) Sri Swetharanyeswarar Temple is a Hindu temple located in the town of Thiruvenkadu near Sirkazhi. The main deity is Shiva - Swetharanyeswarar ("lord of white forest") and the goddess is Brahma Vidya ambal. There is a separate Sannidhi for Budha (mercury). The temple is quite large and all four important Saivite saints have sung in praise of this lord. This temple is especially known for its unique incarnate of Lord Shiva called "Agora Murthi". He is one of the main god who is being prayed in this village. Thiruvenkadu. village is also famous for its unique structure of pools in temples. This temple has 3 pools, 3 Gods. It is a belief that who takes bath in all these pools, the one will be free from their problems like diseases, delay in marriage, etc..

3. Area Population

189. According to 2011 census, Nagapattinam had a population of 102,905 with a sex-ratio of 1,026 females for every 1,000 males, much above the national average of 929. A total of 11,884 were under the age of six, constituting 6,089 males and 5,795 females. Scheduled Castes and Scheduled Tribes accounted for 8.67% and 0.62% of the population respectively. The average literacy of the town was 78.74%, compared to the national average of 72.99%. The town had 24688 households.

4. Languages

190. The native language of Thiruvenkadu is Tamil and most of the village people speak Tamil. Thiruvenkadu people use Tamil language for communication.

5. Sanitation and Sewage Disposal

191. The current sewerage system for disposal of sullage is through septic tanks, drainage into River Kaveri and public conveniences. The same shall be maintained for this site.

6. Solid Waste Management

192. 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

193. 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 officials of the location. The site details are given in the Table 7 below along with the proposed site layout in Figure 31.

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

Table 6: Site Details

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



Figure 31: Site Layout

G. Socio-economic and Cultural Environment

1. Trade and Commerce

194. Presently, the economy of Veerapur is solely dependent on tourism & agri-related 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

195. The temple is operated and maintained by Hindu Religious & Charitable Endowments Department. Veerapur is a village panchayat under Manparai Taluk of Trichy District. Since the temples are ancient, the government of Tamilnadu trough the department of HR&CE / Tourism looks after the temples.

196. Important places to visit in Trichy:

- (i) **Rockfort Temples.** Once a part of the Chola kingdom, Tiruchirappalli has a number of exquisitely sculpted temples and fortresses. Most of the temples, including the Rockfort temples, the Ranganathaswamy Temple at Srirangam, the Jambukeswarar Temple at Thiruvanaikkaval, the Samayapuram Mariamman Temple, the Erumbeeswarar Temple,Ukrakaliamman temple in Tennur and the temples in Urayur, are built in the Dravidian style of architecture; the Ranganathaswamy Temple and Jambukeswarar Temple are often counted among the best examples of this style. The rock-cut cave temples of the Rockfort, along with the gateway and the Erumbeeswarar Temple, are listed as monuments of national importance by the Archaeological Survey of India.
- (ii) Rockfort Fortress. Considered one of the symbols of Tiruchirappalli, the Rock fort is a fortress which stands atop a 273-foot-high rock. It consists of a set of monolithic rocks accommodating many rock-cut cave temples. Originally built by the Pallavas, it was later reconstructed by the Madurai Nayaks and Vijayanagara rulers. The temple complex has three shrines, two of which are dedicated to Lord Ganesha, one at the foot and the Ucchi Pillayar Temple at the top, and the Thayumanavar Temple between them. The Thayumanavar temple, the largest of the three, houses a shrine for Parvati as well as the main deity. The Rock fort is visible from almost every part of the city's north. The Teppakulam at the foot of the Rock fort is surrounded by bazaars. It has a mandapa at its centre and has facilities for boat riding.
- (iii) **Ranganathaswamy Temple.** The Ranganathaswamy Temple, dedicated to the Hindu god Vishnu, is located on the island of Srirangam. Often cited as the largest functioning Hindu temple in the world, it has a perimeter of 4,116 metres (13,504 ft) and occupies 156 acres (630,000 m²). Considered to be among the 108 Divya Desams (Holy shrines of Lord Vishnu), the temple is believed to house the mortal remains of the Vaishnavite saint and Philosopher Ramanujacharya. Originally built by the Cholas, the temple was later renovated by the Pandyas, the Hoysalas, the Madurai Nayaks and the Vijayanagar Empire between the 9th and 16th centuries AD. There are 21 Gopurams (towers), of which the Rajagopuram is 236 feet (72 m). According to the Limca Book of Records, it was the tallest temple tower in the world until 1999.
- (iv) **Jambukeswarar Temple & Erumbeeswarar Temple.** The Jambukeswarar Temple at Thiruvanaikkaval and the Erumbeeswarar Temple at Thiruverumbur

were built in the rule of the Medieval Cholas. The Jambukeswarar Temple is one of the Pancha Bhootha Stalams dedicated to Lord Shiva; it is the fifth largest temple complex in Tamil Nadu. The city's main mosque is the Nadir Shah Mosque or Nathar Shah mosque, which encloses the tomb of the 10th century Muslim saint Nadir Shah. The Christ Church constructed by the German Protestant missionary Christian Friedrich Schwarz in 1766 and the Our Lady of Lourdes Church are noted examples of Gothic Revival architecture in the city.

(v) **Chokkanatha Nayak Palace.** The Chokkanatha Nayak Palace, which houses the Rani Mangammal Mahal, was built by the Madurai Nayaks in the 17th century; it has now been converted into a museum. The Nawab's palace, the Railway Heritage Centre, the Upper Anaicut constructed by Sir Arthur Cotton, and the world's oldest functional dam, the Grand Anaicut, are some of the other important structures in Tiruchirappalli.

3. Area Population

197. According to the 2011 Indian census, Tiruchirappalli had a population of 8,47,387 9.4% of whom were under the age of six, living in 2,14,529 families within the municipal corporation limits. The recorded population density was 5,768/km2 (14,940/sq mi) while the sex ratio was 975 males for every 1,000 females. The Tiruchirappalli urban agglomeration had a population of 1,022,518, and was ranked the fourth largest in Tamil Nadu and the 53rd in India as of 2011. The city had an average literacy rate of 91.37%, significantly higher than the national average of 73.00%.

4. Languages

198. The most widely spoken language is Tamil, but there are significant numbers of Telugu, Gujarati, Kannada, Malayalam and Hindi speakers. The standard dialect of Tamil spoken is the Central Tamil dialect. Saurashtra is spoken by the Patnūlkarars who migrated from Gujarat in the 16th century. There is also a substantial population of Anglo-Indians and Sri Lankan Tamil migrants, most of whom are housed in refugee camps on the outskirts of the city.

5. Sanitation and Sewage Disposal

199. 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

200. 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

201. 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. The site details are given in the Table 8 below along with the proposed site layout in Figure 32.

Table 7: 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 32: Site Layout

H. Socio-economic and Cultural Environment

1. Trade and Commerce

202. 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

203. Nagapattinam district is having administrative division of 5 taluks, 11 blocks, 434 village panchayats, 8 town panchayats, 4 municipality and 523 revenue villages (Plate-I). Blocks - No. of Panchayats: Nagapattinam (29), Thirumarugal (39), Kilvelur (38), Keelaiyur (27), Vedaranyam (36), Thalanayar (24), Mayiladuthurai (54), Kuthalam (51), Sembanarkoil (57), Sirkali (37) and Kollidam (42). The municipality has 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.

- 204. Important places to visit in Nagapattinam district:
 - Nagapattinam's Temples. The district came into existence in the year 1991 with (i) its headquarter in Nagappattinam town. Its long stretch of beach runs along the Bay of Bengal for 188 km. Nagappattinam boasts of having one of the most thriving harbours of India. It has Shri Kayahorana Swami Neelayathatchi Amman Temple, Sowriraja Perumal Temple, and Nellukkadai Mariamman Temple. The mini museum, the towering lighthouse and the long beautiful beach are some of the worth visiting places in this city. The pillar located in front of the district collectorate stands for the achievement of the administration along with the citizens of this district in taking the guinness record achievement of planting the maximum no. of saplings in 24 hours. A beautiful Muragan Temple dedicated to Lord Singaravelan is housed in a large complex. The pillars of this temple are adorned with intricate and exquisite carvings. The beautiful paintings of a bygone era are amazing in colour and portrayal. Beside this temple has the shrine of Siva. Vishnu and Hanuman. It is a rare combination, indeed. Worship in this temple removes all the hurdles of the devotees, it is believed. Thirumullaivasal town is 14Km. east of Sirkali. It is popular for its fine beach, which is full of natural beauty. This town has an ancient temple. The presiding deity of this temple is Arulmigu Mullaivananathar. This temple is glorified in divine songs.
 - (ii) **Muthupet Mangrove Wetland.** The Muthupet mangrove wetland is located in the Southernmost part of the Cauvery delta with Palk Strait in the south and extensive mudflats in the north. Many of the drainage arteries of the Cauvery River, namely, Pamini, Korayar, Marakakoryar, Pattuvanachi and Nasuvini, empty their water into the Muthupet mangrove wetland. The Muthupet mangrove wetland comprises healthy and degraded mangroves, large lagoon and canals, besides creeks and manmade fishing canals. Muthupet mangrove wetland is about 12,000 ha and for administrative purposes it is divided into 6 Reserve Forests. The presence of two large lagoons of about 1,700ha which are

contiguous, is one of the characteristic features of the Muthupet mangrove wetlands. The data also show that the area of the healthy mangrove forest is only about 1855 ha whereas, nearly 7,178 ha of mangrove forest is in degraded condition. Only 5 mangrove species namely, Acanthus illicifolius, Agiceras corniculatum, Avicennia marina, Excoecaria agallocha and Luminitzera racemosa are present in the Muthupet mangrove wetland. Among them, Avicennia marina, which is locally called Alaiyathi is dominant, constituting more than 95% of the tree population.

(iii) **Places of Tourist Attraction** Poompuhar (Sirkazhi block), Tharangampadi (Sembanarkoil block), Velankanni (Velankanni block), Nagore (Nagapattinam block) and Point Calimere (Vedaranniyam block) are the main tourist spots in the district. The first 4 tourist spots are visited throughout the year and the last tourist spot is visited from August to March. The foreign tourist arrivals have fluctuations and domestic tourist arrivals have been steadily increasing except in the years 1992-93 and the tourist arrivals both domestic and foreign are estimated at 2,99,150 during 1996. These five tourist spots are also included in the tourist circuits identified by the Tourism Department.

3. Area Population

205. According to 2011 census, Nagapattinam had a population of 102,905 with a sex-ratio of 1,026 females for every 1,000 males, much above the national average of 929. A total of 11,884 were under the age of six, constituting 6,089 males and 5,795 females. The average literacy of the town was 78.74%, compared to the national average of 72.99%. The town had 24688 households. There were 33,532 workers, comprising 209 cultivators, 320 main agricultural labourers, 605 in house hold industries, 29,875 other workers, 2,523 marginal workers, 35 marginal cultivators, 130 marginal agricultural labourers, 64 marginal workers in household industries and 2,294 other marginal workers. 61. 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. Languages

206. The languages, which are mostly spoken by the Residents of Nagapattinam, is mainly Tamil. The people staying in the urban areas have some knowledge of English.

5. Sanitation and Sewage Disposal

207. The process currently adopted in the city for sewage disposal is through septic tanks and public conveniences. The same shall be maintained for this site.

6. Solid Waste Management

208. Solid waste is being collected dumped in dump yards and / or is being incinerated in the open.

7. Site Details

209. 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 officials of the temple. The site details are given in the Table 9 below along with the proposed site layout in Figure 33.

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

Table 9: Site Details

Notes: Protected Area includes wildlife sanctuary, bird sanctuary, or national park; CRZ=Coastal Regulation Zone. * The distance from subproject location to nearest coastal zone is 5 km.



Figure 33: Site Layout

V. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

210. 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.

211. 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.

212. **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.

213. 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.

214. **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 landscape 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

215. 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;

216. 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

217. **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.

- 218. **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

219. **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.

220. **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.

221. **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.

222. 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.

223. **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.

224. 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.

225. **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.

226. Summary of pre-construction activities is presented in Table 10. 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.

Parameters	Mitigation Measures
Consents, permits, clearances, no	 Obtain all necessary consents, permits, clearance, NOCs, etc. prior to start of civil works.
objection certificate (NOC),	 Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc.
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.

 Table 10: Summary of Pre-Construction Mitigation Measures

Parameters	Mitigation Measures
Social and Cultural	Consult Archaeological Survey of India or State Department of Archaeology to
Resources	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	• Will not promote instability and result in destruction of property, vegetation,
construction work	irrigation, and drinking water supply systems, etc.
camps, areas for	• Residential areas will not be considered so as to protect the human
stockpile, storage	environment (i.e., to curb accident risks, health risks due to air and water
and disposal	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	 Use quarry sites and sources permitted by government.
construction	 Verify suitability of all material sources and obtain approval from PIU/PMSC.
materials	• 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.
	• Notity attected 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

227. 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.

228. 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.

229. 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.

230. 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.

231. 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.

232. **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.

233. **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.

234. **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 control" 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.

235. **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 11 (typical noise levels of principal construction equipment).

Table TT. 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

Table 11: Typical Noise Levels of Principal Construction Equipment

Clearing		Structure Construction	
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		LANDSCAPING 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

- 236. 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.

237. **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

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.

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 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 ethnobotanical resources. Works must be stopped immediately until such time chance finds are cleared by experts.

238. **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.

Impacts on Occupational Health and Safety. Residential accommodation for workers is 239. 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%2BOccupation al%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.

240. **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.

Determinel

- (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.

241. **Summary of Mitigation Measures during Construction**. Table 12 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.

Potential		
Impact	Mitigation Measures	
Erosion	• Save topsoil removed during excavation and use to reclaim disturbed areas, as	
hazards	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 mapiter ROWs to assess precion 	
	Obere and metable better being discharge discharge and authority metable	
	• Clean and maintain catch basins, drainage ditches, and cuiverts regularly.	
	• Conduct routine site inspections to assess the effectiveness of and the	
	maintenance requirements for erosion and sediment control systems.	
Impacts on	• Schedule civil works during non-monsoon season, to the maximum extent possible.	
water quality	• 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	

 Table 12: Summary of Mitigation Measures during Construction Phase

Potential Impact	Mitigation Measures
impact	drainages nallabs or any water body
	Inspect all vehicles daily for fluid looks before leaving the vehicle staging area, and
	repair any leaks before the vehicle resumes operation.
Impacts on air	 Conduct regular water spraying on earth piles, trenches and sand piles.
quality	 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 BOWs cannot be done immediately.
	 Maintain construction vehicles and obtain "pollution under control" certificate from TNSPCB
	 Obtain CFE and CFO for hot mix plants, crushers, diesel generators, etc., if to be used in the project
Noise and	 Limit construction activities in temple complexes and other important sites to
vibrations	davtime only
impacts	 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
	 Ensure vehicles comply with Government of India noise limits for vehicles. The test
	method to be followed shall be 15:3028-1998.
	Provide sound barriers towards the Aviary site and restrict holsy activities in day time only
Impacts on	 Conduct site induction and environmental awareness.
flora and	Limit activities within the work area.
fauna	• 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	 Ensure no damage to structures/properties near construction zone.
physical	• Provide walkways and metal sheets where required to maintain access of people
resources	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

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
	 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 bauling activities during non-peak bours. Communicate read 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.
Impacts on	Prepare and implement a waste management plan. Manage solid waste according
generation	to the following hierarchy: reuse, recycling and disposal. Include in waste management plan designated/approved disposal areas
gonoration	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, ompty containers, oils, lubricants, and other similar items)
	 Prohibit disposal of any material or wastes (including human waste) into drainage
	nallah, or watercourse.
Impacts on	Comply with IFC EHS Guidelines on Occupational Health and Safety
occupational	• Disallow worker exposure to noise level greater than 85 dBA for duration of more
safety	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
	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;
	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.

Potential Impact	Mitigation Measures
	 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- economic activities	 Leave space for access between mounds of soil. Provide walkways and metal sheets where required to maintain access to 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 Plan" has to be chalked out in consultation with the District Administration prior to start of work.

242. 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

- 243. 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

244. 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

245. Public consultation⁴ 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.

246. 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

247. 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

248. 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.

249. 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.

250. 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

⁴ 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.

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 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.

251. 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

252. 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.

253. 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.

254. 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.

255. 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.

256. 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.

257. 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).

258. 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.

259. 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

260. Local Grievance Committee (LGC). In this LGC has worked with NGO, SHG, Line Agency, Special invitee.

261. 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.

262. 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

263. 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 34: 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

264. 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.⁵

VIII. ENVIRONMENTAL MANAGEMENT PLAN

265. 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).

266. 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.

267. 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

268. 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;

⁵ Accountability Mechanism. <u>http://www.adb.org/Accountability-Mechanism/default.asp</u>.

- 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.

269. The contractor's conformity with contract procedures and specifications during 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 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.

Box 2: Terms of Reference of Safeguards Specialist (Environment) of PMSC

- 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-

- 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

270. 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.

271. 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.

272. 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

273. Tables 13 to 16 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.

Parameters	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for	Responsible for Supervision	Frequency of	Source of Funds to Implement Mitigation Measures
Consents,	Obtain all necessary consents,	Consents,	Project Management Init	Executing	check consent	PMU
clearances, no objection certificate (NOC), etc.	prior to start of civil works.	clearance, NOCs, etc.	(PMU)	report to ADB in environmental monitoring report (EMR)	establishments (CFEs), permits, clearance, prior to start of civil works	
	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

Table 13: 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
	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 the amount of land disturbed as much as 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. Use existing roads, disturbed areas, and borrow pits and quarries when possible. 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

		Parameter/ Indicator of	Responsible for	Responsible for	Frequency of	Source of Funds to Implement Mitigation
Parameters	Mitigation Measures	Compliance	Implementation	Supervision	Monitoring	Measures
	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		utilities to be shifted; (ii) contingency plan			
	utility.					
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	Chance find protocol	 PMSC to consult ASI or TN State Archaeology Department PMSC to develop protocol for chance finds 	ΡΜυ	to be included in updated IEE report	PMSC
	conserved.		D 1400			
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

		Parameter/ Indicator of	Responsible for	Responsible for	Frequency of	Source of Funds to Implement Mitigation
Parameters	Mitigation Measures	Compliance	Implementation	Supervision	Monitoring	Measures
work camps, areas for stockpile, storage and disposal	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.	construction work camps, areas for stockpile, storage and disposal Waste management plan	potential sites PMSC to inspect sites proposed by contractor if not included in pre- approved sites	PIU	report	
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	I raffic	Contractor	I PIU and	to be included in	Contractor

		Parameter/		Responsible		Source of Funds to Implement
Parameters	Mitigation Measures	Indicator of Compliance	Responsible for	for Supervision	Frequency of Monitoring	Mitigation Measures
Parameters	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 along the alignments of raw and clear water transmission routes during the construction phase.	management plan		PMSC	updated IEE report	Measures
health and safety	Guidelines on Occupational Health and Safety	(H&S) plan	Contractor	PMU and PMSC	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
Public	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 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.	- Disclosure	PMI Land PMSC	PMSC and	- During undating	PMII
consultations	dissemination, consultations, and involvement/participation of stakeholders during project implementation.	- Disclosure records - Consultations	PIU and PMSC Temple administrators Contractor	PMSC	of IEE Report - During preparation of site- and activity- specific plans as per EMP - Prior to start of construction - During construction	Contractor to allocate funds to support

		Parameter/		Responsible		
Potential		Indicator of	Responsible for	for	Frequency of	Source of
Impact	Mitigation Measures	Compliance	Implementation	Supervision	Monitoring	Funds
Erosion	Save topsoil removed	Erosion control and	Contractor	PIU and	- daily visual	Contractor
hazards	during excavation and use to	re-vegetation plan		PMSC	inspection by	
	reclaim disturbed areas, as soon				contractor	
	as it is possible to do so.			PIU to submit	supervisor	
	Use dust abatement such			EMP	and/or	
	as water spraying to minimize			monitoring	environment	
	windblown erosion.			report to	specialist	
	Provide temporary			PMU	- Weekly visual	
	stabilization of				PMSC (more	
	disturbed/excavated areas that				froquent	
	are not actively under				during	
	Apply proving controls				monsoon	
	• Apply elosion controls				season and if	
	leading to the water bodies				corrective	
	Maintain vegetative cover				action is	
	within road BOWs to prevent				required)	
	erosion and periodically monitor				- random	
	ROWs to assess erosion.				inspection by	
	Clean and maintain catch				PMU, PIU,	
	basins, drainage ditches, and				PMSC and/or	
	culverts regularly.				PMSC	
	Conduct routine site					
	inspections to assess the					
	effectiveness of and the					
	maintenance requirements for					
	erosion and sediment control					
	systems.					
Impacts on	Schedule construction	Work schedule	Contractor	PIU and	- daily	
water quality	activities during non-monsoon			PMSC	inspection by	
	season, to the maximum extent				contractor	
			4		supervisor and/or	
	• Ensure drainages and	Visual inspection		monitoring	anu/ui onvironmont	
	water bodies within the			monitoring	environment	

Table 14: Environment Management Plan for Construction Phase

		Parameter/		Responsible		
Potential		Indicator of	Responsible for	for	Frequency of	Source of
Impact	Mitigation Measures	Compliance	Implementation	Supervision	Monitoring	Funds
	construction zones are kept free of obstructions.			report to PMU PMU PMSC (more frequent during monsoon season and if corrective action is required) - random inspection by PMU, PIU, PMSC and/or PMSC	 specialist weekly visual inspection by PMSC (more frequent 	
	• Keep loose soil material and stockpiles out of drains and flow-lines.	Visual inspection				
	• Avoid stockpiling of excavated and construction materials (sand, gravel, cement, etc.) unless covered by tarpaulins or plastic sheets.	Visual inspection			auring monsoon season and if corrective action is required)	
	Re-use/utilize, to maximum extent possible, excavated materials.	condition in waste management plan				
	• 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				

		Parameter/		Responsible		
Potential		Indicator of	Responsible for	for	Frequency of	Source of
Impact	Mitigation Measures	Compliance	Implementation	Supervision	Monitoring	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	Contractor
	Conduct regular visual Visual inspection inspection in the construction zones to ensure no excessive dust emissions.			environment specialist - weekly visual inspection by PMSC (more		
 Maintain construction vehicles and obtain "pollution under control" certificate from BSPCB. Obtain CFE and CFO for hot mix plants, crushers, diesel generators, etc., if to be used in the project. 	PUC certificates			frequent during dry season and if corrective		
	Consent to establish (CTE) and Consent to operate (CTO)			action is required) - random 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-	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			generating activities and if corrective	

		Parameter/		Responsible		
Potential		Indicator of	Responsible for	for	Frequency of	Source of
Impact	Mitigation Measures	Compliance	Implementation	Supervision	Monitoring	Funds
-	mufflers.	•	•		action is	
	• Avoid loud random noise	zero incidence			required)	
	from sirens, air compression, etc.				- random	
	Require drivers that horns	feedback from			inspection by	
	not be used unless it is necessary	receptors within			PMU, PIU,	
	to warn other road users or	direct and direct			PMSC and/or	
	animals of the vehicle's approach.	impact zone			PMSC	
	• If specific noise	- Complaints				
	complaints are received during	addressed				
	construction, the contractor may	satisfactory				
	be required to implement one or	- Grievance				
	more of the following noise	Redress				
	mitigation measures, as directed	Mechanicm (GRM)				
	by the project manager:	records				
	Locate stationary					
	from poarby poiso-sonsitivo					
	properties such as the hospital					
	as possible					
	Shut off idling equipment					
	Beschedule construction					
	operations to avoid periods of					
	noise annoyance identified in the					
	complaint.					
	Notify nearby residents					
	whenever extremely noisy work					
	will be occurring.					
Impacts on	Conduct site induction	Records	Contractor	PIU and	- daily	Contractor
flora and	and environmental awareness.			PMSC	inspection by	
tauna	• Limit activities within the	Barricades along			contractor	
	work area.	excavation works			supervisor	
	Replant trees in the area	-Number and			environment	
u ti F	using minimum ratio of 2 new	species approved			specialist	
	trees for every 1 tree cut.	by Tamil Nadu			- weekly vieual	
	Replacement species must be	State Forest			inspection by	
	approved by Chief Wildlife	Department				

		Parameter/		Responsible		
Potential		Indicator of	Responsible for	for	Frequency of	Source of
Impact	Mitigation Measures	Compliance	Implementation	Supervision	Monitoring	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. Provide sign boards to inform nature and duration of construction works and contact numbers for concerns/complaints. Increase the workforce in WTP components near the hospital and other sensitive receptors. Implement good housekeeping. Remove wastes immediately. Ensure workers will not use nearby/adjacent areas as toilet facility. Coordinate with PIU/PMSC for transportation routes and schedule Schedule 	 Visual inspection any impact should be addressed by project resettlement plan no complaints received photo- documentation Records of workers deployment Work schedule Visual inspection No stockpiled/ stored wastes No complaints received Sanitation facilities for use of workers Approved routes in traffic 	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

		Parameter/		Responsible		
Potential		Indicator of	Responsible for	for	Frequency of	Source of
Impact	Mitigation Measures	Compliance	Implementation	Supervision	Monitorina	Funds
	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

		Parameter/		Responsible		
Potential		Indicator of	Responsible for	for	Frequency of	Source of
Impact	Mitigation Measures	Compliance	Implementation	Supervision	Monitoring	Funds
Impacts on	 empty containers, oils, lubricants, and other similar items). Prohibit disposal of any material or wastes (including human waste) into drainage, nallah, or watercourse. 	- Visual inspection	Contractor	PILL and	- daily	Contractor
occupational health and safety	Environmental, Health and Safety (EHS) Guidelines on Occupational Health and Safety (OHS)	- Records	Contractor	PMSC	inspection by contractor supervisor	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 			and/or environment specialist - weekly visual inspection by PMSC (more frequent if	
	• 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			corrective action is required) - random inspection by PMU, PIU, PMSC and/or	
	• 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 			PMSC	
	Provide medical insurance coverage for workers	Records				
	Secure construction zone from unauthorized intrusion and accident risks.	- Area secured - Trenches barricaded				
	 Provide supplies of 	- Supply of water				

		Parameter/		Responsible		
Potential		Indicator of	Responsible for	for	Frequency of	Source of
Impact	Mitigation Measures	Compliance	Implementation	Supervision	Monitoring	Funds
	potable drinking water.					
	 Provide clean eating 	- Workers area				
	areas where workers are not					
	exposed to hazardous or noxious					
	substances.					
	Provide visitor orientation	- Records				
	if visitors to the site can gain	- Condition in H&S				
	access to areas where hazardous	plan				
	conditions or substances may be					
	present. Ensure also that visitor/s					
	uposcorted					
	• Ensure the visibility of	- Visual inspection				
	workers through their use of high	- Condition in H&S				
	visibility vests when working in or	plan				
	walking through heavy equipment	P				
	operating areas.					
	• Ensure moving equipment	- Construction				
	is outfitted with audible back-up	vehicles				
	alarms.	- Condition in H&S				
		plan				
	• Mark and provide sign	- Visible and				
	boards in the construction zone,	understandable				
	and areas for storage and	sign boards in				
	accordance with international	- H&S nlan				
	standards and be well known to	includes				
	and easily understood by workers.	appropriate signs				
	visitors, and the general public as	for each hazard				
	appropriate.	present				
Impacts on	Provide sign boards for	Visible and	Contractor	PIU and	- daily	Contractor
socio-	pedestrians to inform nature and	understandable		PMSC	inspection by	
economic	duration of construction works and	sign boards in			contractor	
activities	contact numbers for	construction zone			supervisor -	
	concerns/complaints.				weekly visual	
	• Employ at least 50% of	Employment			inspection by	
		1		1	PMSC (more	

Potential Impact	Mitigation Measures	Parameter/ Indicator of Compliance	Responsible for Implementation	Responsible for Supervision	Frequency of Monitoring	Source of Funds
	the labor force, or to the maximum extent, local persons within the 2- km immediate area if manpower is available.	records			frequent if corrective action is required) - random inspection by PMU, PIU, PMCC	

Table 15: 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 revegetation 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

274. Table 16 summarizes site and activity specific plans to be prepared as per EMP tables.

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

Table 16: 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	H&S plan	Occupational health and safety	Contractor	Contractor

C. Environmental Monitoring Plan

275. 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.

276. Table 17 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.

277. 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.

	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, BOD, COD, Faecal Coliform, Ammonia, Nitrogen	Locations to be decided during detailed design	Twice a year (pre- monsoon and post- monsoon) for the entire period of construction	Contractor, to be monitored by an agency engaged with approval using and under NABL Accreditation norms
5	Noise Levels	Construction	Equivalent Day	All	Once in a	Contractor, to

Table 17: Environmental Monitoring Plan

			Parameters to			
	Attributes	Stage	be Monitored	Location	Frequency	Responsibility
		and Operation Stage	and Night Time Noise Levels	Construction sites	season during construction stage	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

278. 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 Programme 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 18 & 19 below. This training program is intended for the entire destination and is not just specific to this package.

Table 18: Training Modules for Environmental Management (common for entire project)

Program	Description	Participants	Form of Training	Durati on/ Locati on	Training Conducting Agency
A. Pre-Construc	tion Stage				
 Sens 	 Introduction 	Tourism/Forest/	Worksho	•	 Enviro
itization	to Environment:	Roads/Culture	р		nmental
Workshop	Basic	Department Officials,		Workin	Specialist of
	Concept of	Project Director and		g Day	the PMSC and
	environment	Environmental Specialist			PMU

Program	Description	Participants	Form of Training	Durati on/ Locati on	Training Conducting Agency
	Environment tal Regulations and Statutory requirements as per Govt. of India and ADB				
B. Construction	Stage				
• Mod ule 1	 Roles and Responsibilities of officials/contractors/c onsultants towards protection of environment Implementa tion Arrangements 	• Engineers and staff of line depts. of GoTN, and PMU/PIU (including the Environmental Specialist)	Lecture/I nteractive Sessions	• Workin g Day	• Safeg uards Specialist of the PMSC and PMU
• Mod ule 2	 Monitoring and Reporting System 	• Engineers and staff of implementing agencies and PMU/ PIU (including ES)	• Lecture / Interactive Sessions	• Workin g Day	• Safeg uards Specialist of the PMSC and PMSC

Table 19: Training Modules for Environmental Management

					Training
			Form of	Duration/	Conducting
Programme	Description	Participants	Training	Location	Agency
A. Pre-Constru	uction Stage				
Sensitization	Introduction to	Tourism /HR&CE	Lectures	1/2	Environmental
Workshop	Environment: Basic	Department	cum	Working	Specialist of
	Concept of	Officials, Project	interaction	Day	the PMSC
	Environmental	Director and	&		
	Regulations, Guidelines,	Environmental	Workshop		
	EIA Notification, process	Specialist of the			
	and methodology for IEE,	PMU/PIU and			
	EMPs and their use and	PMSC			
	Statutory requirements				
	as per Government of				
	India and ADB.				
Session I				-	
Module I	Introduction to	PMU/PIU	Lecture	1	Safeguards
	Environment: Basic	(including the		Working	Specialist of
	Concept of Environment	ES), PMSC and		Day	the PMSC
	Safeguards Regulations	Engineering staff			
	and Statutory	of the			
	requirements as per	implementing			
	Government of India and	Agencies			
	ADB guidelines on				
	cultural resources,				
	Environmental				
	considerations in				
	planning, design and				
	implementing projects.				

					Training	
	_	_	Form of	Duration/	Conducting	
Programme	Description	Participants	Training	Location	Agency	
	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.	(including the ES) and Engineering staff of Tourism Dept.	Workshop	Working Day	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-tourism and training and awareness building	Local community groups, NGOs	Lecture / Interactive sessions	½ Working Day	Institutes such as the Wild Life Institute of India	
B. Construction Stage						
Dession II Modulo VI Polo during Construction Engineers and Leasture / 1/2						
	Roles and Responsibilities of Officials / Contractors / Consultants towards protection of	Staff of Line Departments of the Govt. of Tamil Nadu and PMU/PIU	Interactive	Working Day	Specialist of the PMSC	

			_		Training
Programmo	Description	Participante	Form of	Duration/	Conducting
riogramme	Environment Implementation Arrangements Monitoring Mechanisms	(including the ES)	Training	Location	Agency
Session III			1		
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 and their applicability, possible corrective actions, reporting requirements and mechanisms	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

E. Environmental Management Plan Implementation Cost

279. 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.

280. 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.

281. 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 20 below.

-									
	Particulars	Stages	Unit	Total	Rate	Cost	Source of		
		_		Number	(₹)	(₹)	Fund		
A. Monitoring Measures									
1	Air quality	Detailed	Per	1	10,000	10,000	PMU		
	monitoring	design	sample						
2	Noise Levels -	Detailed	Per	1	4,000	4,000	PMU		
	silence zones	design	location						
3	Ambient Air Quality	Construction	Per	4	10,000	40,000	Contractor		
			Sample				budget		
4	Ambient Noise	Construction	Per	6	4,000	24,000	Contractor		
	Quality		Sample				budget		
Sub- Total (A)					78,000				
В.	B. Capacity Building – Training cost								
1	Sensitization	Pre-	L.S			1,50,000	PMU		
	Workshop	Construction							
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				

Table 20: Indicative Environmental Management Plan Budget

IX. FINDINGS AND RECOMMENDATIONS

282. 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 Kallasanathar Swamy Temple at Thingalur Village in Thanjavur District; (e) Naganatha Swamy Temple at Thirukoit; (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.

283. 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.

284. 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

The IEE carried out for the subproject shows that the proposed Development and 285. 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 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.

286. 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).

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 (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: Development and Improvement of Infrastructure Facilities at Arulmigu Kallalagar Thirukoil, Alagarkoil, Melur Taluk, Madurai 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 10 m away from the main temple area. 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 HR&CE, 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 1 location 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 at Arulmigu Kallalagar Thirukoil, Alagarkoil, Madurai 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: AruImigu Kallalagar Temple, Alagarkoil

Name of Sub-project: Development and Improvement of Infrastructure Facilities at Arulmigu Kallalagar Thirukoil, Alagarkoil in Madurai District

Sr. No.	Name	Occupation	Contact Details	Signature
1	P. Periyaballane Slyan	Muo	9842270541	ppin .
2	Dr. Londiago	MELVE	946510 8181	1.1. Mary
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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: Development and Improvement of Infrastructure Facilities at Arulmigu Abathsagayeswarar Temple at Alangudi Village, Thiruvarur 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 about 10 m away from the main temple area. This site is barren and free from any encroachments. This property is in the possession of the Department of HR&CE, 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 the infrastructure development for the temple at Alangudi.

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

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Participants of Public Consultation

ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT: Alangudi

Name of Sub-project:Development and Improvement of Infrastructure Facilities at Alangudi in Thiruvarur District

Sr. No.	Name	Occupation	Contact Details	Signature
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Appendix 1(c) : 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: 31.07.2017

Name of the work: Development and Improvement of Infrastructure Facilities at Arulmigu Kumaragiri Dhandayudhabani Swamy Thirukkoil at Ammapet in Salem District.

Name of the Person Visited the site: Mr. Anil Kumar Panda (Safeguard Specialist - Environmental and Social) and Mr. Kiran Kumar (Field Engineer)

Description of the Site: The site is about 7 km from the CBD and is part of Salem City. The site is free from encumbrances and is freely available with the Govt. of Tamilnadu. Further, there is no necessity of any utility shifting & cutting of trees. The DSC has carried out a field visit and has interacted with the present manager of the Tamilnadu Hotel. Figures-A&B below were taken during site visit.

Soil sample collection: Soil samples have been collected at different depths in 1 location at the 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 Dormitory hall and other facilities at Ammapet, Salem.

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

BOREWELL AND TOILET BLOCK PROPOSED SPOT


ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT: A/M.KUMARAGIRI DHANDAYUTHAPANI SWAMY TEMPLE

Name of Sub-project: Development and Improvement of Infrastructure Facilities at A/M.KUMARAGIRI DHANDAYUTHAPANI SWAMY TEMPLE in SALEM District

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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 (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: Development and Improvement of Infrastructure Facilities at Arulmigu Kailasanathar Swamy Temple at Thingalur Village in Thanjavur District, Tamilnadu

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 barren and free from any encroachments. The property boundaries are clearly marked. This property is in the possession of the Department of HR&CE, Government of Tamilnadu. Hence, there is no requirement for any land to be acquired. Figures-A&B given below have been taken at site during the public consultation.

Soil sample collection: Soil samples have been collected at different depths in 1 location 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 Pilgrims' Rest House at Thingalur.

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



ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT: Thingalur

Name of Sub-project:Development and Improvement of Infrastructure Facilities at ThingalurinThanjavur District

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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 (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: Development and Improvement of Infrastructure Facilities at Naganatha Swamy Temple at Thirunageswarm, Thanjavur District, Tamilnadu

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 next to the temple. The site is very close to the Bitumen concrete approach road. It is separated from the temple compound by compound wall in between. 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 HR&CE, Government of Tamilnadu. Hence, there is no requirement for any land to be acquired. The figures-A&B below were taken at site during the 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 Thirunageswaram 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 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

ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT: Thirunageswaram

Name of Sub-project:Development and Improvement of Infrastructure Facilities at Thirunageswaram in Thanjavur District

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Appendix 1(f) : 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: 08.06.2017

Name of the work: Development and Improvement of Infrastructure Facilities at Sri Swetharanyeswarar Temple at Thiruvenkadu, Nagapattinam District, Tamil Nadu.

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 road/compound wall in between. 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 HR&CE, 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 infrastructure development for Pilgrims' Rest House.

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

ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT: Thiruvenkadu

Name of Sub-project:Development and Improvement of Infrastructure Facilities at Thiruvenkadu in Nagapattinam District

Sr. No.	Name	Occupation	Contact Details	Signature
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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 (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: 31.07.2017

Name of the work: Development and Improvement of Infrastructure Facilities at Veerapur, Tiruchirappalli District, Tamilnadu

Name of the Person Visited the site: Mr. Anil Kumar Panda (Safeguard Specialist - Environmental and Social) and Mr. Kiran Kumar (Field Engineer)

Description of the Site: The site is located 50-100 m away from the temple. The site is very close to the Bitumen concrete approach road. It is separated from the temple compound by barren land in between. 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 HR&CE, 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 infrastructure development for Tonsure Hall / Dormitory Hall.

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

ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT: Veerapur

Name of Sub-project:Development and Improvement of Infrastructure Facilities at Veerapur in Trichy District

Sr. No.	Name	Occupation	Contact Details	Signature
1	R. PONNALAGIASAN	Business	9751806099	Romalogeson.
2	R. Soundra Pandiyan.	Business	9994560433	Rinamissouring
3	K. siva subramani rangencia	Business	9842463187	Dr. Cont.
4	M. Selvan	works shop	965584 1155	90000
5	U. Raman	Brinnell	9791428390	v. Qalman
6	K.S. Kanuppaiyo	store	9994336935	KSAGCODWR
7	M. Oruna Stelkarrain	Driver	9786011565	m. Gunse ver
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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:

The details of the site visit are given below:

Date of Visit: 08.06.2017

Name of the work: Development and Improvement of Infrastructure Facilities, —Construction of Pilgrims rest house in Arulmigu Naganathaswamy Temple, Keelaperumpallam, Nagapattinam 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 10 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. A BSNL office has been located to the left of the property. 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 HR&CE, 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 rest house, Keelaperumpallam.
- 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

ATTENDANCE OF THE PARTICIPANTS FOR THE PUBLIC CONSULTATION FOR THE TOURISM INFRASTRUCTURE DEVELOPMENT AT: Thirpretikadu

Name of Bub-project.Development and Improvement of Infrastructure Facilities at Thiruvenkadu in Nagapattinam District

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Appendix 2: CONTRACT CLAUSES TO BE INTEGRATED INTO BID DOCUMENTS

A. 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

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.

7. 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 interstate 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: "Development and Improvement of Infrastructure Facilities at Arulmigu Kallalagar Thirukoil, Alagarkoil, Melur Taluk, Madurai District" Sector Division: INBM

	Vee	NIa	
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 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			During construction, no
establishment of a plant or facility complex in or near			tree felling is being felt
sensitive habitats?			necessitated.
• Eventual degradation of water bodies due to			No waterbody is located
discharge of wastes and other effluents from plant or			adjacent to the proposed
facility complex?			construction site.
• Serious contamination of soil and groundwater?		\checkmark	This issue is not
			envisaged in the
			proposed subproject
		,	activities.
• Aggravation of solid waste problems in the		\checkmark	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 Dining Facilities 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		\checkmark	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
 Deterioration of water quality 		\checkmark	No discharge of waste water is involved in the subproject activity.
 Deterioration of air quality 	V		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 	V		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?		V	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?		V	

• Water pollution from discharge of liquid effluents?	V	No discharge of waste water is involved in the subproject activity.
Air pollution from all plant operations?	V	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?	\checkmark	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	\checkmark	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?	\checkmark	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?	\checkmark	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?	V	The subproject is confined to a clear-cut boundary wall separating the location from it's surrounding.
• Disease transmission from inadequate waste disposal?	N	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: "Development and Improvement of Infrastructure Facilities at Arulmigu Abathsagayeswarar Temple at Arulmigu Abathsagayeswarar temple at Alangudi Village,Valangaiman Taluk,Thiruvarur District, TamilNadu" Sector Division:

		1	
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			During construction, no
establishment of a plant or facility complex in or near			tree felling is being felt
sensitive habitats?			necessitated.
• Eventual degradation of water bodies due to			No waterbody is located
discharge of wastes and other effluents from plant or			adjacent to the proposed
facility complex?			construction site.
• Serious contamination of soil and groundwater?		\checkmark	This issue is not
			envisaged in the
			proposed subproject
			activities.
• Aggravation of solid waste problems in the		\checkmark	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 Toilet Block 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		V	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
 Deterioration of water quality 		\checkmark	No discharge of waste water is involved in the subproject activity.
 Deterioration of air quality 	N		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 	\checkmark		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		V	

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?	V		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?	V		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?		V	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?		V	The subproject is confined to a clear cut boundarywall separating the location from it's surrounding.
• Disease transmission from inadequate waste disposal?		V	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: "Development and Improvement of Infrastructure Facilities at Arulmigu Kumaragiri Dhandayudhabani Swamy Thirukkoil at Ammapet in Salem District, TamilNadu" Sector Division:

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting			
Is the Project area adjacent to or within any of the			
following environmentally sensitive areas?		1	
Cultural heritage site		N	
Protected Area		V	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			During construction, no
establishment of a plant or facility complex in or near			tree telling is being telt
sensitive habitats?		1	necessitated.
• Eventual degradation of water bodies due to		Ν	No waterbody is located
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		\checkmark	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 Dormitory Hall and Toilet blocks 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		V	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
 Deterioration of water quality 		\checkmark	No discharge of waste water is involved in the subproject activity.
 Deterioration of air quality 	\checkmark		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 	V		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?	\checkmark		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?		V	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: "Development and Improvement of Infrastructure Facilities at Arulmigu Kailasanathar Swamy Temple at Thingalur Village in Thanjavur District, Tamilnadu" Sector Division:

SCREENING	QUESTIONS	Yes	No	REMARKS
A. Project Siti	ng			
Is the Project	t area adjacent to or within any of the			
following envi	ronmentally sensitive areas?			
Cultur	al heritage site			
Protect	ted Area			The Land is owned by
				HR&CE Department and
				located in the heart of the
• Wotla	ad		N	city in populated areas.
Manar			N	
 Iviality Estual 			v v	
Buffer	zone of protected area		v v	
Duller Spacir	al area for protecting biodiversity		v v	
 Specia Boy 			v v	
 B Potential E 	nvironmental Impacts		v	
Will the Proje	ct cause			
Ecolor	pical disturbances arising from the			During construction, no
establishmen	of a plant or facility complex in or near			tree felling is being felt
sensitive habi	tats?			necessitated.
Eventi	al degradation of water bodies due to			No waterbody is located
discharge of	wastes and other effluents from plant or			adjacent to the proposed
facility comple	ex?			construction site.
Seriou	s contamination of soil and groundwater?		\checkmark	This issue is not
				envisaged in the
				proposed subproject
			./	
• Aggra	vation of solid waste problems in the		ν	domolition of the present
alear				demonuon or the present
			structure will be disposed off in low lying areas and approved municipality dump yard. Liquid and solid waste generated at the Pilgrims' Rest 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 				
o Soil erosion		\checkmark	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 	\checkmark		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 	V		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		\checkmark	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;		\checkmark		

and modification of natural species diversity as a result of the transformation to monoculture practices?			
• Water pollution from discharge of liquid effluents?		\checkmark	No discharge of waste water is involved in the subproject activity.
Air pollution from all plant operations?	V		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?		\checkmark	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?		\checkmark	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?		\checkmark	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?		\checkmark	The subproject is confined to a clear cut boundarywall separating the location from it's surrounding.
• Disease transmission from inadequate waste disposal?		\checkmark	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: "Development and Improvement of Infrastructure Facilities at Naganatha Swamy Temple at Thirunageswarm, Thanjavur District, Tamilnadu"

S No	REMARKS The Land is owned by HR&CE Department and located in the heart of the city in populated areas.
	The Land is owned by HR&CE Department and located in the heart of the city in populated areas.
	The Land is owned by HR&CE Department and located in the heart of the city in populated areas.
	The Land is owned by HR&CE Department and located in the heart of the city in populated areas.
	The Land is owned by HR&CE Department and located in the heart of the city in populated areas.
	The Land is owned by HR&CE Department and located in the heart of the city in populated areas.
	city in populated areas.
$\frac{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt$	
$\sqrt{1}$	
\checkmark	
V	During construction, no tree felling is being felt necessitated.
\checkmark	No waterbody is located adjacent to the proposed construction site.
	This issue is not envisaged in the proposed subproject activities.
	No solid waste problems
_	

• Public health risks from discharge of wastes			No discharge of liquid
and poor air quality; noise and foul odour from plant			waste is envisaged during
emissions?			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
			davtime
Short-term construction impacts			day into:
 Soil erosion 			No steep slopes involved
			in this subproject hence
			soil erosion of any kind is
			ruled out.
 Deterioration of water guality 			No discharge of waste
· · · · · · · · · · · · · · · · · · ·			water is involved in the
			subproject activity.
• Deterioration of air guality	\checkmark		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	\checkmark		Higher noise level will be
equipment			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			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?			Nie die de sur ef sur etc
• Water pollution from discharge of liquid		γ	No discharge of waste
effluents?			water is involved in the
			Supproject activity.
Air pollution from all plant operations?	'N		will be experienced during
			the construction period
			which will be limited to
			8/10 hours during
			operating period
			oporating poriod.

• Gaseous and odour emissions to the atmosphere from processing operations?	\checkmark	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	V	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?	V	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?	V	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?	V	The subproject is confined to a clear cut boundary wall separating the location from it's surrounding.
• Disease transmission from inadequate waste disposal?	V	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: "Development and Improvement of Infrastructure Facilities at Sri Swetharanyeswarar Temple at Thiruvenkadu, Nagapattinam District, Tamil Nadu" Sector Division:

	Vaa	No	DEMADIZE
SUREENING QUESTIONS	res	INO	
A Project Siting			
A. Toject Stilling Is the Project area adjacent to or within any of the			
following environmentally sensitive areas?			
		2	
Cultural fieldage site		N	The Land is owned by
Protected Area		N	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			During construction, no
establishment of a plant or facility complex in or near			tree felling is being felt
sensitive habitats?			necessitated.
• Eventual degradation of water bodies due to			No waterbody is located
discharge of wastes and other effluents from plant or			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			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 Pilgrims' Rest House/Toilet Block 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?		V	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 		\checkmark	No discharge of waste water is involved in the subproject activity.
 Deterioration of air quality 	N		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?		V	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		V	

of the transformation to monoculture practices?			
• Water pollution from discharge of liquid effluents?		\checkmark	No discharge of waste water is involved in the subproject activity.
Air pollution from all plant operations?	\checkmark		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?	\checkmark		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?		\checkmark	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?		V	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: "Development and Improvement of Infrastructure Facilities at Veerapur, Tiruchirappalli 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		\checkmark	The Land is owned by HR&CE Department and located in the heart of the city in populated areas.
Wetland		\checkmark	
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			During construction, no
establishment of a plant or facility complex in or near			tree felling is being felt
sensitive habitats?		,	necessitated.
• Eventual degradation of water bodies due to			No waterbody is located
discharge of wastes and other effluents from plant or			adjacent to the proposed
facility complex?		,	construction site.
• Serious contamination of soil and groundwater?		\checkmark	This issue is not
			envisaged in the
			proposed subproject
		,	activities.
 Aggravation of solid waste problems in the 		$^{\vee}$	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 Tonsure/Dormitory Hall 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?		N	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 		\checkmark	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
 Deterioration of water quality 		\checkmark	No discharge of waste water is involved in the subproject activity.
 Deterioration of air quality 	\checkmark		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;		V	

and modification of natural species diversity as a result of the transformation to monoculture practices?		
• Water pollution from discharge of liquid effluents?	\checkmark	No discharge of waste water is involved in the subproject activity.
Air pollution from all plant operations?	\checkmark	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?	\checkmark	Not envisaged from the subproject activity.
• Accidental release of potentially hazardous solvents, acidic and alkaline materials?	\checkmark	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?	\checkmark	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?	V	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?	V	The subproject is confined to a clear cut boundarywall separating the location from it's surrounding.
• Disease transmission from inadequate waste disposal?	\checkmark	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: "Development and Improvement of Infrastructure Facilities at Keelaperumpallam"

SCREENING QUESTIONS	Yes	No	REMARKS
<u>A. Project Siting</u> Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
Cultural heritage site			
Protected Area		V	The Land is owned by the Government of Tamilnadu and located in the heart of the town / 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?		V	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?		V	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.

Sector Division: INRM

• Aggravation of solid waste problems in the area?		۸ 	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 Rest House will be disposed off in compliance with CPCB/TNPCB stipulations.
 Public health risks from discharge of wastes and poor air quality; noise and foul odour from plant emissions? 		N 	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 		\checkmark	No steep slopes involved in this subproject hence soil erosion of any kind is ruled out.
• Deterioration of water quality		\checkmark	No discharge of waste water is involved in the subproject activity.
 Deterioration of air quality 	\checkmark		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	\checkmark		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 Tamil Nadu Government 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?		~	Not applicable to this site.
Water pollution from discharge of liquid effluents?		V	No discharge of waste water is involved in the subproject activity.
 Air pollution from all plant operations? 	\checkmark		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?	\checkmark		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?		\checkmark	The subproject would accommodate only the tourists.
• Occupational health hazards due to fugitive dust, materials handling, noise, or other process operations?	\checkmark		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?		\checkmark	The subproject is confined to a clear cut boundarywall separating the location from it's surrounding.
• Disease transmission from inadequate waste disposal?		V	Adequate care will be taken so that waste is collected and disposed in a safe manner meeting the CPCB/TNPCB 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)

		, ,	<u> </u>		
Package	Components/List	Status of Implementation	Contract	If On-	going
Number	of Works	(Preliminary Design/Detailed	Status	Const	ruction
		Design/On-going	(specify if	%Physical	Expected
		Construction/Completed/O&M) ⁶	under	Progress	Completion
			bidding or		Date
			contract		
			awarded)		

⁶ If on-going construction, include %physical progress and expected date of completion

COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS⁷

Package No.	Subproject Name	Statutory Environmental Requirements ⁸	Status of Compliance ⁹	Validity if obtained	Action Required	Specific Conditions that will require environmental monitoring as per Environment Clearance, Consent/Permit to Establish ¹⁰

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.

	i ackage-wise implementation Status							
Packag	Componen	Design	Final	IEE based or	n Detailed	Design	Site-	Remark
е	ts	Status					specific	S
Numbe		(Preliminary	Not yet	Submitted	Disclose	Final IEE	EMP (or	
r		Design	due	to ADB	d on	provided	Constructi	
		Stage/Detail	(detailed	(Provide	project	to	on EMP)	
		ed Design	design	Date of	website	Contractor	approved	
		Completed)	not yet	Submissio	(Provide	/s	by Project	
			complete	n)	Link)	(Yes/No)	Director?	
			d)	-	•	. ,	(Yes/No)	

Package-wise Implementation Status

• Identify the role/s of Safeguards Team including schedule of on-site verification of reports submitted by consultants and contractors.

⁷ 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.

⁸ Specify (environmental clearance? Permit/consent to establish? Forest clearance? Etc.)

⁹ Specify if obtained, submitted and awaiting approval, application not yet submitted

¹⁰ Example: Environmental Clearance requires ambient air quality monitoring, Forest Clearance/Treecutting Permit requires 2 trees for every tree, etc.

- 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 <u>signed</u> 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 E	Invironmental Mo	nitoring Activ	lties (for the	Reporting Pe	riod)"
Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Docian Pha	<u> </u>	monitoreu)				
Design Fila	56		[[[
Pre-Constru	uction Phase					
Constructio	on Phase	I		I	I	
Operational Phase						

Summary of Environmental Monitoring Activities (for the Reporting Period)¹¹

¹¹ Attach Laboratory Results and Sampling Map/Locations

Overall Compliance with CEMP/ EMP

No.	Sub-Project	EMP/ CEMP	CEMP/ EMP	Status of	Action Proposed
	Name	Part of	Being	Implementation	and Additional
		Contract	Implemented	(Excellent/ Satisfactory/	Measures
		Documents	(Y/N)	Partially Satisfactory/	Required
		(Y/N)		Below Satisfactory)	

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

Sita Na	Site No. Date of Testing Site Location	Site Logation	Parameters (Government Standards)		
Sile NO.		Sile Location	PM10 μg/m3	SO2 μg/m3	NO2 µg/m3

Cito No	Site No. Date of Testing Site Location	Cito Logotion	Parameters (Monitori Results)		
Sile NO.		Sile Location	PM10 μg/m3	SO2 μg/m3	NO2 µg/m3

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)

	рН	Conductivi ty µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

			Parameters (Monitoring Results)					
Site No.	Date of Sampling	Site Location	рН	Conductivi	BOD	TSS	TN	TP
				ty µS/cm	mg/L	mg/L	mg/L	mg/L

Noise Quality Results

Sita Na	Data of Tooting	Site Leastion	LA _{eq} (dBA) (Government Standard)		
Sile NO.	Date of Testing	Sile Location	Day Time	Night Time	

Sita No	Data of Teating	Site Leastion	LA _{eq} (dBA) (Monitoring Results)		
Sile NO.	Date of Testing	Sile Location	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					
			DATE:		
LOCATION:			GROUP:		
WEATHER CONDITION:					
INITIAL SITE CONDITION:					
CONCLUDING SITE CONDITION:					
Satisfactory Unsatisfactory	Incid	lent	Resolved	Unreso	lved
INCIDENT: Nature of incident:					
Intervention Steps:					
Incident Issues					
			Survey		
			Design		
Resolution	Pro	Ject Activity Stage	Implementation		
	_		Pre-Commissioning		
			Guarantee P	eriod	
li li	nspe	ction			
Emissions		Waste Min	imization		
Air Quality		Reuse and Recycling			
Noise pollution		Dust and Litter Control			
Hazardous Substances		Trees and Vegetation			
Site Restored to Original Condition		Yes		No	

Site Restored to Original Condition

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	l			
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	e details (v	vho, what,	where	
and how) of your grievance below:						
f 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:	erified thru: Note/Letter E-mail Verbal/Telephonic								
Reviewed by: (Names/Posi	ions of Official(s) r	eviewing gr	rievance)						
Action taken:									
Whether Action Taken Yes No									
Means of Disclosure:									