Initial Environmental Examination

November 2018

Sri Lanka: Railway Efficiency Improvement Project

Prepared by the Project Management Unit, Colombo Suburban Railway Project, and Ministry of Transport & Civil Aviation for the Asian Development Bank.

CURRENCY EQUIVALENTS
(as of 14 October 2018)

Currency unit	–	Sri Lanka Rupee/s (SLRe/SLRs)
SLRe1.00	=	$0.005891
$1.00	=	SLRs169.74

ABBREVIATIONS

ADB	–	Asian Development Bank
CBO	–	community-based organization
CEA	–	Central Environmental Authority
CMC	–	Colombo Municipal Council
CMESD	–	Chief Mechanical Engineers Sub Department
CMR	–	Colombo Metropolitan Region
CSRP	–	Colombo Suburban Railway Project
DMU	–	diesel multiple unit
DPD	–	Deputy Projects Director
DSD	–	Divisional Secretary Division
EIA	–	environmental impact assessment
EMoP	–	environment monitoring plan
EMP	–	environment management plan
EPL	–	environmental protection license
FGD	–	focus group discussion
GND	–	Grama Niladhari Division
GRC	–	grievance redress committee
GRM	–	grievance redress mechanism
IEE	–	initial environment examination
IEER	–	initial environment examination report
kmph	–	kilometer per hour
LPG	–	liquid petroleum gas
MOTCA	–	Ministry of Transport & Civil Aviation
NAAQS	–	National Ambient Air Quality Standards
NEA	–	National Environmental Act
OH&TCC	–	Operation Headquarter and Train Control Center
PAA	–	Project Approving Agency
PIC	–	Project Implementing Consultant
PM	–	respirable particulate matter
PMU	–	project management unit
REA	–	rapid environment assessment
REIP	–	railway efficiency improvement project
SDS	–	Social Development Specialist
SLR	–	Sri Lanka Railways
SLGRTTC	–	Sri Lanka German Railway Technical Training Center
SPS	–	Safeguard Policy Statement
SSEMAP	–	Site Specific Environmental Management Action Plan
TOR	–	terms of reference
TSPM	–	total suspended particulate matter
UDA	–	Urban Development Authority
WHO	–	World Health Organization

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EXECUTIVE SUMMARY

A. Introduction and Project Background

1. The Government of Sri Lanka has requested assistance from the Asian Development Bank (ADB) to finance Railway Efficiency Improvement Project (REIP). The REIP shall provide immediate improvements in the railway sector for improving the efficiency of existing railway operations, addressing key bottlenecks in the railway network, and improving the sustainability of operations, thus making the railway system ready for implementing the Colombo Suburban Railway Project (CSRP). The REIP includes five project components and each of these components have a set of subcomponents totalling to 15. Out of these subcomponents, six involve civil works.

B. Policy, Legal and Administrative Framework

2. The National Environmental Act (NEA) No. 47 of 1980 is the key legislation of the country for matters pertaining to environmental safeguards. The environmental clearance process is implemented through the designated Project Approving Agency as prescribed under the NEA. The procedure that should be followed for obtaining environmental clearance is described under section 23CC and 32 of the NEA.

3. The ADB's Safeguard Policy Statement, 2009 (ADB SPS 2009) consists of three operational policies on the environment, indigenous people, and involuntary resettlement. All three safeguard policies involve a structured process of impact assessment, planning, and mitigation to address the adverse effects of projects throughout the project cycle.

4. Under ADB SPS 2009 classification, this project is categorized B, while the project activities do not fall within the prescribed list of projects under NEA. However, there are other environmental laws and regulations that are also applicable to the investment program.

C. Description of the Project

5. Subcomponents of REIP are located within Colombo District in Western Province. The subcomponents that involve civil works are construction of Operation Headquarter and Train Control Center (OH&TCC); facility for passengers at Colombo Fort and Maradana; underpass for roadway and pedestrians at School Lane; new workshop and stores; new training wing; and housing units for relocation.

D. Description of the Environment

6. All six subcomponents of REIP involving civil works are geographically located within the western regions of low wet zone of the country. Agro-ecologically, the project area is located within WL3 agro-ecological zone, which is characterized by 75% expectancy of annual rainfall value of >1700mm; rolling to undulating terrain; soil types of Red Yellow Podsolic soils with soft and hard Laterite and Regosol soils; and main land uses of coconut, fruit crops, mixed home gardens, and paddy.

7. Colombo and its suburban areas are considered to have deteriorated atmospheric conditions. However, the results of sampling at locations with respective to above six

subcomponents show that the atmospheric conditions at these locations are better compared to many other locations in Colombo district.

8. Noise levels were measured at five locations and the ambient noise levels (especially the background noise level) of four locations (other than at School Lane) were observed to be low or marginally above the stipulated noise levels for medium noise area as defined in schedule I of National Environmental (Noise Control) Regulations No.1 of 1996. Observed noise levels at School Lane underpass was higher than the levels stipulated in the regulations. Main sources of noise are vehicular traffic, movement of trains, and commercial activities near some sites.

9. Groundwater (water from wells) at three locations and surface water at one location were sampled and analysed. Two sampling locations recoded high coliform counts.

10. No subcomponent of the project is located nearby any ecologically important reserves declared by the Department of Wild Life Conservation or Department of Forest Conservation. The natural vegetation in these areas have long been removed and modified due to human activities. Main habitat types observed within the project areas could be classified as home gardens, railway reservations and land, and road side. No endangered species as listed in International Union for Conservation of Nature Red List 2012 were observed within any of these proposed sites.

11. The country's administrative capital (Sri Jayawardenapura) and economic capital (Colombo) are located within Colombo district in Western province. Colombo district recorded a population of 2,324,349 during the household census survey in 2012. Employment in service sector is the main economic activity of the people living in this area.

12. Liquid petroleum gas is the main energy source for cooking in all six Grama Niladhari Divisions affected by subcomponents of REIP. Electricity from the national grid is used as the main source of energy for lighting. People in the surrounding of the subcomponent project areas are benefited through the water supply by National Water Supply and Drainage Board.

13. Elphinstone, Tower hall theatres and Maradana railway station are located about 150 meters (m) from the site for OH&TCC at Maradana on a northeast direction.

E. Screening of Potential Environmental Impacts and Mitigation Measures

1. Location Impacts

14. The site selected for the training wing (located within the land belonging to SLR at Ratmalana) is located about 500 m away from the runaway of Ratmalana airport. Therefore, the Civil Aviation Authority has imposed a maximum height for the new training wing building to be not more than 9 m in height. The occupants of the two quarters at Malapalla site, the Grama Niladhari office, Development Officer's office, sub-post office, office of the community-based organization, and community hall need to be shifted.

2. Design and Pre-construction

15. New OH&TCC building shall require providing sufficient facilities to all occupants which include office space, lighting, air conditioning, parking facilities, sanitary facilities, and dining and resting facilities. The energy footprint of the building shall be high due to usage of information technology equipment. The building shall need to withstand certain velocities of wind and ground vibration and have efficient fire or smoke detection and firefighting facilities. The building shall be

designed considering the building guidelines of Urban Development Authority and green building concept. The sewer system of the building shall be designed to be connected to the central sewer system operated by Colombo Municipal Council.

16. There shall be no significant impacts of the designs of the passenger facilities. However, improvements to the accessibility to Colombo Fort and Maradana stations, new toilet and resting facilities, lighting, drinking water fountains, and information displays shall be included in the designs. Rearranging the shops and other structures on the platform decks to optimize the space usage in each platform deck shall also be considered.

17. The new workshop shall be designed to handle repairs and complete overhauls of diesel multiple units at any time. Around 20 to 30 technical staff and 10 administrative staff will be working within this new facility and shall require washing, resting, sanitary, and dining facilities. Energy requirement shall be high in the new facility as there are equipment that would utilize electricity. The designs of the new workshop shall include all machinery, equipment, and facilities required for repairs and complete overhauls of diesel multiple units. Use of renewal energy shall be considered in the designs. The designs shall also include measures for safety of technical and administrative staff including firefighting and first aid. An oil and grease separator system shall also be included in the designs.

18. Designs for the School Lane underpass shall increase the vertical clearance of the bridge to facilitate smooth and uninterrupted movement of traffic, and to allow future two-way movement of vehicular traffic. Foot paths with guardrails and lighting facilities on both sides of the roadway shall be designed for pedestrian safety. The demolition and reconstruction program shall be developed where the underpass bridge is constructed section by section.

19. The designs of new training wing shall include facilities to accommodate around 200 staff, students, drivers and security personal during day time. A hostel shall also be designed to accommodate 20 persons on a need basis. Use of renewal energy (i.e. photovoltaic generation) shall be considered as an alternate source of energy to the new facility. The toilets shall be designed with sceptic tanks and soakage pits of adequate capacity or shall be connected to common sewer lines (if available and technically feasible). Designs of the new building shall comply to guidelines given by Civil Aviation Authority where the vertical height of the building shall not be above 9 m. Construction material and methodology shall be selected to be suitable to withstand vibrations and act as noise insulators for the vibration and noise caused by aeroplanes taking off and landing at Ratmalana airport.

20. The medium-rise building at Malapalla shall need to withstand certain wind velocities and ground vibration. The structure shall accommodate 96 housing units that would be used to resettle displaced households. Facilities required in housing units shall be included in the designs. A parking area; office spaces for the Grama Niladhari, Development officer, community-based organization; and a space for community hall shall also be included in the designs, as well as fire or smoke detectors, fire escapes, fire hydrants, and fire extinguishers. An in-house sewage treatment plant shall also be designed for this building.

3. Impacts During Construction

21. Impacts due to site preparation activities shall be mitigated through implementing key measures such as fencing off all construction sites; clearing and demolition works to be conducted during day time (6.00 a.m. to 9.00 p.m. as defined in Regulation 4 of National Environment (Noise Control) Regulations No. 1 of 1996; having tyre baths and tyre washing points at exits of

construction sites; during demolition work to avoid break or damage of any asbestos sheets or other materials containing asbestos and to be disposed only at designated locations; disposal of other demolition debris in designated locations; and shifting of utility supply lines in consultation and under the supervision of relevant service provider.

22. Impacts due to extraction, transportation, and storage of construction materials including chemicals and fuels shall be mitigated by implementing key measures such as using washed sea sand as an alternate for river sand; developing transport management plans in consultation with the traffic police with respect to the construction areas to avoid any undue traffic congestions due to movement of trucks and containers; transporting construction materials in trucks and protecting these with tarpaulin or other hard covers and shall not be overloaded; storing cement in silos or enclosures to avoid spillage of cement; and stockpiling construction materials such as soil and sand to avoid any wash offs from rain to nearby lands and water ways.

23. Impacts due to activities that create noise and vibration causing nuisance to public and fauna, and health issues to workers shall be mitigated by implementing the following measures: fencing off the sites with corrugated sheets shall act as temporary noise barrier; high noise-generating construction activities (noise levels beyond 50 dB(A)) shall not be undertaken on days with religious importance or at night (from 21.00 to 06.00 hours as defined in Regulation 4 of National Environment (Noise Control) Regulations No. 1 of 1996); use of a vibratory pile drivers that are quieter in operation shall be used for piling operations at OH&TCC building and at Malapalla site; property condition survey of all structures within an area having a radius of 80 m from each construction site where piling activities shall take place; activities that create vibration shall be avoided from 21.00 to 06.00 (night time as defined in Regulation 4 of National Environment (Noise Control) Regulations No. 1 of 1996).

24. Impacts due to activities which create emissions shall be mitigated. Material stocks shall duly be covered against wind to minimize the dust generation; dust barriers around construction sites shall be maintained throughout the construction period; open ground of all sites shall be kept dampen to arrest any dust emission; vehicle movements within construction sites shall be minimized and operational speeds shall not exceed 10–15 kilometers per hour; proper storage facilities shall be constructed to store chemicals, cement, paints, and other construction materials; and burning of waste material shall not be allowed at site.

25. Impacts due to activities that affect surface and ground water quality and quantity shall be mitigated through placing of soil bags around all stockpiles, covering them and maintaining such measures to avoid or minimize the possibility of such stockpiles being washed off due to rain; scheduling any excavation activity during the dry weather periods; wash water of concrete mixer trucks and any disposed concrete slurry to be collected on to a drying bed lined with thick gauge polythene or tarpaulin constructed within the construction site; grey water discharged from sites to be filtered through a simple sand gravity filter before discharging out of the construction site.

26. Impacts due to migrant labourers and operation of labour camps shall be mitigated through use of the principle of equal wages for equal work done; provision of separate sanitary facilities and accommodation if both male and female works work in sites; educating labourers and strict labour supervision at site on behaviour, safe conduct, and safety; provision of safe and hygienic labour accommodations including, sufficient sanitary facilities, firefighting equipment, solid waste collection and disposal systems, and first aid facilities.

27. Impacts due to hazardous working conditions to worker force and accidents to public shall be mitigated by placing warning signboards and restricting any public from moving in at sites; enforcing labourers to use personnel protective equipment during all times they are at construction activities; keeping provision of first aid facilities, readily available trained paramedical personnel, and emergency transport to the nearest hospital; regular safety checks of vehicles (checks include operation of reverse horns, head and tail lights, braking including parking brakes) and material.

28. Construction activities that would impact flora and fauna shall be minimized by implementing the following; planting ornamental plants and trees (native species) within the construction sites as part of landscaping work; focusing all flood lights only in construction sites shall minimize the effect on feeding and roosting habits of faunal species.

29. Clearing of all scrap material, temporary structures, and landscaping shall improve the scenic beauty of all construction sites.

4. Operational Impacts

30. Impacts with respect to management waste and sewage shall be addressed through waste separation at the source itself (as food and/or kitchen waste, domestic and electrical and/or electronic waste); all wash water and/or grey water filter systems installed at each facility shall be cleaned and maintained on a regular basis; central sewage systems installed at each site shall also be maintained on a regular basis (especially servicing of pumps and motors); SLR shall send the mechanical wastes (metal parts) collected at Ratmalana workshop to steel manufacturing facilities for recycling and used filters to authorized collectors.

31. Impacts with respect to maintenance and safety measures shall be addressed through regular inspection and maintenance of all firefighting systems and fire escape facilities; regular servicing of all escalators or lifts by trained staff; maintenance of guard rails and lamps at School Lane underpass bridge.

5. Beneficial Impacts

32. Implementing the six subcomponents of REIP shall facilitate the smooth implementation of CSRP.

6. Climate Change Adaptation

33. Out of the 15 subcomponents of REIP, only five entail civil works that maybe subject to climate risks. Only one of the five subcomponents (underpass bridge) has a risk of increased flooding which will be addressed through shifting and redesigning the storm drain and road level.

34. The overall climate risk level for the project is low. Hence, there is no need to incorporate climate adaptation measures, except for the subcomponent on underpass bridge. The incremental costs for redesigning the storm drain and road level is $147,320 under this subcomponent. This amount is considered as the climate adaptation finance under the project.

F. Institutional Requirements, Environmental Management Plan, and Capacity Building

35. Secretary to the Ministry of Transport & Civil Aviation shall have the responsibility for decisions on overall approvals and operational policies of the project. The ministry is the executing agency for the project. A project management unit (PMU) headed by a Project Director (PD) has been established by the ministry in collaboration with Sri Lanka Railways to manage REIP and subsequently the CSRP. The PD is assisted by Deputy Directors for engineering, environment and social safeguards, land acquisition, procurement, and their supportive staff.

36. A project implementing consultant (PIC) shall be established to assist the PMU in implementing the project. The PIC shall be headed by a team leader assisted by an Environment Specialist and Social Development Specialist.

37. An environment management plan (EMP) is developed summarising the potential impacts and mitigation measures discussed under screening of potential environmental impacts and mitigation measures. The EMP includes details indicating possible locations of the impact and mitigation measures, on planned monitoring, responsibilities of different agencies and cost for implementation. The nominated contractor/s shall conduct the detail designs; therefore, the contractor/s shall develop Site Specific Environment Management Action Plan (SSEMAP) by updating the EMP based on more accurate design information available from detail designs.

38. Contractor/s shall execute the mitigation measures listed in the SSEMAP/s. All staff of contractor/s shall assist their environment or social officer to execute measures related to mitigating environment impacts. The environment or social officer shall maintain records on daily activities carried out with respect to mitigation measures listed in SSEMAP.

39. The Environment Specialist of PIC shall conduct regular site visits with more frequent site visits during early stages of construction works and monitor the implementation of mitigation measures at each site. Environment Specialist shall guide the contractor/s to rectify any inefficiencies and/or inadequacies related to mitigation of environment issues. The environment team of the PMU shall also conduct site visits on a monthly basis or based on a complaint made by public.

40. An environment monitoring plan (EMoP) which indicates environment parameters that need to be measured on a periodic basis or based on complaints received with respect to environment qualities of air, water, noise, and vibration has been developed to assist monitoring of environment parameters.

41. It is suggested that the REIP shall also conduct few programs on creation and raising awareness on environment and social safeguards and environment conservation.

G. Grievance Redress Mechanism

42. A three-level grievance redress mechanism shall be formulated for REIP. The first shall be at site level where complaints will be directly received and addressed by the contractor, PIC, or PIU representative on site. The second level which is the regional level shall address grievances which cannot be addressed at site level. More complex grievances which cannot be addressed at regional level will be addressed at the national level which includes the inputs of Secretary for the ministry.

43. Each grievance redress committee shall include at least one female member to represent the local community of women to exercise gender responsiveness. When women submit grievances or complaints to the grievance redress committee, they shall be treated equally.

H. Information Disclosure, Consultation, and Participation

44. The SPS considers public consultation and information disclosure as important parts of the environmental safeguard compliance. The NEA also considers stakeholder engagement as a key element for successful management of environmental issues.

45. Project subcomponents at School Lane underpass bridge and Malapalla site for medium-rise building for housing units are considered important areas where public consultation should be carried out as they involve communities living close to the project sites.

46. Consultations shall be carried out during construction and maintenance periods and avenues shall be kept open for public views and during construction and maintenance periods. An information flyer has been developed by PMU including details of the project to be disseminated among public.

I. Findings and Recommendations

47. Six subcomponents of REIP that involves civil works and discussed in this initial environmental examination (IEE) report do not involve any interventions in and around any natural and cultural heritage destinations and have less significant (direct or indirect) environmental impacts. It is expected that implementing these subcomponents along with the other subcomponents of REIP shall facilitate smooth implementation of subsequent CSRP.

48. Likely impacts identified by the IEE shall be mitigated through implementing and monitoring the mitigation measures listed and as summarised in the EMP.

49. The grievance redress mechanism shall be established to act promptly to any public compliant during the construction period.

50. It is recommended that this IEE report including the EMP and EMoP are included as attachments to the bidding documents so that the bidders shall have a clear idea of impacts and mitigation measures with respect to construction stage of the project and bid accordingly with sufficient costing for environment mitigation measures.

51. A series of capacity building workshops on environment and social safeguards is recommended to sustain the good environment and social attitude of PMU and SLR staff developed during the implementation of REIP.

J. Conclusion

52. Impacts identified under the implementation of the subcomponents of REIP that involves civil works can be mitigated through adequate mitigation measures and regular monitoring during the design, construction, and post construction phases.

53. Findings of this IEE confirms the classification of the REIP as an environmentally category *B* project, therefore no further special study or detailed environmental impact assessment needs to be undertaken to comply with the ADB SPS 2009.

I. INTRODUCTION AND PROJECT BACKGROUND

1. Development of the railway network in Sri Lanka was initiated under British governance in 1860's. Presently, this network is operated by Sri Lanka Railways (SLR), a government department functioning under the Ministry of Transport and Civil Aviation (MoTCA). SLR owns and operates approximately 1,500 kilometers (km) of rail tracks, about 100 locomotives, 63 Diesel Multiple Units (DMU), about 900 carriages, about 600 good vegans, about 160 oil tankers, and a signalling network. Both passenger and freight are transported through this railway network and the current transport statistics of the country reveals that the market share for passenger transport by rail is about 6.0% while the freight transport is only 0.7%.[1]

2. This railway network radiates from Colombo Fort and Maradana which are located within Colombo Metropolitan Region (CMR). Located within the Western Province, the CMR which basically extends over Colombo district, has a land area of 699 square kilometres (km^2) and a population of around 2.3 million. The network covers much of the CMR along its four major corridors, namely Main Line, Coastal Line, Kelani Valley Line, and Puttlam Line. Total length of tracks of above main lines within CMR is to about 230 km. Railway provides an important service during the peak period of commuter movement as it acts as a commuter service from the outer suburbs to central Colombo. However, the lack of timely investment in fleet replacement, lack of technology usage by SLR and frequent trade union actions have resulted in overcrowding the trains and delays which has reduced reliability of the railway transport system.

3. The Government of Sri Lanka, having identified the remarkable potential of the railway transport system to enhance the interconnection between different regions of the country both economically and efficiently, directed MoTCA to develop the Colombo Suburban Railway Project (CSRP). The CSRP will support the modernization of the railway network in the Western Province in Sri Lanka.

4. In order to facilitate the CSRP, the government has requested assistance from the Asian Development Bank (ADB) to finance the Railway Efficiency Improvement Project (REIP). The REIP shall provide immediate improvements in the railway sector to improve the efficiency of existing railway operations, address key bottlenecks in the railway network, and improve the sustainability of operations, thus, making the railway system ready for implementing the CSRP.

5. The CSRIEP includes five project components and each of this component has a set of subcomponents which are listed below.

a. Modernized telecom and ticketing system
    i. Telecom system
    ii. Computerized ticketing system

b. Improved operation and maintenance facilities
    i. Operation headquarters and train control center
    ii. Passenger facility at Colombo fort and Maradana
    iii. Universal armature machine
    iv. Traction motor cleaning and vacuum drying plant
    v. New workshop and stores
    vi. Sleeper tamping and ballast profiling machine
    vii. Plano milling machine

[1] Information from the official web site of SLR, http://www.railway.gov.lk.

c. Improved railway safety
   i. Underpass for roadway and pedestrians
   ii. Housing units for relocation

d. Upgraded railway training center
   i. Train simulator
   ii. New training wing
   iii. Various training equipment (packages 1 to 12)

e. Advanced project preparation
   i. Detail design Kandy suburban railway line

6. Other than the above subcomponents, ADB shall provide funds for consultancy services for project implementation.

A. Objective of the Proposed Project

7. The main objective of REIP is to provide immediate improvements to the current railway operations in the railway sector thus making the railway system ready for implementing CSRP.

B. Objective of this Initial Environmental Examination

8. Out of above subcomponents, construction of Operation Headquarter and Train Control Center (OH&TCC), improving the passenger facility at Colombo Fort and Maradana stations, construction of new workshop and stores at Ratmalana railway workshop, reconstruction of underpass bridge at School Lane for roadway and pedestrians, construction of a new training wing at Sri Lanka German Railway Technical Training Center (SLGRTTC) with new facilities and equipment, and construction of housing units for relocation of project affected persons of main railway corridor improvement shall involve civil works that would trigger environment and social safeguard aspects.

9. Therefore this Initial Environment Examination (IEE) is carried out to identify and describe the existing/ baseline environment conditions (including social environment) within the areas of above six subcomponents; describe the activities that would be carried out during different stages of the project cycle; identify and assess possible impacts that would arise due to above activities and develop suitable measures to avoid, minimize or mitigate adverse impacts.

10. This Initial Environment Examination Report (IEER) which presents the findings of the IEE also includes details of institutional requirements, an Environment Management Plan (EMP) and Environment Monitoring Plan (EMoP) to be implemented to monitor the implementation of mitigation measures and their effectiveness.

C. Approach and Methodology for this Study

11. A rapid environment assessment (REA) checklist was used to categorize the project with respect to environment categorization provided in ADB Safeguards Policy Statement 2009 (SPS). The REA checklist is presented in Annex 1.

12. Field assessments related to the sturdy was carried out from May to July 2018. These field assessments were jointly carried out by project management unit (PMU) staff responsible for environment and social safeguards and Environment Safeguards Consultant (TA Consultant) mobilized under ADB Technical Assistance No. 8798 SRI.

13. Measurement of baseline environmental conditions with respect to ambient air quality, water quality, noise and vibration were outsourced to National Building Research Organisation and Central Environmental Authority (CEA) which are government organisations having divisions well established in conducting environmental parameter monitoring.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

A. Applicable National Laws, Regulations, Standards and Requirements

1. National Environmental Act and its Amendments

14. The National Environment Act (NEA) No. 47 enacted in 1980 is the basic national charter for protection and management of the environment. The Act includes provisions to establish the Central Environmental Authority and an Environmental Council. Amendment Act No. 56 of 1988 of NEA include a provision relating to Environmental Impact Assessment (EIA) contained in Part IV C of the statute entitled "Approval of Projects". Part IV C of the NEA was further amended by Act No. 53 of 2000.Under the provisions of section 23Z of the NEA the EIA process applies only to "Prescribed Projects" which have been specified in Gazette Extraordinary No. 772/22 of 24 June 1993. This list of prescribed projects was amended by Gazette Extraordinary No. 1104/22 of 6 November 1999 and Gazette Extraordinary No. 1108/1 of 29 November 1999. The EIA process is implemented through designated Project Approving Agencies (PAA) as prescribed by the Minister under section 23Y of NEA. Under section 23CC of the NEA, regulations (Regulations, No. 1of 1993) have been made by the Minister stating the procedures that should be followed in approval of projects.

15. The environmental approval process is initiated by project proponent submitting preliminary information about the project including exact locations of the project components, extent and environmental sensitivity related to project activities to relevant PAA. Based on this information the PAA shall decide whether the project is a "Prescribed Project"[2] or not. And if the project is considered as prescribed the PAA shall issue Terms of Reference (TOR) to the project proponent to conduct the EIA. Based on the magnitude of the project and impacts the TOR shall guide the project proponent to conduct an IEE or EIA.

16. Project components listed under para. 4 of this report does not trigger any of the activities listed in the schedule Part I or III of Gazette Extraordinary No. 772/22 of 24 June 1993 or subsequent amendments to the prescribed project list. However, the proposed construction of new OH&TCC and housing units shall have a bearing on item 32(a) of Part II of the schedule which refers to "Construction of all commercial buildings as defined in the Urban Development Authority (UDA) Law, No. 41 of 1978 and the construction of dwelling housing units, irrespectively of their magnitude and irrespective of whether they are located in the coastal zone or not, if located wholly or partly within the areas specified in Part III of this schedule."

17. The six project subcomponents discussed in this report shall not trigger any laws and regulations related to protection of flora and fauna. Table 1 presents the national legislations relevant to this project with a brief description of the relevance, main content and the authorizing institution.

Table 1: Applicable National Laws and Regulations for the Project

Legislation	Relevance and Main Content	Authorizing Institution
National environmental protection and quality	This regulates the discharge and deposit of any kind of waste or emission into the	CEA

[2] Under the NEA, a prescribed project means a project that requires a full IEE or EIA study depending on the TOR issued by PAA for securing the environmental clearance.

Legislation	Relevance and Main Content	Authorizing Institution
regulations under Extraordinary Gazette Notification No. 1534/18 and No. 1533/16 of 2008 under NEA section 32 & 23A, 23B	environment and stipulates requirements for an EPL depending on the project activity. Activities requiring EPL that are relevant to the project are operation of concrete batching plants and waste water treatment plants	
National Environmental (Protection and Quality) Regulation No. 1 of 1990 published in Gazette Extraordinary No. 595/16 of February 1990	Provides standards for discharging effluents into inland surface water during proposed project activities.	CEA
National Environmental (Ambient Air Quality) Regulations, 1994, published in Gazette Extraordinary, No. 850/4 of December 1994 and amendment gazette No. 1562/22 of 2008	Provides standards for emissions to the air during proposed project activities.	CEA
National Environmental (Noise Control) Regulations No.1 of 1996 and its amendments	Regulates maximum allowable noise levels for construction activities during proposed project activities.	CEA
National Environmental (Municipal Solid Waste) Regulations, No. 1 of 2009	Regulates dumping municipal solid waste along sides of any national highway or at any place other than places designated for such purpose by the relevant LA's during proposed project activities.	CEA
National Environmental (Protection and Quality) Regulations, No. 1 of 2008	Being a signatory of the Basel convention Sri Lanka has introduced this regulation to implement (including legal provisions) proper management of hazardous waste in the country. This regulation is considered as an extension to the EPL regulations.	CEA
Felling of Trees Control Act No. 9 of 1951 as amended through Act No. 30 of 1953	This Act sought to prohibit and control felling of specified trees (mainly intended to stop indiscriminate felling of specified trees) in the country.	Department of Forest Conservation
Municipal Councils Ordinance No. 29 of 1947, the Urban Councils Ordinance No. 61 of 1939 and the Pradeshiya Sabha Act No. 15 of 1987 as amended in 2010	Regulates and control actions pertaining to site clearance for constructing worker camps, site offices etc. and other activities taking place within the area of jurisdiction relevant to such local authorities.	Ministry of Local Government And Provincial Council
UDA Law No 41 of 1978 and Urban Development Projects	This law provides for the establishment of an UDA to promote integrated planning	UDA under the ministry of Mega

Legislation	Relevance and Main Content	Authorizing Institution
(Special Provisions) Act No 2 of 1980	and implementation of economic, social and physical development of certain areas as may be declared by the minister to be urban development areas and for matters connected with the relevant project activities. Urban Development Projects (Special Provisions) Act No 2 of 1980 is an act to provide for the declaration of lands urgently required for carrying out urban development projects and to provide for matters connected there with relevant project activities.	Polis and Western Development
Town and country planning ordinance No. 13 of 1946 and The Town and Country Planning (Amendment) Act, No. 49 of 2000	This regulates the National Physical Plan with transport as the main component.	National Physical Planning Department under the Ministry of Mega polis and Western Development
Antiquities Ordinance No. 9 of 1940 and amendments	The act regulates activities of projects located in close proximity of any archeological reserves.	Department of Archaeology

CEA = Central Environmental Authority; EPL = Environmental Protection License; NEA = National Environmental Act; UDA = Urban Development Authority.

B. ADB Policy on Environmental and Social Safeguards

1. ADB Safeguards Policy Statement, June 2009

18. ADB's safeguard policy framework known as SPS 2009 consists of three operational policies on the environment, Indigenous People, and involuntary resettlement. All three safeguard policies involve a structured process of impact assessment, planning, and mitigation to address the adverse effects of projects throughout the project cycle. The safeguard policies require that (i) impacts are identified and assessed early in the project cycle; (ii) plans to avoid, minimize, mitigate, or compensate for the potential adverse impacts are developed and implemented; and (iii) affected people are informed and consulted during project preparation and implementation. The policies apply to all ADB-financed projects, including private sector operations, and to all project components.

19. The objective of environment safeguards policy is to ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process.

20. Proposed projects are screened according to type, location, scale, and sensitivity and the magnitude of their potential environmental impacts, including direct, indirect, induced, and cumulative impacts.

21. Projects are classified into the following four categories:

- **Category A.** A proposed project 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 EIA including an EMP is required.

- **Category B.** The proposed project's potential adverse environmental 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 IEE including an EMP is required.

- **Category C.** A proposed project is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed.

- **Category FI.** A proposed project involves the investment of ADB funds to or through a financial intermediary. The financial intermediary must apply and maintain an environmental and social management system, unless all of the financial intermediary's business activities have minimal or no environmental impacts or risks.

2. Policy Principles for Environment Safeguards Under SPS

22. Use of a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment required so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks.

23. Conduct an environmental assessment for each proposed project to identify potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Assess potential transboundary and global impacts, including climate change. Use strategic environmental assessment where appropriate.

24. Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative.

25. Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. Prepare an EMP that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators. Key considerations for EMP preparation include mitigation of potential adverse impacts to the level of no significant harm to third parties, and the polluter pays principle.

26. Carry out meaningful consultation with affected people and facilitate their informed participation. Ensure women's participation in consultation. Involve stakeholders, including affected people and concerned nongovernment organizations, early in the project preparation process and ensure that their views and concerns are made known to and understood by decision

makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment. Establish a grievance redress mechanism (GRM) to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance.

27. Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders.
28. Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclosure.

29. Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.

30. Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phase outs. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides.

31. Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.

32. Conserve physical cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.

C. International Agreements and Conventions

33. Sri Lanka is a signatory to a number international agreements and conventions related to environmental conservation. Those that are relevant for this investment program are provided below:

- Basel convention of the transboundary movement of hazardous waste
- United Nations Framework Convention on Climate Change
- Convention on biological diversity
- Plant Protection Agreement for Asia and the Pacific Region

III. DESCRIPTION OF THE PROJECT

A. Location of the Project

34. All subcomponents of REIP are located within CMR which within Colombo District in Western Province. The six subcomponents that involve civil works are construction of OH&TCC, facility for passengers at Colombo Fort and Maradana railway stations, underpass for roadway and pedestrians at School Lane, new workshop and stores, new training wing, and housing units for relocation. Table 2 presents the Divisional Secretary Divisions (DSDs), Grama Niladhari Divisions (GNDs) and the local authorities within which these facilities will be constructed.

Table 2: Names of the DSDs, GNDs, and Local Authorities within which the Proposed Project Components Involving Civil Works are Located

Project Component	DSD	GND	Local Authority
Operation Headquarter and Train Control Center	Colombo	Panchikawatta	Colombo MC
Passenger facility at Colombo Fort and Maradana	Colombo	Fort/ Maligakanda	Colombo MC
Underpass for roadway and pedestrians	Colombo	Maligawatta east	Colombo MC
New workshop and stores	Ratmalana	Ratmalana east	Dehiwala - Mt. Lavinia MC
New training wing	Ratmalana	Ratmalana east	Dehiwala - Mt. Lavinia MC
Housing units for relocation	Maharagama	Malapalla west	Maharagama UC

DSD = Divisional Secretary Division; GND = Grama Niladhari Division; MC = municipal council; UC = urban council.

35. Map in Figure 1(a) presents an overall location map of all six subcomponents, while maps in Figures 1(b), 1(c), and 1(d) presents details location maps of these project subcomponents.

B. Need of the Project

36. The country's statistics on commuter and fright operations show that an average of over 110,000 passengers per direction enter the Colombo city by rail during a normal working day, which translates into around 13% of all passenger movements. Its contribution to freight transport is much less at around 3%.

37. Insufficient track capacity in the urban railway network and lack of enough infrastructure at the two main railway stations in Colombo, i.e. Maradana and Colombo Fort has caused stagnant market share of the railway network and often delay of trains.

38. The low operating speed of the railway system is another reason for the stagnant ridership. The commercial speed[3] on the Main Line is around 33 kilometres per hour (kmph) while the speed on the coastal line is around 28 kmph. Some sections on the Coast Line have

[3] Commercial speed of a train is defined as the average speed a train takes to complete a journey.

very low speeds. Between Panadura and Ratmalana for example, the operating speed is around 18 kmph while it is around 24 kmph between Ratmalana and Colombo Fort. The operational speeds in these sections are even lower than that of the Kelani Valley Line, which is around 25 kmph.

39. Long delays also occur due to failures in the signalling system especially during rainy days, and due to frequent failures of an outdated communication system. The poor track condition and lack of maintenance of the tracks also contribute to long delays. High loading level is another issue on the Main Line and the Coast Line especially during the peak period.

40. In order to improve the stake of rail transportation the need on short- and long-term intervention is felt as an immediate necessity. The government through MoTCA developed the CSRP which shall intervene to improve the capacity and operating speed of the railway network in CMR by modernizing and upgrading tracks, signalling and telecommunication infrastructure; and potentially electrifying the suburban railway lines. These interventions are considered as long-term investment.

41. In order to facilitate these long-term investments, the government has committed to increase the DMU fleet by another 15 units and identified some immediate interventions such as construction of OH&TCC, underpass for roadway and pedestrians at School Lane, new workshop and stores, new training wing, and housing units for relocation under REIP. These activities shall facilitate the long-term investments under CSRP.

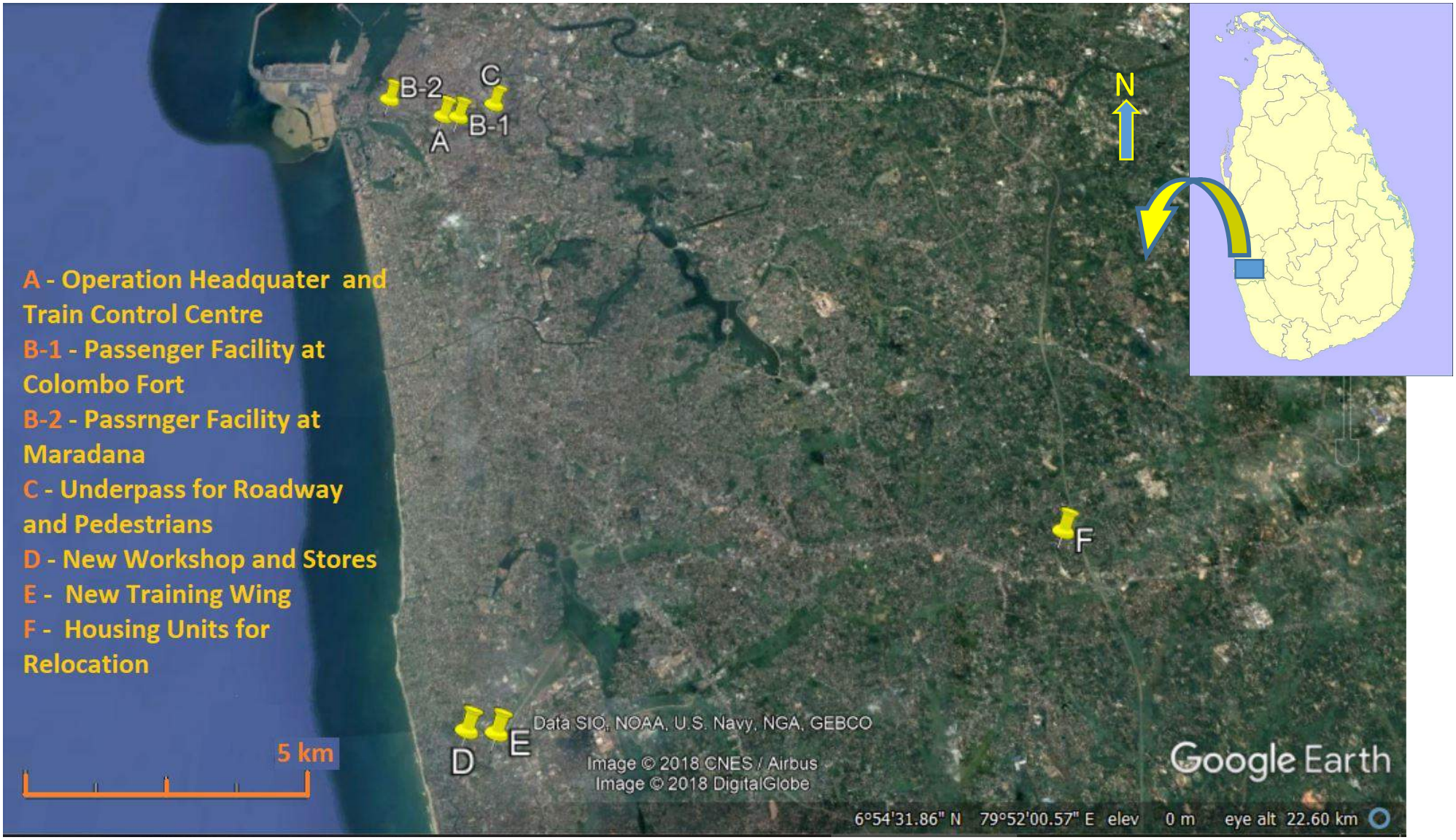


Figure 1(a): Overall Location Map of Project Subcomponents with Civil Works

Figure 1(b): Operation Headquarter and Train Control Center, Passenger Facility at Colombo Fort or Maradana Stations, and Underpass for Roadway and Pedestrians

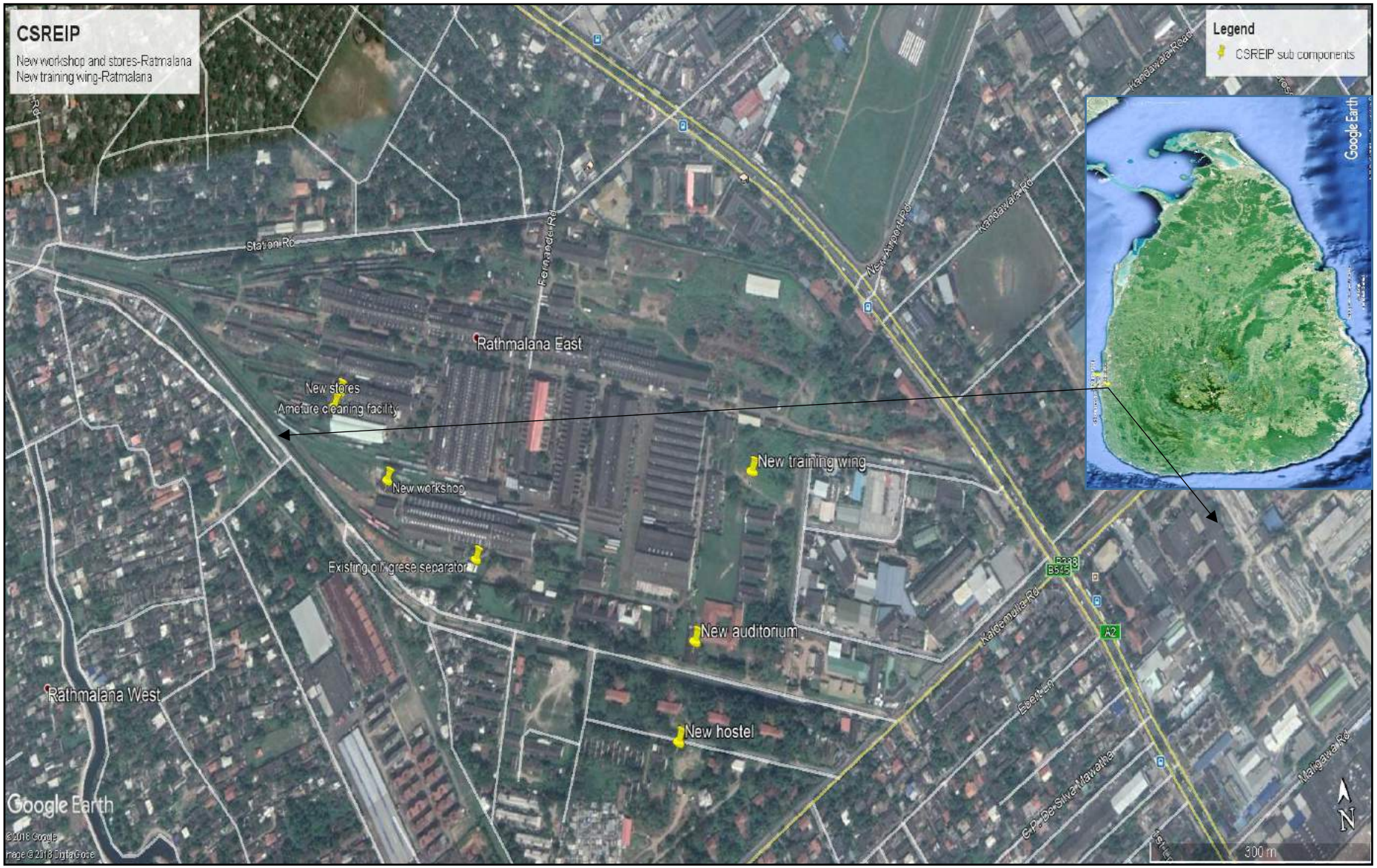


Figure 1(c): New Workshop, Stores, and Training Wing in Ratmalana

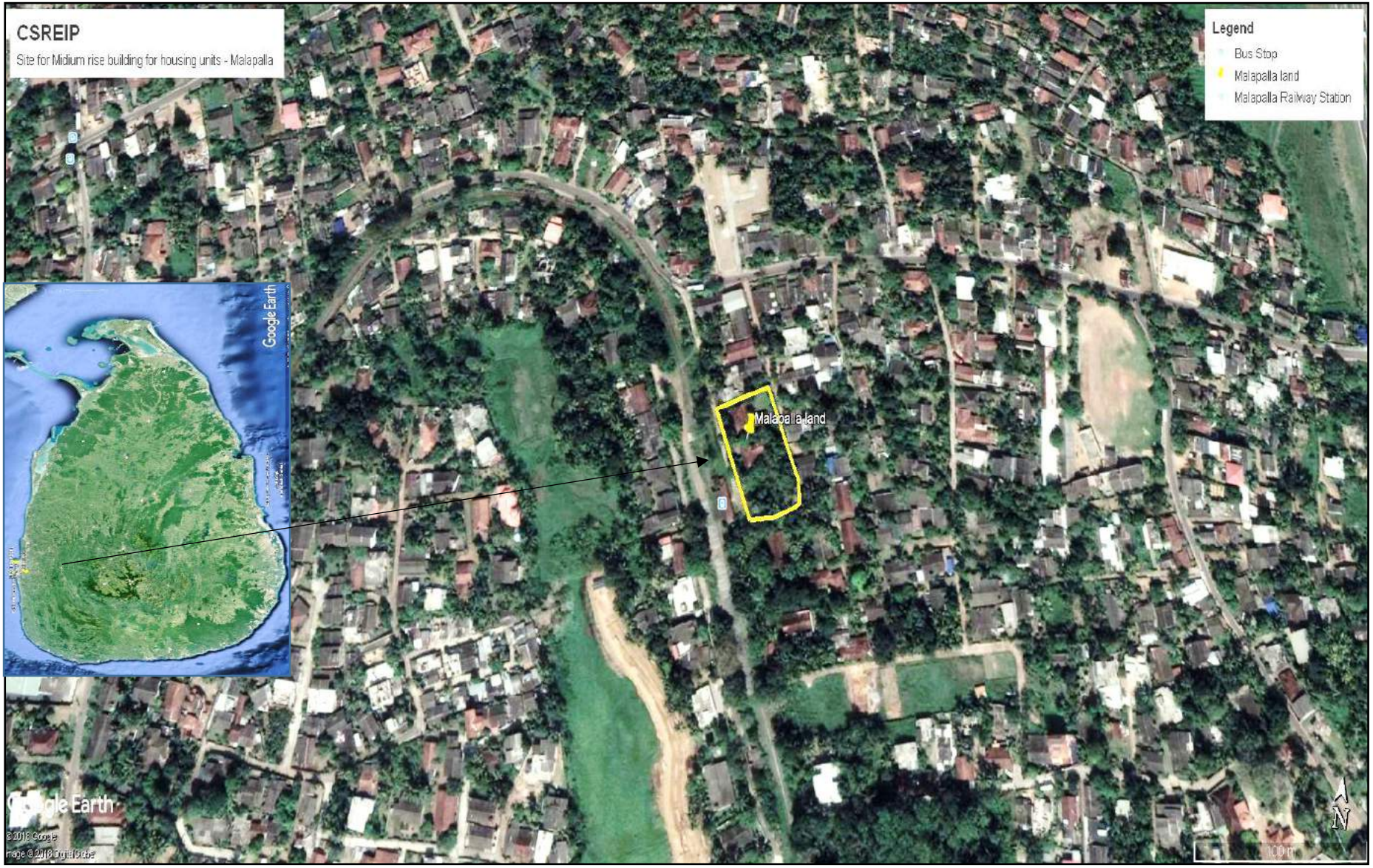


Figure 1(d): New Housing Units for Relocation in Malapalla

C. Analysis of Alternatives

1. No Project Alternative

42. Lack of timely investment in fleet replacement and lack of technology usage by SLR are key issues that have resulted in overcrowding the trains and delays which has reduced reliability of the railway transport system. If no immediate and long-term interventions are made to improve this condition the situation will further deteriorate thus making the commuters and fright operators further apart from railway transport system. Transfer of this passenger and freight operations on to road transport will further increase the traffic congestions on roads especially within CMR.

2. With Project Alternative

43. Introduction of new DMUs to the fleet and implementation of REIP shall provide immediate improvements in the railway sector for improving the efficiency of existing railway operations, where key bottlenecks in the existing railway network (which include existing inefficient signalling and railway telecommunication system) shall be addressed thus making the railway system ready for implementing the CSRP. Such intervention shall again attract commuters and freight in to railway transportation which in turn shall reduce the traffic congestions on roads especially within CMR.

D. Project Activities

44. Following is a description of each subcomponent of REIP that requires civil works to a varying degree from construction of sanitary facilities and resting areas within railway stations at Colombo Fort and Maradana to construction of medium rising building structure for housing units at Malapalla.

1. Operation Headquarter and Train Control Center

45. The new building constructed shall have 14 floors (including the ground floor) and shall house the operation headquarter of SLR. The facility shall also be equipped with a modern high-tech train control center that will monitor and regulate the movement of trains in the main line up to Rambukkana, Northern line up to Maho, Coastal line up to Matara, Puttalam line up to Puttalam and Kelani Valley line up to Awissawella. The building shall house the power control center for future electrical train operations and CCTV system. The facility shall confirm to building design and construction standards of UDA and shall have proper ventilation, lighting, sanitary facilities, access and firefighting equipment.

2. Passenger Facility at Colombo Fort and Maradana

46. New commuter resting, drinking water fountains, information displays, and sanitary facilities shall be constructed within the railway stations of Colombo Fort and Maradana. Accessibility to these two stations shall be improved by modernization of the existing railway platform decks, staircases and other accesses. This modernization shall also accommodate movement of disable persons and loading/ unloading of goods from trains.

3. New Workshop and Stores

47. A new workshop and stores will be constructed within Ratmalana railway yard. The workshop will be designed to handle repairs and complete overhauls of DMUs at any time.

48. The workshop shall be equipped with lifting jack sets, Cranes, high pressure hot water machine, Compressors, electric master lifts, drop tables, fork lifts, a Bogie turn table, hydraulic steel plate bending machine, tig welding plants, Plasma cutters, railway Bogie carrier, a railway carriage washing plant and a universal test bench for testing driver's brake valves and distributor valves.

49. Firefighting equipment, rest rooms for technical staff and rooms for administration staff shall also be provided within the new workshop.

50. An Armature cleaning facility shall also be constructed near workshop No. 39 to facilitate cleaning of Armature units dismantled from locomotives and DMUs.

51. Existing waste water treatment plant at the railway yard shall also be increased in capacity and improved to handle discharges from the new workshop.

52. Additional storage facility for the new workshop No. 39 and a general storage facility for existing workshops shall be constructed to store equipment and spare parts that will be used in the workshops at Ratmalana railway yard.

4. Underpass for Roadway and Pedestrians

53. The underpass bridge at School Lane will be reconstructed to accommodate additional railway lines from Maradana satiation to Loco Junction on Jayantha Weerasekara Mawatha side of existing railway lines including separate lines for technical movements. Reconstruction of this bridge shall also widen the existing carriageway of School Lane under the bridge in to two lanes within the existing Right of Way (ROW). The vertical clearance of the bridge shall also be increased to facilitate movement of traffic. Storm water drainage network at this location shall also be improved to avoid any water stagnation.

54. Pedestrian foot paths including lighting on both side of the roadway shall be provided under the new construction for improved pedestrian movement and safety.

5. New Training Wing

55. The new training wing shall be constructed within the land belonging to SLR at Ratmalana. This new wing shall increase the capacity of the existing training SLGRTTC. The new wing shall include modern lecture rooms and auditorium with audio-video facilities, library facilities, laboratories for material and mechatronics, a diesel workshop and stores.

56. Firefighting equipment, rest rooms for technical staff and rooms for administration staff shall also be provided within the new training wing. The facility shall be design to have proper ventilation, lighting, sanitary facilities, a cafeteria, rest area and changing rooms for students. Hostel facilities to accommodate 20 students shall also designed and constructed at a nearby land also belonging to SLR (this site is located within and area where quarters of SLR officers are located).

6. Housing Units for Relocation at Malapalla

57. New housing units shall be constructed within a medium rise structure at Malapalla on a land belonging to SLR. The design of this building is carried out by the UDA, therefore all standards required for such housing unit shall be provided which include lighting, ventilation, access (including emergency getaways), firefighting provisions and parking.

58. The structure shall accommodate 96 housing units that would be used to resettle displaced households within the section of Kelani Valley Line which passes through Maharagama and Homagama DS Divisions. The structure shall have a ground floor and 11 floors. Each floor shall accommodate 12 housing units. Each unit shall have an area of 500 ft^2 and the ground floor with vehicle parking facility. The building shall also provide office space for the Grama Niladhari office, Development Officer's office, the sub-post office, office of community-based organization (CBO) and community hall.

59. Preliminary designs of these six subcomponents are still being carried out, but the preliminary design consultant have completed conceptual designs for structures at new training wing and Malapalla housing sites. These preliminary drawings are presented in Annexes 2, 3, and 4.

E. Project Implementation Schedule

All six subcomponents of REIP that involves civil works shall be considered as design and build contracts. It is expected that the civil works for each subcomponent shall vary from 18 to 36 months, where improving the passenger facilities at Colombo Fort and Maradana stations being the shortest and construction of OH&TCC and Malapalla medium rise building for housing units being the longest. The tentative project implementation schedule developed by PMU of REIP is presented in Table 3.

Table 3: Tentative Project Implementation Schedule for the Six Subcomponents with Civil Works under REIP

Project Subcomponents or Key Activities	Year 1	Year 2	Year 3	Year 4
Operation Headquarter and Train Control Center				
Preliminary design and bid doc				
Procurement				
Implementation				
Passenger facility at Colombo Fort and Maradana				
Preliminary design and bid doc				
Procurement				
Implementation				
Underpass for roadway and pedestrians				
Preliminary design and bid doc				
Procurement				
Implementation				
New workshop and stores				
Preliminary design and bid doc				
Procurement				
Implementation				
New training wing				
Preliminary design and bid doc				

Project Subcomponents or Key Activities	Year 1				Year 2				Year 3				Year 4			
Procurement																
Implementation																
Housing units for relocation																
Preliminary design and bid doc																
Procurement																
Implementation																

IV. DESCRIPTION OF THE ENVIRONMENT

60. This chapter describes the existing environment around each subcomponent of the project which include civil works. The environment is described in terms of physical environment, ecological environment, and socioeconomic environment including physical cultural resources. Broad aspects on various environmental parameters such as climate and meteorology, geography, geology, air quality, water quality, noise and vibration, ecology, socio-cultural and economic development parameters that are likely to be affected by the proposed subcomponents of the project are presented. Secondary information presented in this chapter were collected from relevant government agencies such as Department of Census and Statistics.

A. Existing Land Use Within Each Subcomponent

1. Operations Headquarter and Train Control Center

61. The land lot for the proposed for the new OH&TCC is about 2 acres in extent located between IT Park (old railway goods shed buildings) and railway workshop of F-18 at Maradana.0 This land and its surrounding lands have been a property of SLR from colonial period. In year 2014 a land area of 11.3 acres including the proposed land lot had been vested to UDA (with consent from SLR) to develop a Science and Technology Park under the Colombo City Development Program. However, no such development took place and the land remained vacant.

62. With the requirement to construct the new OH&TCC, the SLR requested UDA to divest this 2-acre land lot to which the UDA has given their consent. This decision was made on 3 May 2018 during a meeting chaired by Secretary, Ministry of Transport and Civil Aviation. The minutes of this meeting and the Cabinet approval to divest this land are presented in Annexes 5 and 6 of this report. Therefore, acquisition of any private land does not occur under this subcomponent.

63. The land lot proposed for the new building is an open land without any structure or trees. However, there are trees and building belonging to SLR and UDA in the immediate surrounding of this land. The survey map of this land is included in Annex 7.

Figure 2: Land Lot Proposed for Construction of New OH&TCC

2. Passenger Facility at Colombo Fort and Maradana

64. These facilities will be constructed within Colombo Fort and Maradana stations which are located within a highly urbanized area in Colombo Fort and Maradana. The lands in which these facilities are to be constructed are property of SLR.

Figure 3: An Existing Toilet Facility at Colombo Fort Station (With Poor Sanitary Conditions)

Figure 4: Improperly Built Drinking Water Fountain and Platform Deck (Colombo Fort Aad Maradana Stations)

3. New Workshop and Stores

65. The new workshop and stores shall be constructed within the available land at Ratmalana railway workshop premises operated under the Chief Mechanical Engineers Sub Department (CMESD). The land proposed for the construction is surrounded by workshops used for repairing and maintenance work of the existing rolling stock. Some discarded locomotive and carriage parts and scrap material could be observed spread around this land. Few photographs taken at the proposed site are presented in Figures 5 and 6.

Figure 5: Discarded Locomotive and Carriages

Figure 6: Discarded Parts Spread on the Land

4. Underpass for Roadway and Pedestrians

66. This site is also located within a highly urbanised area closer to Maradana railway station at Maligawatta, Colombo 10. The project area is highly congested due to its location near to Maradana Railway station, Panchikawaththa commercial area, hospitals, temples and public roads. The underpass provide access to the School Lane. However, the present underpass only provides one way access to cars, bicycles and three wheelers due to the narrowness and height restriction of the passage. There are five railway tracks operational for service and technical movements.

Figure 7: Birds Eye View at the Location of School Lane Underpass

Figure 8: Pedestrian Footpath Within the Underpass

5. New Training Wing

67. Proposed land for the new training wing is located within the land belonging to SLR at Ratmalana. This land has been used as a disposal site of scrap and waste coming from the workshops of the railway yard. However now vegetation has grown over the land.

Figure 9: Open Land Area Proposed for the New Training Wing

68. Proposed auditorium shall be constructed in the frontage of the land of SLGRTTC where an abandoned garage of the existing training center is located.

Figure 10: Location Selected for Construction of the New Auditorium (Insight)

69. Proposed hostel shall be constructed within a SLR land about 500 m away from the SLGRTTC.

Figure 11: Land Selected to Construct the New Hostel

6. Housing Units for Relocation

70. The proposed land for constructing the medium rise building structure for housing units is located in Malapalla. This land is a property of SLR. There are two officer quarters their home gardens and a structure constructed by a CBO that houses the Grama Niladhari office, Development Officer's office, CBO office and a sub-post office within this land. The land is surrounded by settlements in three sides and the Kelani Valley railway line on one side.

71. The survey map of this land is included in Annex 8.

Figure 12: One of the Officer Quarter at Site

Figure 13: Part of the Existing Vegetation within the Land at Malapalla

B. The Physical Environment

1. Topography, Geology, and Soil

72. All six subcomponents of REIP involving civil works are geographically located within the western regions of low country (i.e. elevation below 400 m above mean sea level) wet zone of the country. According to agro-ecological classification[4] all locations of these subcomponents falls within WL3 agro-ecological zone. Topographic features, 75% expectancy of annual rainfall, soil and predominant land use of WL3 agro-ecological zone is presented below.

Table 4: Characteristics of the WL3 Agro-ecological Zone

Agro-ecological Zone	75% Expectancy Value of Annual Rainfall (mm)	Description (Land Use, Terrain, Soil groups)
WL3	> 1,700	Coconut, Fruit crops, Mixed Home gardens and Paddy Rolling and undulating terrain Red Yellow Podsolic soils with soft and hard Laterite and Regosol soils

Source: The National Atlas of Sri Lanka (2nd edition), Survey Department Sri Lanka.

73. The country's major geological formations are dated back to Precambrian era with metamorphic type formations. These formations are subdivided as *Highland complex, Vijayana*

[4] The entire country has been divided in the 46 agro-ecological zones based on terrain (elevation), soil types, land use and 75% expectancy of annual rainfall.

complex, Wanni comple and *Kadugannawa complex.* More recent formations of sandstones, shales and siltstones are found in Tabbbowa and Andigama near Puttalam. A sedimentary limestone formation is prominent in Jaffna peninsula and along the North western coastal belt. The major geological formations of the country are expressed in Figure 14. Accordingly, the proposed project area is located within Wanni complex.

74. Secondary information available with respect to project area (i.e. with respect to the geographic location of the six subcomponents) revile that the metamorphic rock in the area mostly comprise of hornblende bearing gneiss, overlain by quaternary deposits in the form of alluvium, beach rock, dune sands, marsh and lagoon deposits, coral and old/beach /shore line deposits. Further marsh and lake alluvium are found in the fringes of the coastal lowland areas (where the land for the new workshop and training center at Ratmalana is located). Often this marsh and lake alluvium is found bounded by low lateritic hills.

75. Figure 15 represent a photograph taken inside a deep well at a property near the land proposed to build the medium rise building at Malapalla. The soil profile could be observed in this photograph which clearly show the laterite soil formation. A pit cut at Ratmalana yard is presented in Figure 16. This photograph also presents the existing soils profile in the area which is predominant with sandy alluvium formations.

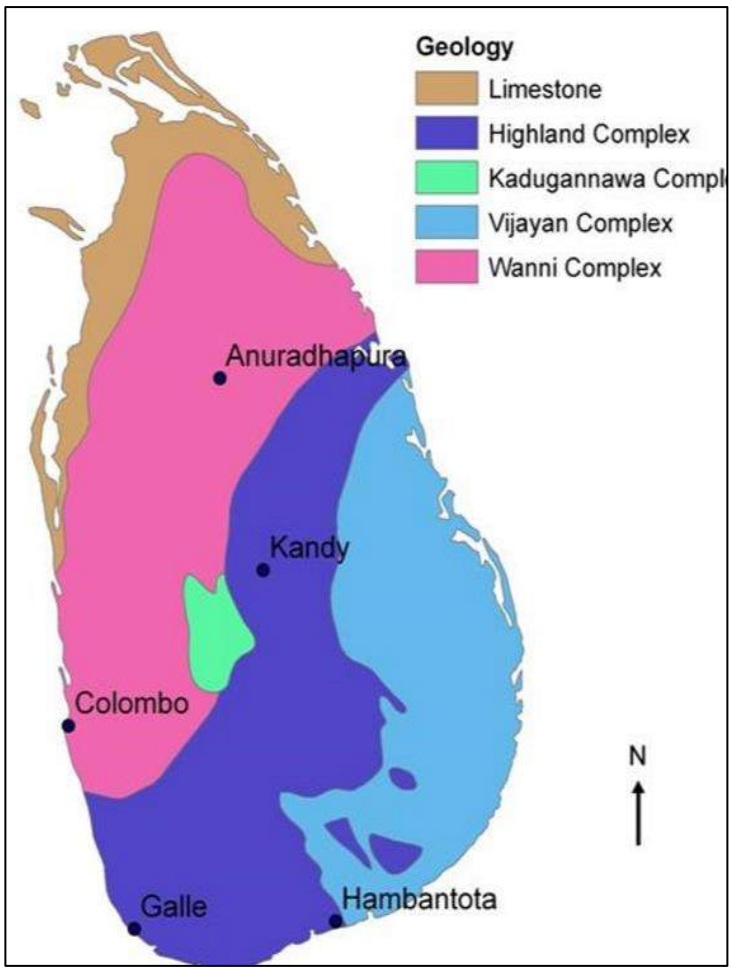


Figure 14: Major Geological Formations of the Country

Figure 15: Inside a Deep Well Near Malapalla Land

Figure 16: A Soil Pit Cut at Ratmalana Site

2. Meteorology

76. Compared to the other months of the year, months of January and February are fairly dry in the project area. Rainfall to the project area is mainly influenced by the south-west monsoon winds (mid-May to September) and second inter-monsoon rains governed by the clouds formed during the shift of the Inter tropical convergence zone.[5] As indicated in Table 4, the 75% expectancy value of annual rainfall is greater than 1,700 mm.

77. Wind direction and wind speeds in the country including the western region are depended on the pressure gradients developed between Siberian high and Mascarine high. Wind roses developed for months of January, April, July, and October by the Department of Meteorology are presented in Figure 17. According to the wind roses the wind directions and speeds within western region could be described as follows:

- January - Northerly direction with average speed of 7.2–9.4 kmph
- April - calm wind with average speed of 5.4–7.6 kmph
- July - Southwest direction with average speed of 7.6–15.5 kmph
- October - Southwest direction with average speed of 5.8–9.0 kmph

[5] Inter Tropical Convergence Zone or ITCZ is the terminology used to delineate a zone of separation between the northern and southern hemispheric trade winds usually close to the equator.

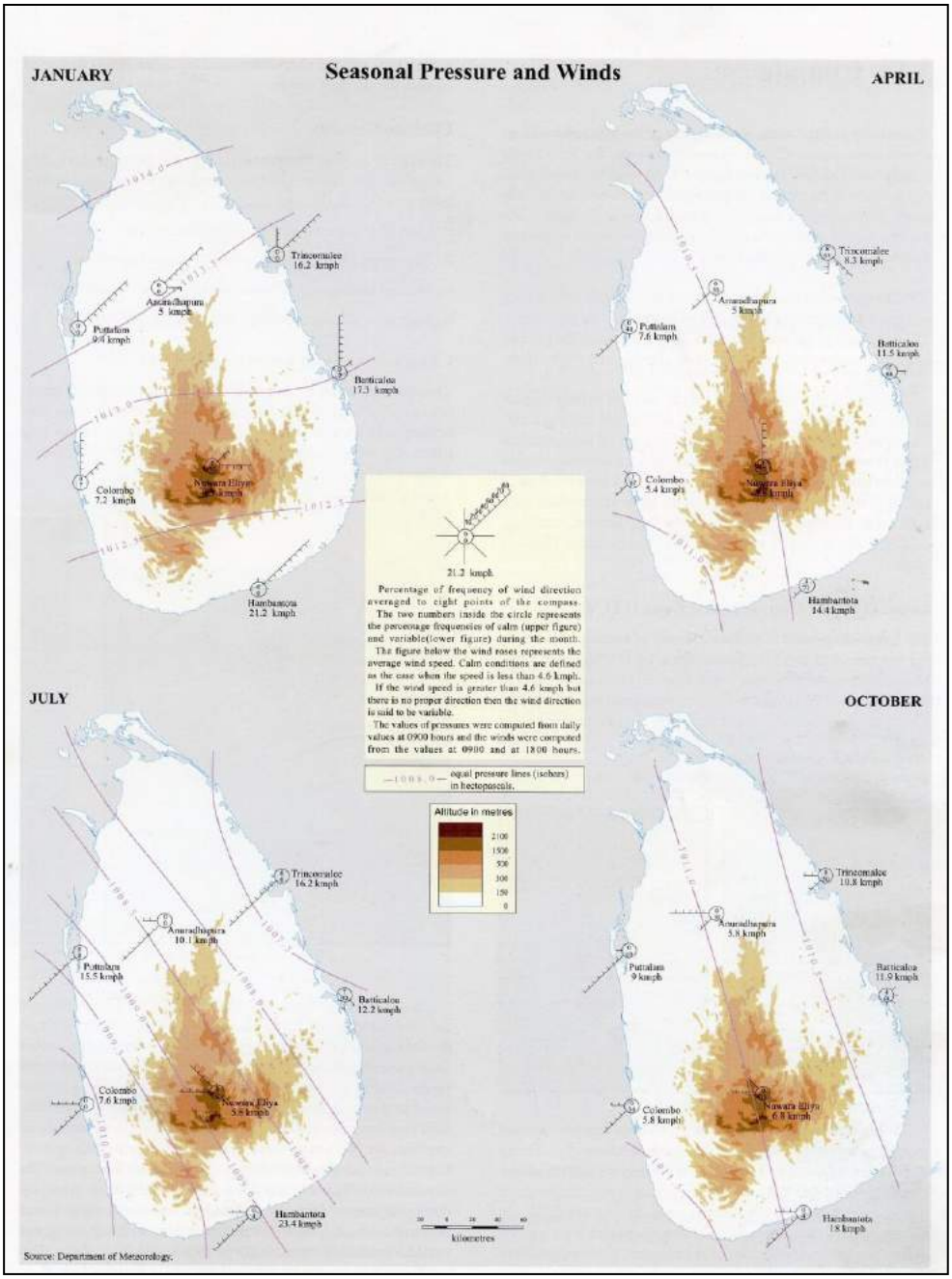


Figure 17: Wind Roses for Months of January, April, July, and October Developed By Department of Meteorology (Source: National Atlas, 2nd Edition)

78. The mean monthly temperatures of the country differ on the seasonal movement of the sun with some influence caused by rainfall. Colombo features a tropical monsoon climate under the Köppen climate classification, falling just short of a tropical rainforest climate.

79. Following facts are relevant with respect to the climatological and meteorological condition of the proposed project area. Firstly, the climate of Colombo district is fairly temperate throughout the year. From March to April the temperature averages around 31^0C maximum. The only major change in the Colombo weather occurs during the monsoon seasons from May to August and

October to January. Heavy rains are expected during this time of the year. Located within WL3 agro-ecological region Colombo experience little relative diurnal range of temperature, although this is more marked in the drier winter months, where minimum temperatures average 22^{0}C. Rainfall in the city averages around 2,400 mm a year. Table 5 below summarizes the climatological data of Colombo.

Table 5: Climatological Data of Colombo City

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average high ^{0}C	30.9	31.2	31.7	31.8	31.1	30.4	30.0	30.0	30.2	30.0	30.1	30.3	30.6
Daily mean ^{0}C	26.6	26.9	27.7	28.2	28.3	27.9	27.6	27.6	27.5	27.0	26.7	26.6	27.4
Average low ^{0}C	22.3	22.6	23.7	24.6	25.5	25.5	25.2	25.1	24.8	24.0	23.2	22.8	24.1
Precipitation mm	58.2	72.7	128.0	245.6	392.4	184.9	121.9	119.5	245.4	365.4	414.4	175.3	2,523.7
% humidity	69.0	69.0	71.0	75.0	78.0	79.0	78.0	77.0	78.0	78.0	76.0	73.0	75.0

^{0}C = degrees Celsius; % = percent; mm = millimeter.
Source: World Weather Information Center - Colombo, World Meteorological Organization.

3. Surface and Groundwater Hydrology

80. There are no rivers, streams or lakes located close to any of these subcomponents of the project. However, storm water drains could be observed near School Lane underpass and the land proposed to construct the new workshop, stores and training wing at Ratmalana.

81. A Well could be observed near the land selected for the OH&TCC building and another on an adjacent land lot to the land at Malapalla proposed resettlement site. An abandoned well could also be observed within the land at Malapalla. A shallow water table could be observed at the well near the land for OH&TCC, but the water level of the well at Malapalla was about 20 feet below the ground level.

82. The general flow direction of storm water from the land for OH&TCC building and School Lane underpass is towards the Beira Lake situated to the west of both sites. Storm water from Ratmalana SLR land drains in to the Lunava lagoon located towards a westerly direction from the land and storm water of Malapalla flows on to a marsh/ abandoned paddy land area.

4. Ambient Air Quality

83. Existing evidence has shown that the ambient atmospheric environment of Colombo and its suburbs are heavily contaminated with vehicular emissions. Many studies undertaken by regulatory agencies and researches clearly indicate that inefficient combustion of petroleum fuels in motor vehicles is the primary cause of growing air pollution in Colombo, the largest metropolitan area with nearly 50% of vehicle population is concentrated and 30% of the nation's human population dwells (Clean Air 2025, An Action Plan for Air Quality Management, 2016). The usage of motor vehicles in the Colombo City has been increased by over 300% in the last 20 years. The majority of these are motor cycles, three wheels and motor cars.

84. Air samples were collected at four locations representing the six subcomponents of REIP as described in Table 6. Location map of these sampling points are presented in Annexes 9, 10, 11, and 12. Sampling parameters included concentrations of total suspended particulate matter (TSPM), respirable particulate matter (PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2), nitrogen dioxide

(NO_2), carbon dioxide (CO_2), and carbon monoxide (CO). Sampling and analysis of samples were carried out as per the methods stipulated under National Ambient Air Quality Standards (NAAQS).

85. Sampling results are summarized in Table 7 which also presents the NAAQS and Table 8 presents World Health Organization (WHO) guidelines on Ambient Air Quality (2005).

Table 6: Details of the Sampling Locations of Ambient Air Quality Measurements

Sample No.	Location Coordinates	Location Description
AQ1	6^0 55' 44.8" N 79^0 51' 44.52" E	Near the Railway shop 18 canteen, Maradana – Representing proposed building site for OH&TCC
AQ2	6^0 48' 35.82" N 79^0 52' 42.28" E	At the premises of SLGRTTC, Ratmalana – Representing the workshop and training wing
AQ3	6^0 55' 52.50" N 79^0 52' 18.20" E	At the premises of Mr. Maithreepala Nanayakkara, No. 37/22 School Lane, Dematagoda – Representing School Lane underpass
AQ4	6^0 50' 38.89" N 79^0 58' 30.41" E	Near the premises of Malapalla railway station – Representing the site for housing units for relocation

E = East; N = North.

Note: Sampling carried out by Environmental Studies and Services Division of National Building and Research Organisation.

Table 7: Concentration of Each Air Quality Sampling Parameter at Each Location

Sample No.	Date of sampling	Time average (hours)	Concentration in µg/m³						
			TSPM	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	CO_2 (ppm)
Interim fugitive dust emission standards[a]		3	450						
NAAQS		8				120	150	10,000	
		24		100	50				
AQ1	9-11/7/2018	3	45						
		8				7	13	<1,000	210
		24		27	14				
AQ2	9-11/7/2018	3	62						
		8				16	25	<1,000	225
		24		37	20				
AQ3	9-11/7/2018	3	48						
		8				10	28	<1,000	215
		24		29	16				
AQ4	9-11/7/2018	3	20						
		8				16	28	<1,000	220
		24		12	7				

µg/m³ = micrograms per cubic meter; AQ = air quality; CO = carbon monoxide; CO_2 = carbon dioxide; NAAQS = National Ambient Air Quality Standards; NO_2 = nitrogen dioxide; PM = particulate matter; ppm = parts per million; SO_2 = sulphur dioxide; TSPM = total suspended particulate matter.

[a] Interim fugitive dust emission standard levels for TSPM between two simultaneous 3 hour measurement at upwind and downwind stipulated by CEA.

[b] Ambient Air Quality Standards stipulated in the Extraordinary Gazette, No. 1562/22 - August 15, 2008.

Table 8: World Health Organization Ambient Air Quality Guidelines, 2005

Parameter	Averaging Period	Guideline value in mg/m^3
Sulphur dioxide (SO_2)	24 hours	125 (interim target 1) 50 (interim target 2) 20 (guideline)
	10 minutes	500 (guideline)
Nitrogen dioxide (NO_2)	1 year	40 (guideline)
	1 hour	200 (guideline)
Particulate matter (PM_{10})	1 year	70 (interim target 1) 50 (interim target 2) 30 (interim target 3) 20 (guideline)
	24 hours	150 (interim target 1) 100 (interim target 2) 75 (interim target 3) 50 (guideline)
Particulate matter ($PM_{2.5}$)	1 year	35 (interim target 1) 25(interim target 2) 15 (interim target 3) 10 (guideline)
	24 hours	75 (interim target 1) 50 (interim target 2) 37.5 (interim target 3) 25 (guideline)
Ozone	8 hours, daily maximum	160 (interim target 1) 100 (guideline)

mg/m^3 = milligram per cubic meter; NO_2 = nitrogen dioxide; PM = respirable particulate matter; SO_2 = sulphur dioxide.

86. According to results in Table 8, concentrations of PM_{10}, $PM_{2.5}$, SO_2, NO_2, and CO are observed to be lower than the standards specified in Ambient Air Quality Standards stipulated under the Extraordinary Gazette, No. 1562/22 - August 15, 2008 under the NEA. The TSPM levels recorded at each sampling location is also below the interim source emission standard level of 450 µg/m^3. Therefore, it can be stated that sampling locations for air quality have better atmospheric conditions compared to many other locations in Colombo district.

5. Existing Noise and Vibration Levels

87. Measurements of existing noise levels were recorded at five locations and vibration levels at four locations. Details of sampling locations and measurement times are presented in Table 9, while Annex 9, 10, 11, and 12 present the map of these sampling locations. Sound level measurements were carried out in accordance with the methods stipulated in National Environmental (Noise Control) Regulations No. 1 of 1996. Ambient vibration levels were measured in accordance with methods laid down in International Organisation for Standardisation – ISO 4966: 1990E.

Table 9: Details of the Sampling Locations of Ambient Noise Level

Sample No.	Type of Sampling	Location Coordinates	Location Description	Sampling Duration
NV1	Noise and vibration	6^0 55' 44.8" N 79^0 51' 44.52" E	Near the railway shop 18 canteen, Maradana – representing proposed building site for OH&TCC	24 hours
NV2	Noise and vibration	6^0 48' 39.48" N 79^0 52' 45.10" E	At the premises of SLGRTTC, Ratmalana – Representing the training wing	3 hours
NV3	Noise and vibration	6^0 48' 41.27" N 79^0 52' 29.17" E	At the premises of Chief Mechanical Engineer's office, Ratmalana – representing the workshop	3 hours
NV4	Noise	6^0 55' 53.94" N 79^0 52' 19.80" E	At the School Lane road (closer to underpass and residential area) – representing School Lane underpass	3 hours
NV5	Noise and vibration	6^0 50' 38.89" N 79^0 58' 30.41" E	Near the premises of Malapalla railway station – representing the site for housing units for relocation	24 hours

E = East; N = North; NV = noise and vibration; SLGRTTC = Sri Lanka German Railway Technical Training Center.
Note: Sampling at locations NV1, NV2, NV3, and NV5 conducted by Environmental Studies and Services Division of National Building and Research Organisation. Sampling at NV4 (noise) carried out by Environment and Social Development Division of Road Development Authority.

88. The National Environmental (Noise Control) Regulations No.1 of 1996 stipulate the maximum permissible noise levels at the boundaries of a land in which any source of noise is located. Schedule one of these regulations provide the following noise guidelines.

a. Schedule I (Regulations 2)

Table 10: Maximum Permissible Noise Levels at Boundaries in La_{eq}.T

Area	Details	La_{eq}.T	
		Day time (6.00 – 18.00 hours)	Night time (18.00 – 6.00 hours)
Low noise	Within PS area	55	45
Medium noise	Within MC and UC area	63*	50
High noise	Export processing zone	70	60
Silent zone	Area covered from a distance of 100 m from the boundary of a court house, hospital, public library, school, zoo, sacred area and area set apart for recreational or environmental purposes)	50	45

La_{eq}.T = equivalent continuous sound pressure level; m = meter; MC = municipal council; PS = Pradeshiya Saba; UC = urban council.
Note: Provided that the noise level should not exceed 60 dB (A) inside existing houses, during the day time.

89. Regulation 4 of above Nosie Control Regulations stipulate the maximum noise levels at boundaries of the land in La_{eq}.T where construction activities take place.

b. Schedule III (Regulations 4)

Table 11: Maximum Permissible Noise Levels at Boundaries in $La_{eq}.T$

$La_{eq}.T$	
Day Time (6.00 – 21.00 hours)	**Night Time (21.00 – 6.00 hours)**
75	50

$La_{eq}.T$ = equivalent continuous sound pressure level.

90. The Guidelines for Community Noise of WHO (1999) as referred in the "General Environmental, Health and Safety Guidelines of World Bank," provides the following guidelines values for noise levels measured out of doors.

Table 12: Guidelines Values for Noise Levels Measure Out of Doors

Receptor	**One Hour** (dBA)	
	Day Time (7.00 – 22.00)	**Night Time (22.00 – 7.00)**
Residential, institutional, educational	55	45
Industrial, commercial	70	70

dB = decibel.

91. Tables 13 (a), (b) and (c) presents the results of noise measurements measured at each sampling location.

Table 13(a): Noise Levels at Location NV1 (24-hour Sample)

Date	**Time Interval**	**Run Time** (hour)	**Measured Residual Noise Level Leq** (dB)	**Background Noise Level L90** dB (A)
09-07-2018	09.45–10.45	1	60	52
	10.45–11.45	1	61	56
	11.45–12.45	1	59	56
	12.45–13.45	1	60	56
	13.45–14.45	1	59	56
	14.45–15.45	1	60	56
	15.45–16.45	1	60	56
	16.45–17.45	1	60	57
	17.45–18.45	1	60	56
	18.45–19.45	1	50	53
	19.45–20.45	1	56	52
	20.45–21.45	1	52	51
	21.45–22.45	1	54	50
	22.45–23.45	1	54	52
	23.45–00.45	1	51	48
10-07-2018	00.45–01.45	1	50	48
	01.45–02.45	1	50	48
	02.45–03.45	1	51	48
	03.45–04.45	1	52	49
	04.45–05.45	1	51	48
	05.45–06.45	1	58	54
	06.45–07.45	1	59	55
	07.45–08.45	1	58	52
	08.45–09.45	1	60	55

dB = decibel; Leq = equivalent sound level; NV = noise and vibration.

Table 13(b): Noise Levels at Location NV5 (24-hour Sample)

Date	Time interval	Run time (hour)	Measured Residual Noise Level Leq (dB)	Background noise level L90 dB (A)
11-07-2018	13.00–14.00	1	48	43
	14.00–15.00	1	69	44
	15.00–16.00	1	51	45
	16.00–17.00	1	69	45
	17.00–18.00	1	62	46
	18.00–19.00	1	58	46
	19.00–20.00	1	58	50
	20.00–21.00	1	54	49
	21.00–22.00	1	56	49
	22.00–23.00	1	52	48
	23.00–00.00	1	51	49
12-07-2018	00.00–01.00	1	51	49
	01.00–02.00	1	50	47
	02.00–03.00	1	52	46
	03.00–04.00	1	49	46
	04.00–05.00	1	55	48
	05.00–06.00	1	57	50
	06.00–07.00	1	63	47
	07.00–08.00	1	68	46
	08.00–09.00	1	58	46
	09.00–10.00	1	69	47
	10.00–11.00	1	60	46
	11.00–12.00	1	55	45
	12.00–13.00	1	55	45

dB = decibel; Leq = equivalent sound level; NV = noise and vibration.

Table 13(c): Noise Levels at Locations NV2, 3, and 4 (3-hour Sample)

Sample No.	Date	Time	Run time (hour)	Measured residual noise level Leq (dB)	Background noise level L90 dB (A)
NV2	09-07-2018	Day	3	45	44
		Night	3	43	36
NV3	09-07-2018	Day	3	51	46
		Night	3	57	48
NV4	21-03-2018	Day	3	79	72

dB = decibel; Leq = equivalent sound level; NV = noise and vibration.

92. Measured residual and background noise levels at all sampling sites are above WHO guidelines for Community Noise. Project subcomponents fall within Colombo MC, Dehiwala – Mt. Lavinia MC and Maharagama urban council limits which are considered as “Medium Noise” area as per schedule I of National Environmental (Noise Control) Regulations No.1 of 1996. Observed noise levels (especially the background noise level) of each sampling location other than NV4 are below or marginally above the stipulated noise levels for “Medium Noise”.

93. Measurements at sampling location NV4 (i.e. School Lane underpass) were primarily influenced by sound from very frequent traffic and train movements and commercial activities. Therefore, the measured residual and background noise levels appear to be higher than the stipulated maximum permissible noise levels in National Environmental (Noise Control) Regulations No. 1 of 1996 under NEA.

94. Although the noise levels at OH&TCC, workshop, training wing and Malapalla housing site are also influenced by traffic and train movements, the distance between noise source (movement of vehicles and trains) and the point of measurement (within the site) could be considered as a cause of reducing the noise levels created by such sources.

95. Tables 14 (a), 12(b), and 12(c) present the vibration measurements at each sampling location.

Table 14(a): Vibration Levels at Location NV1
(24-hour Sample, Frequency Range 10–50 Hz)

Date	Time Interval	Vibration in ppv (mm/sec)
10-07-2018	10.00–11.00	0.17
	11.00–12.00	0.25
	12.00–13.00	0.24
	13.00–14.00	0.25
	14.00–15.00	0.22
	15.00–16.00	0.19
	16.00–17.00	0.22
	17.00–18.00	0.29
	18.00–19.00	0.14
	19.00–20.00	0.21
	20.00–21.00	0.16
	21.00–22.00	0.14
	22.00–23.00	0.14
	23.00–00.00	0.15
11-07-2018	00.00–01.00	0.25
	01.00–02.00	0.16
	02.00–03.00	0.18
	03.00–04.00	0.22
	04.00–05.00	0.25
	05.00–06.00	0.27
	06.00–07.00	0.15
	07.00–08.00	0.23
	08.00–09.00	0.24
	09.00–10.00	0.28

Hz = hertz; mm/sec = millimeter per second; NV = noise and vibration; ppv = peak particle velocity.

Table 14(b): Vibration Levels at Location NV5
(24-hour Sample, Frequency Range 10–50 Hz)

Date	Time Interval	Vibration in ppv (mm/sec)
11-07-2018	07.00–08.00	0.15
	08.00–09.00	0.16
	09.00–10.00	0.18
	10.00–11.00	0.17
	11.00–12.00	0.19
	12.00–13.00	0.14
	13.00–14.00	0.24
	14.00–15.00	0.13
	15.00–16.00	0.13
	16.00–17.00	0.13
	17.00–18.00	0.14
	18.00–19.00	0.13
	19.00–20.00	0.13

Date	Time Interval	Vibration in ppv (mm/sec)
	20.00–21.00	0.14
	21.00–22.00	0.21
	22.00–23.00	0.18
	23.00–00.00	0.19
12-07-2018	00.00–01.00	0.21
	01.00–02.00	0.22
	02.00–03.00	0.31
	03.00–04.00	0.45
	04.00–05.00	0.37
	05.00–06.00	0.28
	06.00–07.00	0.13

Hz = hertz; mm/sec = millimeter per second; NV = noise and vibration; ppv = peak particle velocity.

Table 14(c): Vibration Levels at Locations NV2 and 3

Sample No.	Type of Vibration	Vibration Axis	Vibration level ppv (mm/sec)	Maximum Vibration in ppv (mm/sec)	Frequency Range (Hz)
NV2	Continuous or ground	Transgenic	0.055	0.118	10–50
		Vertical	0.079		
		Longitude	0.095		
NV4	Continuous or ground	Transgenic	0.079	0.208	10–50
		Vertical	0.158		
		Longitude	0.166		

Hz = hertz; mm/sec = millimeter per second; NV = noise and vibration; ppv = peak particle velocity.

96. The CEA stipulated maximum permissible interim vibration levels for different types of structures are summarized below.

Structure Type	Type of Vibration	Frequency of Vibration (Hz)	Vibration in PPV (mm/sec)
Type 1 structures: multi-story buildings of reinforced concrete or structural steel, with filling panels of block work, brick work or precast units not designed to resist earthquakes	Continuous	0–10	5.0
		10–50	7.5
		Over 50	15.0
	Intermittent	0–10	10.0
		10–50	15.0
		Over 50	30.0
Type 2 structures: Two-story domestic houses and buildings constructed of made of reinforced block work, precast units, and reinforced floor and roof construction, or wholly of reinforced concepts or similar, not designed to resist earthquakes.	Continuous	0–10	2.0
		10–50	4.0
		Over 50	8.0
	Intermittent	0–10	4.0
		10–50	8.0
		Over 50	16.0
Type 3 structures: Single and two-story houses and buildings made of lighter construction, using lightweight materials such as bricks, cement blocks etc, not designed to resist earthquakes.	Continuous	0–10	1.0
		10–50	2.0
		Over 50	4.0
	Intermittent	0–10	2.0
		10–50	4.0
		Over 50	8.0
Type 4 structures – Structures that, because of their sensitivity to vibration, do not correspond to those listed above 1,2 &	Continuous	0–10	0.3
		10–50	0.5
		Over 50	1.0

Structure Type	Type of Vibration	Frequency of Vibration (Hz)	Vibration in PPV (mm/sec)
3, & declared as archeologically preserved structures by the Department of Archaeology	Intermittent	0–10	0.5
		10–50	1.0
		Over 50	2.0

Hz = hertz; mm = millimeter per second; ppv = peak particle velocity; sec = second.

97. Vibration levels recorded at each site at the frequency range 10–50 Hz, were lower than the vibration levels specified for any type of structure listed in the interim vibration standards stipulated by CEA (as indicated above).

6. Existing Water Quality and Sources of Water Pollution

98. Existing surface and groundwater quality were measured at four locations with respect to the six subcomponents of the project (one surface and three ground water samples). Details of the sampling locations are presented in Table 15. Annexes 9, 10, 11, and 12 present maps of these sampling locations. The sampling and analysis were carried out by the laboratory of CEA using standard methods for the examination of water and wastewater APHA, AWWA and WEF 22 edition 2012.

99. Analytical results of the surface water sample is presented in Table 16(a) in comparison with draft Sri Lankan standard for inland water quality, 2004 (Class III Waters). Table 16(b) presents analytical results of groundwater samples in comparison with specification for potable water (SLS 614: 2013).

Table 15: Details of the Sampling Locations of Surface and Ground Water

Sample No.	Type of Sampling	Location Coordinates	Location Description
WQ1	Ground water	6^0 55' 44.94" N 79^0 51' 42.03" E	Near IT Park (old railway goods shed building), Maradana – Representing proposed building site for OH&TCC
WQ2	Ground water	6^0 48' 38.55" N 79^0 52' 30.64" E	At the premises of Chief Mechanical Engineer's office, Ratmalana – Representing the workshop
WQ3	Surface water	6^0 48' 36.98" N 79^0 52' 31.09" E	At the premises of Chief Mechanical Engineer's office, Ratmalana – Representing the workshop (oil and grease separator)
WQ4	Ground water	6^0 50' 38.55" N 79^0 58' 31.46" E	At the premises of Mrs. H.M.M. Kumarihami, No. 112/4 Malapalla, Pannipitiya – Representing the site for housing units for relocation

E = East; N = North.

Note: Sampling date 13-7-2018 using Grab samples.

Table 16(a): An Assessment of Existing Surface Water Quality at WQ3 Location

Parameter	Unit	Location WQ3	Draft Sri Lankan Standard for Inland Water Quality, 2004 Class III Waters
			Minimum Quality (Other Uses) Category 7
Temperature	^{0}C	29.60	
pH at ambient temperature	-	6.90	5.50–9.00

Parameter	Unit	Location WQ3	Draft Sri Lankan Standard for Inland Water Quality, 2004 Class III Waters
			Minimum Quality (Other Uses) Category 7
Electrical Conductivity (EC)	mS/cm	0.30	
Turbidity	NTU	5.00	
Salinity	g/kg	0.01	
Total Suspended Solids (TSS)	mg/l	16.00	
Biochemical Oxygen Demand (BOD_5) @ 20 °C	mg/l	2.00	5.00
Dissolved Oxygen (DO)	mg/l	3.80	
Total coliforms / MPN/100 ml	-	>16,000	

^{0}C = degrees Celsius; g/kg = grams per kilogram; ml = millimeter; MPN = most probable number.

Table 16(b): An Assessment of Existing Ground Water Quality at Locations WQ1, WQ2 and WQ4

Parameter	Unit	Location			Drinking Water Standards SLS 614:2013
		WQ1	WQ2	WQ4	
Temperature	°C	31.00	30.70	27.70	-
pH at ambient temperature	-	6.60	6.10	4.60	6.50–8.50 @ 25°C ± 2°C
Electrical Conductivity (EC)	mS/cm	0.44	0.35	0.20	-
Turbidity	NTU	3.00	3.00	2.00	2.00
Salinity	g/kg	0.01	0.01	0.00	-
Total Suspended Solids (TSS)	mg/l	14.00	14.00	3.00	
Biochemical Oxygen Demand (BOD_5) @ 20 °C	mg/l	1.00	2.00	2.00	-
Dissolved Oxygen (DO)	mg/l	3.40	8.10	4.80	-
Total coliforms/ MPN/ 100 ml	-	16,000.00	270.00	<18	-

^{0}C = degrees Celsius; g/kg = grams per kilogram; ml = millimeter; MPN = most probable number.

100. From above results it could be stated that water samples of WQ1 and WQ3 have contaminations of coliforms compared to the two samples from WQ2 and WQ3. All samples contain some number of suspended solids.

C. Biological Environment

101. Any of the six subcomponents of the project are not located nearby any ecologically important reserves declared by the Department of Wild Life Conservation or Department of Forest

Conservation. The natural vegetation in these areas have long been removed and modified due to human activities. Home garden vegetation could be observed at the land selected for constructing the medium rise building for housing units at Malapalla. Some trees could be observed in the surrounding environments of lands proposed to construct the OH&TCC, workshop and the training wing. Vegetation could also be observed towards to residential area passing the School Lane underpass bridge. Overall the main habitat types observed within the project areas could be classified as home gardens, railway reservations and land, and road side. No any rare, endemic, threatened or endangered species (either flora or fauna) were observed within the project areas during this assessment.

102. Many types of exotic plant species could be observed within these modified habitats, these include ornamental flowering plants, some fruit trees, tress with timber value and many naturalized weed species.

103. Sri Lanka Almond tree (*Terminalia cattappa*), Jack (*Artocarpus heterophyllus*), Yellow flame tree, *Peltophorum pterocarpum,* Teak (*Tectona grandis*), Mango (*Mangifera indica*), Attica (*Ficus racemose*), Ahu or Great Morinda (*Morinda citrifolia*), Banana (*Musa*), Coconut (*Cocos nucifera*) and Gliricidia (*Gliricidia sepium*) are some of the common tree species that could be observed within most of the project sites. Ornamental species like Roses (*Rosa spp*) and Garden croton (*Codiaeum variegatum*) could be observed in the home gardens within Malapalla site. These trees provide shade, food and roosting sites for animals, absorb dust and add scenic beauty to the surrounding urbanized environment.

Figure 18: Existing Landscape of the Land Adjacent to the Proposed OH&TCC Site

104. Several species of butterflies who have adopted to thrive in these urban environments were observed during the study. The larval stages of these butterfly species feed on the weeds

and ornamental plants in the surrounding. Few species of snails and reptiles were observed in the sites proposed to construct the workshop and training wing.

105. Only ground associated urban bird species were observed in these sites and no fish species were observed in the storm water canals which were close to the project sites.

106. Mammal species observed in the project sites included domestic dogs, cats, common rats and common mongoose. These species are well adopted to the urbanized environment and feed on food waste thrown by humans.

107. No endangered species with respect to the Flora and Fauna Protection Act or International Union for Conservation of Nature Red Data List 2012 were found or observed within any land selected for the subcomponents of the project. The list of flora and fauna observed in the sites proposed for the six subcomponents of the project are presented in Annex 13.

D. Social and Economic Environment

1. Demography

108. Colombo district located within Western province has the lowest land area compared to other districts in the country. Both administrative capital (Sri Jayawardenapura) and economic capital (Colombo) are located within Colombo district. Table 17 below compares the land area, population, population density and poverty head count index for year 2016 with respect to Sri Lanka and Colombo district.

Table 17: A Summary of Land Area, Population, Population Density and Poverty Head Count Index

Province	District	Population (Census 2012)	Land Area (km^2)	Population Density (person/ km^2)	Poverty Head Count Index (%)	Total Poor Population	Cont. to Total Poverty (%)
Sri Lanka		20,359,439	65,610	325	4.1	843,913	100.0
Western	Colombo	2,324,349	699	3,325	0.9	19,796	2.3

% = percent; km^2 = square kilometres.
Source: Department of Census and Statistics.

109. Population distribution by sex, economic activity of population above 15 years and educational levels attained in each of the GNDs affected are discussed below.

Table 18: Population Disaggregated by Sex

DSD	GND	Total	Male	Female
Colombo	Panchikawatta	8,462	4,195	4,272
	Fort	1,473	1,065	408
	Maligakanda	8,526	4,530	3,996
	Maligawatta east	11,524	5,774	5,750
Ratmalana	Ratmalana east	6,564	3,408	3,156
Maharagama	Malapalla west	2,692	1,304	1,388

GND = Grama Niladhari Division.
Source: Department of Census and Statistics, 2012.

Table 19: Population Above 15 Years and Economic Activity

DSD	GND	Total	Employed	Unemployed	Economically Not Active
Colombo	Panchikawatta	6,168	2,750	114	3,304
	Fort	1,337	1,234	5	138
	Maligakanda	6,194	2,786	95	3,313
	Maligawatta east	8,256	3,854	219	4,453
Ratmalana	Ratmalana east	5,082	2,659	93	2,330
Maharagama	Malapalla west	2,139	1,039	33	1,067

GND = Grama Niladhari Division.
Source: Department of Census and Statistics, 2012.

Table 20: Educational Attainment

GND	Total	Primary	Secondary	G.C.E. O/L	G.C.E. A/L	Degree and Above	No Schooling
Panchikawatta	7,684	1,884	3,966	1,072	442	62	258
Fort	1,449	71	176	504	624	62	12
Maligakanda	7,814	1,607	3,009	1,651	1,160	184	203
Maligawatta east	10,412	2,458	4,838	1,753	867	147	349
Ratmalana east	6,083	1,154	2,410	1,423	808	115	173
Malapalla west	2,506	308	689	697	608	167	37

Source: Department of Census and Statistics, 2012.

2. Main Economic Activities

110. Industry and services are the main economic activities that are prevalent in Colombo district. Labour force involvement in main three sectors of agriculture, industry and services based on the labour force survey of 2016 are presented below.

Table 21: Employment by Major Industry Group

District	Agriculture %	Industry %	Services %
Colombo	1.8	28.4	69.7
Sri Lanka	27.1	26.4	46.5

% = percent.
Source: Department of Census and Statistics, Labour Force Survey - Annual Report 2016.

111. People living in GNDs of Panchikawatta, Fort, Maligakanda, and Maligawatta east are mainly involved in daily labour in Colombo Fort, and some work as labourers in the ports.

3. Socioeconomic Status

112. **Literacy rate:** As per the department of Census and Statistics information for year 2016, Colombo district having a literacy rate of 95.8 percent falls only behind Gampaha and Jaffna districts with respect to literacy rate. However, this figure is above the national literacy rate of 93.1% and urban literacy rate of 95.1%. Table 22 below summarizes the information with respect to male and female literacy rates in Colombo district.

Table 22: Literacy Rate in Colombo District

District	Literacy Rate		Total
	Male	Female	
Colombo	96.7	95.1	95.8
Sri Lanka	94.1	92.2	93.1

Source: Department of Census and Statistics, Labour Force Survey - Annual Report 2016.

113. **Household income and expenditure:** Monthly mean household income and expenditure of Colombo district as per the "Household Income and Expenditure Survey – 2016" of the Department of Census and Statistics is presented in Table 23. According to this information the mean monthly household income and expenditure are about twice than that of the country standards.

Table 23: Mean Monthly Household Income and Expenditure in Colombo District

District	Income (Rs.)	Expenditure (Rs.)
Colombo	104,581	90,670
Sri Lanka	62,237	54,999

Source: Department of Census and Statistics, Household Income and Expenditure Survey - 2016.

4. Existing Infrastructure Facilities

114. **Primary energy source of households for cooking:** Liquid petroleum gas (LPG) is the main energy source for cooking in all six GNDs affected by the project, and Kerosene falls as the second source. Few households in Fort and Ratmalana east GNDs use electricity as their source of energy for cooking. Below table summarizes the primary source of energy used for cooking in the households within the six GNDs in the project area.

Table 24: Primary Source of Energy Used for Cooking

GND	Total	Fire wood	Kerosene	LPG	Electricity	Saw dust/ Paddy husk	Other
Panchikawatta	1,793	46	546	1,187	3	0	11
Fort	130	3	3	108	15	0	1
Maligakanda	1,588	24	368	1,181	10	0	5
Maligawatta east	2,344	78	683	1,562	3	1	17
Ratmalana east	1,695	384	418	841	24	19	59
Malapalla west	734	196	30	495	3	0	10

LPG = liquid petroleum gas.
Source: Department of Census and statistics, 2012.

115. **Principle type of energy for lighting:** Table 25 summarizes the principle type of energy source used by the households within the six GNDs in which the subcomponents of the project are located.

Table 25: Principle Type of Energy Source Used for Lighting

GND	Total	Electricity - National Grid	Electricity - Rural Hydroelectricity Project	Kerosene	Solar Power	Bio Gas	Other
Panchikawatta	1,793	1,739	0	54	0	0	0
Fort	130	130	0	0	0	0	0
Maligakanda	1,588	1,578	0	10	0	0	0
Maligawatta east	2,344	2,284	0	58	0	0	2
Ratmalana east	1,695	1,661	0	32	0	0	2
Malapalla west	734	727	0	3	0	0	1

Source: Department of Census and Statistics, 2012.

116. **Drinking water:** Main water source for drinking in the six GNDs is the piped water supplied by National Water Supply and Drainage Board. A fair number of households in Malapalla west GND have access to protected wells. The primary sources of drinking water in each GND is summarized in Table 26 below.

Table 26: Primary Source of Drinking Water

GND / Source	Panchikawatta	Fort	Maligakanda	Maligawatta East	Ratmalana East	Malapalla West
Protected well (inside)	2	0	6	11	2	197
Protected well (outside)	2	0	0	3	4	7
Unprotected well	0	0	0	4	0	2
Tap within unit (main line)	1,155	59	1,180	1,771	1,258	427
Tap within premises	233	2	160	246	364	85
Tap outside premises	364	56	241	294	66	12
Rural water project	0	0	0	11	0	0
Tube well	45	0	0	0	0	2
Bowser	0	0	0	0	0	0
River/tank other	0	0	1	0	0	0
Rain water	0	13	0	0	0	0
Bottled water	1	0	0	0	0	0
Other	1	0	0	4	1	2

Source: Department of Census and statistics, 2012.

117. **Sanitary facilities:** Water seal with connection to common sewer lines or septic tanks are the most common types of sanitary facilities found in the six GNDs of the project area. Table 27 summarizes the available sanitary facilities.

Table 27: Types of Sanitary Facilities Available

GND	Type of Toilet					
	Water seal with Connection to Sewer System	Water Seal with Septic Tank	Pour Flush Not Water Seal	Direct Pit	Other	Not Using a Toilet
Panchikawatta	144	1,576	71	0	2	0
Fort	36	94	0	0	0	0
Maligakanda	308	1,263	16	1	0	0
Maligawatta east	636	1,704	2	2	0	0
Ratmalana east	1,410	223	30	1	30	1
Malapalla west	646	31	12	43	2	0

Source: Department of Census and statistics, 2012.

118. **Education and health facilities:** Colombo district houses some of the leading schools in the country. Ananda Balika Vidyalaya, Kotte; AL Nasser College, Colombo; Ananda College, Colombo; Ananda Sastralaya, Kotte; Ananda Balika Vidyalaya, Colombo; Anula Vidyalaya, Nugegoda; Asoka Vidyalaya, Colombo; Bomiriya National School and Royal College, Colombo are few such leading schools located within Colombo educational zone.

119. Colombo district population is well served by several national and private hospitals of the country. The National hospital, Colombo; Colombo south teaching hospital; Lady Ridgway hospital and Maharagama cancer hospital are few such leading government hospitals located in Colombo district.

5. Places with Historical, Archaeological, and Cultural Significance

120. Elphinstone, Tower hall theatres and Maradana railway station are located about 150m from the site for OH&TCC at Maradana on a north-east direction. Both these theatres are famous for showing stage dramas and are considered as the home of Sri Lankan stage dramas. Both these buildings were renovated recently. Other than these two sites there are no other places of historical, archaeological or cultural significance close to any subcomponent of the project.

V. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

121. The six subcomponents of REIP that involves civil works shall have impacts on the existing environment within and surrounding areas where they are to be implemented. This chapter discuss these impacts from site selection towards operational stage of each subcomponent with suitable measures to avoid, minimize or mitigate the significant adverse impacts. Impacts and mitigation measures are presented in the following order;

(i) **Location impacts:** Impacts associated with selection of sites including effects on the environment including any resettlement or livelihood impacts on communities.
(ii) **Design and preconstruction impacts:** This include the impacts arising due to designs of the subcomponents, standards and techniques selected for construction.
(iii) **Construction impacts:** This include impacts arising due to activities from site clearing up to completing of construction of each subcomponent including civil works, mechanical and electrical works where applicable.
(iv) **Operation and maintenance impacts:** Impacts associated with operation and maintenance of each subcomponent of REIP.

A. Location Impacts

122. All sites selected for implementing the six subcomponents of REIP are owned by SLR. These lands do not have any encroachments or other socio-economic activities that would be affected by implementing the project. No land acquisition is envisaged in any of these subcomponents therefore there will be no physical or economic displacement leading to Involuntary Resettlement (IR) of people. PMU has developed IR Due Diligence Reports for each of these subcomponents and have submitted to ADB for concurrence.

1. New Training Wing

123. The site selected for the training wing, located within the land belonging to SLR at Ratmalana is about 500 m away from the runaway of Ratmalana airport. And this site is directly in line with the runaway. The Civil Aviation Authority has enforced a height restriction to buildings near the airport and this shall be applicable to the new building for the training center.

2. Malapalla Site

124. The site selected to construct the medium rise building to resettle the families displaced from CSRP has two quarters owned by SLR and a small building built by a CBO. The two quarters are presently occupied by two officers of SLR. Figure 19 and 20 shows the two quarters and the details of these occupants are provided in Table 28.

Figure 19: Quarter No. 1 Occupied by Mr. Damith Nilusha

Figure 20: Quarter No. 2 Occupied by Mr. Mallawa Arachchi

Table 28: Details of the Two Occupants of the Quarters at Malapalla Site

Quarters No.	01	02
Name of the officer	Mr. Damith Nilusha (41 years)	Mr. M. A. E. S. Mallawa Arachchi (28 years)
Level of education	University degree	University degree
Designation	Rail controller	Kottawa Railway Station Master
Work place	Colombo Train Control Center	Kottawa railway Station
Period of occupies	6 years	2 years
Relocation option	Relocation is good in new quarter, better to have adequate space and facilities for a family	Relocation is good in new quarter, better to have adequate space and facilities for a family
Family members living in the quarters and their ages	Mother - 67 years Wife - 44 years Daughter 1 - 14 years Daughter 2 - 11 years	Married but lives alone in the quarter
Utilities available	Water, electricity, and telephone	Water, electricity, and telephone

125. The PMU shall be constructing two new quarters near Makumbura Multimodal Transport Center which is less than 200 m away from the existing two quarters. These two employees of SLR have already agreed to shift to these two new quarters.

126. The other building at this site houses the offices of Grama Niladhari–Malapalla West, Development Officer and the sub-post office. MOTC has agreed with the host community to temporary relocate these offices in to the old railway station at Malapalla (near to this site). Once the housing scheme is constructed these officers and the sub-post office will get office space within the new building. Therefore, no interruption to these services shall occur during the construction period.

127. Further the host community shall also have access to any additional services/ facilities that would be provided to the resettled households. The access road to the site (existing road) shall need to be widened. The widening shall take place on the side of the railway line as the land between the road and railway line also belong to SLR.

128. There shall be a number of counselling and social awareness programs for the new settlers before they are resettled. Such programs shall be designed and implemented by PMU staff of SLR with assistance and participation of the host community. Summary of discussions held with host community at Malapalla site is discussed under “Consultation and Information Dissemination” chapter.

B. Design and Preconstruction Impacts

1. Operation Headquarter and Train Control Center

129. As a medium rising building the designs of OH&TCC shall accommodate more than 100 SLR staff working at different levels of the building. Other than space for their working place they shall need sanitary facilities, dining area or cafeteria and some rest area within the new facility.

All this staff shall face a hazardous situation in an emergency where they need to be evacuated from the building immediately.

130. Most of this staff shall be using their own vehicles for transportation. Therefore, proper parking facilities shall be needed within the new facility and this parking space should also accommodate the vehicles owned by SLR to be parked at the facility.

131. The building shall also need to withstand certain levels of wind velocities and ground vibrations.

132. The building will also be equipped with modern Information Technology (IT) facilities. The energy footprint of the new building would be high as there will be a lot electricity consumption for IT equipment, air conditioners, lighting, escalators and lifts.

133. Therefore, the designs of this facility shall be done confirming to building design and construction standards of UDA and recommendations from National Building Research Organisation. Fire/ smoke directors, fire alarms, emergency fire escapes and firefighting facilities at each level shall be included in to the designs of the building. Sanitary facilities shall be provided in each level. A level shall be developed as the dining area with resting and cafeteria facilities. Adequate parking facilities shall also be incorporated in to these designs. The building shall be designed with its own sewage treatment plant or the sewer lines shall be connected to the central sewer system operated by Colombo Municipal Council (CMC).

134. Green building concepts that include sustainable site planning, building design optimization, energy performance optimization, renewable energy utilization, water and waste water management, solid waste management, use of sustainable building material and construction technologies and health and wellbeing of staff and environmental quality shall be considered in designing the new building for OH&TCC. A conceptual drawing with some main features of a “Green Building” is presented in Figure 21.

135. A backup power system shall also be designed to provide electricity to the facility in the event of a break down in the main supply grid.

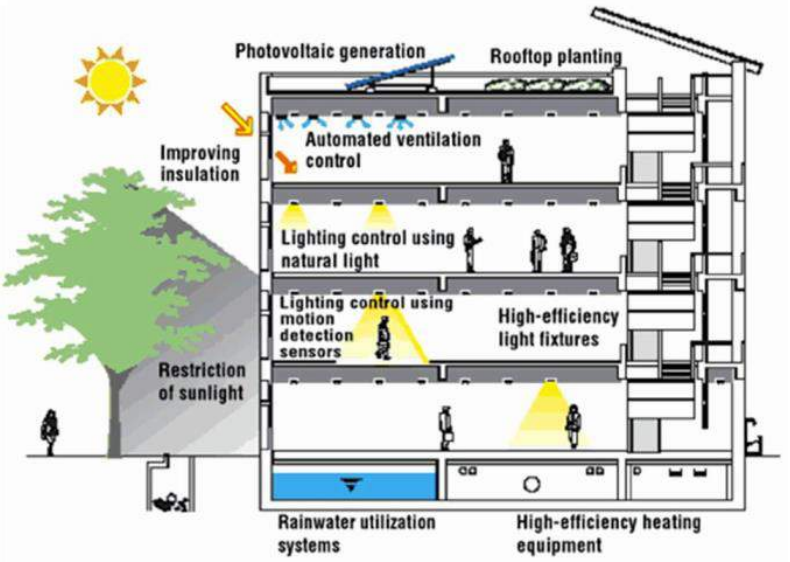


Figure 21: A Conceptual Drawing with Some Main Features of a “Green Building”
(Source: www.ecomena.org)

136. As the site for OH&TCC shall take up a part of the access road within the land identified, and alternate access road shall be designed in the vacant land area between the new building site and existing railway buildings.

2. Passenger Facility at Colombo Fort and Maradana

137. There shall be no significant impacts in the designs of the passenger facilities. However, the designs shall consider improvements to the accessibility to these two stations. Movement of differently able persons within the stations when designing the platform decks, staircases, other accesses and toilets. Adequate number of drinking water fountains shall also be included in to the designs. More number of information displays, rest areas shall be included in to the designs. Rearranging the shops and other structures on the platform decks to optimize the space usage in each platform deck shall also be considered.

138. Lighting and wiring shall also be considered to be improved in terms of illumination and energy saving. Use of renewal energy (i.e. photovoltaic generation) shall be considered as an alternate source of energy at these two stations.

139. The new toilets shall be designed with septic tanks and soakage pits with adequate capacity and access for gully bowsers for removal of sludge.

140. Efficient and safe loading/ unloading goods from trains shall also be considered in designing the platform decks.

3. New Workshop and Stores

141. The new workshop shall need to be designed to handle repairs and complete overhauls of DMUs at any time. There will be many moving equipment within this facility which include lifting jacks, cranes and fork lifts. The facility shall also high-pressure hot water machine, Compressors, a Bogie turn table, hydraulic steel plate bending machine, Tig welding plants and Plasma cutters. An Armature cleaning facility shall also be constructed near the old workshop No. 39 to facilitate cleaning of Armature units dismantled from locomotives and DMUs. The new stores shall store equipment, spare parts, oil, grease, kerosene and petrol as solvents. It is expected that there would be around 20 – 30 technical staff and around 10 administrative staff will be working within this new facility.

142. Working within such facility may cause safety hazards to above technical and administrative staff. Usage of cutting and welding tools could cause injuries to technicians. Possibility of electrocution shall be another risk faced by the both technical and administrative staff. Improper storage of flammable material such as kerosene and petrol could cause fire hazards. Spillage of stored oil, grease, kerosene, petrol or direct discharge of used oil and wash water of DMUs to land or water ways outside the facility shall lead to contamination of soil and water around the facility.

143. The energy requirement shall be high in the new facility as there are equipment that would utilize electricity. The need of lighting within the workshop shall also increase the energy consumption. Improper or inadequate ventilation within the workshop and stores would affect the health of technical staff working in the workshop.

144. Following design measures shall be considered to mitigate above issues.

145. The design of the new workshop shall include separate entrance and exit for administration staff and their offices shall be well separated from the workshop area. An emergency gathering point shall also be included in to the design. The design shall include placing of fire/ smoke detectors, fire alarms and indicate the points of the building where fire extinguishers and water hydrants shall be located.

146. Overhead and under carriage inspection bays and specific worker movement areas shall be designed and clearly demarcated in the designs. A rest room, toilets that discharge in to septic tanks and soakage pits with adequate capacity or to a central sewer system (if available and feasible), washing and bathing facilities for staff and an ambulance room shall also be included within the workshop area design.

147. The roof of the workshop shall be designed to allow daylight in to the workshop. The clearance between the ground and the roof of the workshop shall be designed to induce natural ventilation with assistance of energy efficient exhaust fans that would operate with convective currents developed within the workshop or using electricity. Proper ventilation shall especially be provided at stores where flammable liquids are to be stored.

148. Use of renewal energy (i.e. photovoltaic generation) shall be considered as an alternate source of energy to the new facility. Few photographs of such improved workshop facilities are presented in Figure 22.

Figure 22: Samples of Modernized Workshops

149. A separate enclosure within the stores shall be designed to store all lubricants, kerosene and petrol. This enclosure shall have a concrete floor with a gentle slope to one end of the enclosure with facility (a dip tray) to collect any spilled oil, kerosene or petrol. The walls of this enclosure shall be designed to act as an accidental spill retention compartment.

150. The new building design shall include the storm water drainage system which should preferably be discharged in to the ground or channelled to the storm water canal running parallel to this SLR land.

151. Existing oil and grease separator plant at the railway yard shall also be redesigned with increased capacity to handle discharges from the new workshop. A conceptual design of the oil and grease separator plant is presented in Figure 23. Wash and waste water discharged from the

new workshop shall be directed to the improved waste water treatment plant. The waste water (oil and grease separator) treatment plant could be automated in operation.

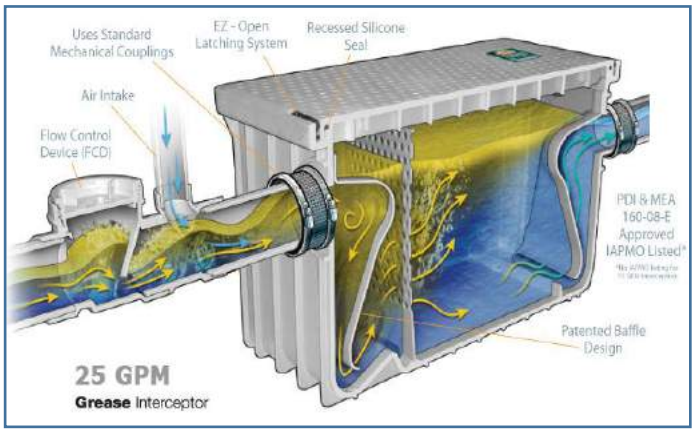


Figure 23: Conceptual Design for the New Oil and Grease Separator

152. A backup power system shall also be designed to provide electricity to the facility in the event of a break down in the main supply grid.

4. Underpass for Roadway and Pedestrians

153. The location at which the road section of School Lane passes under the existing bridge is naturally a sagging point. Accumulation of storm water is of a common phenomenon at this location. Construction of the new underpass without any consideration to this issue shall further aggravate the storm water stagnation making it difficult for the movement of vehicles and pedestrians during a storm event. Further the existing vertical clearance within the underpass is not sufficient for the movement of large vehicles.

154. Therefore, the drainage structure across the School Lane bridge and road finish levels under the bridge shall be designed in compliance with the recommendations as stipulated in the hydrology study report conducted for the School Lane bridge. These designs shall be presented to CMC by the PMU of SLR for their concurrence.

155. The designs for the underpass shall increase the width of the passage to accommodate smooth and uninterrupted movement of traffic and also to allow future two-way movement of vehicular traffic and increase the vertical clearance of the bridge to facilitate movement of large vehicles.

156. Foot paths with guardrails and lighting facilities on both sides of the roadway shall be designed for the pedestrians to move safely across the underpass bridge.

157. Reconstruction of the School Lane bridge will require temporary removal of the rail tracks over the bridge. Closure of all tracks at once shall lead to a complete stoppage of train movement between Maradana and Dematagoda as well as the Kelani Valley railway line. Therefore, to avoid such issue construction of School Lane bridge shall be programed in a way that a section of the bridge accommodating a set of tracks is demolished and fully repaired and laid with new railway tracks for train movement before the next such section is demolished for reconstruction. Use of prefabricated reinforced concrete box cells with required dimensions against in situ formation of

the structure are technologies to be considered to reduce the time of closure of railway tracks and also to total construction time.

5. New Training Wing

158. The new training wing shall need to accommodate around 200 persons during day time which include the staff, students, drivers and security personal. Energy requirement of this building shall also be significant as there will be the need of lighting and air conditioning especially within the lecture rooms, auditorium, library and laboratories.

159. In order to avoid any unsuitable conditions for conducting lectures and practical sessions the design of new training wing shall include proper ventilation, efficient lighting, sanitary facilities, a cafeteria and rest area for students.

160. Use of renewal energy (i.e. photovoltaic generation) shall be considered as an alternate source of energy to the new facility. The toilets shall be designed with sceptic tanks and soakage pits of adequate capacity or shall be connected to common sewer lines (if available and technically feasible). The new building design shall include the storm water drainage system which should preferably be discharged in to the ground or channelled to the storm water canal running parallel to this SLR land.

161. As stated under section 5.1 “location impacts”, the new building shall be designed with a maximum height not more than 9 m, which is the guideline given by Civil Aviation Authority with respect to building height. Further the material and technologies selected for the construction shall be suitable to withstand vibrations and act as noise insulators for the vibration and noise caused by aeroplanes taking off and landing at Ratmalana airport.

162. The building shall also be equipped with fire/ smoke detectors, fire alarms, fire extinguishers and emergency passages and assembly point/s outside the building.

163. A backup power system shall also be designed to provide electricity to the facility in the event of a break down in the main supply grid.

164. Hostel facilities shall be designed to accommodate 20 students. The design of the hostel shall also comply with providing adequate living and sanitary facilities for the occupants.

6. Housing Units for Relocation at Malapalla

165. As a medium rise building the structure shall need to withstand some of the nature’s forces such as wind and ground vibration.

166. The structure shall accommodate 96 housing units that would be used to resettle displaced households in the Kelani Valley Line passing within Maharagama and Homagama DSDs. With an average family size of 4.2 the total population within this housing structure once fully accommodated shall be around 400 persons.

167. Most of these households shall use LPG, Kerosene and/ or electricity as fuel for cooking and all the units shall need electricity for lighting. LPG, Kerosene and electricity have great potential to cause fires that would put all occupants in the building and neighbouring settlements to a hazardous situation. Any leakage LPG shall also pose a threat to occupants in the building.

168. Some of the sports, leisure and recreational activities that the households had been used may need to be abandon when they get settled in a housing scheme of this nature.
169. PMU has assigned UDA to design this building, therefore all standards required for such housing unit shall be provided which include lighting, ventilation, access (including emergency getaways), firefighting provisions and parking.

170. A centralized sewage treatment plant shall also be designed to treat sewage from each housing unit. It is recommended to have a closed treatment system as the smell of such open treatment system would cause a nuisance and inconvenience to the neighbourhood. Designing of such system (with adequate capacity) shall consider generation of Methane gas within the closed chambers of the system which has to be released using an outlet without causing it to ignite. It is best that such system is designed as an automated system as manually operated system may run in to errors such as operating of pumps at dry conditions or not operating them at times causing blockage in the system.

171. Further the concepts of “Green building” that include sustainable site planning, building design optimization, energy performance optimization, renewable energy utilization, water and waste water management, solid waste management, use of sustainable building material and construction technologies and health and wellbeing of the resettled households and well as the host community and environmental quality of the surrounding shall also be considered.

172. A central exhaust system to take out fumes, smoke and smells generated in each housing unit (especially during cooking) shall also be included in to the designs. A backup power system shall also be designed to provide electricity to the facility in the event of a break down in the main supply grid.

173. Each housing unit shall have two bedrooms, a kitchen cum dining area, toilet and bathroom, a living area and a balcony.

174. The designers shall also provide office space for the Grama Niladhari office, Development Officer’s office, sub-post office, CBO office and community hall. Facilities such as small recreational parks, play grounds and space for grocery shops should also be considered in to the design of the entire resettlement facility at Malapalla.

C. Impacts During Construction

1. Impacts Due to Site Preparation Activities

175. Site preparation activities shall take place at all six subcomponents which requires civil works. These preparation activities shall include mainly the removal of existing vegetation, shifting of any utility supply line located within the construction site, demolition of any structure located within the construction site and clearing the access road to the construction site. The key environment issues that would occur from above clearing activities shall be;

- Accidents to workers and public by falling tree trunks or branches when removing trees;
- Accumulation of vegetation and demolition waste generated and disposal of the same;
- Interruptions to utility services such as electricity, water, telecommunication and sewage;
- Emission of dust during demolition of structures;
- High noise levels generated during demolition works, use of chain saws for cutting trees and operation of backhoes, loaders and dump trucks;

- And in the case of School Lane bridge, there shall be an interruption to traffic and pedestrian movement.

176. All these sites shall then establish temporary worker accommodations, stores and yards especially for mending reinforcement steel structures for foundation and concrete works. Stockpiling of construction material which mainly include metal, sand, cement and reinforcement steel shall also take place during site preparation activities. Risk of fire, accidents, dust and blockage of existing drainage paths (if materials are stocked haphazardly) are the important environment issues that would occur with respect to above activities.

177. Fencing off the construction sites shall be the first step to avoid/ restrict public entering in to the construction sites and being injured by falling branches or tree trunks during tree removal or by moving vehicles. This measure is important to be applied at all six sites. “Safety first” warning notices shall also be placed at all sites.

178. Construction of temporary dust barriers around the sites shall minimize the dust blowing out of the sites during clearing and demolition works. Clearing and demolition works shall only be conducted during 6.00 a.m. to 9.00 p.m. (as defined with respect to Regulation 4 of National Environment (Noise Control) Regulations No. 1 of 1996) to avoid any noise nuisance caused to the public.

179. Dust can also be generated on the roads used by dump trucks if mud and debris moving out of the site get spilled on these roads and starts emitting dust as they get dried off. Tyre baths and tyre washing shall be done at exits of each construction site to avoid mud and debris carried out in tyres of dump trucks.

180. Care shall be taken not to break/ damage any Asbestos sheets or other material containing Asbestos used in the structures that will be demolished. The collected Asbestos shall be transported to the Kilns at Puttalam cement factory to be incinerated. With the current regulations enforced by the government disposal of such demolition debris could only be disposed at sites approved by local authorities or CEA. Therefore, the contractors involved in the demolition works shall need to obtain proper clearances from these local authorities and CEA for transporting and dumping of these wastes. Karadiyana waste collecting center (located within Colombo district) managed by Boralesgamuwa Pradeshiya Saba is one such approved site to dispose demolition waste.

181. As an alternative the possibility of reusing such demolished material should also be considered as a mitigation measure for disposing demolition waste.

182. As all the sites selected for the project are government land all the trees marked for removal shall be cut and removed through the State Timber Corporation. Any remaining parts left at site could be used as fuel wood for cooking in the labour camps established at sites.

183. All waste shall be transported using well covered dump trucks, and these tucks shall not be allowed to be over loaded with waste material. The contractor/s shall develop a transport management plan in consultation with traffic police of each area of the project subcomponents to avoid any traffic congestions along the roads due to movement of these dump trucks.

184. Shifting of utility supply lines that will obstruct the construction woks shall be done in consultation and under the supervision of the relevant service provider. Therefore, the PMU shall keep close coordination with CMC, Ceylon Electricity Board, National Water Supply and Drainage

Board and Sri Lanka Telecom during this shifting and relocation operations. Public shall be noticed in advance of scheduled interruptions. Trained operators and workers shall be deployed for these shifting operations to avoid any undue damages to such utility lines. Shifting of these utility lines shall be completed within the minimum possible time to avoid any prolonged interruptions that would make a significant incontinence to the public.

185. PMU shall discuss with CMC and the traffic division at Maradana police station to identify and select convenient alternate roads that would connect the both ends of the School Lane bridge. These alternate routes shall then be informed to public through media, posters, direction boards and sign boards placed along the access roads to the School Lane. The overhead pedestrian foot path across the railway line shall be kept undisturbed for use of pedestrians until the reconstruction activities of School Lane underpass is fully completed.

2. Impacts Due to Extraction, Transportation and Storage of Construction Material

186. Sand, metal, soil, cement and reinforcement steel shall be the major construction material required for the construction works in all the six subcomponents of REIP. Extraction of river sand, quarrying for metal aggregates and borrowing of earth shall have a permanent impact on the natural resources. Emission of dust, depletion of water quality due to washed off sediments and chemicals, nuisance to public due to high noise and vibration levels, failure of cut slopes causing hazard to public and workers and excavated pits causing hazards to public are key negative impacts of operating quarry sites and borrow pits.

187. The damage to the environment caused by extraction of aggregate and soil has been signified by unauthorized excavations and over extraction of material at approved sites which also lead to creation of large pits which acts a breeding grounds for mosquitoes and traps for animals and even humans.

188. However, the quantity of soil required shall only be for works like foundation backfilling especially at workshop and training wing which shall not be a significant quantity. The demand to use of river sand in construction industry has led to over extraction of river sand damaging river banks, changing the morphology of some rivers, causing sea water intrusion (in the case of Kelani river). Extraction of river sand is also affecting the ecology in most of the rivers used for sand extraction.

189. Based on the quantities required for these constructions the civil works contractors shall obtain these materials from approved quarry sites of Geological Survey and Mines Bureau and operating with Environmental Protection License (EPL) from CEA thus avoiding opening and operation of their own material extraction sites (to the extent possible). If the contractor/s intends to open and operate their own quarry and borrow sites, they shall obtain all necessary approvals and licences.

190. As an alternate for river sand it is suggested that the contractors use washed sea sand available at depots of Sri Lanka Land Reclamation and Development Corporation.

191. Construction material shall be brought to the site using containers and large six-wheel trucks. The contractor/s shall develop transport management plans in consultation with the traffic police with respect to the construction areas to avoid any undue traffic congestions due to movement of these trucks and containers.

192. All construction material shall be transported covered in trucks using tarpaulin or other hard covers.

193. It is also recommended that bulk cement containers are used to transport cement to construction sites of OH&TCC and Malapalla housing site and store cement in silos as there will be a large amount of concrete works involved at these two sites. For other sites cement bags could be used but they shall be stored within proper enclosures where spillage of cement on ground shall be avoided.

194. Other construction material such as soil and sand shall be stockpiled avoiding any wash offs from rain in to nearby lands and water ways. The reinforcement steel shall also be placed at a designated location with barricading to avoid any accidents to workers at site. These measures are particularly important at OH&TCC site and Malapalla site.

195. Use of roofing sheets and other construction material that does not include Asbestos for construction shall also be considered as means “environmentally responsible procurement” of construction material.

3. Impacts due to activities creating noise and vibration

196. Operation of various machinery and equipment at each construction sites shall emit noise at varying levels. Noise levels generated by equipment will greatly depend on factors such as type of equipment, the specific model, the operation being performed and condition of equipment. The equivalent sound level of the construction activity also depends on the fraction of time the equipment is operated over the time period of construction. Typical noise levels created by different equipment that would be used for construction works at approximately 15m from the source is presented in Table 29.

Table 29: Typical Noise Levels Generated by Construction Equipment

Equipment	Typical noise level (dB(A)) at 15m from source	Equipment	Typical noise level (dB(A)) at 15m from source
Air compressor	81	Loader	85
Backhoe	80	Paver	89
Ballast equalizer	82	Pile driver (impact)	101
Ballast tamper	83	Pile driver (Sonic)	96
Compactor	82	Pneumatic tool	85
Concrete mixer	85	Pump	76
Concrete pump	82	Rail saw	90
Concrete vibrator	76	Rock drill	98
Crane, Derrick	88	Roller	74
Crane, mobile	83	Saw	76
Dozer	85	Scarifier	83
Generator	81	Scraper	89
Grader	85	Shovel	82
Impact wrench	85	Spike driver	77
Jack hammer	88	Truck	88

Source: US EPA, Noise from construction equipment, operations, building equipment and home appliances (Note: these values may vary with site conditions).

197. In general, the increase of noise levels shall be of temporary in nature restricted to construction stage. Impact of noise shall mostly be of a nuisance to the public. However, workers and public exposed to high noise levels for prolong time durations could develop difficulties of hearing.

198. Noise from construction activities at School Lane underpass shall cause a nuisance to the occupants at Ranasinghe Premadasa memorial hospital; National Institute for Nephrology, Dialysis and Transplantation; Bo Sevana Viharaya (A Temple); and some residential buildings located within an area of 70 to 80 m radius. Construction noise shall also be a nuisance to residents close to Malapalla site; lecturers, staff and students at the existing training facility at Ratmalana.

199. As stated under site preparation, placement of a temporary dust barrier using tarpaulin or corrugated sheets around the construction site shall also act as a noise barrier.

200. The contractor shall be instructed to use exhaust mufflers in all construction vehicles and equipment. The functionality of such mufflers shall be frequently monitored and if found faulty they shall be replaced immediately. All heavy machinery shall be maintained in good operable conditions at all time during construction period to avoid any unnecessary sounds generated during the operation of such equipment. Any additional fittings fitted to construction equipment that generates high and irritating noises shall not be permitted at site.

201. Workers in vicinity of high noise levels and workers exposed to continuous noise such as those working with pneumatic tools shall be instructed to wear ear plugs during working hours, and this instruction shall be made compulsory.

202. High noise generating construction activities (noise levels beyond 50 decibel (dB(A)) shall not be undertaken on days with religious importance or at night (between 21.00 and 6.00 hours as per Regulations 4 of National Environmental (Noise Control) Regulations No.1 of 1996). If the contractor wishes to carry out construction activities during the night time such activities should not generate noise levels more than 50 dB (A) (as defined in Regulations 4 of National Environmental (Noise Control) Regulations No.1 of 1996). The contractor/s shall make a written request to PIC and PMU to obtain approval from both PIC and PMU and recommendations from CEA before executing such activity.

203. The use of impact pile drivers shall be avoided, drilled piles or the use of a vibratory pile drivers that are quieter alternatives shall be the technology used for piling operations at OH&TCC building and at Malapalla site. If more than one pile driver is to be used at these sites, they will be operated tandemly to further reduce the noise generated. All such operations and methods shall be approved by PIC prior to commencement of construction works.

204. It is suggested that the contractor informs the public on any noisy operations that would be carried out close to settlements with details of timing and duration of such operations. The contractor shall always listen to any complaints from public and make necessary changes to the operations or equipment without any delay. Provisions and facilities should be kept with the contractor to monitor the noise levels generated during construction activities.

205. Vibration levels that would cause nuisance to public and may cause damage to nearby structures would occur only at locations where deep foundation works such as piling would be conducted. Such piling activities shall only be needed at OH&TCC and Malapalla housing sites.

206. Contractor/s shall be instructed to carry out a property condition survey of all structures within an area having a radius of 80 m from each construction site where piling activities shall take place. If any structure is found susceptible to vibration the occupants of such structure shall be vacated from the structure at least until the heavy vibration activities are over. Such vacated households shall be assisted with accommodation and compensation for any loss of livelihood or income (subsistence assistance). The environmental and social unit of the PMU shall be responsible in handling such measures with the assistance from Environment Specialist (ES) and Social Development Specialist (SDS) of PIC.

207. The structure will be handed over to the occupants back only after thorough inspection of any structural failures. The contractor shall pay for any damages caused to structure due to vibration or repair the damages. The contractor shall obtain a third-party insurance to cover any unforeseen damage to property due to activities with heavy vibration.

208. Phasing off the demolition, earth moving and ground impacting operations so as not to occur in same period of time should help in reducing the impacts of heavy vibration. The total vibration levels produced could be significantly less when vibration sources operate separately.

209. Activities that create vibration shall be avoided during hours from 21.00 to 06.00 (night time, as defined in Regulations 4 of National Environmental (Noise Control) Regulations No.1 of 1996) as the public are more aware of vibration in their homes during the hours of night time.

4. Impacts Due to Activities Creating Emissions

210. Dust generated from material stocks and exposed ground surfaces will particularly a hindrance to residents near School Lane underpass site and Malapalla site.

211. Exhaust gases from construction vehicles and equipment shall also add to the deterioration of existing air quality. Painting and any abrasive blasting (sandblasting) activities inside construction sites of workshop, stores and new training wing could also emit fumes and dust that would deteriorate the air quality.

212. Health effects caused by air pollutants include difficulty in breathing, wheezing, coughing and aggravation of existing respiratory and cardiac conditions which could be fatal. Children, elderly persons and persons with respiratory ailments such as Asthma in the project area shall particularly be vulnerable to increased dust levels in the atmosphere. Families with such persons shall face extra burden as they will have to spend money to treat such aliments.

213. Following mitigation measures shall be adopted during construction period to mitigate the adverse impacts of emissions.

214. All material stocks shall duly be covered against wind to minimize the dust generation. The dust barriers constructed around construction sites shall also be maintained throughout the construction period. Open ground (soil surface) of all sites shall be sprayed with water and kept dampen to arrest any dust emission. Vehicle movements within construction sites shall be minimized and the speed allowed within the sites shall not exceed 10-15 kmph.

215. All heavy equipment and machinery shall be in full compliance with the national environmental air emissions fuel and vehicle standards of Extra Ordinary Gazette 1137/35 of June 2000 updated by air emissions fuel and vehicle standards (importation standards) 1268/18 December 2002 and 1295/11 June 2003 and further amendment, 1557/14 July 2008.

216. All vehicles delivering material to construction sites shall duly cover the material when transporting to avoid spillage of material and emission of dust.

217. The contractor shall maintain the tyre bath and tyre washing areas at each exit of the construction sites until end of constructions.

218. Proper storage facilities shall be constructed to store chemicals, cement, paints and other construction material. Such storage facilities should always be adequately ventilated.

219. All workers shall be advised not to burn waste material at random locations, all such waste shall be collected and disposed to an authorized disposal site/s. This waste includes empty cement bags, discarded form boards used for concrete works, paper and textile waste from labour accommodations and site offices. The empty cement bags shall be stored inside the stores used for cement bags and transported to an incinerator for burning or shall be given to a cement factory for recycling. Discarded form boards shall also be piled up at a designated location within the construction site. Few workers shall be deployed to recover any board/ part of board that can be reused, and the remaining boards shall only be disposed to an authorized collector. Discarded paper and textile waste shall be collected and given to collector/s of such waste for recycling.

5. Impacts Due to Activities that Affect Surface and Ground Water Quality and Quantity

220. Considering the construction activities involved in the project the main cause of any water pollution shall occur by washed off soil, cement and concrete from construction sites and discharges from worker camps.

221. Placing of soil bags around all stockpiles, covering them and maintaining such measures shall avoid/ minimize the possibility of such stockpiles being washed off due to rain.

222. Scheduling any excavation activity during the dry weather periods should also be considered as means of avoiding erosion and sedimentation.

223. Wash water of concrete mixer trucks and any disposed cement/ concrete slurry shall be collected on to a drying bed lined with thick gauge polythene or tarpaulin constructed within the construction site. Once dried it shall be transported and disposed at an authorized disposal site or could be crushed and reused for paving, landscaping works or as filling material in utility trenches at the site. An example of such drying bed constructed using hay bale and plastic is shown in Figure 24 below.

Figure 24: A Sample of a Concrete Mixer Truck Wash Water and Sludge Drying Bed
(source: www3.epa.gov/npdes/pubs/concretewashout.pdf)

224. The grey water discharged from labour accommodations shall mainly include detergents and soap used for bathing and washing. Therefore, this grey water shall be filtered through a simple sand gravity filter before discharging out of the construction site. Possibility of storing this wash water and reusing it for suppressing dust at site shall also be considered as an environmentally friendly practice.

225. Ground water shall not be extracted at site for any construction purposes, therefore there shall be no impact on groundwater quantity due to the project.

6. Impacts Due to Migrant Labourers and Operation of Labour Camps

226. Civil work contractors in each site may fulfil the requirement for skilled and unskilled labour by subcontracting through labour supply agencies. These migrant labourers often create social and cultural conflicts with the surrounding societies.
227. Labourers brought from outside the project area shall need to be provided with accommodation. Improperly and inadequately constructed labour accommodations often leads to health, electrocution and fire hazards to workers as well as communities living close to such labour accommodations.

228. Chances of spread of contagious dieses and other communal diseases would be high within and near labour camps. Stagnant waste water from these accommodations and domestic waste dumped at site shall lead to spread of mosquitoes and flies causing vector born disease to workers and neighbouring communities.

229. Food borne diseases could also be common if the workers do not have proper facilities for cooking and storing of food material. Unhygienic site conditions will also lead to the spread of other domestic pests such as rats and cockroaches who are also vectors of human diseases.

230. If these workers are provided with inferior living facilities (labour accommodations) and poor working conditions, their physical and mental health will be affected. This shall increase the possibility of workers getting injured and also moving out of the project.

231. As a result of increased worker force, the possibility of increase of Sexually Transmitted Diseases including the possibility of spreading HIV/ AIDS in the area should also be considered as a significant health impact.

232. Above impacts shall be of significance at OH&TCC site, two sites at Ratmalana and Malapalla site where a large labour force shall be operational and at School lane due to the proximity to neighbouring settlements.

233. Following measures shall be adopted at all construction sites to mitigate above adverse impacts of migrant labourers and their accommodations.

234. Payments for male and female labourers shall comply with the principle of equal wages for equal work done. Separate sanitary facilities and accommodation shall be provided if both male and female works work at sites.

235. All labourers brought in to construction sites shall be educated as not to conduct any activity that would create conflicts with nearby communities. Contractors shall keep strict supervision of the migrant labour and no alcohol, drugs shall be permitted within the labour accommodations.

236. Separate cooking and dining areas shall be constructed in these labour accommodations and the workers shall be advised not cook or dine inside their billets. Such cooking and dining areas shall be provided with food waste collectors with adequate capacity. These food waste shall only be disposed to authorized sites that collect Municipal Solid Waste or facilities that recycle this waste.

237. Waste water including wash water from labour accommodations shall only be discharged outside the construction only after filtering at least through a sand gravity filter.

238. All billets shall be provided with adequate ventilation facilities and mosquito nets. The billets shall be constructed avoiding any rain or storm water entering in to the billets. All electrical wiring inside these billets shall be well insulated and occupants shall only use plug sockets to get electricity for their utensils. Installation of the wiring shall be done by trained technicians and no occupant shall be allowed to tap these wiring.

239. Fire extinguishers shall be kept in all worker billets, cooking and dining areas. These fire extinguishers should be able to douse fires caused by wood, paper, textile, gas, live electrical apparatus and cooking oil.

240. A first aid room shall also be constructed within the labour accommodation. The labour supervisors shall be provided with contact numbers of nearby hospitals and other first aid facilities.

241. Regular tool box meetings shall be held with all worker staff and these tool box meeting shall focus on safe operations, personal safety, safety of others and keeping an environmentally friendly work environment. All contractor staff including labourers shall be made aware on healthiness and avoiding spread of Sexually Transmitted Diseases including HIV/ AIDS.

7. Impacts Due to Hazardous Working Conditions (Accidents to Worker Force and Public)

242. Construction activities pose potential hazards to both workers and public. Safety to workers and the public shall be enhanced by adopting the following measures during civil works

- Barricading and restricting any public from moving in to construction sites,
- Placing of warning signboards around all construction sites,
- Regular briefing and training of workers on safety precautions, and their responsibilities for the safety of themselves and others,
- Providing workers with personnel protective equipment, and enforcing strict supervision so that the personnel protective equipment are used during they are involved in construction activities,
- Ensuring that concrete batch mixing plant (if used) and vehicle operators are properly licensed and trained,
- Arranging for the provision of first aid facilities, readily available trained paramedical personnel, and emergency transport to the nearest hospital,
- Arranging for regular safety checks of vehicles (checks include operation of reverse horns, head and tail lights, braking including parking brakes) and material,
- Provision of hazard warning signals around construction sites, and directing vehicle and pedestrian traffic away from work sites,
- Provision of traffic management plans during construction including barricading of openings and lighting at night where required.

8. Construction Activities that Would Impact Flora and Fauna

243. As discussed under impacts due to site preparation activities, some of the large trees located within proposed sites shall have to be removed in order to carry out the construction work. Based on the preliminary designs it is estimated that a total of about 30 trees shall need to be removed which exist at OH&TCC, School Lane, Ratmalana and Malapalla sites. As stated under the existing biological environment section of this report these trees and existing ground vegetation acts as roosting sites for many faunal species found around the project area. Therefore removal of this vegetation shall lead to loss of habitat for these faunal species. Use of high beam flood lights during night time shall affect the feeding and roosting habits of faunal species around these sites.

244. These impacts could be minimized by planting ornamental plants and trees (native species) within the construction sites as part of landscaping. It is recommended that replanting is done at 1:3 ratio, i.e. a minimum of 90 trees shall be planted in all six sites (including locations available at Colombo Fort and Maradana stations as it will give shade and scenic beauty to the environment). These plants and tress shall attract birds and butterflies and help in improving the scenic beauty of the newly constructed building sites.

245. Focusing all flood lights only in to the construction sites shall minimize the effect on feeding and roosting habits of faunal species.

246. No aquatic habitat is affected any civil works of the six subcomponents of the project as there are no prominent aquatic habitats located close to these sites.

9. Other Inconveniences Caused to Public

247. Flood lights focused outside the construction sites/ worker accommodations shall cause a nuisance to the residents living close to such sites at night time. This issue shall be of importance at School Lane site and Malapalla site where there are residential structures near these sites.

248. Therefore, all contractors shall be instructed only to focus any flood light only towards their work areas or worker accommodations.

10. Impacts Due to Site Clearing (at the End of Construction) and Landscaping

249. Once all construction works are completed the sites shall be cleared of all construction waste which shall include pieces of reinforcement steel; pieces of wire, conduit pipes used for wiring; empty packing boxes of equipment fixed in the buildings (especially OH&TCC, workshop and the new training wing); scrap material from demolished labour accommodations; and scrap material from the temporary barriers put around the construction sites. If these materials are kept heaped up at the site it will create a negative impression on the scenic beauty of these new constructions and also attract “scrap collectors”. These “scrap collectors” may even remove valuable parts of the newly constructed buildings.

250. Therefore, all these scrap materials shall be disposed to an authorized collector/s of such waste. This measure is of particular important at OH&TCC and Malapalla sites.

251. If the remaining ground in these lands are kept exposed to wind and storm events it will create dust and get eroded during rains. Direct exposure to solar energy shall heat these surfaces causing localized convective currents.

252. Therefore, it is important to commence landscaping works soon after the construction of these structures are over. Landscaping shall include planting of shade trees and other ornamental plants where possible.

D. Operational Impacts

1. Impacts with Respect to Management Waste and Sewage

253. Except the subcomponent at School Lane, all other subcomponents of REIP shall accumulate waste (solid and liquid) and sewage to a varying degree. Solid waste generated could mainly be segregated as food and kitchen waste; domestic waste (paper, plastic and glass) and electrical and/or electronic waste. Liquid waste or grey water discharged from OH&TCC, training wing and Malapalla sites shall include wash water and kitchen waste water. Other than these waste water the effluents in workshop shall include equipment wash water which contain oil and grease.

254. Food and kitchen waste if disposed around the project sites shall attract animals like cats, dogs, cattle and birds. An unpleasant smell shall be emitted from partially decomposed food and kitchen waste. Such heaps of garbage shall also be breeding and feeding grounds for vectors of diseases such as mosquitoes, flies, rats and common mongoose. Garbage around the site shall also have a negative visual appearance.

255. Improper disposal of domestic waste shall attract “scrap collectors” who may break-in to these facilities and burgle.

256. The electrical/ electronic waste generated in these facilities shall mainly include burned Compact Fluorescent Light bulbs or Light Emitting Diode bulbs, burned electrical appliances, IT waste, burned out mobile phones and even waste generated from operation and maintenance of solar photovoltaic cells (if used in these buildings as an alternate source of energy). All these items include Mercury which is considered as a hazardous heavy metal. Therefore, discarding such waste in a haphazard manner shall especially pollute soil and any water source located nearby such discarding location.

257. Any break down of wash water/ grey water filter systems shall cause spills or direct discharge of waste water in to ground or existing drainage network and shall pollute these waters with detergents, fats, grease and oil.

258. Any break down of the central sewage treatment system or septic tank systems shall cause a nuisance to users and occupants of these facilities.

259. Other than the above waste, the workshop at Ratmalana shall generate mechanical waste from removed metal parts and filters from DMCs.

260. Following measures shall be adopted to avoid these negative impacts;

- Users and occupants of all the facilities shall be advised to do waste separation at the source itself (as food/ kitchen waste, domestic and electrical/electronic waste). All facilities shall have a dedicated central solid waste collecting site which shall have separate facilities (collectors) to dispose the segregated waste. Then the waste shall be handed to the CMC the in case of OH&TCC; Dehiwala – Mt. Lavinia MC in the case of the workshop and training wing; and Maharagama urban council in the case of Malapalla housing scheme.
- Electrical/ electronic waste of OH&TCC, Workshop and training wing shall only be disposed by SLR to authorized collectors for recycling.
- All wash water/grey water filter systems installed at each facility shall be cleaned and maintained on a regular basis. Any malfunction of the system shall be attended within the shortest possible time to avoid any over spills and direct discharges.
- The central sewage systems installed at each site shall also be maintained on a regular basis (especially servicing of pumps and motors).
- SLR shall send the mechanical waste (metal parts) collected at Ratmalana workshop to steel manufacturing facilities for recycling and used filters to authorized collectors.

2. Impacts with Respect to Maintenance and Safety Measures

261. Accidental fires if occurred within the facilities of OH&TCC; Ratmalana workshop and training center; and Malapalla housing shall cause significant damage and loss to their users and occupants and equipment.

262. Pedestrians crossing along School Lane could meet with accidents if they do not use the pedestrian foot walks.

263. All firefighting systems in these facilities shall be regularly inspected by trained staff and shall be maintained. All occupants in these buildings shall be given training on safe evacuation in

case of a fire or gas leak hazard. All emergency exits shall be maintained so that there would be no obstacles for movement in any emergency.

264. All escalators/ lifts at OH&TCC and Malapalla site shall be regularly inspected for their operation, serviced and maintained by trained staff.

265. Guard rails, lamps fixed at School Lane underpass bridge shall be maintained along with warning and directional sign boards to advice pedestrians to use the foot walks and not to move on the road.

E. Beneficial Impacts

266. Implementing the six subcomponents of REIP shall facilitate the smooth implementation of CSRP through;

- Operation of a more advanced and efficient train control center,
- Repair and maintain new DMCs,
- Training more technical staff for repair and maintain the rolling stock,
- Early relocation of affected families of CSRP.

F. Climate Change Adaptation

1. Appraisal of Climate Change Risks Based on Review of Literature

a. Observed Changes of Climate in Sri Lanka

267. A number of climate change literature specific to Sri Lanka has evolved since the last two decades. Based on those recent studies on local, regional and global patterns of climate change, the National Adaptation Plan[6] (NAP 2015) presents a broad outline of observed and projected changes in climate in Sri Lanka. The research conducted on climatic trends from analysis of past meteorological data indicate that Sri Lanka's climate has been changing gradually. Areas that attracted researchers' attention most were trends in temperature, changes in precipitation patterns and observations on extreme events. The atmospheric temperature is gradually on the rise almost everywhere in the country. A major feature of rainfall in Sri Lanka was high year to year variability, although no distinct pattern of change was observed.

268. In response to the observations and projections of climate variables based on scientific evidences, NAP 2015 recommends adaptation measures as a response strategy to overcoming the impacts of observed and projected changes in climate. The thematic areas for action (Page 18 of the NAP, 2015) aims to minimize impacts and the report states that most infrastructure constructed in Sri Lanka to date, including roads, drainage systems, railways, etc. have not factored in climate change considerations. While in some areas it may not matter, in others this is critical. At a broader level, guidelines and standards for development and engineering of infrastructure currently in use are outdated and do not include climate change risk considerations—thus posing a substantial threat to the sustainability of ongoing investments. The NAP 2015 sets priority adaptation measures as: (a) Identify climate change risks on transport

[6] National Adaptation Plan for Climate Change Impacts in Sri, Lanka, 2016-2025, Climate Change Secretariat, Ministry of Development and Environment, (National Designated Entity for UNFCCC), Sri Lanka, 2015

infrastructure, and invest in adaptive measures, and (b) Update standards/guidelines for infrastructure design and development

b. Projected Climate Change Scenario for Sri Lanka[7]

269. Sri Lanka has a tropical maritime climate characterized by two monsoon seasons. Mean annual temperature is about 27ºC in the lowlands and 15ºC in the central highlands. There is considerable spatial variation of rainfall, which has a national annual average of 2,000 mm. The highest rainfall occurs in the central highlands, with several stations recording values exceeding 5,000 mm. Rainfall is lowest in the north western and southwestern lowlands, with minimum values around 1,000 mm.

270. Regional climate model projections for future temperature indicate consistent increases: 1.0°C–1.1°C in 2030, 1.3°C–1.8°C in 2050, and 2.3°C–3.6°C in 2080. The ensemble mean indicates a temperature increase of about 2.0°C–3.0°C by the end of the 21st century, with a high degree of agreement (high confidence) among the CMIP3 models.

271. At least three IPCC climate scenarios (A2, A1B, and B1) agree that Sri Lanka precipitation is likely to increase over the three time periods: by 3.6%–11.0% in 2030, 15.8%–25% in 2050, and 31.3%–39.6% in 2080. The ensemble mean from the GCMs indicates a 5%–10% increase by the end of the 21st century, with low agreement. The rainfall projections therefore have low confidence.

2. Climate Risk and adaptation needs for REIP

272. Under the REIP project there are six subcomponents requiring civil works that maybe subject to climate risks: i) construction of Operation Headquarter and Train Control Center (OH&TCC), ii) improving the passenger facility at Colombo Fort and Maradana stations, iii) construction of new workshop and stores at Ratmalana railway workshop, iv) reconstruction of underpass bridge at School Lane for roadway and pedestrians, v) construction of a new training wing at SLGRTTC with new facilities and equipment, and vi) construction of housing units for relocation of project affected persons from the main railway corridor improvement.

273. Most subcomponents are buildings and structures being constructed within existing structures and facilities. They are located in different areas within Colombo city and do not have any rivers, streams, lakes or sea located near them. Hence none of them have specific flooding or other climate change issues.

274. The subcomponent on underpass bridge at School Lane for roadway and pedestrians will require the shifting and redesigning of an existing storm water drain and will be subject to flooding issues. However, the drain and the road level will be re-designed and built to accommodate increased quantities of rain and water.

275. The overall project includes five components with fifteen subcomponents. Of the fifteen subcomponents, only 5 entail civil works that maybe subject to climate risks. Only one of the 5 subcomponents (Underpass Bridge) have a risk of increased flooding which will be addressed through shifting and redesigning the storm drain and road level.

[7] Assessing the Costs of Climate Change and Adaptation in South Asia, (Mahfuz Ahmed, Suphachol Suphachalasai), June 2014, ADB and UKaid

276. In light of the above the overall climate risk level for the project is low. Hence, there is no need for incorporation of climate adaptation measures, except for the subcomponent on Underpass Bridge. The incremental costs for redesigning the storm drain and road level is $ 147,320 under this subcomponent. This amount is considered as the climate adaptation finance under the project.

3. Climate Mitigation

277. The scope of the five project components with fifteen subcomponents includes: construction of buildings and structures; improvement in telecom and ticketing systems; procurement of equipment and machinery; and detailed design of the Kandy suburban railway line. The generation or savings of greenhouse gases from these activities will be minimal and insignificant. Hence this project does not entail any climate mitigation activities.

VI. INSTITUTIONAL REQUIREMENTS, ENVIRONMENTAL MANAGEMENT PLAN AND CAPACITY BUILDING

A. Institutional Arrangements

278. The Ministry of Transport & Civil Aviation is the Executing Agency for the project and the secretary to the ministry will be responsible for decisions on overall approvals and operational policies of the project. A PMU headed by a Project Director (PD) has been established under MOTCA to manage the project in collaboration with SLR.

279. The PMU key staff shall include Deputy Projects Directors (DPD) each for Social & environment; Land acquisition; Civil engineering; Finance; Procurement and Railway Bridges and Tracks who will be directly reporting to the PD. Each DPD shall have Assistant Project Directors and a number of officers as approved by the Ministry. The PD shall be responsible for overall environment and social safeguards compliance in the project and he will be assisted by DPDs and their staff on Social and environment and Land acquisition.

280. The PMU shall be assisted by a PIC whose scope shall be to work as the “Engineer” and shall be responsible to review and approve designs prepared by contractor/s; supervise civil works of contractor/s and review and certify bills submitted by contractor/s. A team of experts including engineers, quantity surveyors, environment and social development (including land acquisition and resettlement) experts will be working in the PIC headed by a Team Leader. The ES and SDS shall be responsible in guiding the contractor in executing mitigation measures at field level, monitoring the level of compliance and assisting them to rectify issues where mitigation measures used are not effective or in any non-compliance situation.

281. The contractor/s team shall be headed by a Project Manager who shall be assisted by an environment/ social officer and a safety officer. Contractor/s have the direct responsibility of executing environment and social safeguard measures at site level.

282. Flow chart of the proposed institutional structure is presented in Annex 14.

B. Environmental Management Plan

283. An important objective of an environment assessment is to develop procedures and plans that could be adopted at various stages of a project to ensure mitigation measures and monitoring requirements are complied with. The Environment Management Plan (EMP) presented in Annex 15 is an activity plan which summarize the potential impacts and mitigation measures discussed under chapter five “Screening of potential environmental impacts and mitigation measures”. It also includes details indicating possible locations of the impact and mitigation measures, on planned monitoring, responsibilities of different agencies and cost for implementation.

284. As the project is still in the preliminary design stage, specific construction and operational activities may not be well defined. However, it is important that all bidders for the project shall read this EMP and price for proposed mitigation actions in preparing their respective bids. Based on the information given in the EMP the nominated contractor/s shall develop Site Specific Environmental Management Action Plans (SSEMAP) for each of these six subcomponents of REIP. As the project shall be design and build contracts, the contractor/s shall develop the SSEMAP using inputs from the final designs of each of these six subcomponents. The SSEMAPs shall clearly include all impacts relevant to the site with respective location information within the

site (e.g. labour camps, material stores etc.) and mitigation measures proposed. The SSEMAP shall be supported by site plans in which proposed mitigation measures are presented.

285. The Environment Specialist shall review and approve these SSEMAPs. ES shall consult the environment team of PMU when granting the approval for the SSEMAPs. The contractor/s shall submit a draft SSEMAP at the time of mobilization and the PIC shall make sure that the approved SSEMAP is available with the contractor at the time of land preparation activities commence at a given site.

C. Monitoring and Reporting

286. Contractor/s shall execute the mitigation measures listed in the SSEMAPs. The environment/ social officer of contractor/s shall guide the construction staff in complying with the required measures. The contractor/s shall also be responsible in obtaining any licences or approvals as discussed under chapter two of this report (e.g. obtaining EPL for concrete batch mixing plants). All staff of contractor/s shall assist their environment/ social officer to execute measures related to mitigating environment impacts. The environment/ social officer of contractor/s shall maintain records on daily activities carried out with respect to mitigation measures listed in SSEMAP.

287. ES of PIC shall conduct regular site visits with more frequent site visits during early stages of construction works and monitor the implementation of mitigation measures at each site. ES shall consider the baseline/ acceptable limits, performance monitoring indicator and targets set out in the monitoring section of the EMP in developing a monitoring plan to monitor the level of implementation of mitigation measures at each site. Then ES shall advise and assist the contractor/s to rectify ineffective mitigation measure or any noncompliance issue. ES shall maintain records of his site visits, monitoring and advice/ assistance given to contractor/s.

288. The environment team of the PMU shall conduct site visits on a monthly basis or based on a complaint made by public. Any issue observed with respect to implementing of mitigation measures shall be documented and reported to PIC through PD for PIC to instruct the contractor on rectification measures.

289. The contractor shall update or modify the SSEMAP based on new site conditions. PIC shall have the responsibility of maintaining the approved copies of SSEMAPs and relevant approvals and licences submitted by contractor/s.

290. This report also includes an Environment Monitoring Plan (EMoP) as Annex 16 which indicate environment parameters that need to be measured on a periodic basis or based on complaints received with respect to environment qualities of air, water, noise and vibration. Obtaining measurements of these parameters shall be a responsibility of the contractor/s. ES of PIC shall guide the contractor/s in conducting the measurements.

291. The contractor shall submit a summary report on monthly activities carried out in terms of environment and social safeguards which include (but not limited to); summary of the weather condition; key construction activities carried out; environmental impacts observed during the reporting period and mitigation measures taken with their effectiveness; summary of approvals/ licences (if any); No. of public suggestions, requests and complaints received and summary of actions taken to address these grievances.

292. Based on these monthly reports, site visit observations and instructions given at site by PIC, the PIC shall prepare an environmental monitoring report on a quarterly basis for submission to PMU of REIP and ADB (through PMU). This quarterly environment monitoring report can be a standalone report or as an attachment to the quarterly progress report prepared by PIC. This report shall be reviewed by the environment team at PMU before submission to ADB. The report shall be disclosed in ADB web as well as in a website developed and maintained for REIP and CSRP at SLR[8].

293. It is important that sufficient budgetary allocations are available for PMU and PIC to execute environment monitoring and reporting mechanisms at least up to the completion of construction works. In this aspect it is important that the services of ES, SDS of PIC and the environment staff of PMU are retained at least up to the end of construction period of all subcomponents of REIP.

D. Capacity Building on Environment Safeguards

294. In addition to the primary objective of facilitating the smooth implementation of CSRP, it is suggested that the REIP shall also conduct few programs on creation and raising awareness on environment and social safeguards and environment conservation. The project shall have the opportunity to build capacity on environment protection especially among staff allocated to new OH&TCC, Workshop (including staff of CMESD, Ratmalana) and staff of SLGRTTC.

295. Special awareness program can also be done for both resettled families and families of host community at Malapalla site.

296. Such special awareness creation programs can also be conducted focusing different levels of staff and works of contractor/s.

297. The ES and SDS of PIC and environment/ social team of PMU can formulate such programs to be executed at different stages of the project.

[8] SLR already has a website as www.railway.gov.lk/web

VII. GRIEVANCE REDRESS MECHANISM

298. Any construction activity carried out within or close to habitations may cause inconveniences to public, even though public are not directly affected by a project there may be requests or suggestions on the proposed development interventions. REIP located within CMR shall also receive public requests, suggestion and complaints during its implementation. Attending and addressing public complaints that affect the day to day life of communities within the project area shall be of great importance and shall help to complete civil works without any delays due to public protests.

299. The country's legal framework has well defined and established systems such as *"Samatha Mandala"* that could be used to resolve such issues. Objective of the GRM shall be to support genuine claimants to resolve their problems through mutual understanding and consensus reaching process with relevant parties.

300. In line with these aspects a GRM shall be formulated for REIP. The GRM shall work at three levels and grievances will be addressed at each level depending on the nature and significance of the grievances or complaints. The first shall be at site level where complaints will be directly received and addressed by the contractor, PIC or PIU representative on site. The regional level which shall be the second levels shall address grievances which are simple but still cannot be addressed at site level. More complex grievances which cannot be addressed at regional level will be addressed at the national level which includes the inputs of Secretary for the ministry. Grievance Redress Committees (GRC) shall be established at each of these three levels. The minimum composition of these GRCs are presented below:

1. Site level

i)	Grama Niladhari of the area	Chairman
ii)	Safeguard officer	Secretary
iii)	Representative of Supervision Consultant (Technical officer)	Member
iv)	Representative of Contractor	Member
v)	A community member/religious leader	Member
vi)	Woman representative from the local community	Member

2. Regional level

i)	Divisional Secretary of the area	Chairman
ii)	DPD safeguards from PMU	Secretary
iii)	Grama Niladhari	Member
iv)	Representative of Supervision Consultant (Site engineer)	Member
v)	Representative of Contractor	Member
vi)	Representative of a social organization of the area	Member
vii)	A community member/religious leader	Member
viii)	Woman representative from the local community	Member

3. National level

i)	Secretary to the ministry	Chairman

ii)	Project Director of PMU	Secretary
iii)	Representatives from relevant line agencies	Member
iv)	Representative of Supervision Consultant (Team Leader)	Member
v)	Representative of Contractor	Member
vi)	Representative of a social organization of the area	Member
vii)	A community member/religious leader	Member
viii)	Woman representative from the local community	Member

301. To make the GRM process gender responsive, each GRC shall include at least one woman member to represent the local community women. Further when grievances or complaints are submitted to the GRC, they will be treated equally irrespective of the gender of the person who forwarded the grievance or complaint.

302. Suggestions, requests and complaints may be received through different avenues or channels such as letters, telephone calls or emails. Public or stakeholders could verbally make their suggestions, requests or complaints directly to PMU, PIC or contractor/s.

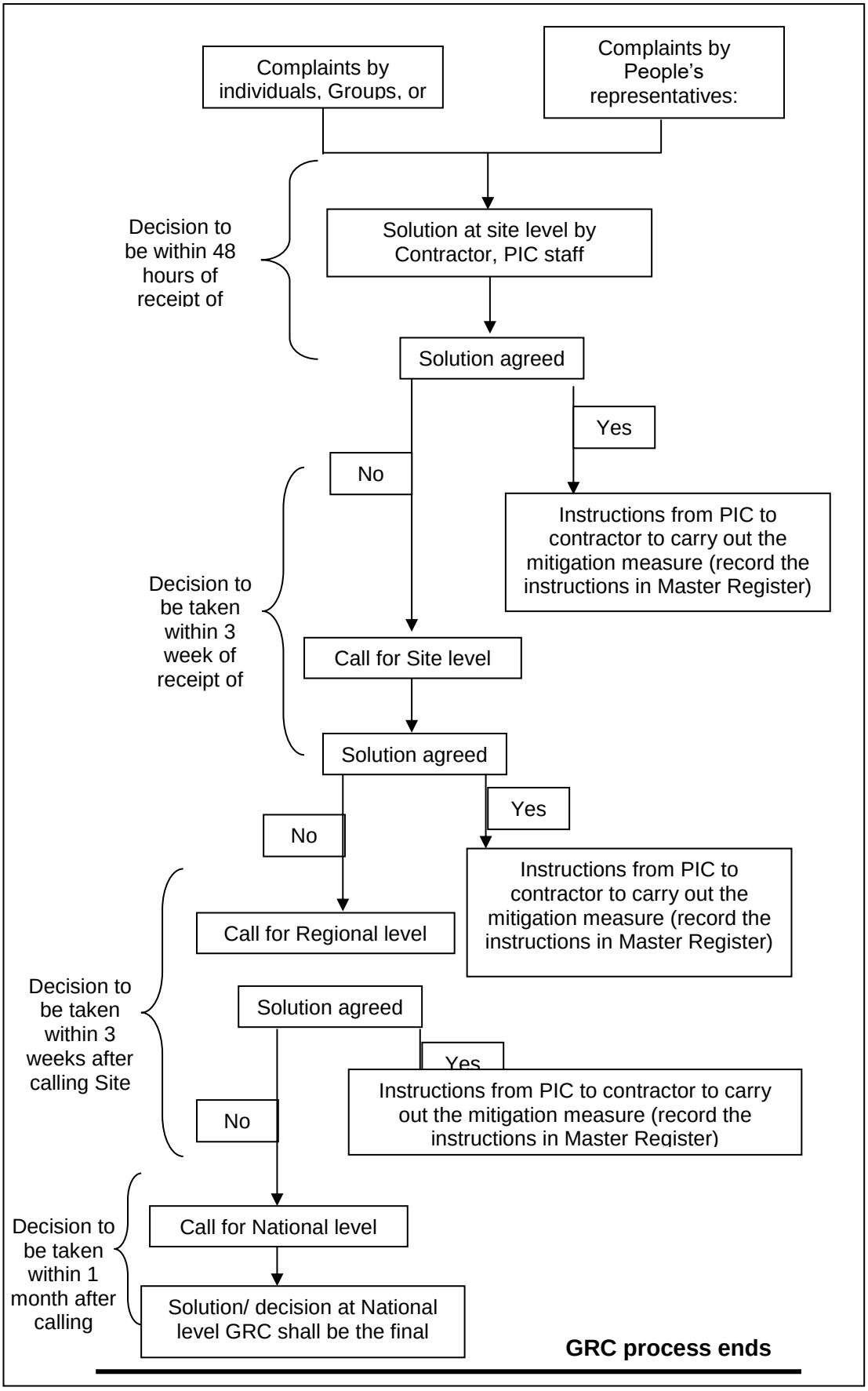
303. Letter boxes where public or stakeholder could put their suggestions, requests and complains in written form (as letters) shall be placed at the security point of each construction site. Letters including suggestions, requests or complaints could also be directly handed over to PMU, PIC or contractor/s.

304. These suggestions, requests or complaints shall be recorded in a “Master register” maintained at Project Manager’s office of the contractor/s. The environment/ social officer of contractor/s shall be responsible to maintain and update this “Master register”.

305. Recommended steps with timeline on the operation of the GRM is provided in Figure 25. Contact details of persons of PMU, PIC and contractor/s shall be displayed in project information display board that will be placed at the project site.

306. Minutes of GRC meetings including decisions taken shall be recorded by contractor/s (by environment/ social officer) and the decisions taken shall also be included in to the “Mater Register.”

Figure 25: Proposed GRM Process for REIP



VIII. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

307. Public consultation and information disclosure is an important part of the environmental safeguard requirements under SPS. In addition, the NEA also considers stakeholder engagement as a key element for successful management of environmental impacts.

308. The two subcomponents at School Lane and Malapalla site are considered important where public consultation should be carried out as they involve communities living close to the project sites. Key informant interviews, one on one interviews and Focus Group Discussions (FGDs) which have been carried out with respect to these six subcomponents of REIP are presented in this chapter. Table 30 presents a summary of FGDs held and the key views expressed by stakeholders and Table 31 presents the views expressed by officers during key informant interviews. Summary of one-on-one consultations are presented as Annex 17 of this report.

Table 30: Summary of FGDs Held and Key Views Presented

Location of FGD, Date and No. of Participants	Comments Made by Participants	File Photo
School Lane Underpass		
37 Watta (colony) 22 March 2018 Total: 34; Male: 13, Female: 21, (female participation: 62%)	• Presently, the School Lane Bridge is a single lane - one directional underpass. It is good to improve this underpass in to two lane status. • Existing vertical clearance in the underpass is less than 2m. Therefore, large vehicles such as buses, Lorries cannot pass through this underpass. • Many pedestrians use this underpass daily to go to hospitals, work places and other day today activities. Children also use this underpass to go to school. • When improving this underpass lightning system should be installed. • During heavy rainy days this road section gets inundated. • During the construction period people cannot use this road. But people can use alternative road and existing foot bridge which is about 250m away from this underpass. • During the construction period traffic around the area will be increased.	

Location of FGD, Date and No. of Participants	Comments Made by Participants	File Photo
67 Watta (colony) 22 March 2018 Total: 59; Male: 30, Female: 29, (female participation: 49%)	• Existing bridge width is insufficient, so bridge should be widened. • It is good if this road developed in to two lane status. • During heavy rainy days this road section getting inundated due to blocking of the canals. Therefore, canal system should be improved when developing this bridge. • In this area, there are two hospitals namely; Government hospital-Maligawatta, and National Institute for Nephrology Dialysis & Transplantation. There are two schools namely; St. Anthony's Balika Vidyalaya and St. Anthony's Convent school. Public in this area use this road to go to these hospitals, schools, and their workplace and other day-to-day activities.	
Malapalla Site for Housing Units		
Meththarama Viharasthanaya – Pannipitiya (Households to be resettled) 08 April 2018 Total: 82; Male: 32, Female: 50, (female participation: 61%)	• All participants expressed willingness to be resettled in the Malapalla area as a opportunity received to them in better living area with future development potentials. • They wanted Vehicle Park in the resettlement site in addition to the other basic facilities provided. • To consider increasing floor area of household unit by considering number of family members and sub families living within the extended family.	
Railway Station - Malapalla (Households to be resettled) 08 April 2018 Total: 21; Male: 14, Female: 7, (female participation: 33%)	• They expressed their happiness in selecting the Malapalla site for their resettlement due to close proximity to their existing settlements • Requested to give priority to their village in selecting people for Malapalla resettlement site.	

Location of FGD, Date and No. of Participants	Comments Made by Participants	File Photo
Near Community Building – Malapalla (Host community) 10 April 2018 Total: 19; Male: 11, Female: 8, (female participation: 42%)	• They expressed willingness to provide memberships in their welfare society for those who are resettled in this land. • Requested to find possibility to construct housing scheme without interrupting their community Building. • If interrupted, to provide alternative existing office spaces with community hall within proposed housing scheme. • If interrupted to arrange to accommodate above services in the spaces of Malapalla railway station building or to pay rent for alternative building during the construction period. • To arrange and implement proper social integration programs with resettled families and host community.	

Table 31: Summary of Key Views Expressed During Key Informant Interviews

Key Informant Person	Key Views Expressed
OH&TCC site	
Divisional Secretary Colombo DSD	• Divisional Secretary commented on this proposed construction and agreed that this proposed center will help to improve railway operation system in Sri Lanka.
Director Planning Colombo Municipal Council	• Agreed in this construction and commented that CMC does not have any involvement in giving the planning clearance. • Informed that the council provides services such as sewage and garbage collection and disposal.
Grama Niladhari, Panchikawatta	• Stated that improvement of train service will help to reduce traffic congestion in Colombo.
Ratmalana workshop and training center	
Assistant Divisional Secretary Ratmalana DSD	• Assistant Divisional Secretary expressed the view that improvement of train services will help the general public in the country to receive good and easy transport service. • It was further stated that these buildings proposed will help to improve train service and no objection from her office.
Grama Niladhari, Ratmalana West GND	• Expressed that no settlement near the sites shall be negatively affected as the buildings are constructed within Ratmalana workshop yard which is a property of SLR, surrounded by a masonry wall. • No issue of dust or noise shall also be anticipated due to these constructions.
Underpass for roadway and pedestrians at Maligawatta	
Assistant Divisional sectary, Colombo Divisional secretariat	• The bridge is very narrow. The bridge development is very good. If you can create better railroad system, there will be a solution to traffic jams. If it is possible to provide a good train service for those who arrive to work in Colombo, most people shall use the facility. Then road traffic will be reduced. Access

Key Informant Person	Key Views Expressed
	problems will not arise because people have an alternative road to use during construction period.
Grama Niladhari, Maligawatta East	• It is better if the bridge is constructed. Present condition of the bridge is dangerous for pedestrian movement. When it gets inundated it is mixed with the drainage pit water and difficult to travel through the bridge. • During the night, it is too dark, so pedestrians cannot walk. Most of the school children are using this bridge. • If this is constructed into two lanes the traffic will get less. • During the construction period, if the bridge closed, we will have to use alternative roads like Dematagoda or Maradana. Then the people will have to take a long away about 2-3 km. • This project is an essential to the whole nation as a development project.
Principal, St.Anthony's Balika Vidyalaya	• The underpass gets inundated. The road should be constructed into two lanes. • Traffic congestion is high during the day time. During the construction period, it is difficult to travel for the pedestrians. • There are about 750 children in this school. Many children use this School Lane road to come to school.
Principal, Ananda Balika Vidyalaya	• Construction should be started during the school holidays. • If the road gets lower, water will collect. • Children coming from Wattala and Kadana area use the underpass bridge to travel. Most of the school vans are using this road. • Construction should be completed within the shortest possible time period.
Malapalla site for housing units	
Assistant Divisional Secretary Divisional Secretariat Office, Maharagama	• Assistant Divisional secretory fully agreed for use of this land for resettlement of dwellers living along the railway line close to this site.
Post office Master Main post office, Pannipitiya	• Sub post office located at Malapalla site was controlled by this main office. • Post master in this office agreed for relocation of sub post office located at Malapalla for proposed new housing scheme.
Prelate at Sri Sudarsanaramaya, Malapalla	• Praised the establishment of housing scheme at Malapalla site which will help to overcome some current malpractices being taken place by notorious persons in the area.

309. Consultations shall be carried even during construction and maintenance period of the project. Avenues shall be kept open for public views and during construction and maintenance periods. Details of these avenues are discussed under the chapter on GRM.

310. An information leaflet about CSRP has been developed by the PMU. This leaflet includes information about project benefits, preparation of project plans, land acquisition procedure, payment of compensation and resettlement procedure, project activities and contact information of PMU. Annex 18 includes a scanned copy (English version) of this leaflet. The leaflet shall be translated in to Sinhala and Tamil and be distributed especially to the affected parties of CSRP.

IX. FINDINGS AND RECOMMENDATIONS

311. The proposed six subcomponents of REIP that involves civil works and discussed in this IEER do not involve any interventions in and around any natural and cultural heritage destinations and have less significant (direct or indirect) environmental impacts. It is expected that implementing these six subcomponents along with the other subcomponents of REIP shall facilitate smooth implementation of subsequent CSRP which aims at modernization of the railway network in the Western Province of Sri Lanka. Overall the interventions shall improve the railway transport system and enhance the interconnection between different regions of the country both economically and efficiently.

312. This IEE has identified likely impacts that would occur at different stages of the project and has defined mitigation measures. Those mitigation measures will be implemented and monitored during the execution of each subcomponent of REIP.

313. Consultation with public has been carried out up to the preparation of this IEER and it is recommended that this consultation continues throughout the construction stage of the six subcomponents of REIP. The GRM shall be established as given in this IEER which shall act promptly to any public compliant during the construction period. PMU with assistance from ES and SDS of PIC and environment/ social officer of contractor especially at Malapalla site and School Lane underpass shall keep close monitoring on any social developments that take place with respect to surrounding communities and act promptly to resolve any issue that would affect this community.

314. It is recommended that this IEER including the EMP and EMoP are included as attachments to the bidding documents so that the bidders shall have a clear idea of impacts and mitigation measures with respect to construction stage of the project and bid accordingly with sufficient costing for environment mitigation measures. It is also recommended that services of ES, SDS of PIC, environment and social team of PMU and environment/ social officer of contractor/s are retained at least until all construction works of the six subcomponents are completed.

315. PMU along with design consultants shall be responsible to implement the mitigation measures suggested under location impacts; and design and preconstruction impacts.

316. The implementation of SSEMAP with respect to each site shall mitigate any negative impact that would arise during construction.

317. Implementing the mitigation measures listed under operational stage shall be a responsibility of PMU or specific divisions of SLR. For example, measures with respect to new workshop shall be executed by CMESD at Ratmalana and measures with respect to new training wing shall be done by staff of SLGRTTC under the overall supervision of SLR top management.

318. A series of capacity building workshops on environment and social safeguards is recommended to sustain the good environment and social attitude of PMU and SLR staff developed during the implementation of REIP.

X. CONCLUSION

319. Based on this IEE, it is expected that the proposed six subcomponents of REIP that involves civil works have only localized and mostly temporary adverse environmental impacts. These can be mitigated through adequate mitigation measures and regular monitoring during the design, construction, and post construction phases of these subcomponents of REIP.

320. Based on the findings of the IEE, the classification of the REIP as an environmentally category *B* project is confirmed. No further special study or detailed EIA needs to be undertaken to comply with the ADB Safeguard Policy Statement, 2009.

ANNEX 1: RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST

Project Name: Railway Efficiency Improvement Project

Subproject Name:

- Operation Headquarter and Train Control Centre (OH&TCC)
- Passenger facility at Colombo Fort and Maradana
- Underpass for roadway and pedestrians - Maligawatta
- New workshop and stores - Ratmalana
- New training wing - Ratmalana
- Housing units for relocation - Malapalla

Subproject Location: Colombo District, Western Province

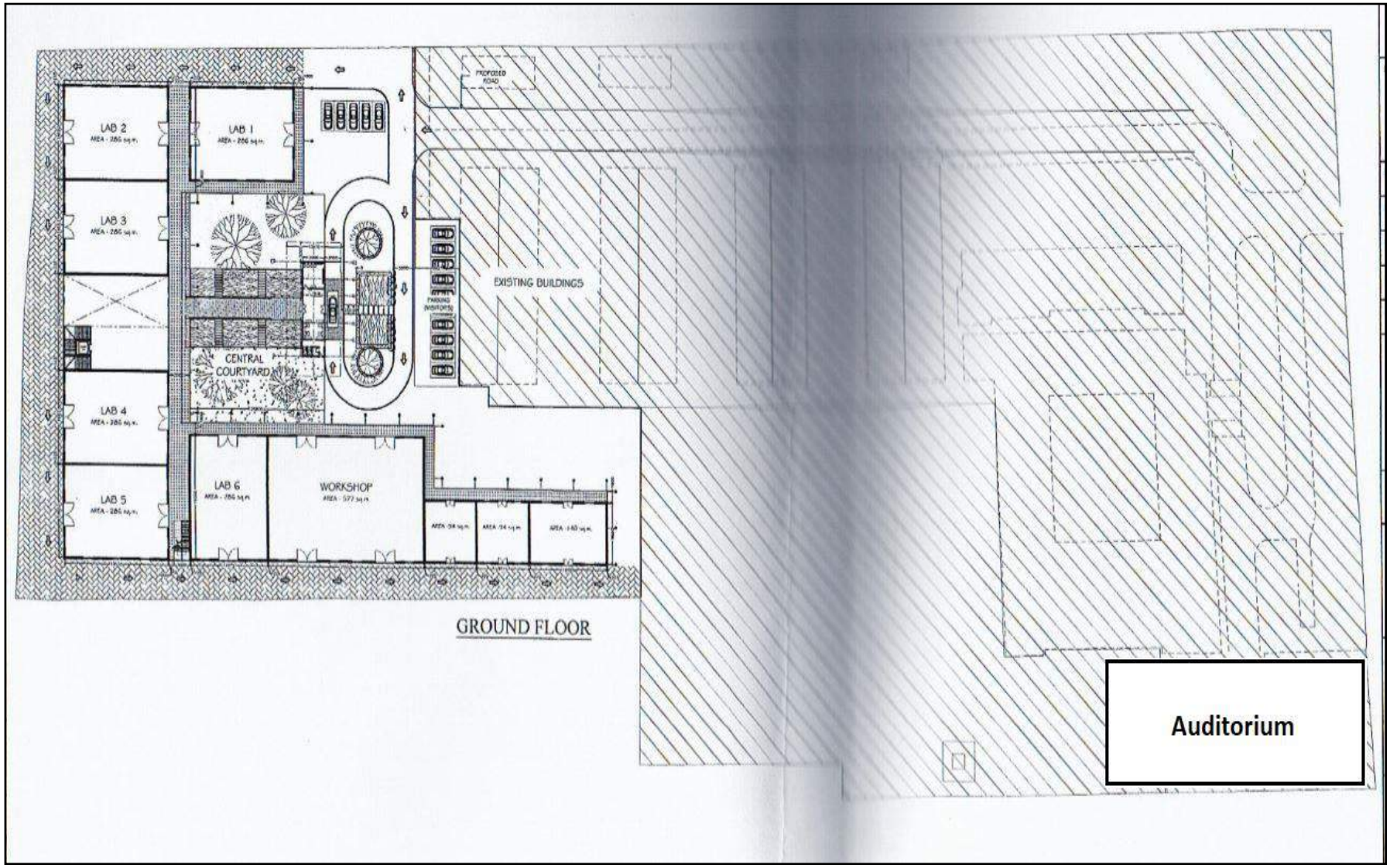
SCREENING QUESTIONS	YES	NO	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
Underground utilities		X	
Cultural heritage site		X	Elphinstone, Tower hall theatres and Maradana railway station are located about 150 m from the site for OH&TCC at Maradana
Protected Area		X	
Wetland		X	
Mangrove		X	
Estuarine		X	
Buffer zone of protected area		X	
Special area for protecting biodiversity		X	
Potential Environmental Impacts Will the Project cause…			
encroachment on historical/cultural areas?		X	
encroachment on precious ecology (e.g. sensitive or protected areas)?		X	
Impacts on the sustainability of associated sanitation and solid waste disposal systems?	X		The sewer system of OH&TCC shall be connected to the central sewer system operated and maintained by Colombo Municipality Council.

SCREENING QUESTIONS	YES	NO	REMARKS
Dislocation or involuntary resettlement of people?		X	However, two officers of SLR and their families residing in the two quarters at Malapalla site shall be shifted to the new quarters constructed at a nearby location.
Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	
Accident risks associated with increased vehicular traffic, leading to loss of life?		X	However, there will be an increase of construction related vehicles during construction stage. This issue shall be addressed by developing a transport management plan.
Increased noise and air pollution resulting from increased traffic volume (construction traffic)?	X		Implementation of mitigation measures listed in the Environmental Management Plan (EMP) and transport management plan shall reduce the issues of noise and air pollution.
Occupational and community health and safety risks?	X		
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?		X	However, safety measures shall be adopted as guided in the EMP and safety management plan developed by contractor and approved by project Implementing consultant
Generation of dust in sensitive areas during construction?	X		However temporary dust barriers shall be erected surrounding all construction sites. And other
Requirements for disposal of fill, excavation, and/or spoil materials?			Mitigation measures listed in the EMP shall be adopted to minimize dust issue.
Noise and vibration due to blasting and other civil works?	X		No blasting works shall be involved at construction sites. However deep foundations work at OH&TCC and Malapalla medium rise building shall emit noise. Mitigation measures listed in the EMP shall be adopted to minimize the noise issue.
Long-term impacts on groundwater flows as result of needing to drain the project site prior to construction?		X	
Long-term impacts on local hydrology as a result of building hard surfaces in or near the building?		X	

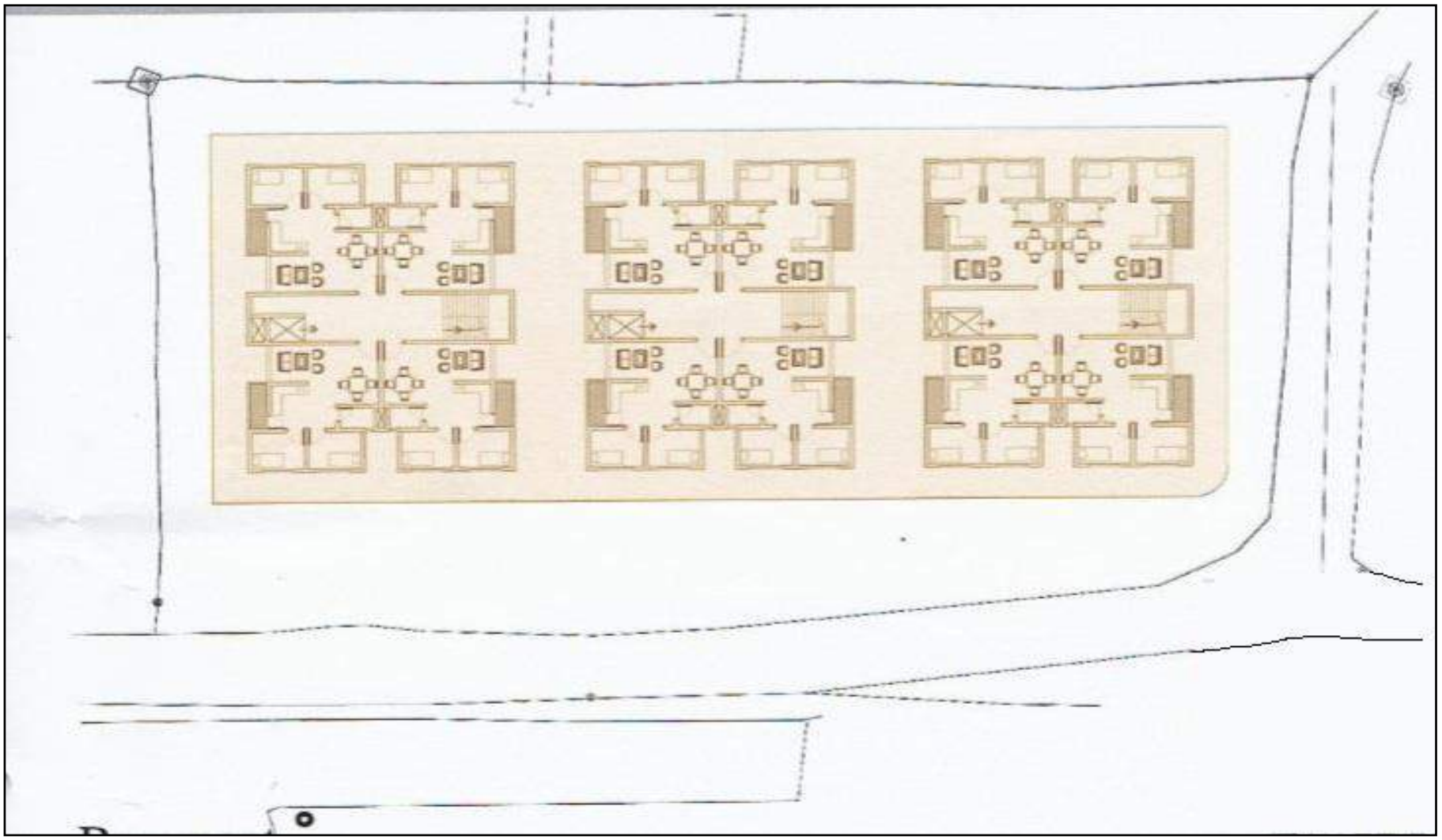
SCREENING QUESTIONS	YES	NO	REMARKS
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		X	
Social conflicts if workers from other regions or countries are hired?	X		Labour supervision and adopting other measures listed in MEP on Labour force management shall reduce this risk.
Risks to community safety caused by fire, electric shock, or failure of the building's safety features during operation?	X		Mitigation measures including servicing and maintaining all firefighting equipment at these sites shall reduce this risk.
Risks to community health and safety caused by management and disposal of waste?	X		Servicing and maintaining the in-house sewage treatment plants, septic tanks and soakage pits; waste separation, collection and disposal to approved local authority waste and garbage collectors shall reduce this risk (As indicated in the EMP).
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	X		Designs of OH&TCC and Malapalla medium rise building to be carried out adhering to Urban Development Authority guidelines and National Building Research Organization recommendations.

Proposed Environmental Classification: [A] [B] **x**

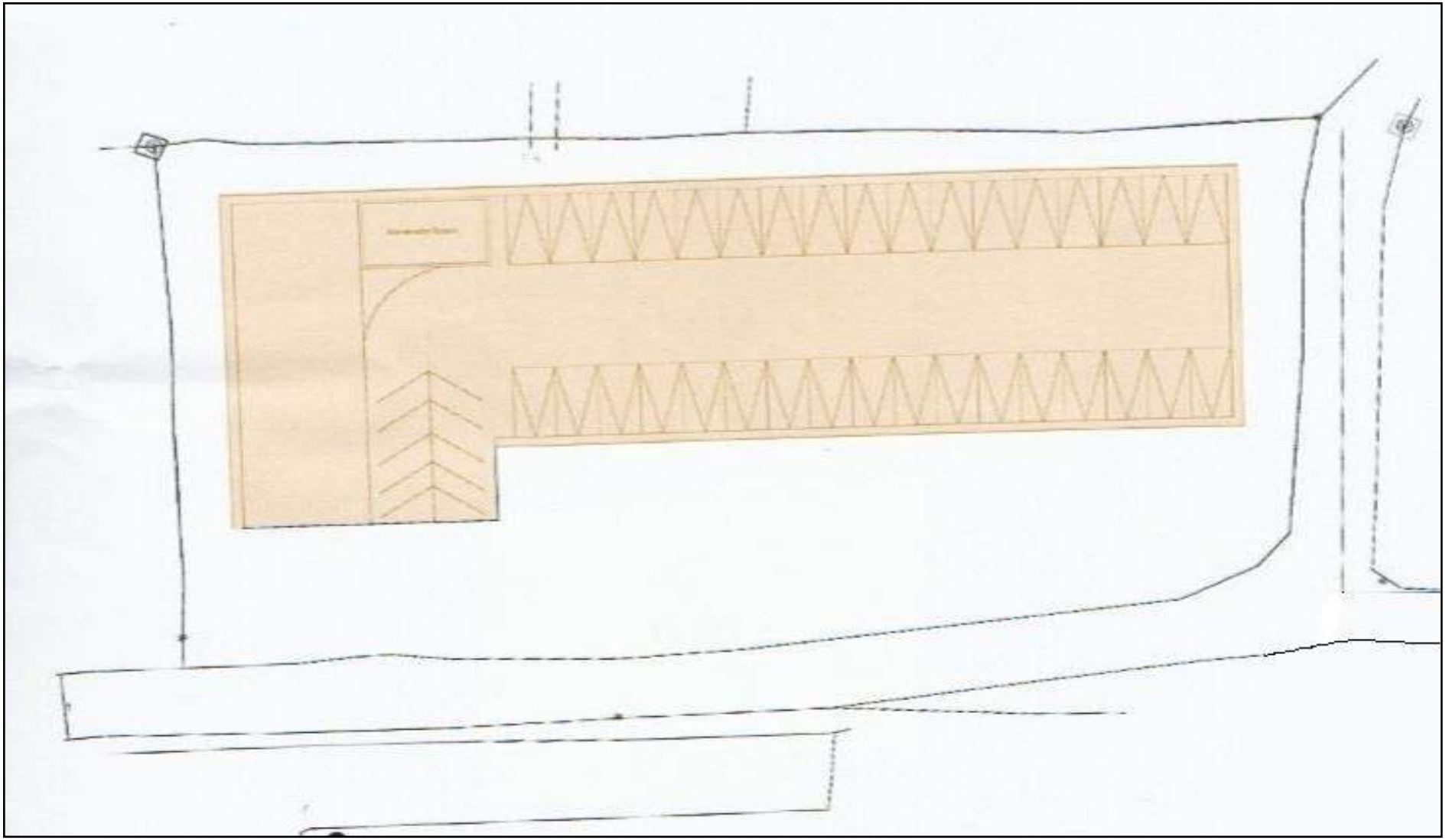
ANNEX 2: PRELIMINARY DESIGN DRAWING OF NEW TRAINING WING



ANNEX 3: PRELIMINARY DESIGN DRAWING FOR MALAPALLA MEDIUM RISE HOUSING SCHEME (LAYOUT OF UPPER FLOORS)



ANNEX 4: PRELIMINARY DESIGN DRAWING FOR MALAPALLA MEDIUM RISE HOUSING SCHEME (LAYOUT SOF GROUND FLOOR - PARKING)



ANNEX 5: MEETING MINUTES BETWEEN OFFICIALS OF MOT&CA, CSRP AND UDA

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போக்குவரத்து மற்றும் சிவில் விமானசேவைகள் அமைச்சு
MINISTRY OF TRANSPORT & CIVIL AVIATION

07 වෙනි මහල, සෙත්සිරිපාය, අදියර II, බත්තරමුල්ල
07 ஆவது மாடி, சேத்சிரிபாய, II ஆம்கட்டம், பத்தரமுல்லை
7th Floor, Sethsiripaya, Stage II, Battaramulla

වෙබ් අඩවිය / இணையத்தளம் / Website: www.transport.gov.lk

දුරකථන / தொலைபேசி Telephone

අමාත්‍ය / அமைச்சர் Minister: 2187225
ලේකම් / செயலாளர் Secretary: 2187233
කාර්යාලය / அலுவலகம் Office: 2187200, 2187201
ෆැක්ස් / தொலை நகல் Fax: 2865093, 2187226
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මගේ අංකය / எமது இல. My No. MT/CSRP/UDA

ඔබේ අංකය / உமது இல. Your No.

දිනය / திகதி Date 14/05/2018

Minutes of the Meeting regarding deciding the site for Construction of Colombo Train Control Center (CTCC) and Railway Operations Headquarters (ROHQ) under Colombo Suburban Railway Efficiency Improvement Project (CSREIP)

Date : 03rd May 2018

Time : 09.00 AM

Venue : Main conference Hall – Ministry of Transport and Civil Aviation -Baththaramulla

Participants:

MoT&CA
Mr. G.S. Withanage -The Secretary- MoT&CA

SLR
Mr. J.Uthayakumar –Additional General Manager (Infrastructure) - SLR
Mr. J.I.D. Jayasundara –Chief Engineer (S&T) - SLR
Mr. H.M.K.W. Bandara –Deputy Chief Engineer (Way & Works) - SLR

UDA
Mr. Sumedha Rathnayake -Director General
Mr. Mahinda Withanachchi- Deputy Director General (Projects)
Ms Champika de Silva -Deputy Director General(Design)
Ms. Priyani Nawarathne - Director (P)
Mr. RLW Perera -Director-(Land)
Brigadier S.A.R. Samarasinghe –Project Director-URPCC
Mr. S.L.S. Wijesinghe-Assistant Director -Lands
Mr. W.M.J.U. Weerakoon - (URP)
Mr. Rohana Karunarathne –Field Assistant

CSRP
Mr. Palitha Samarasinghe -Additional Secretory (Technical)-MoT&CA
Mr. Mihindukulasooriya- Diputy Project Director -Land Acquisition
Mr.U.Mallikarachchi- Deputy Project Director – Environmental & Social Safeguard
Mr.P.K.Piyaratne - Assistant Project Director - Environmental & Social Safeguard
Ms Hema Prathapage -Assistant Project Director-Land Acquisition
Mr.W.M.K.Bandaranayake, Social Safeguard Officer

The Secretary, MoT&CA chaired the meeting and welcomed all participants. When reading the agenda, the Secretary explained that,

1) The development should encompass all sectors of the country. It can be observed that land acquisition has happened without paying much consideration about this factor.
2) The Sri Lanka Railway is an organization, functioning and rendering services to the public with immense difficulties. The task of SLR is not easy at all. This is an opportunity to develop railway sector and hence support from every other sector is needed at this stage.

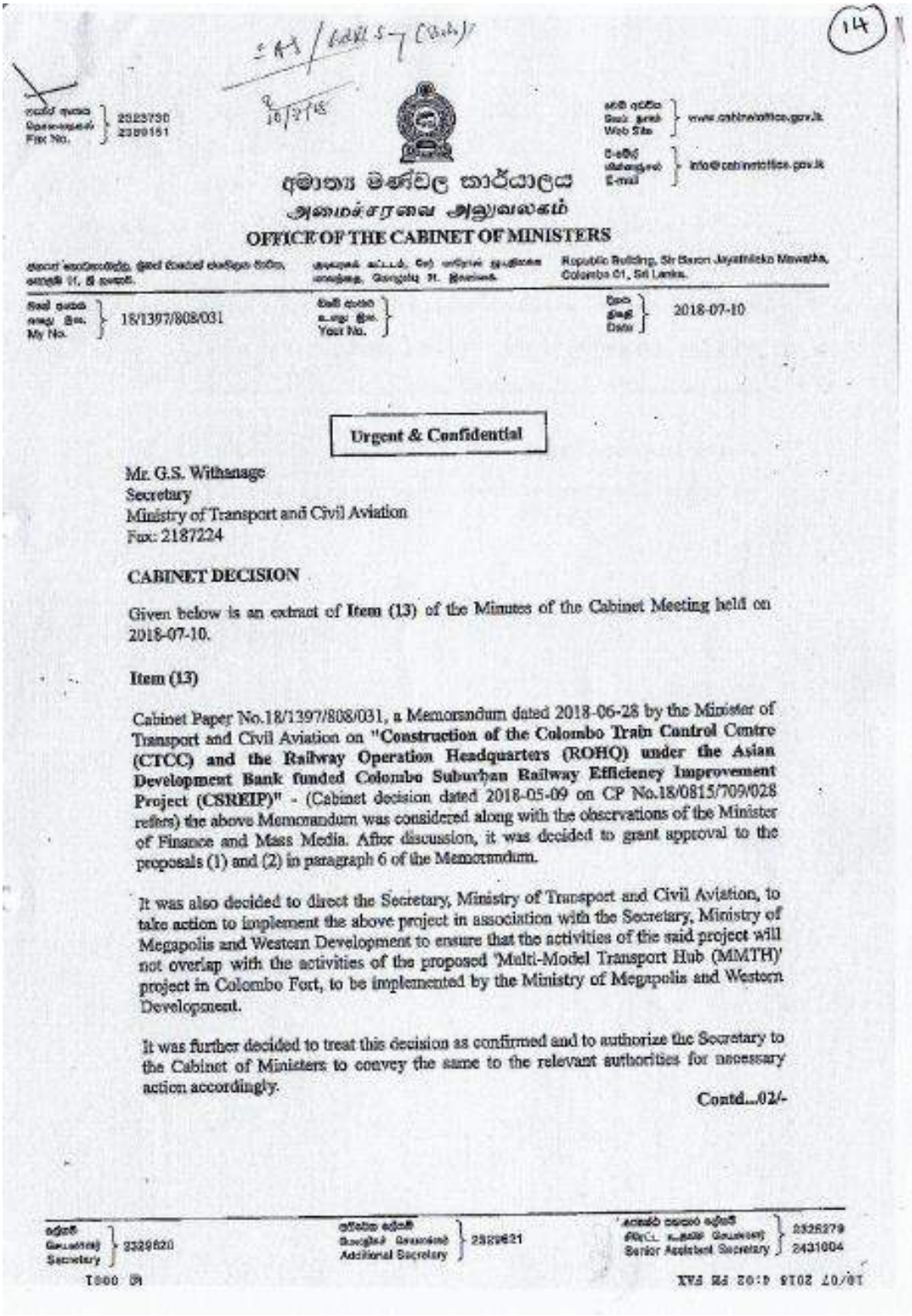
The relevant cabinet approvals, survey maps etc. were then checked by all parties.

S/N	Issue/Agenda Item	Responsible	Time Period
1	**Utilizing the empty land available at Maradana in front of the Elpinstain Hall.** The CSRP requested the unutilized land area available at present, in the 10 and half acre land which was vested in 2014 to the UDA through a Cabinet approval. Further, it was revealed that vesting has taken place with the agreement to provide 05 acres from Manning Town market to the SLR. But, this vesting has not been implemented. The UDA expressed that proposed transport hub in Colombo Fort has been designed in the 5-acre land and discussion has to be held with Megapolis Ministry in that regard. The CSRP further mentioned that this building construction is funded by ADB. When designing of the CTCC is carried out, it was seen that, more room space is necessary to be utilized as per requirements of the CTCC, to function it as one single center to coordinate island wide railway system. The cabinet paper in transferring this land to UDA includes a condition that if the land is not utilized, SLR can obtain it for its activities. UDA expressed that part of this land has been rented to a private party and income is received from it. Also agreed to arrange a coordination meeting between two designing teams of CSRP and UDA to assure a planned aesthetic view and height of buildings. Finally, CSRP requested consent letter to transfer the ownership of available vacant space to SLR to carry out the necessary designs of the CTCC. **Considering the above facts and requirements, UDA & MOT&CA agreed to release the vacant area of the land towards SLR premises (IBDW- Colombo office) for the construction of CTCC & ROHQ and its related technical facilities. CSRP to survey the area and to send a request to UDA. Then, UDA will issue a formal agreement enabling the CSRP to obtain necessary approvals etc for the construction.** **The Secretory –MOT&CA stated that a Cabinet Approval will then be sought by MoTCA, because, SLR land has been vested to UDA on Cabinet Approval. With this, the ownership will be transferred to SLR.**	UDA and CSRP	As soon as possible

2	**Malapalla Land** CSRP explained the agreement that has been reached already with UDA to design and prepare bid documents for Malapalla Housing Scheme. A cabinet paper has already been submitted in this regard. **UDA expressed that design concept paper is being prepared while design work is underway. Eleven floors and 140 houses are expected in 120 perches land. Once survey plan is received, output can be given within two weeks' time.** **CSRP agreed to give the survey plan within one-week time.**	CSRP UDA CSRP	As soon as possible Two weeks One week
3	**Development of Pedestrian Walkway between Panadura Bus stand to Panadura Railway Station** SLR requested UDA to submit the proposed plan to consider it and give concurrence with railway district engineers view. **The advantages of this pedestrian path was understood by both SLR and UDA.**	UDA & SLR	
4	**Progress of allocation of 1200 houses to project affected people in the Kelani Valley Railway Line.** **UDA expressed that 70 houses in Borella and Dematagoda will be ready by end of May 2018 and 192 housing units from Maradana will be ready by July 2018.** CSRP expressed that entitlement matrix with resettlement plan have been just received and ready to be submitted to the cabinet. Once the cabinet approval is received, resettlement is expected to begin from Maradana to Castle road.	UDA & CSRP	

Palitha Samarasinghe
Additional Secretary (Technical)
Ministry of Transport and Civil Aviation

ANNEX 6: CABINET APPROVAL FOR DIVESTING THE LAND



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info@cabinetoffice.gov.lk

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அமைச்சரவை அலுவலகம்
OFFICE OF THE CABINET OF MINISTERS

Republic Building, Sir Baron Jayathilaka Mawatha, Colombo 01, Sri Lanka.

My No. 18/1397/808/031

Your No.

Date 2018-07-10

Urgent & Confidential

Mr. G.S. Withanage
Secretary
Ministry of Transport and Civil Aviation
Fax: 2187224

CABINET DECISION

Given below is an extract of **Item (13)** of the Minutes of the Cabinet Meeting held on 2018-07-10.

Item (13)

Cabinet Paper No.18/1397/808/031, a Memorandum dated 2018-06-28 by the Minister of Transport and Civil Aviation on **"Construction of the Colombo Train Control Centre (CTCC) and the Railway Operation Headquarters (ROHQ) under the Asian Development Bank funded Colombo Suburban Railway Efficiency Improvement Project (CSREIP)"** - (Cabinet decision dated 2018-05-09 on CP No.18/0815/709/028 refers) the above Memorandum was considered along with the observations of the Minister of Finance and Mass Media. After discussion, it was decided to grant approval to the proposals (1) and (2) in paragraph 6 of the Memorandum.

It was also decided to direct the Secretary, Ministry of Transport and Civil Aviation, to take action to implement the above project in association with the Secretary, Ministry of Megapolis and Western Development to ensure that the activities of the said project will not overlap with the activities of the proposed 'Multi-Model Transport Hub (MMTH)' project in Colombo Fort, to be implemented by the Ministry of Megapolis and Western Development.

It was further decided to treat this decision as confirmed and to authorize the Secretary to the Cabinet of Ministers to convey the same to the relevant authorities for necessary action accordingly.

Contd...02/-

Secretary 2329620
Additional Secretary 2329621
Senior Assistant Secretary 2326279 2431004

T900 PM

10/07 2018 4:02 PM FAX

02

Action by: **My/Transport and Civil Aviation** - above observations annexed.
My/Megapolis and Western Development - copy of Memorandum and above observations annexed.

Copied to: **Secretary to the President** - copy of Memorandum and above observations annexed.
Secretary to the Prime Minister - copy of Memorandum and above observations annexed.
My/National Policies and Economic Affairs - copy of Memorandum and above observations annexed.
My/Finance and Mass Media
My/Lands and Parliamentary Reforms - copy of Memorandum and above observations annexed.
My/Telecommunication, Digital Infrastructure and Foreign Employment - copy of Memorandum and above observations annexed.

S. Abeysinghe
Secretary to the Cabinet of Ministers

2000

(13)

நிதி மற்றும் வெகுசன ஊடக அமைச்சு

MINISTRY OF FINANCE AND MASS MEDIA

The Secretariat, Colombo 01,
Sri Lanka

Office - Finance (+94)-11-2484500, (+94)-11-2484600, (+94)-11-2484700
Fax - Finance (+94)-11-2448622
Office - Mass Media (+94)-11-2513492, (+94)-11-2513498, (+94)-11-2512394
Fax - Mass Media (+94)-11-2513458
Websites www.treasury.gov.lk www.media.gov.lk

My No. PFD/SER/114/306/CM/419 Your No. CP 18/1197/808/031 Date 09.07.2018

Cabinet Memorandum
Observations of the Minister of Finance and Mass Media

Ministry : Transport and Civil Aviation

Subject & Date : Construction of the Colombo Train Control Centre (CTCC) and the Railway Operation Headquarters (ROHQ) under the Asian Development Bank (ADB) funded Colombo Suburban Railway Efficiency Improvement Project (CSREIP)

28.06.2018

Proposals/ Requests : Approval of the Cabinet of Ministers is sought for the following proposals;

1. To instruct the Secretary, Ministry of Megapolis and Western Development and the Chairman, Urban Development Authority to release the land area of 01 Acre 02 Roods (the plot of land already surveyed out of the land of 10 Acre and 02 Roods) to the Sri Lanka Railways to fulfil the project requirement and to enable the Railway Development in Sri Lanka.
2. To instruct the Secretary, Ministry of Transport and Civil Aviation to implement the project in accordance with the agreement with the ADB.

Observations : I agree with the proposals.

Mangala Samaraweera, M.P.
Minister of Finance and Mass Media

MINISTRY OF TRANSPORT & CIVIL AVIATION

7th Floor, Sethsiripaya, Stage II, Battaramulla

Website www.transport.gov.lk

Minister 2107225 Secretary 2107233 Office 2187200 2187201 Fax 2865093 2107226 E-Mail ministransport@sltnet.lk

My No. MTCA/SP/2018 Your No. Date

Cabinet Memorandum

Ministry of Transport and Civil Aviation

Construction of Colombo Train Control Centre (CTCC) and Railway Operation Headquarters (ROHQ) Under Asian Development Bank funded Colombo Suburban Railway Efficiency Improvement Project (CSREIP).

1. **Background.**

   Approval (No. 18/0815/709/028 of 09.05.2018) of Cabinet of Ministers was obtained for Construction of Colombo Train Control Centre (CTCC) and Railway Operation Headquarters (ROHQ) at Maradana (In front of Elphinston Theatre) under Asian Development Bank funds. As a result, ADB, listed this project as one of the key development endeavours under the USD 150.0 million financial assistance extended to Railway Sector.

   The Consultancy for preparation of Preliminary Designs and Bid Documents has been assigned to M/s. Dohwa – Oriental Consultans – Brazil. Joint Venture and this endeavour is now at its final Stage. Intention is to commence the procurement process in July 2018.

2. **Obtaining bear land of 01 Acre 02 Roods from the 10 Acre 02 Roods Land vested to UDA by Sri Lanka Railways.**

   In December 2014, 10 Acre, 02 Roods Railway Land at Maradana (In front of Elphinston Theatre) was vested to Urban Development Authority (UDA) by Sri Lanka Railways (SLR). Vesting took place as a grant to UDA, for setting up of International Market Oriented Information Technology Developments (ICT Industry). There were 18 Nos. of Railway Good Sheds and those were developed and were rented for ICT Developing Companies.

   However, with this transaction, Sri Lanka Railway (other than the lands with railway establishments) lost lands for Railway developments. Because of this, a condition was included in the agreement (dated 05.12.2014) between UDA and SLR, as follows, (attachment I)

1. The vested land shall be used only for the International Market Oriented ICT Development.
2. If any land (out of the entire vested land of 10 Acre 02 Roods) would be used for purposes other than the above purpose, and if land would not be used and be kept as bear land, then that land shall to be handed over to GOSL back.

3. **Present Status**

Out of the 10 Acre 02 Roods land vested to UDA, only 07 Acre 01 Roods land area (this is the area where 18 Nos. of Railway Stores Buildings are existing) has been used for "International Market Oriented ICT Development".

Balance, land area is left behind unutilized. This means that plot of land has not been used for the purpose, stated in the agreement between UDA and SLR.

4. **Need of 01 Acre 02 Roods land for construction of Colombo Train Control Centre (CTCC) and Railway Operation Headquarters (ROHQ).**

Under the Pre-Feasibility Study of Colombo Suburban Railway Project (completed in 2017), few small-scale Railway Efficiency Improvement Project were identified and one of them was the Construction of Colombo Train Control Centre (CTCC) and Railway Operation Headquarters (ROHQ).

Later approval of Cabinet of Ministers was obtained for this small-scale project to be implemented at Maradana (in front of Elphinston Theatre). (attachment II)

Sri Lanka Railways considered different options (sites) to locate CTCC & ROHQ, by considering Technical, Architectural and future development needs. The best location to construct CTCC and ROHQ (and the related Car Parking and Services) is the 01 Acre 02 Roods bear land lot between Railway existing establishments and Railway Good sheds developed and rented for ICT Developers.

Since this plot of land too has been vested to UDA by SLR in 2014, a discussion participated by Ministry of Transport and Civil Aviation, Sri Lanka Railways and Urban Development Authority was held on 03.05.2018 and agreement was reached to release this plot of land by UDA for construction of CTCC & ROHQ (attachment III). Later, the land area was surveyed by MOT&CA and the Survey Plan (complying with plan prepared in 2014) has been prepared. (attachment IV)

5. **Present Status of Design of CTCC & ROHQ.**

Consultancy has been appointed for preparation of Preliminary Design and BID Documents and 90% of this development has been completed.

ADB has included the project under their financing and has agreed to implement the project under ADB.

Sought

ring above, the approval of the Cabinet of Ministers is sought,

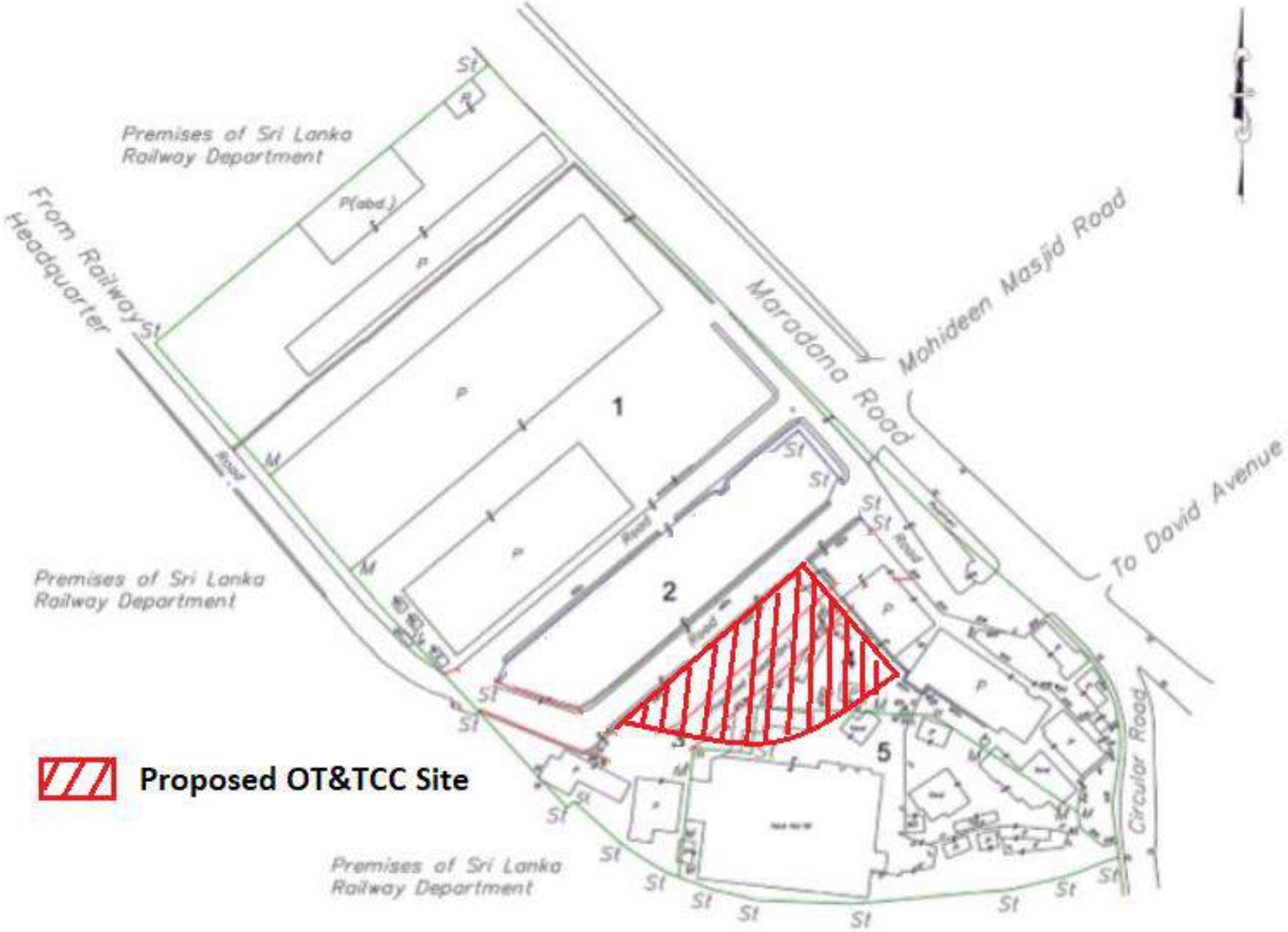
the Cabinet of Ministers to instruct, Secretary, Ministry of Megapolis and Western Development and Chairman, Urban Development Authority to release the 01 Acre 02 Roods land area (the plot of land already surveyed out of 10 Acre 02 Roods land) to Sri Lanka Railways to fulfil the project requirement and to enable Railway Development in Sri Lanka.

For the Cabinet of Ministers to instruct, Secretary, Ministry of Transport and Civil Aviation to implement the project in accordance with the agreement with ADB.

Nimal Siripala De Silva (M.P.)
Minister of Transport and Civil Aviation

..28.. June 2018
Ministry of Transport and Civil Aviation

ANNEX 7: EXTRACT OF SITE SURVEY PLAN OF OH&TCC

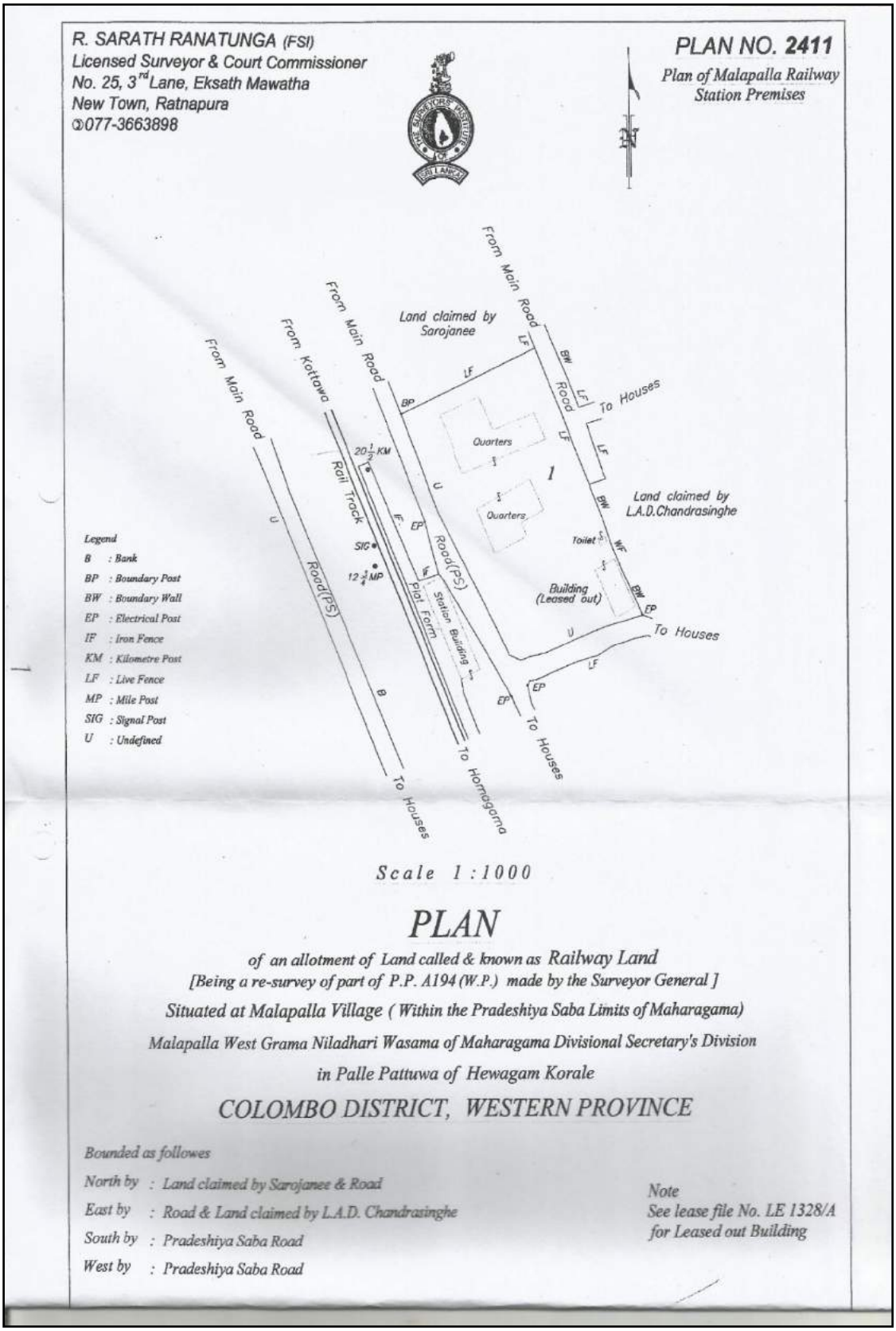


ANNEX 8: EXTRACT OF SITE SURVEY PLAN OF MALAPALLA SITE

R. SARATH RANATUNGA (FSI)
Licensed Surveyor & Court Commissioner
No. 25, 3rd Lane, Eksath Mawatha
New Town, Ratnapura
✆077-3663898

PLAN NO. 2411

Plan of Malapalla Railway Station Premises



Scale 1 : 1000

PLAN

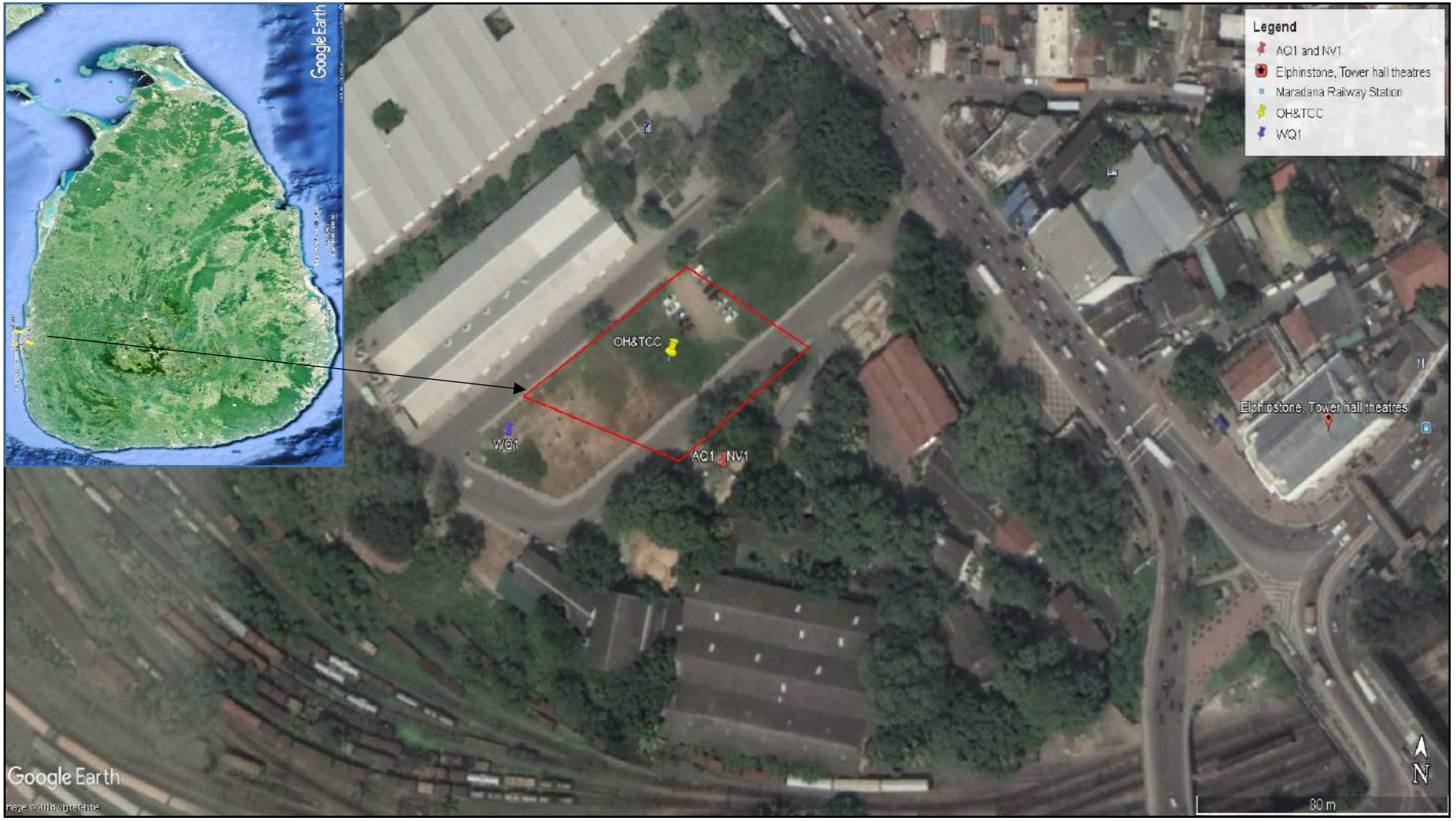
of an allotment of Land called & known as Railway Land
[Being a re-survey of part of P.P. A194 (W.P.) made by the Surveyor General]
Situated at Malapalla Village (Within the Pradeshiya Saba Limits of Maharagama)
Malapalla West Grama Niladhari Wasama of Maharagama Divisional Secretary's Division
in Palle Pattuwa of Hewagam Korale
COLOMBO DISTRICT, WESTERN PROVINCE

Bounded as followes

North by : *Land claimed by Sarojanee & Road*
East by : *Road & Land claimed by L.A.D. Chandrasinghe*
South by : *Pradeshiya Saba Road*
West by : *Pradeshiya Saba Road*

Note
See lease file No. LE 1328/A for Leased out Building

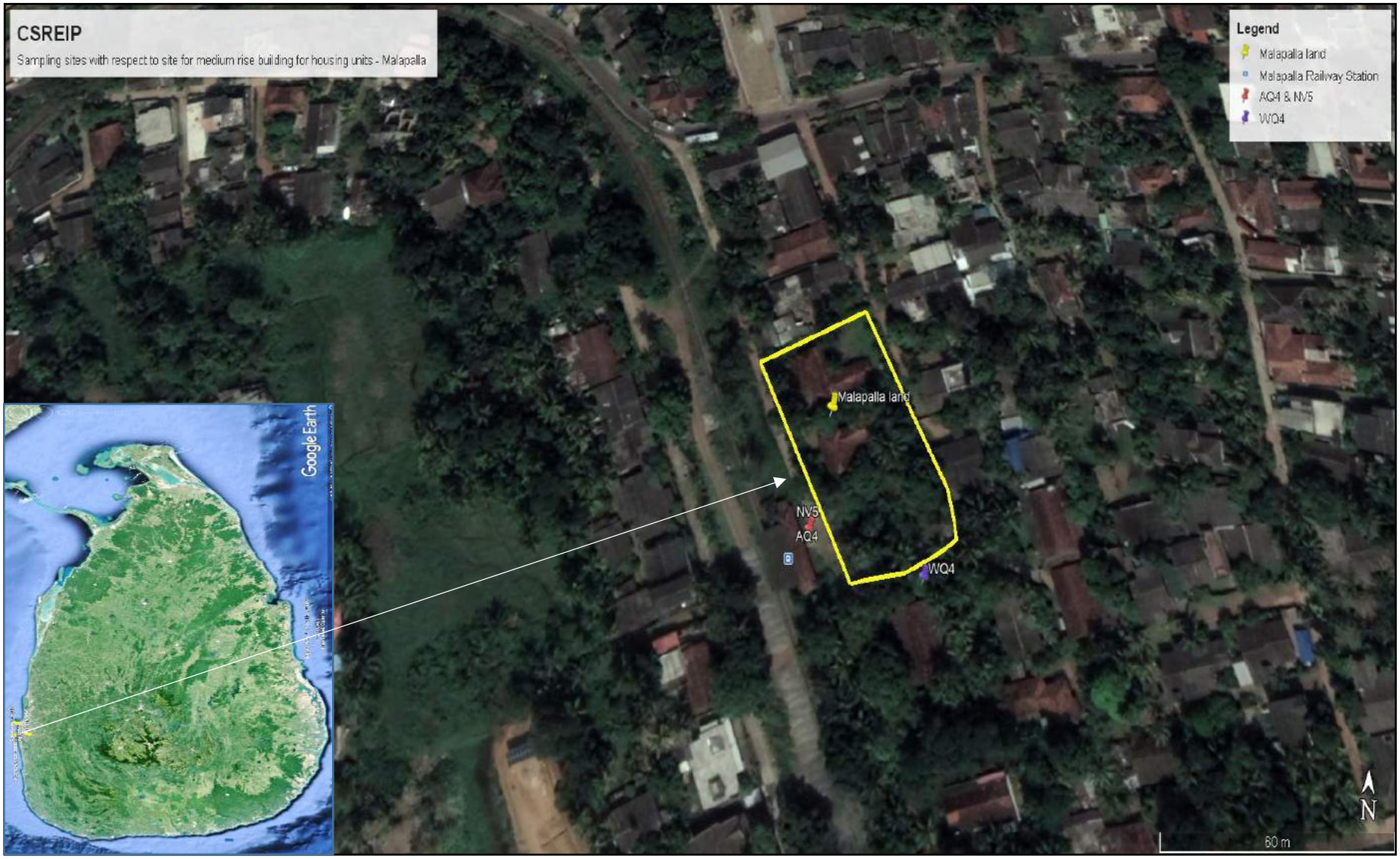
ANNEX 9: SAMPLING LOCATIONS WITH RESPECT TO OH&TCC SITE



ANNEX 10: SAMPLING LOCATIONS WITH RESPECT TO SCHOOL LANE UNDERPASS SITE

ANNEX 11: SAMPLING LOCATIONS WITH RESPECT TO NEW WORKSHOP AND TRAINING WING

ANNEX 12: SAMPLING LOCATIONS WITH RESPECT TO THE SITE FOR MEDIUM RISE BUILDING FOR HOUSING UNITS



ANNEX 13: LIST OF FLORA AND FAUNA OBSERVED WITHIN THE SITES FOR THE SIX SUBCOMPONENTS OF REIP

RS: Road sides, RL: Railway Land, HG: Home Gardens

List of Flora

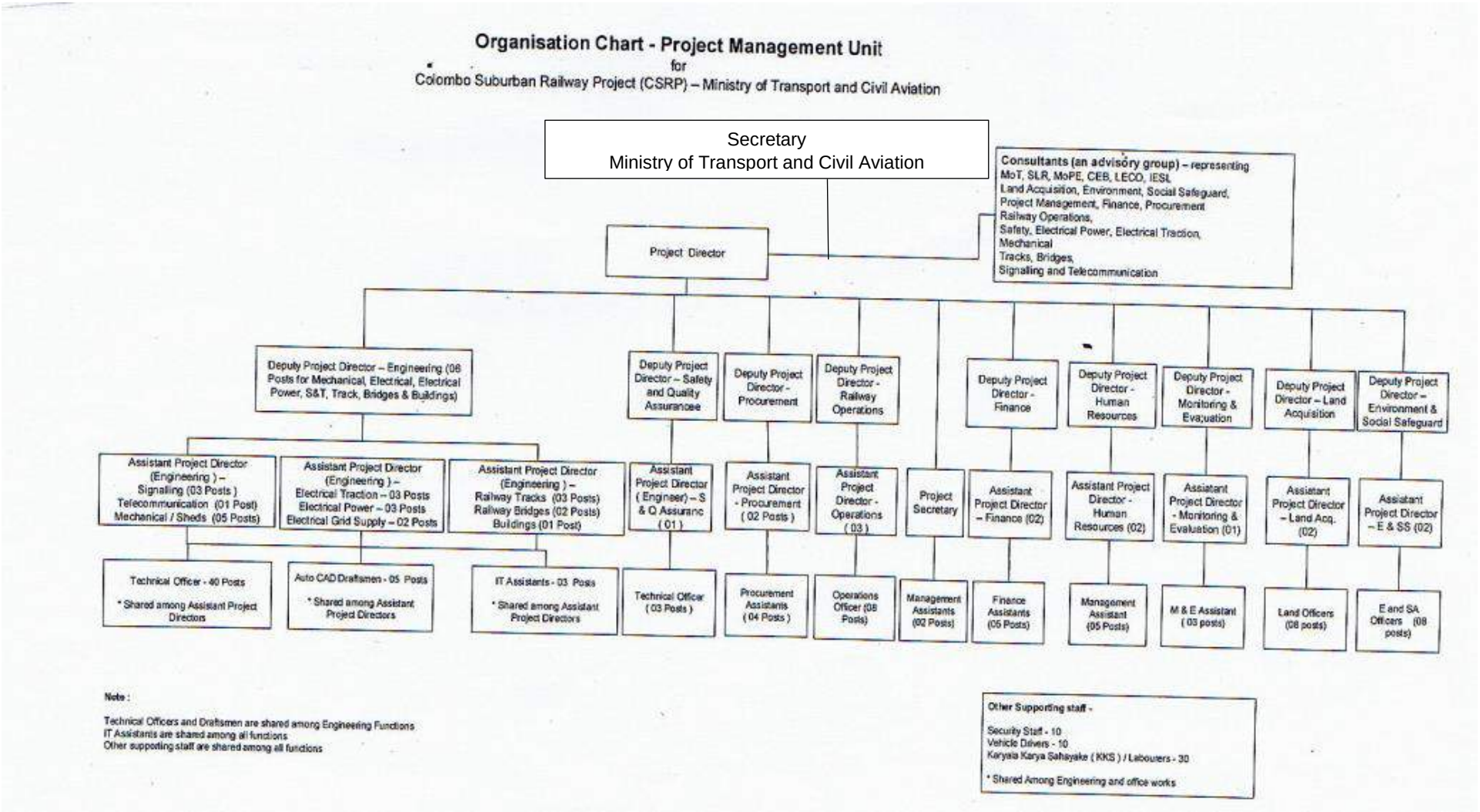
Family	Species	English name	Distribution status	Conservation status (Red list 2012)	RS	RL	HG
Amaranthaceae	*Amaranthus viridis*		Native	LC			
Amaranthaceae	*Aerva lanata*		Native	LC			
Anacardiaceae	*Mangifera indica*	Mango	Exotic				X
	Spondias dulcis	June Pulm	Exotic				X
Annonaceae	*Anona muricata*	Soursop	Exotic				X
	Polyalthia longifolia	False asoka	Exotic				X
Arecaceae	*Cocos nucifera*	Coconut	Exotic		X	X	X
Caricaceae	*Carica papaya*	Papaw	Exotic			X	X
Combretaceae	*Terminalia catappa*	Sri Lankan Almond tree	Exotic			X	X
Compositae	*Tridax procumbens*		Exotic			X	X
Elaeocarpaceae	*Elaeocarpus serratus*	Ceylon olive	Native	LC		X	
Euphorbiaceae	*Ricinus communis*	Castor bean tree					X
	Acalypha indica	Indian Acalypha	Native	LC			X
	Codiaeum variegatum	Garden croton	Exotic			X	X
Fabaceae	*Peltophorum pterocarpum*	Yellow flame tree			X	X	
	Mimosa pudica	Touch-me-not	Exotic		X	X	X
Lamiaceae	*Tectona grandis*	Teak	Exotic		X	X	
Lauraceae	*Persea americana*	Avacardo	Exotic				X
Moraceae	*Artocarpus heterophyllus*	Jack	Exotic		X	X	X
	Ficus religiosa	Bo	Exotic		X	X	
	Ficus racemosa	Attikka	Native		X	X	
Moringaceae	*Moringa oleifera*	Drumstick tree	Exotic				X
Musacaeae	*Musa x paradisiaca*		Exotic			X	X

Family	Species	English name	Distribution status	Conservation status (Red list 2012)	RS	RL	HG
Myrtaceae	*Syzygium caryophyllatum*		Native	LC	X		
Polygonaceae	*Antigonon leptopus*		Exotic				X
Rosaceae	*Rosa spp.*	Rose	Exotic				X
Rutaceae	*Aegle marmelos*	Stone Apple	Native			X	X
	Murraya koenigii	Curry tree	Native	LC			X
Rubiaceae	*Morinda citrifolia*	Great Morinda	Native			X	
Sapindaceae	*Nephelium lappaceum*		Exotic				X

List of Fauna

Family	Species	English name	Conservation status (Red list 2012)	RS	RL	HG
Mammals						
Felidae	*Felis Domesticus*	Cat		X	X	X
Canidae	*Canis familiaris*	Dog		X	X	X
Muridae	*Ratuus ratuus*	Rat		X	X	X
Birds						
Corvidae	*Corvus splendens*	Common crow	LC	X	X	x
Timalidae	*Turdoides affinis*	Yellow billed babbler	LC	X		x
Ramphastidae	*Megalaima zeylanica*	Brown Headed Barbet			X	
Sturnidae	*Acridotheres tristis*	Common Myna	LC	X	X	X
Sylviidae	*Orthotomus sutorius*	Common Tailorbirds	LC		X	
Butterflies						
Lyceanidae	*Eurema hecabe simulate*	The common grass yellow				X
Pieridae	*Appias albina daranda*	The Common Albatross	LC		X	X
Pieridae	*Leptosia nina*	Psyche			X	X

ANNEX 14: PROPOSED INSTITUTIONAL STRUCTURE



ANNEX 15: ENVIRONMENTAL MANAGEMENT PLAN

Environmental Management Plan for Six Subcomponents of Railway Efficiency Improvement Project

1. This Environmental Management Plan (EMP) is the summarized matrix of all impacts and mitigation measures discussed under chapter five “Screening of environmental impacts and mitigation measures” of the Initial Environmental Examination (IEER) developed for six subcomponents involving civil works of Railway Efficiency Improvement Project (REIP). The six subcomponents are:

- Operation Headquarter and Train Control Centre
- Passenger facility at Colombo Fort and Maradana
- Underpass for roadway and pedestrians
- New workshop and stores (Ratmalana SLR premises)
- New training wing including auditorium and hostel (Ratmalana SLR premises)
- Housing units for relocation at Malapalla

2. The EMP presents the impacts and mitigation measures on activity basis occurring at project design and pre-construction; construction and operation stages. Therefore, the EMP is presented as three sections, and the environmental management and monitoring parameters are discussed within each section.

3. The overall responsibility of executing the EMP is held with Project Management Unit (PMU). Design, pre-construction and operational level mitigation measures will be directly implemented by PMU and/ or relevant divisions of SLR. Mitigation measures during construction stage will be implemented by appointed contractor/s under direct supervision of a Project Implementing Consultant (PIC) and PMU.

4. This EMP shall be included in the Bid Documents and bidders are advised to carefully consider the EMP requirements stated under item 2.0 “Construction phase” when preparing the bid and pricing the items of work. As a thumb of rule it is suggested that the contractor allows 5~10% of construction cost as cost to execute environmental compliance requirements. The prescriptions detailed in the EMP are mandatory in nature and also contractually binding. Therefore, the appointed contractor shall submit a Site-Specific Environmental Management Action Plan (SSEMAP) based on the impacts/ issues and mitigation measures listed in this EMP for a given site and relevant activities.

5. Contractor/s shall submit a draft SSEMAP at the time of mobilization and the PIC shall make sure that the reviewed and approved SSEMAP is available with the contractor at the time of land preparation activities commence at a given site. The approved SSEMAP shall equally be applicable to sub-contractors including nominated sub-contractors if any.

6. Appointed contractor/s shall submit monthly progress reports on status of compliance with SSEMAP to PIC. The PIC with environment/ social staff of PMU shall conduct site visits to verify the level of compliance by contractor/s. PIC shall advise/ instruct the contractor on additional mitigation measures in cases of the used mitigation measures is not effective or in cases of any non-compliance.

7. In case the Contractor/s or sub-contractor/s fails to implement the SSEMAP recommendations after informing in writing, the PIC shall take whatever actions it is deemed necessary to ensure that the SSEMAP is properly implemented. If the contractor or his sub-contractor/s still fails to comply with SSEMAP requirements, the PIC may levy a penalty based on the level of non-compliance, cost incurred to rectify the damages caused by such negligence and/ or recover the cost from contractor's payments.

8. The Contractor/s through an appointed Environment/Social Officer (EO) shall implement the mitigation measures at site. The EO shall also keep records of daily activities related to SSEMAP. The contractor/s shall submit a monthly progress report on environment compliance to PIC and assist the PIC and PMU in any other tasks related to environment compliance.

1.0 Preconstruction Stage

Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation measures**	**Location/s**	**Implementation / Supervision**	**Cost of mitigation**	**Acceptable limits/ (Baseline)**	**Performance monitoring indicator**	**Target**
Selection of project subcomponent sites	Displacement of the two families presently occupying the two quarters at Malapalla site. Inconveniences to the community living around the Malapalla site, which include disruption to the services provided by Grama Niladhari – Malapalla west, Development Officer and the sub-post office.	Constructing two new quarters near Makumbura Multi Modal Transport centre which is less than 200m away from the existing two quarters and shifting these two families. The office of Grama Niladhari, Development Officer and sub-post office shall be shifted to the old railway station at Malapalla. Host community shall have access to any additional services/ facilities that would be provided to the resettled households.	Malapalla site selected to develop the medium rise building for housing units	SLR and PMU for REIP		The two new quarters shall be family quarters with facilities of electricity, water and telecommunication. Basic facilities utilized d by the host community.	Construction of the two new quarters at Makumbura Multi Modal Transport centre. Shifting of the three offices before demolition of the building.	Shift and settle the two families at new quarters before demolition of the entwining quarters. Uninterrupted service provided by Grama Niladhari, Development officer and sub-post office.
Detail design	Stability of building structure against winds with high velocity and ground vibration.	Designs shall be done confirming to building design and construction standards of UDA and recommendations from NBRO.	OH&TCC, Malapalla site for medium rise building for housing units	Design consultants/ PMU for REIP	Design cost	Design and construction standards of UDA.	Design standards included in to designs.	Design of a sustainable building structure.
Detail design	High energy usage in buildings and failures of electrical supplies.	Designs to incorporate use of energy efficient lighting, use of natural lighting, use of renewal energy (i.e. photovoltaic	OH&TCC, Colombo Fort and Maradana stations,	Design consultants/ PMU for REIP	Design cost	Standards set under building codes of International	Availability of energy saving measures in design.	Reduce the energy foot print.

Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation measures**	**Location/s**	**Implementation / Supervision**	**Cost of mitigation**	**Acceptable limits/ (Baseline)**	**Performance monitoring indicator**	**Target**
		generation) and other green building concepts. Designing of backup power systems.	New workshop (Ratmalana), New Training Wing (Ratmalana), Malapalla site for medium rise building for housing units			Energy Agency.		
Detail design	Vibration damages to the building, Nuisance caused to occupants of building.	Selection of material suitable to withstand vibrations and act as noise insulators for the vibration and noise caused by movement of aeroplanes and construction technologies suitable under such conditions.	New Training Wing (Ratmalana)	Design consultants/ PMU for REIP	Design cost	Standard for Type 2 structures under CEA interim vibration levels.	Availability of material selection, noise insulators in design	A building that would resist noise and vibration.
Detail design	Contamination and pollution of soil, surface and ground water resources by spillage or discharge of sewage, wash/ grey water, chemicals, oils and grease.	Design in house sewage treatment plants or connect to common sewer lines. Design septic and soakage pits with adequate capacity. Design oil and grease separators. Design spill retention enclosure within fuel, oil and grease stores.	OH&TCC, Malapalla site for medium rise building for housing units. Colombo Fort, Maradana stations. Workshop and Training wing. Workshop and Training wing.	Design consultants/ PMU for REIP	Design cost	National Environmental (Protection and Quality) Regulations No. 1 of 1990	Availability of in-house sewage treatment plants in design. Adequacy of the capsity of septic tanks and soakage pits designed. Availability of spill arrestors in design.	No untreated waste water, or any spillage of chemicals, oils discharge in to soil or water sources.

Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation measures**	**Location/s**	**Implementation / Supervision**	**Cost of mitigation**	**Acceptable limits/ (Baseline)**	**Performance monitoring indicator**	**Target**
Detail design	Efficient and safe loading/ unloading goods from trains. Accessibility to these two stations. Movement of differently able persons within the stations.	Designs to include features providing efficient and safe loading/ unloading goods from trains. Improvement to accessibility shall be considered in the designs. Designs for platform decks, staircases, other accesses and toilets shall consider the movement of differently able persons.	Colombo Fort and Maradana stations	Design consultants/ PMU for REIP	Design cost	NA	Availability of efficient and safe loading/ unloading; improved accessibility features and features for movement of differently able persons in the designs	Efficient and safe operation of goods, higher number of commuters entering the stations including differently abled persons and their movements.
Detail design	Stagnation of storm water causing floods, inconvenience to public and breeding of mosquitoes.	Drainage structure across the School Lane bridge and road finish levels under the bridge shall be designed in compliance with the recommendations as stipulated in the hydrology study report conducted for the School Lane bridge.	Underpass for roadway and pedestrians at School Lane	Design consultants/ PMU for REIP	Design cost	NA	Availability of storm water drainage system in design.	No storm water stagnation a site.
Detail design	High rising structures causing issues to movement of aeroplanes.	Vertical height of the building to be restricted to 9 m maximum.	New Training Wing (Ratmalana)	Design consultants/ PMU for REIP	Design cost	Guidelines given by Civil Aviation Authority	Vertical height of building shall not exceed 9 m.	Safe movement of aeroplanes over the building.
Detail design	Interruption to movement of trains, pedestrians and vehicles due to	Programming the demolition and reconstruction of underpass bridge section by section.	Underpass for roadway and pedestrians at School Lane	PMU for REIP	Design cost	NA	Availability of demolition and reconstruction program	No stoppage of train movements.

Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation measures**	**Location/s**	**Implementation / Supervision**	**Cost of mitigation**	**Acceptable limits/ (Baseline)**	**Performance monitoring indicator**	**Target**
	scheduled demolition of underpass bridge	Considering different construction methods that reduce time of construction. SLR to identify alternate routes with assistance from CMC and Maradana traffic police and notice the public.						
Detail design	Availability of sanitary facilities and wash areas, dining areas, rest areas and parking lots	Incorporate wash areas, sanitary facilities, dining areas, rest areas and parking lots with adequate capsity in to designs.	OH&TCC Colombo Fort, Maradana stations. Workshop and Training wing. Workshop.	Design consultants/ PMU for REIP	Design cost	NA	Availability of wash areas, sanitary facilities, dining areas, rest areas and parking lots with adequate capsity in designs.	NA
	Availability of living space, accumulation of cooking fumes, smoke and smells generated in each housing unit and parking lots. Interruption to the series provided by Grama Niladhari, Development Officer, sub-post office, CBO office and community hall.	Provide 500 ft^2 space in each housing unit, Provide centralized exhaust system, parking lots with adequate capsity in to designs. Provide office space for Grama Niladhari, Development Officer, sub-post office, CBO office and community hall in the design of building.	Malapalla site for medium rise building for housing units.	Design consultants/ PMU for REIP	Design cost	Provide 500 ft^2 space in each housing unit	Availability of adequate space in each housing unit.	Provide optimum living conditions.

Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	Mitigation measures	Location/s	Implementation / Supervision	Cost of mitigation	Acceptable limits/ (Baseline)	Performance monitoring indicator	Target
Detail design	Hazardous conditions due to fires and other emergencies.	Inclusion of smoke detectors, fire alarms, fire extinguishers, fire hydrants, emergency exists and gathering points in each building design.	OH&TCC Workshop and Training wing. Malapalla site for medium rise building for housing units.	Design consultants/ PMU for REIP	Design cost	Design and construction standards of UDA.	Availability of smoke detectors, fire alarms, fire extinguishers, fire hydrants, emergency exists and gathering points in design.	Immediate evacuation and safety of occupants.
Detail design	Accidental risks for pedestrian movement	Inclusion of guard rails, lamps for lighting and advance warning signboards	Underpass for roadway and pedestrians at School Lane	Detail design	Design cost	NA	Availability of guard rails, lamps for lighting and advance warning signboards	No accidents to pedestrians during operational stage.

CBO = community-based organization; CEA = Central Environmental Authority; CMC = Colombo Municipal Council; LA = Local Authority; NA = not applicable; OH&TCC = Operational Headquarter and Train Control Center; NBRO = National Building Research Organization; UDA = Urban Development Authority.

2.0 Construction Stage

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	Mitigation Measures	Locations	Implementation / Supervision	Cost of Mitigation	Acceptable Limits/ (Baseline)	Performance Monitoring Indicator (with Frequency)	Target
Site preparation – demolition of structures, removal of trees and vegetation	Generation of dust and high noise levels during demolition of structures and cutting of trees	Fencing off the construction site with corrugated sheets and/ or tarpaulin which shall also act as dust and noise barriers.	OH&TCC Stations at Colombo Fort and Maradana. Workshop and Training wing.	Contractor/ PIC and PMU	Construction cost	No public complaints due to dust and noise nuisance.	No. of water bowser trips done per day (weekly). No. of temporary noise barriers	Avoid nuisance to public due to site preparation works.

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation Measures**	**Locations**	**Implementation / Supervision**	**Cost of Mitigation**	**Acceptable Limits/ (Baseline)**	**Performance Monitoring Indicator (with Frequency)**	**Target**
	using chain saws which shall be a nuisance to public and surrounding communities. Blockage of existing drainage. Removal of Asbestos waste.	Maintenance of these barriers until end of construction. Clearing and demolition woks shall only be conducted during day time (6.00 a.m. to 9.00 p.m. – as defined with respect to Regulation 4 of National Environment (Noise Control) Regulations No. 1 of 1996). Use of tyre baths and washing at exits of each construction site to avoid mud and debris carried out in tyres of dump trucks. Damping the exposed ground surfaces. Avoid stockpiling disposed material or construction of temporary structure in any way that would block existing drainage. Scheduling any excavation activity during the dry weather periods. Disposal of all demolition debris to approved sites by LA and CEA.	Underpass for roadway and pedestrians at School Lane. Malapalla site for medium rise building for housing units.				constructed at site (Monthly). Incidences of blockage of drainage due to washed off debris (weekly). Asbestos debris at site (weekly)	

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation Measures**	**Locations**	**Implementation / Supervision**	**Cost of Mitigation**	**Acceptable Limits/ (Baseline)**	**Performance Monitoring Indicator (with Frequency)**	**Target**
		All waste shall be transported using well covered dump trucks, and they shall not be allowed to be over loaded. All Asbestos material shall be collected without breakage and they shall be transported to incinerators authorized to incinerate such material.						
Site preparation - removal of trees, vegetation	Loss of trees and ground vegetation shall lead to loss of habitat for these faunal species.	All trees marked for removal shall be cut and removed through the State Timber Corporation. Planting ornamental plants and trees (native species) within the construction sites as part of landscaping (replanting 3 trees for each tree removed).	OH&TCC Workshop and Training wing. Malapalla site for medium rise building for housing units.	Contractor/ PIC and PMU	Construction cost	(Number of trees at site and number of trees marked for removal.)	Number of trees removed from site (weekly).	Minimize removal of existing vegetation.
Site preparation – shifting of utility supply lines	Interruptions to utility services such as electricity, water, telecommunication and sewage during shifting shall cause	Shifting of utility supply lines shall be done in consultation and under the supervision of the relevant service provider. Public shall be noticed in advance of scheduled interruptions. Trained	Underpass for roadway and pedestrians at School Lane. Malapalla site for medium rise building for housing units.	Contractor/ PIC and PMU	Construction cost	NA	Shifting and reinstating of utility supply lines.	Minimum disturbance to public due to shifting of utility supply lines.

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	Mitigation Measures	Locations	Implementation / Supervision	Cost of Mitigation	Acceptable Limits/ (Baseline)	Performance Monitoring Indicator (with Frequency)	Target
	inconvenience to public	operators and workers shall be deployed for these shifting and shifting shall be completed within the minimum possible time.						
Movement of heavy trucks transporting disposal and construction material	Spillage of transport material on to road surface. Traffic congestions caused by these vehicles. Safety of other road users.	All haulage material shall not be over loaded and shall be properly covered. A transport management plan shall be developed, approved and implemented. Instructing drivers of these vehicles to obey road rules and to drive in a responsible manner.	All routes used by these vehicles to reach material extraction sites, disposal sites from construction sites and back.	Contractor/ PIC, PMU and local traffic police	Construction cost	NA	Incidences of any overloading and transporting material without covering (daily).	Avoid any spillage of hauling material.
Road closure and demolition of existing underpass bridge	Interruption to vehicle, pedestrian and train movements.	Implement the section by section construction program. Provide advance guidance notices to vehicular traffic to use alternate routes. Maintain the pedestrian overpass across rail tracks at Maradana.	Underpass for roadway and pedestrians at School Lane.	Contractor/ PIC, PMU and local traffic police	Construction cost	NA	Incidences of stoppage of train movements (weekly).	Avoid interruption to train movement.
Use of high beam lighting (flood lights) at construction sites	Affect the feeding and roosting habits of faunal species around these sites	Focusing all flood lights only in to the construction sites.	Underpass for roadway and pedestrians at School Lane. Malapalla site for medium	Contractor/ PIC and PMU	Construction cost	NA	Incidences of flood lights focused outside the construction site (weekly).	Avoid disturbance to fauna.

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation Measures**	**Locations**	**Implementation / Supervision**	**Cost of Mitigation**	**Acceptable Limits/ (Baseline)**	**Performance Monitoring Indicator (with Frequency)**	**Target**
	during night hours.		rise building for housing units.					
	Nuisance to public and communities living around construction sites.	Focusing all flood lights only in to the construction sites.		Contractor/ PIC and PMU		NA	Incidences of flood lights focused outside the construction site (weekly).	Avoid disturbance to public and community.
Extraction of construction material	Depletion of natural resources. Depletion of air quality due to dust, Depletion of water quality due to washed off sediments and chemicals. Nuisance to public due to high noise and vibration levels. Failure of cut slopes causing hazard to public and workers. Excavated pits causing hazards to public and animals.	Use of existing quarry and borrow sites operating with GS&MB, CEA and local authority approvals and licences. Selecting new quarry and borrow sites with adequate capacity, quality and at least 100 m away from water bodies, settlements and habitats. Obtaining approval from CEA (EPL), GS&MB (Mining licence), local authority (trade licence) and operating according to conditions. Blasting activities to be limited within the time given in the mining licence. Maintain a vegetation belt or any artificial barrier around the sites. Executing site restoration plans soon	Material extraction sites	Contractor/ PIC, PMU, GS&MB, CEA and LA	Construction cost	Noise and vibration levels to remain below the stipulated limits as indicated in GS&MB mining licence and EPL from CEA	No. of public complaints on dust, noise and vibration (monthly), Availability of permits and licences (annually), Incidences of excavating material beyond limits (boundary) marked on ground (monthly)	Operate all quarry and borrow sites as per requirements stipulated in permits and licences (approvals)

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation Measures**	**Locations**	**Implementation / Supervision**	**Cost of Mitigation**	**Acceptable Limits/ (Baseline)**	**Performance Monitoring Indicator (with Frequency)**	**Target**
		after the use of quarry or borrow sites. Filling and levelling of excavated pits with disposed material from construction sites.						
Storage of construction material including chemicals and fuel for machinery	Wash off of soil and sand shall cause blockage of drainage paths and silted on nearby lands. Spilled oil/ fuel cause pollution of soil and water sources. Generation of dust causing air pollution. Fumes and vapour cause respiratory problems to workers.	Soil and sand shall be stockpiled avoiding any wash offs from rain in to nearby lands and water ways (Placing of soil bags around all stockpiles, covering them). Construction of spill retention structure around stores of fuel and oil. All material stocks shall duly be covered against wind. Construct proper storage facilities for chemicals, cement and paints including adequate ventilation.	OH&TCC Workshop and Training wing. Underpass for roadway and pedestrians at School Lane. Malapalla site for medium rise building for housing units.	Contractor/ PIC and PMU	Construction cost	(As presented in table 4.10 a, b of the IEER). (As presented in table 4.4 of the IEER).	Incidences of washed off soil and in to nearby lands, drains (weekly). Incidences of spillage of oil/ fuel outside the spill retention structure (weekly). Incidences of complaints due to dust (weekly).	Avoid water and air pollution from discharges, spills, dust and fumes.
Producing and use of concrete	Contamination of soil and water sources from disposed concrete, concrete sludge and concrete	Wash water of concrete mixer trucks and any disposed concrete slurry shall be collected on to a drying bed lined with thick gauge polythene or tarpaulin constructed within the	OH&TCC Stations at Colombo Fort and Maradana. Workshop and Training wing.	Contractor/ PIC and PMU	Construction cost	(As presented in table 4.10 a, b of the IEER).	Incidences of concrete waste, sludge and wash water discharged outside collecting area (weekly).	Avoid water and air pollution.

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation Measures**	**Locations**	**Implementation / Supervision**	**Cost of Mitigation**	**Acceptable Limits/ (Baseline)**	**Performance Monitoring Indicator (with Frequency)**	**Target**
	mixer truck wash water.	construction site. Once dried it shall be transported and disposed at an authorized disposal site or could be crushed and reused for paving, landscaping works or as filling material in utility trenches at the site. Used cement bags shall be stored and disposed only for recycling or incineration and shall not be burned at site. Use of cement silos and bulk cement transporters instead of cement bags.	Underpass for roadway and pedestrians at School Lane. Malapalla site for medium rise building for housing units.				Incidences of burning used cement bags (weekly).	
Operation of noise generating equipment at site	Nuisance to the public and fauna. Developing difficulties in hearing under prolonged exposure to high noise levels.	Construction and maintaining the barrier around the construction sites. Use exhaust mufflers in all construction vehicles and equipment. All heavy machinery shall be maintained in good operable conditions at all time during construction period. Additional fittings fitted to construction equipment that	At all construction sites	Contractor/ PIC and PMU	Construction cost	Maximum permissible noise levels stipulated under NEA/ (As presented in table 4.7 a, b, c of IEER)	No. of temporary noise barriers at site (monthly). No. of public complaints due to noise (weekly).	Minimum disturbance public and fauna.

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	Mitigation Measures	Locations	Implementation / Supervision	Cost of Mitigation	Acceptable Limits/ (Baseline)	Performance Monitoring Indicator (with Frequency)	Target
		generates high and irritating noises shall not be permitted at site. Workers working with pneumatic tools shall be instructed to wear ear plugs during working hours. Activities that generate noise levels beyond 50 dB(A) shall not be carried out during days with religious importance or at night (as defined in Regulation 4 of National Environment (Noise Control) Regulations No. 1 of 1996). Written concurrence shall be taken from PIC and CEA for any night time construction activity/ies. No impact type pile driving shall be used at site. If more than one pile driver is to be used they shall operate tandemly. Contractor informs the public on any noisy operations that would be carried out close to settlements with details						

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation Measures**	**Locations**	**Implementation / Supervision**	**Cost of Mitigation**	**Acceptable Limits/ (Baseline)**	**Performance Monitoring Indicator (with Frequency)**	**Target**
		of timing and duration of such operations.						
Operation of vibration generating equipment at site	Nuisance to the public and fauna. Damages to nearby structures due to vibration.	Conduct a property condition survey of all structures within an area having a radius of 80 m from each construction site. Occupants of such any structure identified as weak shall be vacated from the structure and provided with alternate accommodation and any subsistence assistance (if required) during construction period. The structure shall be properly investigated for any structural failures before handing over back to the occupants. Obtain a third-party insurance to cover any unforeseen damage to property. Compensate for any damages caused to structure due to vibration or repair the damages. Phasing off the demolition, earth moving and ground	At all construction sites	Contractor/ PIC and PMU	Construction cost	Maximum permissible interim vibration levels stipulated by CEA/ (As presented in table 4.8 a, b, c of IEER)	No. of temporary noise barriers at site (monthly). No. of public complaints due to noise (weekly).	Minimum disturbance public and fauna.

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	Mitigation Measures	Locations	Implementation / Supervision	Cost of Mitigation	Acceptable Limits/ (Baseline)	Performance Monitoring Indicator (with Frequency)	Target
		impacting operations so as not to occur in same period of time. Activities that create vibration shall be avoided during at night time (21.00 – 6.00 hours as defined in Regulation 4 of National Environment (Noise Control) Regulations No. 1 of 1996).						
Operation of machinery and vehicles at site	Emissions from these machinery and vehicles causing air pollution that would cause respiratory affects to public and fauna.	Open ground (soil surface) of all sites shall be sprayed with water and kept dampen to arrest any dust emission. Vehicle movements within construction sites shall be minimized and the speed allowed within the sites shall not exceed 10-15 kmph. All heavy equipment and machinery shall be in full compliance with the national environmental air emissions fuel and vehicle standards. All vehicles delivering material to construction sites shall duly cover the	At all construction sites.	Contractor/ PIC and PMU.	Construction cost.	Ambient air quality standards stipulated under NEA / (As presented in table 4.4 of IEER).	No. of public complaints due to noise (weekly).	Minimum disturbance to public and fauna.

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation Measures**	**Locations**	**Implementation / Supervision**	**Cost of Mitigation**	**Acceptable Limits/ (Baseline)**	**Performance Monitoring Indicator (with Frequency)**	**Target**
	Accidents and injuries to workers and public.	material when transporting. Maintain the tyre bath and tyre washing areas at each exit of the construction sites. Barricading and restricting any public from moving in to construction sites. Placing of warning signboards around all construction sites. Regular briefing and training of machine, vehicle operators and workers on safety precautions, and their responsibilities for the safety of themselves and others. Providing workers with PPE and enforcing strict supervision so that the PPEs are used during all working hours. Arranging for the provision of first aid facilities, readily available trained paramedical personnel, and emergency transport to the nearest hospital.	At all construction sites.	Contractor/ PIC and PMU.	Construction cost.	NA	No. of accidents and near misses at site (weekly).	No serious or fatal accidents at site.

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation Measures**	**Locations**	**Implementation / Supervision**	**Cost of Mitigation**	**Acceptable Limits/ (Baseline)**	**Performance Monitoring Indicator (with Frequency)**	**Target**
		Arranging for regular safety checks of vehicles (checks include operation of reverse horns, head and tail lights, braking including parking brakes) and material. Provision of hazard warning signals around construction sites and directing vehicle and pedestrian traffic away from work sites.						
Establishment and maintenance of labour accommodations	Inferior living facilities (labour accommodations) shall affect physical and mental health of worker force. Possibilities of fire hazards Attraction of domestic and stray animals in to labour accommodations and it's neighbourhood and become pests in adjacent residential areas.	Separate labour accommodation shall be provided for male and female labourers including separate toilet and washing facilities in adequate numbers. Separate cooking and dining areas shall be constructed in these labour accommodations. A first aid room shall also be provided in each site. Billets shall be provided with adequate ventilation facilities and mosquito nets. Billets shall be constructed avoiding any rain or	At all labour accommodation sites	Contractor/ PIC and PMU.	Construction cost.	Not applicable	Availability of food and waste bins with adequate numbers, Availability of adequate supply of drinking water and wash water, Availability of adequate toilet and other sanitary facilities, Appearance of breeding sites of mosquito and flies (monthly).	No domestic animals within labour accommodations. Adequate water and sanitary facilities available to all worker force, No diseases spread by mosquitoes and flies.

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation Measures**	**Locations**	**Implementation / Supervision**	**Cost of Mitigation**	**Acceptable Limits/ (Baseline)**	**Performance Monitoring Indicator (with Frequency)**	**Target**
	Stagnation of storm water leading to breeding of mosquitoes and flies. Grey water discharged from labour accommodations shall pollute soil and water sources.	storm water entering in to the billets. All electrical wiring inside these billets shall be well insulated and occupants shall only use plug sockets to get electricity for their utensils. Fire extinguishers shall be kept in all worker billets, cooking and dining areas. Adequate food and other waste collecting bins with cover lids shall be provided. Collection and disposal of waste only at locations approved by local authority. Burying food waste in pits cut within labour accommodation area or giving away the food and other degradable waste to collectors of such degradable waste. Include proper storm water drainage facilities and all water stagnant locations will be levelled to allow free flow of storm water.						

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation Measures**	**Locations**	**Implementation / Supervision**	**Cost of Mitigation**	**Acceptable Limits/ (Baseline)**	**Performance Monitoring Indicator (with Frequency)**	**Target**
		Waste water including wash water from labour accommodations shall only be discharged outside the construction only after filtering. Regular cleaning of septic tanks to avoid any situation of blockages and overflow of septic tanks and sewerage systems.				NA NA	Incidences of storm water stagnation (weekly). Incidences of overflow of septic tanks (weekly).	No accumulation of storm water at labour accommodation. No overflows and blockages in septic tanks.
Activities of labour force	Issues on daily wages of labourers. Inferior working conditions shall affect physical and mental health of worker force. Possibility of increase in spread of STD including spread of HIV/ AIDS in the area. Development of unwanted business such as illicit liquor, Conflicts between communities	Payments for male and female labourers shall comply with the principle of equal wages for equal work done. Continuous labour supervision with frequent awareness programs on health and safety, to avoid activities that would create conflicts with surrounding communities and public. Counselling of worker force. Regular tool box meeting focusing on safe operations, personal safety, safety of others and keeping an environmentally	At all construction sites.	Contractor/ PIC and PMU.	Construction cost.	NA	No. of public complaints due to unaccepted labour behaviour, Appearance of breeding sites of mosquito and flies (monthly)	No public complaints due to labour activities, No spread of vector borne diseases.

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation Measures**	**Locations**	**Implementation / Supervision**	**Cost of Mitigation**	**Acceptable Limits/ (Baseline)**	**Performance Monitoring Indicator (with Frequency)**	**Target**
	and migrant labour. Creating health problems including breeding of mosquitoes and flies. Accidents to workers.	friendly work environment. Provide health and first aid facilities to worker force. Provide adequate drinking and wash water facilities. Arranging for the provision of first aid facilities, readily available trained paramedical personnel, and emergency transport to the nearest hospital.	At all construction sites.	Contractor/ PIC and PMU.	Construction cost.	NA	No. of accidents and near misses at site (weekly).	No serious or fatal accidents at site.
Site clearing/ cleaning (at end of construction) and landscaping	Heaped up construction waste at site will create a negative impression on the scenic beauty of these new constructions and also attract “scrap collectors”. Remaining ground in these lands if kept exposed to wind and storm	All scrap material and construction waste shall be disposed to an authorized collector/s of such waste. Conduct shade tree and ornamental plant planting as part of landscaping works. Planting of trees shall be done at the rate of at least 3 trees planted for each tree removed.	At all construction sites. OH&TCC, Workshop and training wing at Ratmalana, Malapalla site for medium rise building for housing units.	Contractor/ PIC and PMU. Contractor/ PIC and PMU.	Construction cost. Construction cost.	NA NA	No scrap material or construction waste at site (once at end of construction). Planting of shade trees and ornamental plants (once at end of construction).	No waste left over at site. Improve the scenic beauty of the completed sites.

Construction Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	Mitigation Measures	Locations	Implementation / Supervision	Cost of Mitigation	Acceptable Limits/ (Baseline)	Performance Monitoring Indicator (with Frequency)	Target
	events it will create dust and get eroded during rains. Direct exposure of open land to solar energy shall heat the ground surface causing localized convective currents.							

Note:
EPL: Environmental Protection Licence; GS&MB: Geological Survey and Mines Bureau; LA: Local Authority; PPE: Personal Protection Equipment; STD: Sexually Transmitted Diseases

3.0 Operational Stage

Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	Mitigation measures	Locations	Implementation/ Supervision	Cost of mitigation	Baseline/ Acceptable limits	Performance monitoring indicator	Target
Management of solid waste including food and kitchen waste; domestic waste (paper, plastic and glass) and electrical/ electronic waste.	Accumulation of waste (solid and liquid) and sewage. Food and kitchen waste disposed around the project sites shall attract stray animals and birds. An	Users and occupants of all the facilities shall be advised to do waste separation at the source itself. All facilities shall have a dedicated central solid waste collecting site which shall have separate facilities (collectors)	OH&TCC, Workshop and training wing at Ratmalana, Malapalla site for medium rise building for housing units.	PMU or designated division of SLR, LA.	Operation and maintenance cost.	NA	No waste shall be observed outside waste collecting areas (weekly).	To have a clean environment.

Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation measures**	**Locations**	**Implementation/ Supervision**	**Cost of mitigation**	**Baseline/ Acceptable limits**	**Performance monitoring indicator**	**Target**
Management of liquid waste including grey water and sewage	unpleasant smell shall be emitted from partially decomposed food and kitchen waste. Such heaps of garbage shall also be breeding and feeding grounds for vectors of diseases such as mosquitoes, flies, rats and common mongoose. Garbage around the site shall also have a negative visual appearance.	to dispose the segregated waste. This waste shall be handed over to authorised collectors on a regular basis.						
	The electrical/ electronic waste generated include Mercury which is considered as a hazardous heavy metal. Break down of wash water/ grey water filter systems shall cause spills or	Electrical/ electronic waste of OH&TCC, Workshop and training wing shall only be disposed by SLR to authorised collectors for recycling. Electrical/ electronic waste Malapalla housing site shall only be disposed to collectors from LA.	OH&TCC, Workshop and training wing at Ratmalana, Malapalla site for medium rise building for housing units.	PMU or designated division of SLR, LA.	Operation and maintenance cost.	NA	No waste shall be observed outside waste collecting areas (weekly).	To have a clean environment.

Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation measures**	**Locations**	**Implementation/ Supervision**	**Cost of mitigation**	**Baseline/ Acceptable limits**	**Performance monitoring indicator**	**Target**
	direct discharge of waste water in to ground or existing drainage network. Break down of the central sewage treatment system shall cause a nuisance to users and occupants of these facilities.	All wash water/grey water filter systems installed at each facility shall be cleaned and maintained on a regular basis. Any malfunction of the system shall be attended within the shortest possible time to avoid any over spills and direct discharges. The central sewage systems installed at each site shall also be maintained on a regular basis (especially servicing of pumps and motors).	OH&TCC, Workshop and training wing at Ratmalana, Malapalla site for medium rise building for housing units.	PMU or designated division of SLR, LA.	Operation and maintenance cost.	NA	Incidences of system failures (weekly).	Continuous operation of central sewage systems.
Repair and maintenance work of DMUs at Ratmalana workshop	Mechanical waste from removed metal parts and filters from DMCs. Discharging of grey water including oil and grease.	SLR shall send the mechanical waste (metal parts) collected at Ratmalana workshop to steel manufacturing facilities for recycling and used filters to authorized collectors.	Workshop at Ratmalana.	PMU or designated division of SLR	Operation and maintenance cost	NA	Incidences of scrap material observed outside collecting area (weekly).	To have a clean environment.

Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation measures**	**Locations**	**Implementation/ Supervision**	**Cost of mitigation**	**Baseline/ Acceptable limits**	**Performance monitoring indicator**	**Target**
		Maintenance of the oil and grease separator plant.					Incidences of system failures (weekly).	Continuous operation of oil and grease separator plant.
Maintenance and inspections on safety arrangements	Hazards to occupants due to accidental fires and smoke.	All firefighting systems in these facilities shall be regularly inspected by trained staff and shall be maintained. All occupants in these buildings shall be given training on safe evacuation in case of a fire or gas leak hazard.	OH&TCC, Workshop and training wing at Ratmalana, Malapalla site for medium rise building for housing units.	PMU or designated division of SLR, LA.	Operation and maintenance cost.	NA	Maintenance of firefighting equipment (once in six months).	No fires or operational failures of escalators/ lifts at sites.
	Accidents to users of escalators/ lifts due to malfunctions of machines.	All emergency exits shall be maintained so that there would be no obstacles for movement in any emergency. All escalators/ lifts at OH&TCC and Malapalla site shall be regularly inspected for their operation, serviced and maintained by trained staff.				NA	Maintenance of escalators/ lifts equipment (once in six months).	
	Accidents to pedestrians at School Lane underpass.	Maintenance of guard railings and lamps.	Underpass for roadway and pedestrians at School Lane.	PMU or designated division of SLR, Police	Operation and maintenance cost	NA	Incidences of pedestrian accidents (once in six months).	

Activity	Issues/ Impacts and Mitigation Measures					Monitoring		
	Issues/ Impacts	**Mitigation measures**	**Locations**	**Implementation/ Supervision**	**Cost of mitigation**	**Baseline/ Acceptable limits**	**Performance monitoring indicator**	**Target**
		Maintenance of warning and directional sign boards fixed at School Lane underpass to advice pedestrians to use the foot walks and not to move on the road.						

ANNEX 16: ENVIRONMENTAL MONITORING PLAN

Environmental Monitoring Plan for six subcomponents of Railway Efficiency Improvement Project

1. This matrix includes the Environmental Monitoring Plan (EMoP) for the six subcomponents of Railway Efficiency Improvement Project (REIP) which are:

- Operation Headquarter and Train Control Centre (OH&TCC)
- Passenger facility at Colombo Fort and Maradana
- Underpass for roadway and pedestrians
- New workshop and stores (Ratmalana SLR premises)
- New training wing (Ratmalana SLR premises)
- Housing units for relocation at Malapalla

2. The matrix includes environment quality parameters that should be monitored during pre-construction, construction and operational stages of the project. Measurements of environmental parameters at pre-construction and construction stages shall be a responsibility of the appointed contractor. Therefore, the contractors is expected to cost for environmental monitoring during pre-construction and construction stages when bidding for the project.

3. Appointed contractor shall produce environment parameter monitoring reports including the results of the measurements and submit to Project Implementing Consultant (PIC) to be included in their respective environment reports.

4. Measurement of environment parameters during operational stage of each subcomponent shall be the responsibility of the Project Management Unit (PMU) or designated division of Sri Lanka Railways (SLR).

Environmental Component	Project Stage	Parameters to be Monitored	Locations and No. of Samples	Frequency	Standards and Measurement Methods	Approximate Rate Per Sample (Rs.)	Implementation and Supervision
Air quality	Pre-Construction	SPM, PM10, PM2.5, NO_2, SO_2, CO, CO_2	OH&TCC (1 Nos.) School Lane underpass (1 Nos.) Workshop and stores (1 Nos.) New training wing (1 Nos.) Housing units for relocation (1 Nos.)	Once during dry weather and once during wet weather conditions	NAAQS under NEA	50,000	Implemented by the Contractor under supervision of PIC and PMU
	Construction	SPM, PM10, PM2.5, NO_2, SO_2, CO, CO_2	OH&TCC (1 Nos.) School Lane underpass (1 Nos.) Workshop and stores (1 Nos.) New training wing (1 Nos.) Housing units for relocation (1 Nos.)	On complain basis or semi-annually if no complain is received during a period of 6 months	NAAQS under NEA	50,000	Implemented by the Contractor under supervision of PIC and PMU
	Operational	SPM, PM10, PM2.5, NO_2, SO_2, CO, CO_2	OH&TCC (1 Nos.) School Lane underpass (1 Nos.) Workshop and stores (1 Nos.) New training wing (1 Nos.) Housing units for relocation (1 Nos.)	On complain basis		50,000	Implemented by PMU or designated division of SLR
Noise	Pre-Construction	Residual noise level (dB) Background noise level L90 dB (A)	OH&TCC (1 Nos.) School Lane underpass (1 Nos.) Workshop and stores (1 Nos.) New training wing (1 Nos.) Housing units for relocation (1 Nos.)	Once during dry weather and once during wet weather conditions	NENCR under NEA	35,000	Implemented by the Contractor under supervision of PIC and PMU
	Construction	Residual noise level (dB) Background noise level L90 dB (A)	OH&TCC (1 Nos.) School Lane underpass (1 Nos.) Workshop and stores (1 Nos.) New training wing (1 Nos.) Housing units for relocation (1 Nos.)	On complain basis or semi-annually if no complain is received during a period of 6 months		35,000	Implemented by the Contractor under supervision of PIC and PMU
	Operational	Residual noise level (dB)	OH&TCC (1 Nos.) School Lane underpass (1 Nos.) Workshop and stores (1 Nos.) New training wing (1 Nos.) Housing units for relocation (1 Nos.)	On complain basis		35,000	Implemented by PMU or designated division of SLR

Environmental Component	Project Stage	Parameters to be Monitored	Locations and No. of Samples	Frequency	Standards and Measurement Methods	Approximate Rate Per Sample (Rs.)	Implementation and Supervision
		Background noise level L90 dB (A)					
Vibration	Pre-Construction	Vibration in Peak Particle Velocity (mm/sec)	OH&TCC (1 Nos.) School Lane underpass (1 Nos.) Workshop and stores (1 Nos.) New training wing (1 Nos.) Housing units for relocation (1 Nos.)	Once during dry weather and once during wet weather conditions	Maximum permissible interim vibration levels stipulated by CEA, using methods under International Organisation for Standardisation –ISO 4966:1990E	30,000	Implemented by the Contractor under supervision of PIC and PMU
	Construction	Vibration in Peak Particle Velocity (mm/sec)	OH&TCC (1 Nos.) School Lane underpass (1 Nos.) Workshop and stores (1 Nos.) New training wing (1 Nos.) Housing units for relocation (1 Nos.)	On complain basis or semi-annually if no complain is received during a period of 6 months		30,000	Implemented by the Contractor under supervision of PIC and PMU
	Operational	Vibration in Peak Particle Velocity (mm/sec)	OH&TCC (1 Nos.) School Lane underpass (1 Nos.) Workshop and stores (1 Nos.) New training wing (1 Nos.) Housing units for relocation (1 Nos.)	On complain basis		30,000	Implemented by PMU or designated division of SLR
Water quality	Pre-Construction	Temperature, pH, EC, DO, BOD5, TSS, TDS, Turbidity, Salinity, oil and grease, Total Coliform Count	OH&TCC (1 Nos.) School Lane underpass (1 Nos.) Workshop and stores (1 Nos.) New training wing (1 Nos.) Housing units for relocation (1 Nos.)	Once during dry weather and once during wet weather conditions	National Environmental (Protection and Quality) Regulations No. 1 of 1990	10,000	Implemented by the Contractor under supervision of PIC and PMU
	Construction	Temperature, pH, EC, DO, BOD5, TSS, TDS, Turbidity,	OH&TCC (1 Nos.) School Lane underpass (1 Nos.) Workshop and stores (1 Nos.) New training wing (1 Nos.) Housing units for relocation (1 Nos.)	On complain basis or semi-annually if no complain is received during		10,000	Implemented by the Contractor under supervision of PIC and PMU

Environmental Component	Project Stage	Parameters to be Monitored	Locations and No. of Samples	Frequency	Standards and Measurement Methods	Approximate Rate Per Sample (Rs.)	Implementation and Supervision
		Salinity, oil and grease, Total Coliform Count		a period of 6 months			
	Operational	Temperature, pH, EC, DO, BOD5, TSS, TDS, Turbidity, Salinity, oil and grease, Total Coliform Count	OH&TCC (1 Nos.) School Lane underpass (1 Nos.) Workshop and stores (1 Nos.) New training wing (1 Nos.) Housing units for relocation (1 Nos.)	On complain basis		10,000	Implemented by PMU or designated division of SLR

Note: BOD5 = Biological Oxygen Demand (5-day); CO = carbon monoxide; CO_2: carbon dioxide; DO: dissolved oxygen; EC: electrical conductivity; NO_2: nitrogen dioxide; PM_{10}: particulate matter <10μm; $PM_{2.5}$ = particulate matter <2.5μm; SO_2: sulphur dioxide; SPM: suspended particulate matter; TDS: total dissolved solids; TSS: total suspended olids.

ANNEX 17: SUMMARY OF ONE-ON-ONE INTERVIEWS

Person Interviewed	Key Views Expressed
Ratmalana Workshop and Training Centre	
Workshop Forman	• Additional Workshop for DMU repair will be essential because the existing workshops do not have adequate capacity to maintenance and repair new DMUs. • Safety and first aid facilities should be provided in the new workshop.
Neighbouring Dweller Woman	• The workshop premises is closed with high wall therefore activities in the workshop does not affect the outside dwellers.
Malapalla site for housing units	
Mrs. H.M.M. Kumarihami	• This is a very peaceful community and we hope the settlers at this site shall oblige to this condition, • resettling families displaced only within Maharagama DSD, • Proper monitoring and reconciliation program for resettled community, • Provide new pathway from site to newly constructed Makumbura multimodal transport centre.
Mrs. K.M. Saroja	• Need to keep peaceful environment at Malapalla village forever therefor don't bring outsiders from far places, • No objection to resettle neighboring affected peoples surrounding Malapalla village.
OH&TCC Site, Colombo Fort and Maradana Stations and School Lane Underpass	
Rev. Denagama Indrasiri Head Priest, Mallikaramaya Temple, Dematagoda	The development program is very good; Keep the program in the right direction. Do not affect in any way as to public. Should take care of the safety of pedestrians and vehicles during working hours. Safety signboards should be displayed during construction and operational period.
Rev. Katudora Sumana threo Head Priest, Sri Naiwasaramaya Temple, Dematagoda	For some heavy rainy days this road gets flooded. Then it is difficult to travel under the bridge. Tall vehicles like bus and lorry cannot use this road. Its good if the road gets more widen. Canal should be reconstructed. If that road is maintained by the municipal council, it is better to join and do the development.
Rav. Ignatiais Head Priest, St. Anthony's church Dematagoda	It's better, to construct this road in to two lane status. During the construction period there should be an alternative solution for the people who uses this road.
Rev. Massid Thaewa Mohammad Head Priest, Mosque, No 29', School Lane, Dematagoda	There are numbers of schools around here. Most of the children use this road. Accidents happen frequently. This road should be widened. It is better to install lighting system inside the underpass.
Mr. Ajith Munaweera Businessmen J4, Jayantha Weerasekara Mw, Colombo 10.	During heavy rainy days, bridge gets flooded. The canal adjoining the bridge also gets blocked. Most of the school children use this road. School Van go St. Anthony's, St. Jones, St. Mathives and Sahira use this road. From morning 7.00 a.m. to 9.00 a.m. and during afternoon from 12 noon to 2.00 p.m. this road gets blocked due to traffic congestion. This bridge should be widened, and foot walk should be constructed.
Mr. Aleam Businessmen	Height of the bridge is not enough. Nearly around 3000 to 4000 vehicles are moving here daily. Frequently accidents are occurring this road.

Person Interviewed	Key Views Expressed
211/A12, Jumma Masheed road, Maligawatta	
Mr. Kamal Businessmen, 66/3 Kuraisana Mawatha	It is better to reconstruct the school lane bridge. Existing foot bridge should be demolishing because people put garbage there. When the bridge is constructing there should be an alternative road for the people to use.
Mr. R. Samarasinghe Road user, J7, Jayantha Weerasekara Mw, Colombo 10	Bridge should be widened. It is more useful if the road can be constructing to two lanes. Bridge gets Flooded for a heavy rain and canal gets blocked. Then the canal gets overflow and road also gets flooded. This happens only for a heavy rain. After 12 hours, water gets drain out. No accidents happen. The main problem is that vehicles cannot use both sides. School vans also using this road. Under the bridge, there should be a lighting system.
Mr. Wimalasiri Road user 37/51 School lane Dematagoda.	During the rainy season, water collects under the bridge. There is a lighting system inside the underpass, but it is not functioning.
Mr.Ganesh Moorthy Road user 37/52 School lane Dematagoda.	This bridge is very old so, it should be demolished and rebuild again. Canal should be reconstructing to drain out the water.
Mr. Nohomed Ismail Road user School lane, Dematagoda	This road is very busy. Most of the school children use this road. During school time many vehicles move; it amounts to 2000-3000. Road should be more widened when constructing. There are two hospitals here, namely central hospital and Kidney hospital. Most of the patients use this road. Due to the negligence of the drivers, accidents are happing.
Ms.Pushpa Kollonnage Resident 37/54 School lane Dematagoda.	This is a one-way road. It is good if this road developed into two-lane status. Most of the school children use this road.
Mr.M.K.M.Irfan Resident No.252, Wennawatta, Wellampitiya	Even for a slight rain road gets inundated This road should be construct, because the road gets flooded over 2 feet. At that time, it is difficult to travel from that area. Two Three wheelers cannot be move here and there. This road should be constructed with two lanes for vehicles to move easily.

ANNEX 18: SCANNED COPY OF INFORMATION FLYER

IC/4/2018.

Ministry of Transport & Civil Aviation
Sri Lanka Railways

Colombo Suburban Railway Project (ADB funded)

"Develop Sri Lanka Railways in the Colombo Suburban Region to ensure its contribution to the National Transport System for next 20 years"

Project Director
Colombo Suburban Railway Project
No. 217, Cotta Road
Borella
Colombo 08

Telephone: 076 8005500 / 011 – 2674354
Fax : 011 – 2674354
e-mail : info@csrp.lk

Colombo Suburban Railway Project

Introduction

This project is implemented under the Ministry of Transport & Civil Aviation together with Sri Lanka Railways with a loan facility of the Asian Development Bank (ADB). At present, the Pre-feasibility Study Phase of the project has been completed and the Detailed Design Phase has commenced.

Project Benefits

- Provision of efficient and cost effective service to the Railway Passengers, thereby making Railway, the most frequently used transport mode
- Solving the issue of the traffic congestion by reducing daily inflow of vehicles to Colombo and its suburbs.
- Reduction of traffic congestion and accidents at rail - road crossings.
- Provision of necessary facilities by modernizing railway stations for passengers, especially for women and differently able persons.
- Ensuring the safety of railway passengers.

Preparation of Project Plans

- Prepare detailed design to construct new parallel lines and to rehabilitate existing lines by focusing on Railway Electrification and accordingly determining the new Railway Right of Way.
- Conducting the Socio-Economic Survey of all the residents living in the project affected areas, especially in the Railway Reservation.
- To Prepare Resettlement Plans for resettling and payment of compensation for the people in project affected persons
- To conduct an Environmental Impact Assessment within the project affected area.

Land Acquisition Procedure

Construction of parallel railway lines and rehabilitation of existing railway lines will be planned to implement them within the limit of existing Railway Reservations and the acquisition of Private Lands will be done only in unavoidable circumstances.

Payment of Compensation and Resettlement procedure

- All steps will be taken to provide a higher living standard to the 'Project Affected Persons' who are occupying the railway reservations or lands belonging to the Sri Lanka Railway, by settling them in new housing units with permanent ownership status or paying them better compensations, instead.
- Action will be taken to extend compensation to the relevant parties for the damage to the properties, based on the market value of such properties. (Repl. cost)
- The necessary arrangements will be made by taking into account, the views and suggestions of the 'Project Affected Persons' in implementing the resettlement process.

Project Activities

- Rehabilitation of existing railway lines, construction of new parallel lines, modernization of associated railway stations, will be done under the project focusing on future railway electrification. Major interventions undertaken will be,
  1. Kelani Valley line from Maradana to Padukka will be constructed as a double line and existing single line from Padukka to Avissawella will be rehabilitated.
  2. Main line from Maradana to Ragama will be developed as four tracks, Ragama to Veyangoda will be constructed as three tracks and the existing double line from Veyangoda to Rambukkana will be rehabilitated.
  3. Coastal line from Colombo Fort to Panadura will be developed as three lines section and existing double line from Panadura to Kaluthara will be rehabilitated.
  4. Development of the double line of the Puttalam line from Ragama to Negambo and to connect the railway line with the Bandaranayake International Airport, Katunayake

- During the process of preparation of Detailed Designs for above major developments, the under mentioned short term project activities will be implemented by the project as short term subprojects.
  1. Installation of Railway Telecommunication System
  2. Construction of three or four additional new railway lines between Maradana and Maligawaththa
  3. Installation of New Ticketing and Seat Reservation System
  4. Development of the Railway Technical Training Center at Rathmalana as a center for New Railway Technology which will be introduced by the project.

Map of Project Area