Environmental and Social Impact Assesment
Construction of Kandy Multimodal Transport Terminal

On behalf of the **Project Management Unit**
Kandy Multimodal Transport Terminal Project
Ministry of Urban Development, Water Supply and Housing Facilities
December 2019

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Annexes

ABBREVIATIONS

BS	British Standards
CEA	Central Environmental Authority
dB	Decibel
EMS	Environmental Method Statement
EMP	Environmental Management Plans
EPL	Environmental Protection License
ESHS	Environmental, Social, Health & Safety
GHG	Greenhouse Gases
ICTAD	Institute for Construction Training and Development
ID	Irrigation Department
DS	Divisional Secretory
ILO	International Labour Organization
IFC	International Finance Corporation
ICTAD	Institute for Construction Training and Development
KMC	Kandy Municipal Council
LA	Local Authorities
NBRO	National Building Research Organization
NEA	National Environmental Act
PCR	Physical Cultural Resources
PHI	Public Health Inspector
PMU	Project Management Unit
RDA	Road Development Authority
SC	Supervision Consultant
SCDP	Strategic Cities Development Project
SLRD	Sri Lanka Railway Department
SLTB	Sri Lanka Transport Board
UDA	Urban Development Authority
VET	Vehicle Emission Test
WB	World Bank

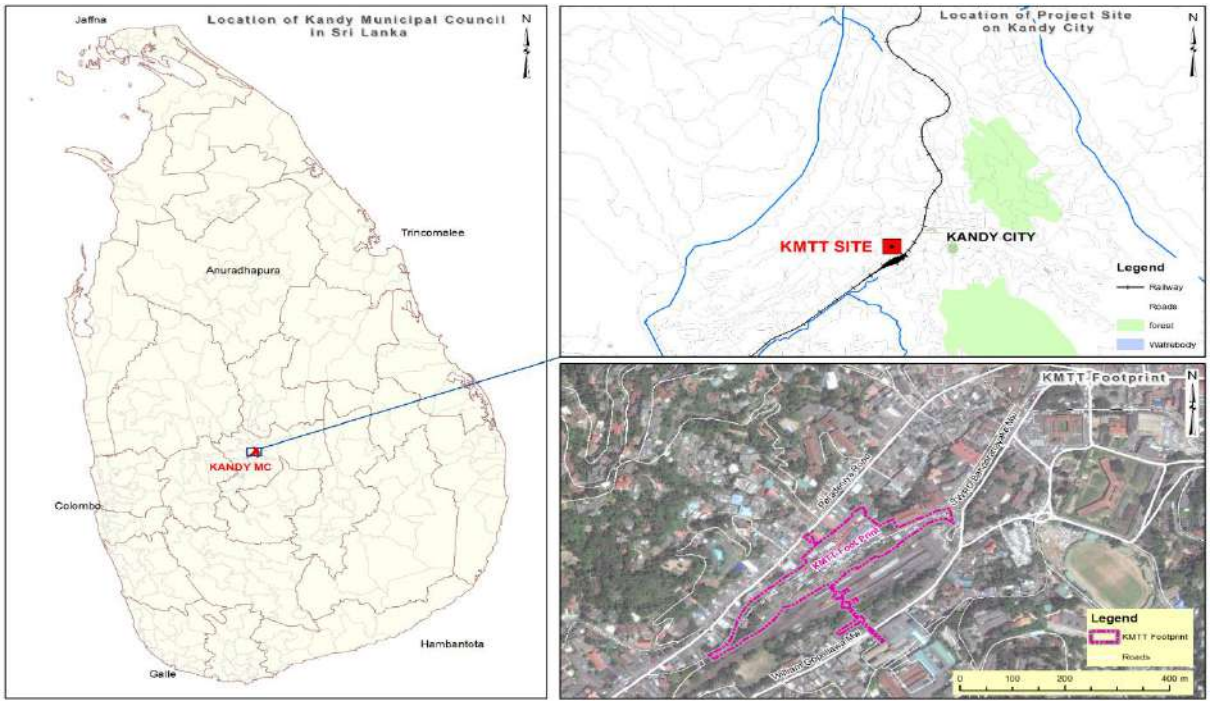
A. ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT REPORT

1. Project Identification

Project title	Kandy Multimodal Transport Terminal (KMTT) Project
Project Proponent	Ministry of Urban Development, Water Supply and Housing Facilities, Sri Lanka.

2. Project Location

Location (*relative to the nearest town, highway*)	The proposed location is the present Good Shed Bus Stand which is at the heart of the Kandy city, The proposed project will encompass the following lands (*note the ownership of these lands is provided in section 4 under projet description*); • Current Good Shed bus stand • Railway land adjacent the Good Shed Bus stand • Railway lands adjacent to William Gopallawa Mw. • S.W R D Bandaranayake Mw. Which belongs to the Road Development Authority (RDA) and a small portion of private lands. Map of project site provided in **Annexure 1**



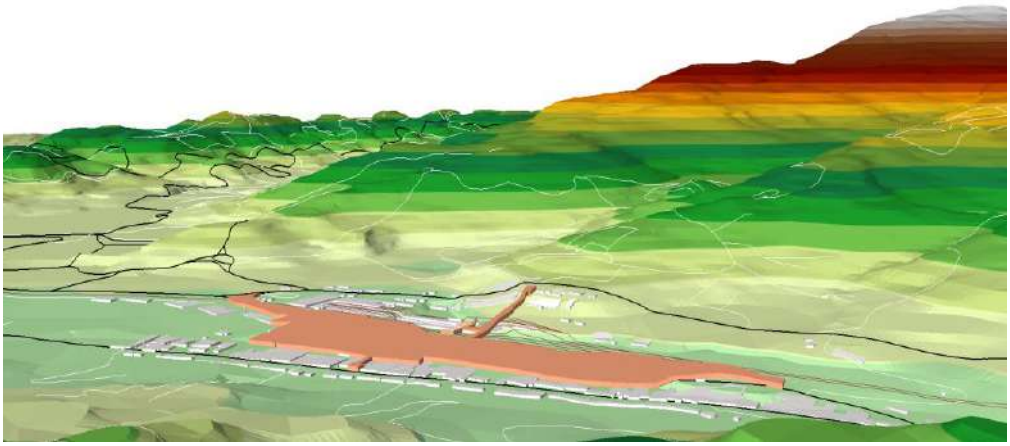
Definition of Project Area *(The geographical extent of the project & areas affected during construction)*	The Proposed site is situated in a highly urbanized area of the Kandy City. Geographically it is at a lower elevation surrounded by hilly areas. The total area of approx. 8 acres encompassing the project site and 500m from the perimeter of the site can be defined as direct impact area. Map of project site and areas affected during construction period is provided in **Annex 01 & 02**   ***Figure 2.1**: Present view of the natural landscape of proposed area for KMTT*  ***Figure 2.2**: View of Good shed Bus Stand and the Railway land from Kandy-Peradeniya Road*

	 ***Figure 2.3:*** *View of the Existing Bus Stand at Good Shed*  ***Figure 2.4:*** *view of the entrance to the Good Shed area at Post Office end*
Adjacent land and features	The site is situated in a highly built up area of the city of Kandy adjacent to the Kandy Railway Station, Kandy old and new Post Offices, Several Government

	offices and Commercial Buildings. The site is situated in a lower elevation between Peradeniya road and William Gopallawa Mawatha. The site borders a number of dilapidated and structurally unsound private buildings along its northern boundary. In addition, there are number of utility structures located in the proposed project area, such as electricity lines, water supply, storm water drains, telephone lines etc. Meda Ela, the main drainage canal that runs through the city, traverses underneath the site as a tunnel and opens up at the end of the project site.

3. Project Justification

Need for the project (*What problem is the project going to solve*)	Traffic congestion in Kandy is one of the biggest problems the city faces and one of the worst situations in all of urban Sri Lanka. The following are the key issues resulting from traffic congestion requiring priority initiatives in most of the cities. • Long travel time during peak hours • Restricted mobility • Road congestion caused by passenger buses • Air quality deterioration in cities There are three main bus terminals located within the Kandy city centre (i) The Goodshed bus stand which is the main bus terminal for Kandy city (ii) clock tower and (iii) Torrington. These bus terminals are spatially scattered and cause severe traffic congestion in the city. Traffic congestion due to improper public transport management has been identified as one of the major issues by the studies carried out by the Road Development Authority in 2011 and with the formulation of SCDP it has been agreed to study the issue in detail in order to find a permanent solution to traffic issue in the city and to invest on the priority infrastructure under the SCDP. As such, a comprehensive study has been carried out by a team of international and local consultants resulting in the preparation of the Public Transport and Traffic Management Strategies for the Kandy city. The Kandy Multimodal Transport Terminal (KMTT) is one of the major initiatives proposed under the recommended strategies as well as included in the Transport Master Plan developed for Kandy aiming to systematically address some of the key public transport issues in the city. The project aims to improve the quality of transport in Kandy, through the creation of modern infrastructure, improve service delivery, integrate transport modes and improve the operating environment for public transport in the city and outstations. Kandy Multimodal Transport Terminal (KMTT) aims to provide a facility to eliminate the spatial scattering of the three existing bus terminals in Kandy by bringing all existing terminal operations under one roof at Good-shed area of approximately eight acres of land adjacent to the Kandy railway station. The proposed terminal facility spans over three levels and links the old Peradeniya road and William Gopollawa Mawatha through an underground passageway and an overhead Skywalk with access to the bus and railway terminals.

As per the findings of the study and the proposed priority interventions, public transport system in the Kandy city will be re-arranged with expected significant impacts on relieving traffic congestion in the city. Following table indicates the reduction in traffic volumes that is expected from the improved bus operations along with the establishment of KMTT

Table 3.1 Comparison of bus trips before and after the operation of KMTT

	No. of Scheduled Trips (24 Hrs)		Percentage	
	Before	**After**	**Before**	**After**
By Pass Routes	**22**	**202**	**0.3%**	**3%**
Terminating at KMTT	**6856**	**2,611**	**97%**	**37%**
Touch-n-Go	**161**	4,226	**2.7%**	**60%**
Via KMTT (Touch –n-Go) and Terminating at Katugastota		**117**		
Via KMTT (Touch-n-Go) and Terminating at Digana		**356**		
Via KMTT (Touch-n-Go) and Terminating at Gatambe		**81**		
Via KMTT (Touch-n-Go) Beyond Peripheral Terminals		**3,425**		
KMTT (Touch-n -go) for orbital Routes		**247**		
Grand Total	**7,039**	**7,039**		

The KMTT is expected to handle 330,000 passenger per day with over 5,000 bus trips from 193 bus routes mainly from 3 bus corridors. There will be IT based Terminal Operating system to control bus operation as well as to provide information to passengers with respect to time of departure and location of the respective bus bay. Out of 5,000 bus trips around 2100 bus trips will be terminated at the KMTT at boarding and alighting bays. All other bus trips will be converted to touch and go trips where they will have bays to unload and pick passengers and continue the trip to destination of the trip or back to origin. By this rearrangement, demand for bus parking within city will be reduced and parking requirement will be provided within KMTT.

With the construction of KMTT, there will be 13 bays for Touch and Go, 32 bays for boarding and alighting, 2 bays for maintenance and 94 bus parking slots for bus operation. In addition to that there will be 40 parking slots for three wheelers and 40

	parking slots for private cars. All these structures will be accommodated within the land area designated for the KMTT where the current Good Sheds Bus Stand (GSBS) is. All passenger facilities required in a terminal including public conveniences-washrooms & toilets, rest rooms, seating areas, ticketing areas, public information displays and centers, food and shopping outlets are provided within the terminal building. There will be facilities for accommodating bus crew and staff of the bus operation and management of KMTT. There will be stair cases, electrical escalators and lifts for the passenger movement between different floors of the terminal building including facilities for disable persons. An elevated pedestrian connection between Peradeniya road and William Gopallawa Mawatha through KMTT over the railway premises is proposed to be constructed. This will provide easy and short distance movement between two roads and the KMTT & Railway station. This pedestrian sky walkway will be connected to second floor level of the KMTT terminal building where passenger concourse is located. Further, due to reduction in traffic congestion in the city, city air quality (which is one of the worst in Sri Lanka) improvements could also be expected. In order to document and analyze the impact on urban air quality resulting from the proposed KMTT project a baseline air quality assessment has been conducted by SCDP and will be repeated and documented throughout KMTT construction and operational phases. A parking space will be allocated for the mobile air quality unit (vehicle) to be parked enabling the Central Environmental Authority (CEA) to operate an air quality monitoring unit. It is expected that air quality trend monitoring within the Kandy city in the future will formally take place in collaboration with the CEA. For this, (i) an operational fund will be provided and managed by the CEA and an (ii) MOU will have to be arranged between CEA and the KMTT operator.
Purpose of the project (*what is going to be achieved by carrying out the project*)	Public Transport Traffic Management Plan (PTTM), capture the synergies of the integrated interventions in public transport, and improve the overall operating environment for bus services in Kandy. Some of the key objectives of the KMTT project are: 1. To streamline public transport operations in Kandy to make it commuter friendly 2. To integrate with Railway and other modes for better accessibility, connectivity and seamless transfer for first and last mile connectivity. 3. To increase efficiency of public transport service delivery by using modern techniques 4. To create modern facilities for commuter convenience 5. To develop infrastructure that caters the current and future demands 6. To improve overall attractiveness of public transport so as to induce modal shift from use of private vehicles, 7. Well defined roles for supplementary modes of transportation 8. To decongest the city center gradually in order to meet future expansion and demographic growth of the Kandy city. In summary, the improved public transport facilities provided through the KMTT will address the traffic congestion issues in Kandy in order to transform it to a livable heritage city.

Alternatives considered

(*different ways to meet the project need and achieve the project purpose*)

The KMTT project is one key component of an overall transport strategy and masterplan for the Kandy City. The Kandy City Transport Strategy has been prepared with extensive study of vehicular/commuter movement and has considered combinations of interventions using different modes of transport before finally recommending the list of priority investments for decongesting the city.

The Good Sheds Bus terminal (GSBT) plays a central role in the public transport to/from/within Kandy city and plays a pivotal role in transport connectivity between regional hubs in the central region. The GSBT is strategically located in the centre of the Kandy city and lies adjacent to the Kandy railway station. The need for a modern bus terminal in the city that can serve a large commuter population with better transport management and one that can be easily connected with other key modes of transport such as the railway has been considered a priotiy need.

The SCDP has selected the Good Shed area, as the most suitable location for the KMTT primarily because of its strategic position within Kandy city limits and the non-availability of any other land with required space and convenient access to commuters. The other reasons for selecting Good Shed area is its proximity to the railway station, availability of sufficient crown land vested in transport authorities that could be utilized for the establishment of KMTT and other locational advantages of the Goodshed Bus Station (GSBS), including proximity to Kandy city centre, to schools, hospitals, government offices and other establishments visited by large numbers of employees and members of the public. The whole intension of the effort is to integrate the different public transport modes with modern facilities to make the people's life easy. Further, the Goodshed has been recommended under the strategic transport planning study for the proposed KMTT.

In order to ensure uninterrupted bus service operations to the public during the period when the Good Shed Bus Stand is being developed into the Multimodal Transport Terminal, temporary bus terminal facilities have beeen established at alternate locations such as the Kandy Clock Tower Terminal and touch and go, boarding and alighting bays at SWRD Bandaranayake Mawatha and Yatinuwara Veediya. These have been established under separate contracts under the on-going World Bank funded Strategic Cities Develoment Project (SCDP) with necessary due diligence on safeguards. Therefore, bus passengers will not be inconvenienced due to construction of the KMTT buildings.

Meda Ela is a natural canal (which serves as the main stormwater drainage for Kandy city) that flows underneath the current GSBT. The canal is required to be diverted to facilitate the construction of the KMTT. The diversion will be contained within the proposed KMTT land and hence no footprint is anticipated outside the project's direct impact zone. On the diversion of the canal, the following alternatives have been considered.

Table 4.3 Alternative options considered for Meda Ela diversion

Option	**Design Constrains**	**Design Advantage**	**Recommendation**
Existing Trace	a) Interference with KMTT Structure	a. Canal already existing	Not Recommend

		b) Difficulty in Dealing with Water during Construction c) Access and facilities for Maintenance not possible d) Shoring and coffer dams etc. needed e) Periphery Drain will need to cross the KMTT building		
	Deviate the section up to the Bo-Tree	a) Section of the Canal beyond the Bo tree needs extensive Construction work. b) Difficulty in Dealing with Water during Construction c) Shoring and coffer dams etc. needed	a. Part of the existing canal can be used b. No need any deep cut channel or supporting structure adjoining the buildings close to Singer building	**Recommend**
	Deviate entire Canal strip on the South of the KMTT foot print	a) Deviated Canal will interfere with the Under passes of the proposed KMTT Structure b) Shoring and coffer dams etc. needed c. Periphery Drain will need to cross the KMTT building c) More risk at the section close to existing buildings at southern boundary	a) Canal will be at a lower elevation and therefore less excavation but need supportive	Not Recommend
	Deviate entire canal on to the North of the	a) Excess Excavation and sheet piling for the canal section	a) Ease of Construction b) Periphery drain can be	Not Recommended

	KMTT foot print		connected to the Main Canal easily due to its close proximity	

4. Project Description

Proposed start date	August 2020
Proposed completion date	December 2024
Estimated total cost	USD 70 million
Present land ownership	The land where the KMTT is to be built belongs to the Sri Lanka Railway Department (SLRD) and the Kandy Municipal Council (KMC). The lands in which is the sky walk is to be built belong to the SLRD, the Road Development Authority (RDA) and a small portion of private land will also be required (0.0189 ha - 0.5% of the total land requirement for the construction of the KMTT), and it is under the land acquisition process
Description of the project (*with supporting material such as maps, drawings etc. attached as required*)	The main functions of the terminal are to facilitate the free flow of vehicular and pedestrian traffic and enhance intermodal connections between transport modes, in a convenient, efficient and safe manner. Both inter and intra provincial route buses will commence their trips from KMTT and shall require regular bay areas for dropping and picking the passengers. It is anticipated that about 1419 inter-provincial scheduled bus trips and another 5473 intra-provincial scheduled bus trips will depart from KMTT with equal numbers of arrivals daily. Both will pass through KMTT in separate Touch-and-Go (T -n-G) bays. The passenger movements within KMTT are estimated at 330,000 persons per day. Nearly 65,000 passengers will terminate their journeys at KMTT and an equal number of passengers will wait inside KMTT terminal area for boarding the long route buses. Furthermore, around 100,000 passengers will alight from T-n-G buses and will dwell briefly around the KMTT complex while an equal number of passengers will wait in this area on the designated platforms to board the T-n-G buses. Please refer table 4.1 for key features and facilities of the new terminal. The key design considerations according to the design briefs can be listed as follows; 1. Modern and energy efficient, green building designs for quality infrastructure that suitably incorporates various architectural facets of Kandyan heritage (ESS 3)

	2. Environment friendly urban designs that aim to reduce energy usage, carbon footprint, noise and air pollution level within and surrounding areas of the terminal. 3. Integrated designs with passenger-centric facilities that facilitate passenger movement from within and around the surrounding areas 4. Convenient movement of passengers between the bus terminal and the adjoining railway station through an overhead Skywalk. 5. Designs that account for future demographic & economic growth volumes, commuting habits and its impact on the terminal and surrounding areas 6. Technology assisted Terminal Operating System for administrative control and management of terminal facilities and its operations 7. Safe and easy passenger access to the terminal that include grade restricted entry to adjoining railway station. 8. Integration of various modes of transit- public as well as private transport such as buses, railways, three wheelers, private cars and two-wheel automobiles 9. Designs that provide for well-defined and state of art passenger facilities The Key construction components of KMTT include the following: • **Construction** of the Main Structure of the Kandy Multimodal Transport Terminal with all required services to facilitate the volume of commuters, bus services and transport terminal facilities distributed in three floors interconnected through ramps, elevators and lifts to be established. • **Construction** of a 150m long Skywalk stretching from old Peradeniya Road to William Gopallawa Road and the adjoining Kandy Teaching Hospital for pedestrians to move from these main roads to KMTT and Kandy Railway station and between these two public transport modes and preventing or minimizing pedestrian road crossing at busy points inhibiting the flow of traffic. • **Construction** of a Parking building (a park for three-wheeler taxis, fuel stations and other logistic services needed by KMTT) • **Diversion** of Meda Ela, incorporating KMTT building construction ensuring smooth functioning of entire Meda ela storm water drainage canal.

5. Description of the existing environment

5.1 Physical features – Ecosystem components

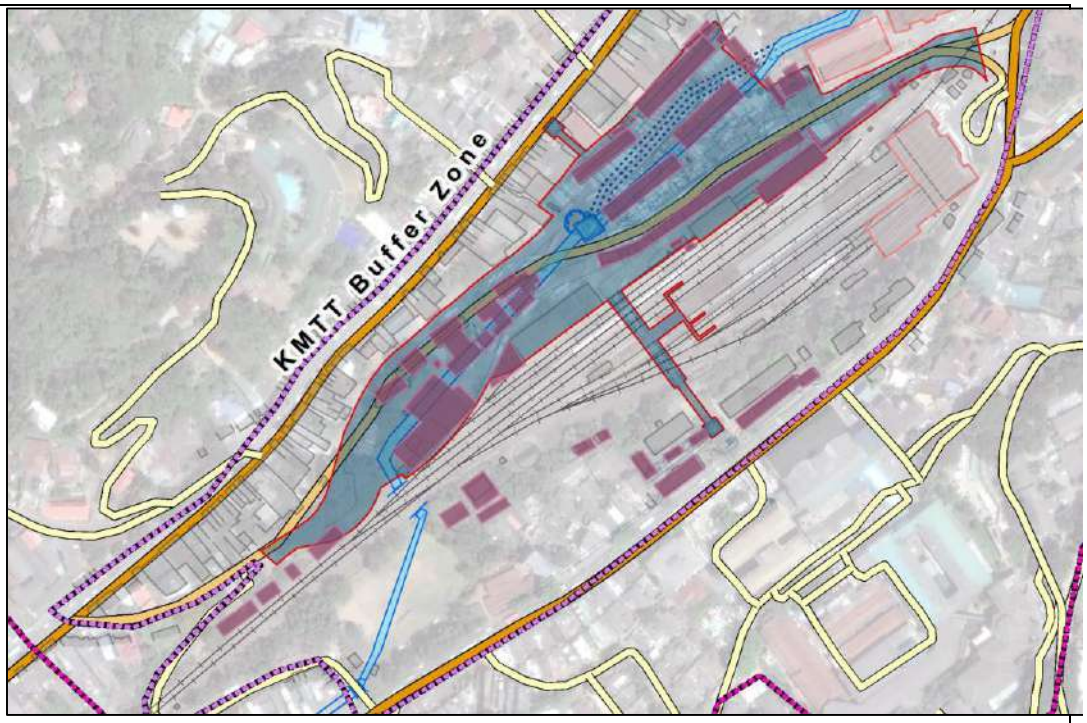


Figure 4.1: *view of buildings to be (marked in purple) demolished for KMTT development*

Construction of Main Structure of the Kandy Multimodal Transport Terminal

The main terminal building of the KMTT will be a three-story building with a roof garden and basement floor. The majority of the passenger movement will be expected in the 2nd floor of the KMTT building where the ticketing machines, rest areas cafeterias etc. are planned to be accommodated. The bus operation, mainly the touch and go and boarding and alighting bays will be located within 1st floor of the terminal building. The service units and facilities to be established in each level are listed in Table 4.1.

Figure 4.2: *Schematic view of the entrance to the Good Shed area at Post Office end*

The movement of buses and service vehicles from one floor to the other is facilitated via ramps.

The passenger movement in and out of KMTT is facilitated through a skywalk connecting Sirimavo Bandaranayake Mawatha (old Peradeniya Road/Uda Para) and William Goppallawa Mawatha serving as southern corridors of Kandy town and through an underground pedestrian walkaway connected to other access roads including S.W.R.D. Bandaranayake Mawatha. For vertical passenger movement within KMTT lifts, elevators and staircases will be established at optimum locations. The design parameters include provision for 2% increase in the volume of commuters per year over the next 5 years and a corresponding increase in the volume of public transport handled by the facility.

Figure 4.3: *Schematic view of the arcade building & skywalk from William Gopallawa Mawatha side entrance*

As per the preliminary technical design the rooftop of KMTT with a floor area of 6654sq.m will be the public area for cultural, entertainment and commercial activities. The rooftop will be connected to rest of the floors via lifts, elevators and staircases. The second floor including mezzanine floor with an area of 12,251 sq.m will consist of the arrival plaza, ticket counters, waiting area, spaces for operation and management and passenger services. The second floor will be connected to the main roads of Sirimavo Bandaranayake Mawatha and William Goppallawa Mawatha and the railway station through the skywalk. The first floor of 19,657sq.m will be assigned for Touch and Go Bus bays and Boarding and alighting bays which will be connected to rest of the floors via lifts, elevators, staircases and ramps. The ground floor with an area of 31,798 sq.m also provides for Touch and Go Bus bays and boarding and alighting bays, service areas, and waiting area for bus crews. There are underground pedestrian walkways which will provide commuters' access to Sirimavo Bandaranayake Mawatha and William Goppallawa Mawatha.

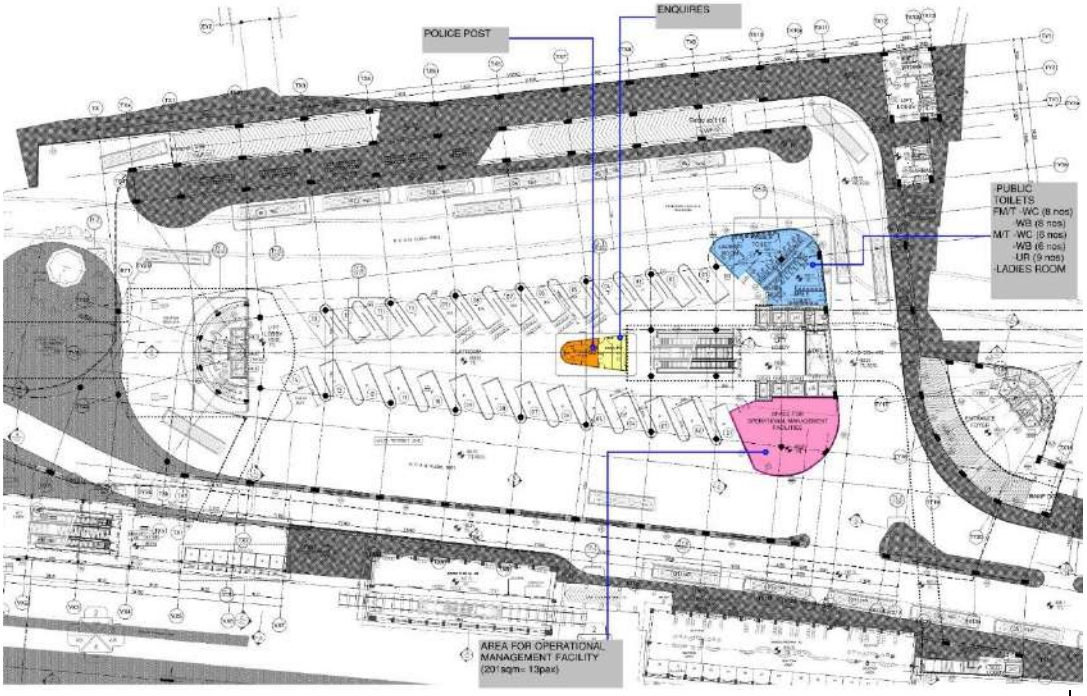


Figure 4.4: *Detailed Drawing of ground floor*

Figure 4.5: *Detailed Drawing of first floor*

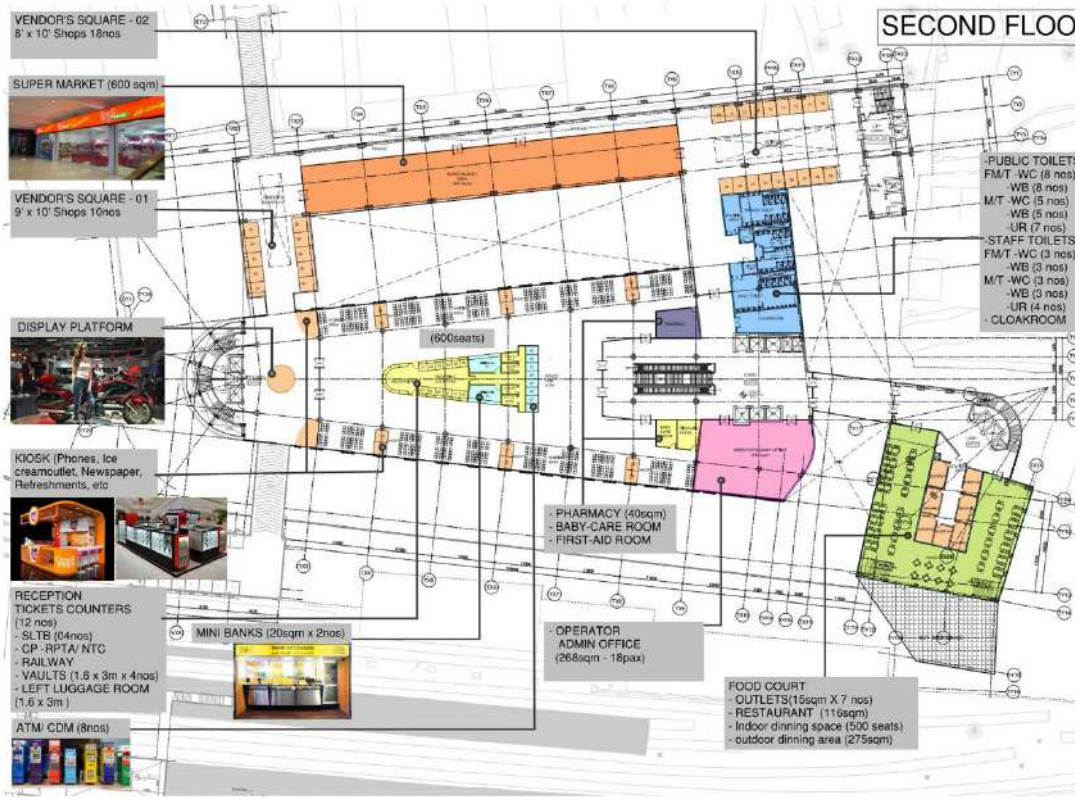


Figure 4.6: *Detailed Drawing of second Floor*

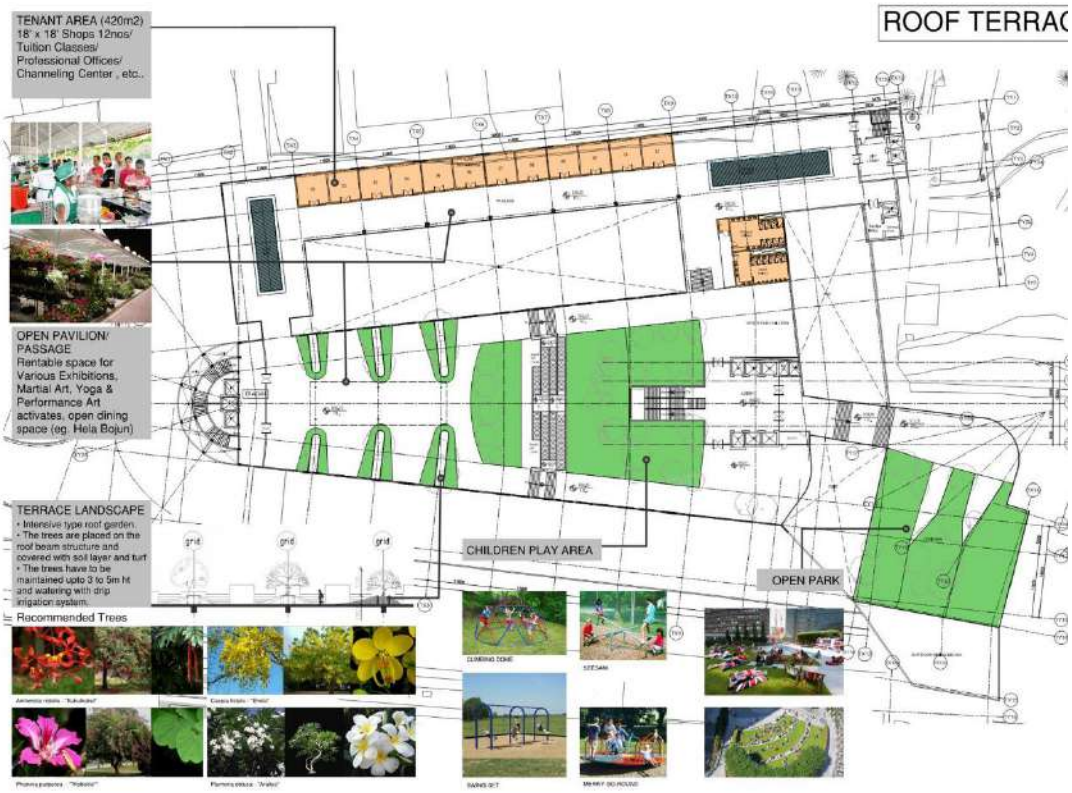


Figure 4.7: *Detailed Drawing of Roof Terrace*

Table 4.1: Service units and facilities in KMTT building.

Ground floor	First floor	Second floor	Rooftop
• 22 bus parking bays, 5 boarding and alighting bays and 13 T-n-G bays • One dedicated operation and maintenance bay • Emergency vehicle bay • Vertical circulation cores- elevators, staircases and public utilities • Rest areas for bus drivers • Operations and administration services • Commercial outlets (6'X6' shops) 7 nos • Circulation ramps for busses • Information Centre and Food Court 368.2 sq. (80 seats) • Service connections to first floor Bus Parking	• 72 bus parking bays, 27 boarding and alighting bays and 1 operation and maintenance bay • Emergency vehicle bay • Vertical circulation cores – elevators, staircases and public utilities • Circulation ramps for buses • 10 shops (8'X8') **Refer Annex 8.2**	• 600 Seats of waiting lounges • Kiosk for newspapers, refreshments, phone cards, etc (2.4 x 2.4m x 12nos • Mini Banks 2nos) • ATM/ CDM Machines (Space for 8Nos) • First-Aid room • Baby-care Room • Pharmacy • Self-operated Information Kiosks • Passenger Information Displays (PID) • LED TV screens • Restroom	• **Rentable Area** (18'x18' Shops 12 nos) tuition classes, channeling centers, Professional Institutions etc., • **Surfacing:** The trees are to be placed on the roof beam structure • **Vegetation:** The trees have to be maintained up to 3m height • **Open Park area & Viewing platform:** recreational space, • **Open Pavilion:** the open pavilion is a flexible space for multifunction • **Access:** VC-02 via stairs and lifts or from VC-04 **Refer Annex 8.4 & 8.5**

• Connection to the underground pedestrian walkway connected with nearby streets **Refer Annex 8.1**		facilities @ Arcade building (20 rooms) **Refer Annex 8.3**	

Source: Conceptual Design drawing

Provision of Toilet facilities

The restroom capacity requirement has been developed based on the following assumptions:

~ Passenger Terminals & Transportation Facilities' Toilet Requirement as per International Plumbing Code 2006 : 1 Nos Water Closet per 500 Male/ 500 Female, 1 Nos Drinking Fountains per 1000 Male/ 1000 Female . Urinals shall not be substituted for more than 67% of the required water closets.

~ 1 Nos Lavatories designed for the use of the physically handicapped (Development plan for Urban Development area of Kandy – Volume II – Planning & Building Regulations

~ Peak hourly flow of passengers (two way) Touch-n-go & Terminating =14,500 + 10,000=24,500 (Public Transport Design and Operational management Plan and Strategic Traffic Demand Management and Design Plan for the City of Kandy, Sri Lanka – Integrated Strategic Public Transport Plan)

~ 50% Male = 12250 pax , 50% Female = 12250pax

				Passengers Toilet			Staff Toilet	
			No of Pax	**Male**	**Female**	**Disable**	**Male**	**Female**
As per IPC	All levels	Water Closet	24500	10	25	3	-	-
		Urinals		15	-	-	-	-
		Wash Basin		13	13	3	-	-
TERMINAL BUILDING	GF	Water Closet		6	9	1	-	-
		Urinals		9	-		-	-
		Wash Basin		6	8		-	-
	FF	Water Closet		6	9	1	-	-
		Urinals		9	-		-	-
		Wash Basin		6	8		-	-
	SF	Water Closet		5	8	1	3	3
		Urinals		7	-		4	-
		Wash Basin		5	8		3	3
	RT	Water Closet		5	8	1	-	-
		Urinals		7	-		-	-
		Wash Basin		5	8		-	-
		Water Closet		2	3		-	-

PARKING BUILDING	GF	Urinals		2	-	-	-	-
		Wash Basin		2	2		-	-
	Mezz		40	Drivers Toilet				
		Water Closet		8	-		3	4
		Urinals		8	-		2	-
		Wash Basin		6	-		3	4
		Shower		10	-		-	-

Piling Arrangements:

According to the structural designs, piling is to be used as part of the foundation of the entire structure of the KMTT, inclusive of the sky walk foundation up to rock level. There will be approximately 550 piles bored inclusive of the sky walk foundation and the project also involves the re-alignment of the Meda Ela which runs through the project site. Piling will only be carried out at least 2.5 m from the realigned Meda Ela trace at the SLTB area.

The locations of piling arrangements within Sri Lanka Railway's lands have been carefully considered. The limited space available for construction activities within the Railway complex has been carefully considered when designing of piling arrangements. Further the locations of abandoned tanks will have to be taken into consideration for piling. The clearance of any construction is at least six feet from the railway track as imposed by Sri Lanka Railways. According to the details given in design drawings, four types of piles will be used and the details can be listed as follows;

Table 4.2: Details of the General Pile Arrangements

Pile type	**Pile Diameter mm**	**# Pile**	
		Car park Buildings in Railway Dept site	**Main Building in SLTB site**
P1	600	04	06
P2	800	62	43
P3	1000	155	44
P4	1200	156	44
Total		**377**	**137**

Height of the pile will vary based on depth to the hard rock. Cast-in-place cased concrete piles are used for KMTT. In case of cased cast in situ piles, the shell is usually made of steel. This type of piles is suitable for any type of soil and the main advantages of using them are as follows;

- No need extra storage facility
- The shell has driving resistance so, it can be easily driven.
- Concrete filling is not disturbed.
- Internal inspection can be done after driving shell.
- Piles can be easily cut or extended in case of cased piles.

- Noise and vibration pollution during pile driving is minimum and it is environmentally advantageous. (Pl. refer annex 8 for general arrangements of piles and pile caps)

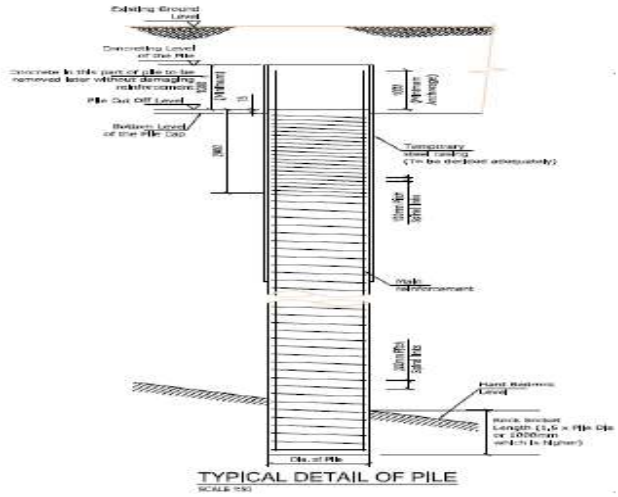


Figure 4.8: Typical detail of a pile

This non-vibratory piling method which will be used when carrying out construction adjacent to the Peradeniya Road side slope safeguarding the foundations of the existing buildings on the steep slope avoiding potential damage.

Concrete slurry has to be managed carefully to avoid contamination of adjacent water bodies including Medaela with cement/slurry sediment. It is recommended to implement a proper surface drainage plan with controlling measures such as leachate tanks, silt traps, siltation ponds etc. And maintain the drainage system throughout the construction phase.

The Skywalk

The skywalk will provide access to KMTT and Kandy Railway Station from Old Peradeniya Road (Uda Para) as well as from William Goppallawa Road and facilitate passenger movement between the bus terminal and the railway station. The skywalk is connected to the Second Floor of KMTT, this will also be an important landmark and viewing point for visitors to Kandy including tourists. This will be a main pedestrian link that will be extending to the Kandy Teaching Hospital opening up an important access for patients and hospital visitors. Facilities within the KMTT are equipped for people with special needs.

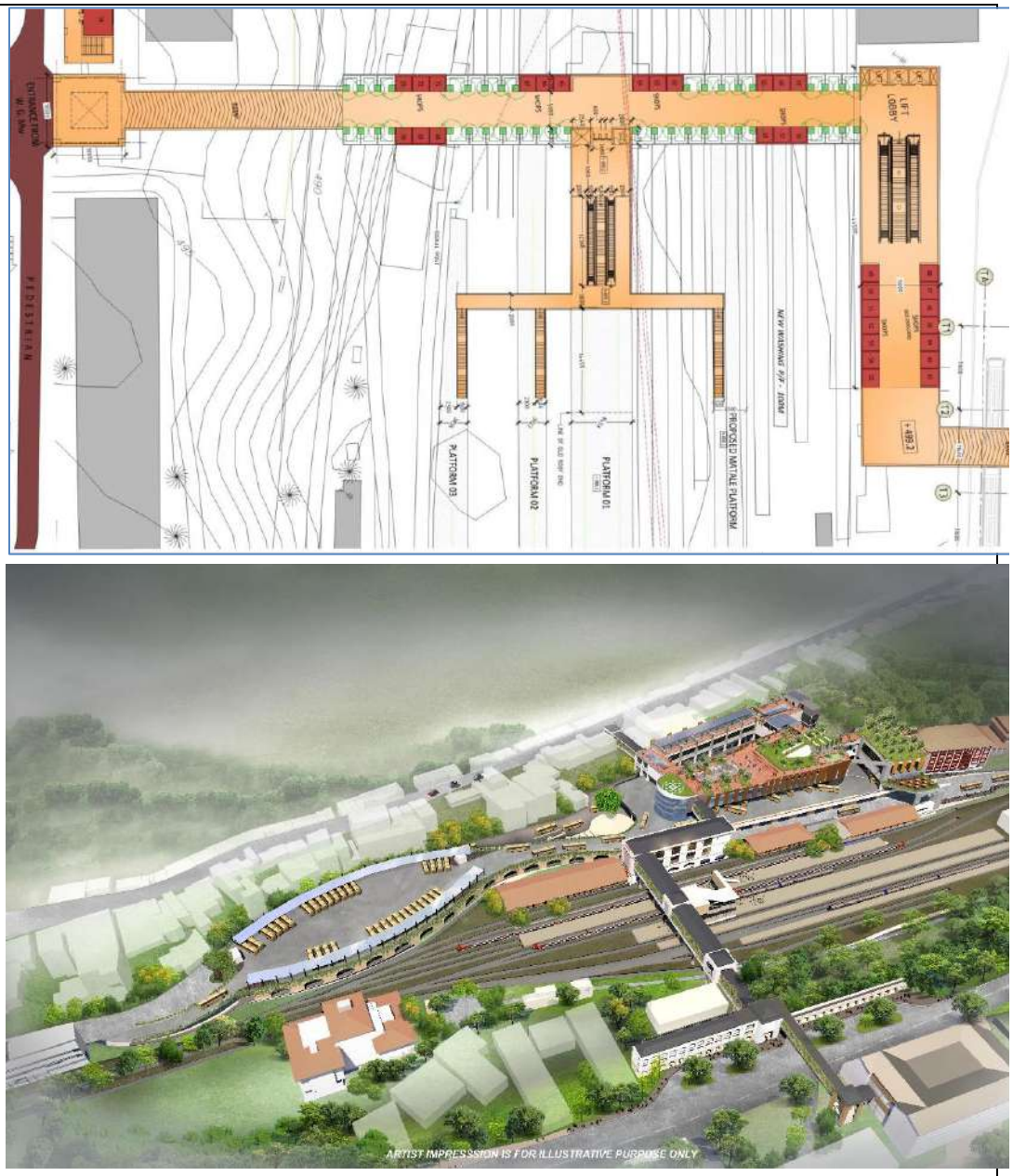


Figure 4.9 *Birds Eye view of KMTT and Skywalk*

Vehicle parking facilities

A parking building (for 40 vehicles) with three-wheeler taxi park (for 40 three wheelers) will be established for the benefit of passengers. They will be established outside the main KMTT building with easy accessibility to and from the arrival and departure areas.

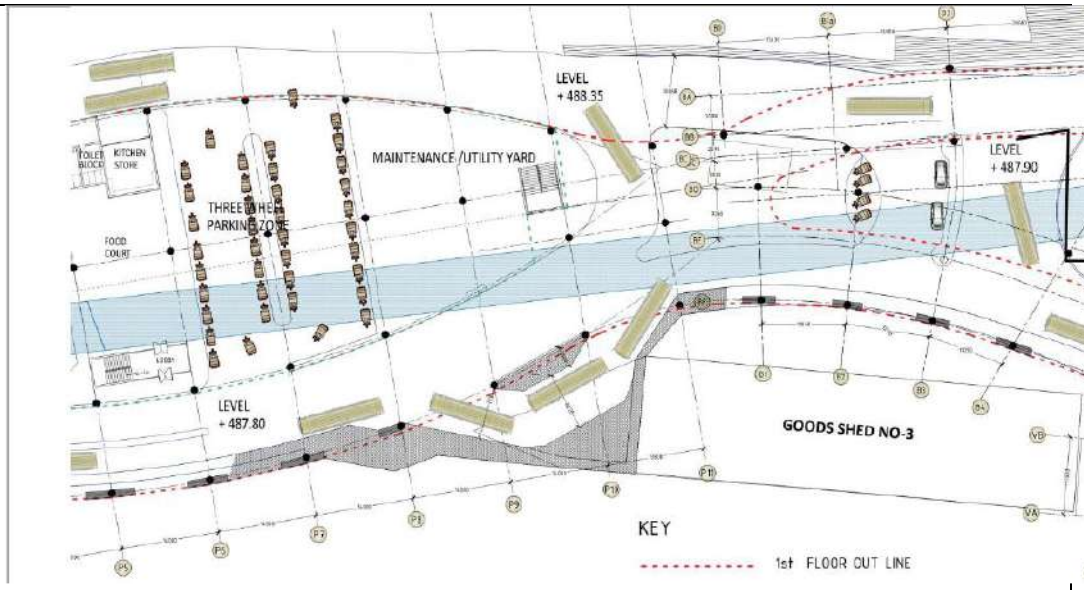


Fig 4.10 Refueling area floor plan

Table 4.3 Special Service units and facilities in Car Park Area

Mezzanine Floor	Fuel station Area
Operation Control Centre: Facilities provided within control center – meeting room, Control room with video wall, AM and Managers offices, Data room **Office Spaces:** SLTB – 400sqm, (Centre Bus Office, Internal Audit Dept., Shroff, Duty office, Depot Admin Office) CP-PTSA -230sqm NTC – 87sqm **Driver facilities:** Dormitories 40 beds/ recliners (for 45mins-60 min stay), Locker rooms, Toilets WC -8Nos, Urinals-8Nos, WB-06Nos, Showers-10Nos (female washrooms) **Bus maintenance**: Bus maintenance Facility 340sqm, 2Nos inspection pits for running repairs. Building maintenance area: **Refer Annex 3.2**	04 Nos of Dispenser, 04 Nos of underground diesel tanks (02 for operation & 02 Nos for Bulk storage), Air pump, 25kva backup generator Operational office**.** **Refer Annex 3.3**

Relocation of Fuel Pumping Stations

There are three fuel pumps located within the Good Shed bus stand which has been managed by the Ceylon Petroleum Corporation (CYPETCO). The fuel pumping station which is located in front of the present Good Shed Bus Stand has been operated by a private owner. All the existing underground tanks will be abandoned under the supervision of CYPETCO and the private operator will be compensated for his loss of business. The CYPETCO has been informed to

relocate the Good Shed fuel pump to the Yatinuwara Depot, at Kadugannawa. As per expert recommendation by the CYPETCO all 7 existing fuel storage tanks will be abandoned and the tanks will be filled with sand (not physically removed from the site). The locations of these buried tanks will be notified to the contractor for due consideration in making suitable piling arrangements. For smooth operations, the number of fuel pumps at the Kandy South Depot will be increased to compensate for the loss of pumps at Good Shed.

As part of the KMTT, a new fuel station with 04 Nos of Dispensers and 04 Nos of underground diesel tanks (02 for operation & 02 Nos for Bulk storage) will be built. All of these facilities will be designed in line with the CYPETCO, CEA guidelines. World Bank Group Environmental Health and Safety guidelines found at; www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines under thier direct supervision and control. **As such the, abandonment and the new construction of the fuel tanks will not be undertaken by the KMTT contractor, as such it will not be part of the D&B contract.**

The following actions are required for the new establishment of fuel pumping station and have been incorporated as specifications for the new fuel pumping station:

To be ensured through the design of the KMTT (space allocated for this purposes in the overall KMTT layout has considered the following facts)

- Buildings are to be located at a minimum of 40 ft. from the road boundary of the properties to provide adequate area for maneuvering of vehicles in the service area.
- Canopies and supports over pumps and service equipment when located less than 20 ft. from interior residential lot lines or building or structure should be constructed of noncombustible material.
- Petrol pumps shall be located a minimum of 100 ft. from any residential building. All service areas should be paved to avoid dust nuisance.

To be implemented by CYPETCO

- Environmental impact on surface water and ground water aquifers, etc., will be taken into consideration. An Environmental Recommendation[1] from the CEA will be required.
- Exterior design of the building should be compatible with adjacent development and should be such that it is not detrimental to property values in the area.
- A raised curb of at least 6" in height should be erected along street property lines except for driveway openings so as to prevent operation of vehicles on sidewalks, and to define entrance/exit points.

[1] In Sri Lanka, EIA/IEE is only required for certain projects which are prescribed by EIA regulations (according to stipulated thresholds) while everything that falls outside prescribed thresholds can proceed without national enviornmnetal clearance. Neither the proposed terminal nor any of its components fall within the prescribed categories. Environmmental recommendation is not a permit or a clearance required by law, it is rather an operational clearance for those who seek the advice and recommendation of the CEA.

	• Signs should be accordance with the Advertisement Regulations and should be located so as not to reflect the sun into the face of motorists and should be large enough so that they can be seen from a reasonable distance at a reasonable speed. • Stations are to be equipped with fire-fighting and fire protection equipment installed in accordance with the requirements of the Fire Department of KMC • Each tank shall be vented to the atmosphere outside of buildings by means of an independent vent pipe which should not be less than 12 ft. in height or 2 ft. above the top of the nearest adjacent building. • All volatile flammable liquid storage tanks shall be installed below ground in compliance with the requirements of the CEYPETCO and CEA • Integral containers of adequate design and capacity should be provided for solid waste, such as discarded cans, bottles, etc. • Proper facilities for storage and disposal of used and waste oil and gas must be provided. • Waste water from the washing of motor vehicles and sewage disposal should be to meet the regulations of the CEYPETCO & CEA. • Fuel should be stored in double walled container to minimize leakage and prevent contamination of ground water. • Other development criteria are given in the Filling Station Development Permit from the CEPETCO. **Meda Ela Diversion** The drain that runs east to the dividing ridge near Ampitiya in which the Kandy lake is situated, is known as Meda Ela drain. It carries overflow from storm water from Kandy Lake. It was originally an open natural stream and was converted into a stone/brick masonry drain in about 1920. Meda Ela is considered a major conveyance for Storm water discharge in the Kandy city and discharges its waters in to the Mahaveli River at Getambe.

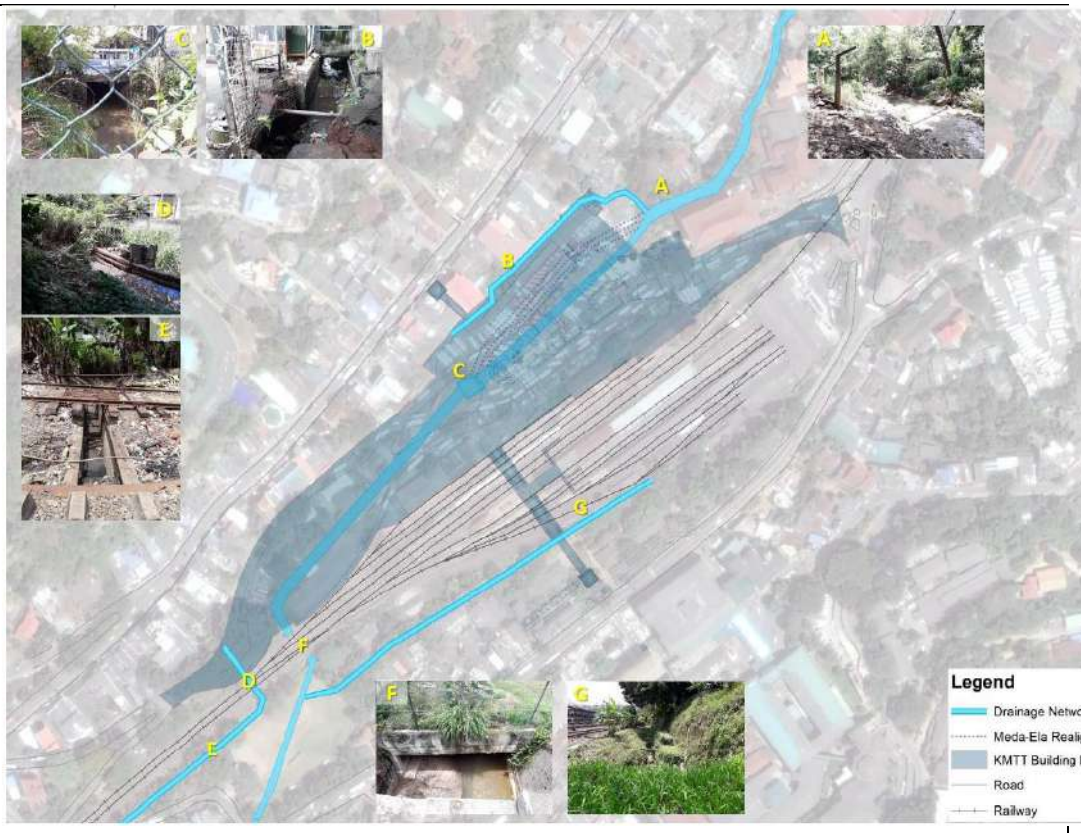


Fig 4.11 Drainage pathways of KMTT area

With the rapid urbanization of the city the canal has been encroached at several places and poses a threat to flooding of the surrounding areas. It runs in a westward direction as a tunnel for about 461m, thereafter runs in a southwesterly direction as a tunnel for another 70m and becomes an open channel at about 531m from the spillway.

It runs as an open channel up to the Goods Shed bus stand where the proposed KMTT main structure will be constructed and crosses the existing bus stand as covered U section before it becomes an open channel on the other side of the bus stand. The section of the covered drain in the project area is in a poor state with the remaining masonry drain which has deteriorated requiring reconstruction and rehabilitation. Discussions were held on the possibilities of assimilating the existing canal with rehabilitations. However, it was determined that this was both unsafe, costlier, and more inefficient than diverting the canal trace. The options considered to

1. Ease in the construction of the deviated Drain section without dealing with the existing flow in the drain,
2. Avoid any difficulty in the Piling works of the main terminal Building when work commences
3. Ease the maintenance and access of the covered drain while the Terminal is in operation.

	Please see fig. 4 11for the conceptual design of diversion path. For the diversion of Meda Ela for easy and speedy construction, monolithic rectangular conduit is avoided and instead, laying of precast / pre-stressed flat beams over the rectangular monolithic canal section is proposed. Other than that, 3 nos of silt traps are proposed at the selected and most suitable locations to arrest trash and silt at the up-stream to the underground portions of the canal. The 1st silt trap will be established at a location few meters before the beginning of the Conduit section where a machine can be deployed for desilting purposes. This section needs to be an earthen section with mild slopes (Trapezoidal). The rectangular conduit and the trapezoidal section will be joined by a smooth concrete transition and the conduit base will be extended up to the Silt trap. The silt trap will be a 6.0 m (width) x6.0 m (length) x2.0 m (depth) concrete box buried in the stream bed. The four vertical walls will be designed as rectangular horizontal frame section of unit height uniformly loaded from all four sides. The other two silt traps will be established at a suitable location at the confluence of two drainage canals before connecting to the main Meda Ela at the Bo tree. These silt traps will be a 2.0 m (width) x2.0 m (length) x1.5 m 2.5m (depth) concrete box buried in the ground. The four vertical walls will be designed as rectangular horizontal frame section of unit height uniformly loaded from all four sides. The recommendations of the Hydrodynamic Study were acceptable and the outcomes were used for the design of diversion of Meda Ela. The designed flow rate in the study report at the Goods Shed bus stand is 85.673 m3/s for the rain fall event of 25-year return period and 2030 nex 9attern. The deviated Meda Ela section has been designed to carry a design flow of 85.673 m3/s and to be compatible with the upstream designed section. The Consultant, TTI Consulting Engineers has carried out a survey and a detailed inspection of the underground sections. According to the survey, the chainages, invert levels and the cross-sectional shapes are given below. Invert level of the entry point of the 1st tunnel at Goods Shed Bus Stand at chainage 0+804 m is 485.535 m. Cross section of the tunnel is rectangular in shape with a width of 4.60 m and height of 2.92 m. Invert level at the exit point of the 1st tunnel at Goods shed Bus stand near the Bo tree at chainage 0+945 m is 484.405 m. The tunnel cross section at this point is rectangular in shape with width of 4.60 m and height of 2.92 m.

Fig. 4.12 Views of Medaela underground area at KMTT main Building site

Fig. 4.10 Views of Medaela underground area at Railway Building site

To facilitate dry weather flow, around 3% side slope would be introduced towards the center of the canal/tunnel inverts. Either closed tunnel or cut and cover type canal can be chosen for the construction. The existing capacities of tunnel reaches were also estimated using Manning's formula and they were found to be inadequate for 25yr design runoff and would cause backwater effect if they were

left unimproved. Thus, the deviation of Meda Ela will be from the entry point of the 1st tunnel at Goods Shed Bus Stand at chainage 0+804 m to the exit point of the 1st tunnel at Goods shed Bus stand near the Bo Tree at chainage 0+945 m.

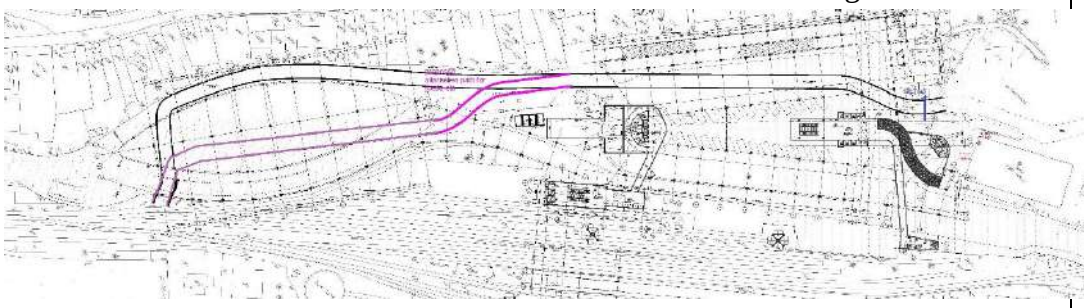


Figure 4.11 *design of proposed diversion to existing section of Meda Ela at KMTT foot print*

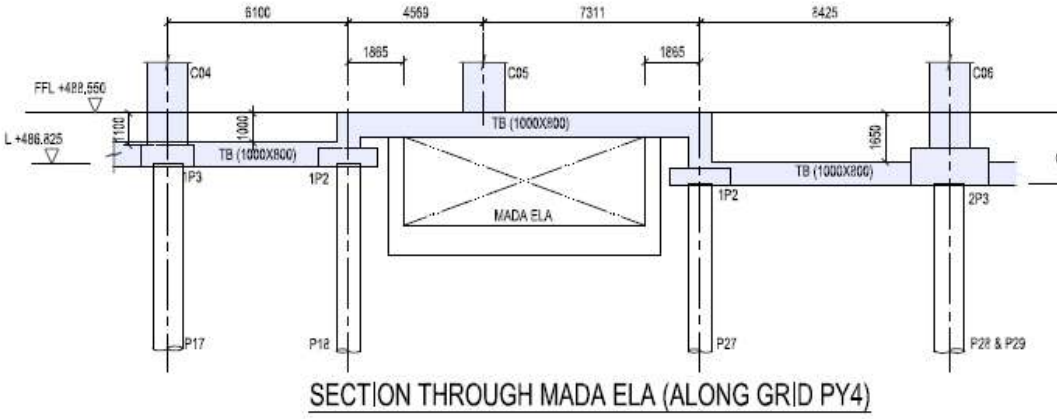


Figure 4.12 *Structural design of Meda Ela section*

Green Building Considerations

In order to award the green building certificate, the UDA has developed a points awarding scheme in order to assess each building for certification. Seven areas relevant to Sri Lanka have been considered and points have been allocated accordingly in order to calculate overall score when awarding the green building certificate. These seven areas include: This is directly relevant to ESS3 of the WB's ESF.

- **Energy efficiency** - design, improvement and quality improvement, evaluation of accuracy and maintenance,
- **Sustainable site planning and management** – site planning, construction management, transportation,
- **Materials and resource management** – recycling and re-use of materials, sustainable use of resources, waste management, and use of green products are highly encouraged for the KMTT project. The procedures stipulated in the annex 11 will have to be followed in obtaining mining licenses for borrow pit operation and strict supervision on the same will be employed for controlling over extraction of natural resources.

- **Quality of the building environment** – internal air quality, the optimum temperature, the optimum level of visual light and sound,
- **Water efficiency** – rainwater collection and water recycling, enhancement of efficiency, green innovation and socio-cultural compatibility.
- **Green cover enhancement with tree planting & landscape improvements**

Trees affect our climate, and therefore our weather, in three primary ways: they lower temperatures, reduce energy usage and reduce or remove air pollutants. Design of each part of the KMTT development has kept the room for green cover enhancement which will uplift the environmental conditions and turn down the thermostat etc. The following tree species will be used for landscape arrangement of the Roof Terrace. The Table 4.2 indicates average height of trees in the natural habitat. In landscape layout maximum height of 4m crown is to be maintained instead of the height indicated in the chart. All trees are to be properly maintained by pruning to obtain horizontally spread crown, to maximize the shading area.

Table 4.4: Tree species to be utilized for landscape arrangements of roof terrace of KMTT

The KMTT building designs followed the UDA Green Building Specifications up to the extent possible. The UDA Green Building Specifications are designed for both conventional and green building projects. Application for Green Building Certification will have to be carried out during the operational stage of KMTT.

As such the Green Building guideline were taken into consideration for KMTT designing.

Sewage Disposal and Incorporation of Dual and Low Flush Systems

The Kandy City Wastewater Management Project (KCWMP) is expected to be completed by 2021 including commissioning. At present, the construction of the WWTP has been completed and sewer lines has been laid in some parts of he city. According to the current schedule of connection, the KMTT connection will be ready prior to completion of its construction.

Therefore, the sewer system will be ready for connection by the time the KMTT is ready for operations. In general, the greywater discharges i.e. greywater from the kitchens and sinks etc. will be discharged via an interceptor to the sewerage system. There are two types of interceptors, one which is installed within the premises and which traps debris etc. The other interceptor is outside the premises where it connects with the sewer line. This interceptor prevents the entering of

gases from the sewerage system to the premises. The sewage from flushing of toilets etc. also enters the same sewerage system via another interceptor installed within the premises.

Sewage and greywater from all fixtures of KMTT shall be connected to the Kandy sewerage system and disposed to the upcoming sewerage network. The underground sewerage system consists of a sewerage pipe network, sewer manholes, grease traps etc will be embedded to the KMTT building. The sewerage system has been designed in consultation with the Kandy Wastewater Project ensuring the proper connection of KMTT system to the main sewerage network.

The inclusion of low flow fixtures is considered to reduce water consumption and greywater/ sewage generation without affecting the health and safety of occupants. The washrooms within the KMTT will use low flush toilet systems via a dual flush system in order to use a lesser amount of water than a normal flush toilet. Dual flush water closets are becoming increasingly popular for their ability to save water on most flushes. This not only reduces the amount of water used, saving resources, it also lowers water bills. Low flow urinals, wash basins with water saving pipes will also be used.

Safe Water Consumption Considerations

There is important, high quality or scarce resources (groundwater, surface waters) which could be affected by the project although the project site is located in an area which is highly urbanized and commercialized.

The water supply requirement in KMTT is to meet mainly the following services:

1. Potable water for cooking and drinking within the facility;
2. Non-potable water for washing and sanitation; and irrigation (gardening) water.

As per the calculations the potable water requirement for KMTT operation is 325m^3/day. The water sump (drinking water) capacity to be installed in the KMTT will be 1650 cubic meters. Water from the Kandy Municipal Council (KMC) will be the sole supply of potable water. Under the WB funded SCDP, the drinking water supply of the KMC was rehabilitated with work specifically undertaken to detect leaks (leading to non-reveue water (NRW) as well as to enhance storage and treatement capacity by almost 3000 m^3. The scheme has capacity to supply this daily requirement to the KMTT.

Further strategies like rainwater harvesting and wastewater recovery has been incorporated to the design to reduce consumption from primary sources. Kandy belongs to the wet zone that receives around 2500 mm of rain yearly, hence rainwater storage will serve as a significant source of water for non-potable use. The capacity of the KMTT rainwater harvesting tank is 380 m^3.

The rainwater which is intercepted by the building gets recycled via a rainwater harvesting system. The rainwater collected will be stored in a sump built

underground within the premises and pumped up for non-potable purposes. (Garden taps to water the gardens and connected to flush the toilets via cisterns).

Rainwater harvesting will cover areas to be drained inclusive of roofs, hard landscaping areas, turfing and planting areas as well. The system provided will avoid storm water going straight into the external drains outside the terminal premises. Here the rainwater will be considered as a resource rather than a nuisance. The irrigation system will be designed to keep up with the varying nature of different vegetation. The design includes a sprinkler system for turfing areas and a drip irrigation system for trees and shrubs and in addition, hose bibs will be provided for all other gardening areas.

The excess rainwater falling on the ground within the KMTT footprint eventually gets discharged via the storm water drains into the Meda Ela.
All fixtures, pipes and plumbing fittings will be made out led free material that are intended to convey or dispense water for human consumption within the KMTT premises.

Safe & Sustainable energy consumption considerations
Energy saving has been a key criterion throughout the electrical design for the KMTT. The most noticeable is the incorporation of occupancy controls to turn off lights when the space is unoccupied (specially in wash rooms). Day lighting has been incorporated into the lighting design, where available, for utilizing controls to minimize or eliminate electric lighting when sufficient day light exists to illuminate the space. Exterior lighting will be designed to comply with dark sky standards. Highly efficient lighting and equipment will be used to contribute to the overall reduction in energy usage, while proper switching and lighting control contributes to the controllability of systems, providing improved building operation. Most of the roof structures shall be provided with high efficiency polycrystalline solar photovoltaic panels to enhance sustainable power generation.

All lights will be highly efficient LED (light-emitting diode) lights and general lights will comply with SLS 1458 PART I & II and all the other lights/ fittings will comply with the relevant International Electro-technical Commission (IEC) standards. General purpose lights of the office and shop area will be of a minimum efficacy of 100 lm/W and all the high bay lamps, flood lamps and street lamps will be of a minimum efficacy of 130 lm/W. All outdoor light fittings will be IP 65. Lighting of public areas will be controlled by light dependent relays (LDR) and lighting for toilets and washroom areas will generally be controlled by local passive infra-red (PIR) occupancy sensors. Lighting for office areas will be occupancy sensor controlled and will be dimmable with daylight sensing and control to take maximum advantage of available daylight.

Maximizing natural daylight within the building is essential for both physiological and energy efficiency reasons. Hence, the arrangements such as light shelves, skylights and light pipes to bring daylight as deep as possible into interiors will be incorporated. The exterior of the building and the surrounding will require night lighting both for effect and for the public safety. The lighting is for enhancing the surfaces with no spill light into the night sky. The entire external lighting system will be carefully designed and thus there will be no light pollution of nearby external premises. Emergency lighting and exit signs will be provided in accordance with the standards and regulations. The back-up power source for the emergency lighting system will be provided from integral emergency battery ballasts within the specific light fixtures.

Required lux levels for specific functional areas within the premises have been developed considering the design guidelines for public transport terminals of Hong Kong and Singapore and CPTED methods (Crime Prevention through Environmental Design). These also comply with the CIBSE Standards and the Sri Lanka Standard Code of Practice for the Energy Efficient Buildings.

The outdoor lighting concept consists of lighting up the sky walk, the paths and the steps, the trees, the bridges, the arches, the colonnades and the frontage panels with RGB LED bracket mounted landscape lights, LED step lamps, wall mounted solar lamps, RGB LED wall washers and adjustable LED upright lights. Solar street lamps will also be used.

Solar photovoltaic panels shall be placed on every effective roof structure of the KMTT buildings. They can provide sustainable energy which will both reduce the building's overall energy costs and contribute towards on-site renewable energy generation.

With the green energy consumption scenario, it is expected to mix the solar energy generation within the KMTT foot print. The expected solar power output can be forecast on two different bases: considering current roof structures only and considering the first-floor bus parking space as well.

The Solar Photovoltaic (SPV) System consists of Solar PV Modules consisting of the required number of Poly-Crystalline PV Modules, Module Mounting Structure, Power Conditioning Unit (PCU) consisting of a Maximum Power Point Tracker (MPPT), an Inverter, Controls and Protections, Inter-connection Cables and Switches.

The output power from the SPV array would be fed into the inverters which convert DC produced by the SPV array to AC and feed it into the main electricity grid after synchronization. In case of grid failure, low or high voltage fluctuations, the SPV system will be out of synchronization and disconnected from the grid. Once the Distributed Generation (DG) set comes into service the PV system will again be synchronized with the DG supply and the load requirement would be met to the extent of availability of power. Pole isolation of inverter output with respect to the grid/ DG power connection need to be provided. Stand by electrical power

generator will be fixed with sufficient capacity to meet with the power requirement to be used when the grid power supply is interrupted.

An Electric Vehicle Charging Facility will also be introduced into the terminal to cater to the future requirements. The desired location for the Electric Vehicle Charging Facility and the number of charging points has been determined as per the forecasted demand during KMTT operational stage.

Facilities for Disables

Facilities for the disables such as ramps, toilets, railings etc. were designed as per the guidelines issued by the National Secretariat for Persons with Disabilities (NSPD) in order to meet with the national building regulations.

Gender Mainstreming

A number of gender features have been integrated into the project deisgn: firstly to increase structural safety of women and girls accessing the terminal the design of the terminal provides facilities such as women-only waiting areas, breastfeeding rooms and sanitation facilities which are in safer locations and well-lit; secondly the TA on urban integration of the terminal will provide gender-informed planning principles together with measures for safe NMT access for all vulnerable groups; thirdly under capacity building activities in Component 3, all stakeholders in the management, operation of the terminal, bus and train drivers and conductors will be sensitized on the issue of sexual harassment.

In addition to the above, the project will specifically focus on reducing incidents of sexual harassment in public transport by encouraging reporting such incidents and accommodating relevant authorities to address such incidents effectively. Messaging around zero tolerance of sexual harassment and processes of reporting incidents will be included in and around the terminal, skywalk and the pedestrian public spaces. A kiosk for reporting issues of service provision, suggestions for improvements of the facilities will include specific referral mechanisms for women and girls to report sexual harassment experienced during travel and within the terminal. The kiosk will be linked to a hotline to record and refer cases of sexual harassment to the required law enforcement authority. The 24-hour hotline could be used either in call or SMS form to inform the kiosk. A protocol will be developed for the people working at the kiosk on how to record the complaint against sexual harassment and the method of referring the person to the requested services (police, health, CSOs). They will also need to be trained to handle reports of GBV beyond sexual harassment experienced while using public transport and be able to refer them to additional services such as shelters, legal services and organizations working on GBV service provision. Police, Health, Legal and Women's Organizations working on GBV response will be engaged and consulted when developing protocols and sensitized on them. The hotline number and usage will be advertised widely throughout the transport system, terminal and skywalk. Safety audits will be integrated into the GRM mechanism to increase safety for female commuters and to notify the management of areas which require further improvements for safety.

Fire Safety Considerations

The KMTT is a public building and its design, construction and operation will be in full compliance with local building codes, KMC fire department regulations,

local legal/ insurance requirements, and in accordance with WBG accepted life and fire safety (L&FS) standards in the EHS guidelines, which ever is stricter will be taken as the standard to apply to the projectWith regard to these objectives: project proponents, architects and professional consulting engineers have demonstrated that the KMTT buildings meet these life and fire safety objectives. Life and fire safety systems and equipment have been designed and will be installed using appropriate prescriptive standards and/ or performance-based design, and sound engineering practices. Life and fire safety design criteria for all existing buildings have been incorporated in all local building codes and fire department regulations requirements.

Fire safe design features have been fully incorporated into the KMTT buildings design. All new buildings including transport premises has been designed to the mandatory standards as follows;

National

- Construction Industry Development Authority (CIDA) Fire Regulations and Specifications.
- Guidance notes issued by the Fire Service Department, Colombo

International

- National Fire Protection Association (NFPA) Guidelines
- WBG EHS guidelines : Life and Fire Safety

KMTT being a large scale project adherence to the safety procedures are very vital ensuring the safety of the workers and the safety of the community. As stipulated in the annex 15 and 16 the safety procedures are mandatory to be followed by the Contractor.

Table 4.3 Fire & Safety design

Major Considerations	**Measures**	**Standard**
Control Smoke Spread	Smoke Extraction System	
Limit fire spread within building	Compartmentation Sprinkler System	
Means of Escape	Fire Alarm Evacuation Alarm Adequate Escape Route Smoke Extraction System	
Facilitate Fire Service Operations	Access to the Building Smoke Extraction System Fire Fighting System	

Consideration for maintenance of ventilation

Increased vehicle emissions within the KMTT is to be expected which will primarily include carbon monoxide (CO), nitrogen oxides (NOx), oil and gasoline fumes and smoke haze from diesel engines. The ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) guidelines indicate that an adequate supply of fresh air is required to control CO and NOx in this type of environment in order to satisfactorily control air contaminants.

In this design special care has been taken to ensure that: (i) Noise levels within the area is restricted to allowable limits as per the CEA standards; (ii) Air Circulation Effectiveness (ACE) in each space complies with ASHRAE 129 – 1997; and (iii) Environmental, Health and Safety aspects comply with national regulations and EHS Guidelines of the World Bank.

The ground floor of the parking building and bus bay areas, the ground floor and first floor of the terminal building will be provided with automatically operated ceiling suspended ductless smoke extraction systems using variable pitch axial jet fans, as per the ASHRAE guidelines. Extracted polluted air from the two underpasses and the ground floor of the Terminal Building will be released at the roof level of the building through 4 Nos. of vertical duct risers. However, such a treatment is not required on the ground floor of the parking building and on the first floor of the terminal building because those areas are adequately open to the external environment from all sides. Those systems will be controlled by sensor modules comprising of carbon monoxide (CO) sensors and nitrogen oxides (NOx) sensors, ensuring air quality standards stipulated by the Central Environment Authority (CEA) of Sri Lanka are complied with.

Underpasses and closed corridors will be provided with adequate ventilation and smoke control during any fire situation. Reversible type fans will be selected for this purpose.

All cooking areas will be provided with proprietary kitchen hoods and ducted extract systems. All toilets and kitchen areas will be designed for a negative pressure. To achieve this, extraction required to maintain a minimum of 6 ~ 8 A Ch/h is considered in the design.

Green cover enhancement with tree planting & landscape improvements

Trees affect our climate, and therefore our weather, in three primary ways: they lower temperatures, reduce energy usage and reduce or remove air pollutants. Design of each part of the KMTT development has kept room for green cover enhancement which will uplift the environmental conditions and turn down the thermostat etc. The following tree species will be used for landscape arrangement of Roof Terrace. The Table 4.2 indicates average height of trees in natural habitat.

In landscape layout maximum height of 4m crown is to be maintained instead of height indicated in chart. All trees are to be properly maintained by pruning to obtain horizontally spread crown, to maximize the shading area.

Table 4.4: Tree species to be utilized for landscape arrangements of roof terrace of KMTT

No.	Scientific Name	Other Name	Family	Details
01	*Cassia fistula*  	Ehela, golden rain tree	Fabaceae	Common tropical and subtropical ornamental flowering plant distributed in Indian subcontinent, Southeast Asia
02	*Phanera purpurea*  	Kobolile orchid tree, Hong Kong orchid tree	Leguminosae	Height : 6 m Common shaded tree with showy large pinkish purple flowers which is native to South China, Hong Kong and Southeast Asia

	03	*Saraca asoca*  	Asoka	Fabaceae	Height : 6-9 m, evergreen rain forest tree with fragrant flowers distributed in Indian sub-continent, India, Nepal and Sri Lanka.
	05	*Mesua thwaitesii*  	Diya na	Clusiaceae	Endangered species which is endemic to Sri Lanka
	06	*Campnosperma zeylanicum* 	Aridda	Anacardiaceae	Endangered, Vulnerable species which is endemic to Sri Lanka

	07	*Jacaranda acutifolia*  		Bignoniaceae	Height : 15 m Tropical tree with bell shaped mauve flowers and native to Tropical America Asia, Africa & Australia.
	08	*Plumeria obtusa*  	Araliya/ Graveyard flower	Apocynaceae	Height : 8 m Common ornamental plant with fragrant flowers which is native to the West Indies, around warm climates
	09	*Murraya paniculata*  	Etteriya Orange jessamine, mock orange,	Rutaceae	Height : 6-7 m Tropical ornamental tropical, plant with scented white flowers which is distributed in Indian sub-continent, south-eastern Asia northern Australia

10	*Tecoma stans*  	yellow trumpet bush, yellow bells, yellow elder	Bignoniaceae	Height : 1.5 to 5 m Ornamental tree with bright golden yellow trumpet shaped flowers which is native to the Americas
11	*Bridelia moonii* 	Path kela	Phyllanthaceae	Endangered and Vulnerable species Which is endemic to Sri Lanka
12	*Dillenia triquetra* 	Diyapara	Dilleniaceae	Endangered and Vulnerable species Which is endemic to Sri Lanka

					
	13	*Dillenia retusa*  	Godapara	Dilleniaceae	Endangered and Vulnerable species Which is endemic to Sri Lanka
	14	Syzygium rubicundum 	Kurumbattiya	Myrtaceae	Endangered Species which is endemic to Sri Lanka
	15	*Amherstia nobilis* 	Kukulkakul Queen of flowering trees, Pride of Burma	Fabaceae	Height : 15 m Common ornamental plant with drooping clusters of flowers Which is Native to Burma and humid

					tropical climates
	16	*Litsea longifolia* 	Rath keliya	Lauraceae	Endangered and Vulnerable species which is endemic to Sri Lanka

Shifting of existing utility lines and demolition of structures

Demolition of the Good Sheds Bus Stand and the Shifting of utility lines enabling the construction of KMTT will be undertaken through a separate works package administered and managed by the on-going World Bank funded SCDP. Safeguards due diligence for this works package has been completed as per SCDP's EAMF, complete with bank review and clearance. Accordingly, the shifting of utilities and demolision of existing structures will be completed and the site will be fully cleared before hand over to the KMTT D&B contractor.

Associated facilities linked with the proposed project	Kandy Multimodal Transport Terminal Project will be implemented to establish an integrated transport facility based on the recommendations under the transport management strategy which has been developed considering all the transport modes and their functional aspects. As a result of the said approach the train transportation is taken as the most important transport mode proposed to be integrated expecting more usage of trains in the future. Accordingly the majority of land space owned by the Department of Railway will be utilized for KMTT project by providing them the better facilities relocating the existing functions ensuring smooth railway operation in all stages of KMTT project implementation. As such the following facilities will be developed at the railway premises parallel to the KMTT project implementation. Given that these works will (i) not be funded by the KMTT or necessary if KMTT wasn't required (ii) will take place contemporaneously, (iii) within the same project location and facilitating the functions of the new bus terminal with little disruption to the railway, these facilities have been considered linked/associated to the development of the KMTT. [2]It is important to note that while the KMTT has been spun off as a stand-alone project[3] and hence coming under the ESF

[2] Under the ESF, the term "Associated Facilities" means facilities or activities that are not funded as part of the project and, in the judgment of the Bank, are: (a) directly and significantly related to the project; and (b) carried out, or planned to be carried out, contemporaneously with the project; and (c) necessary for the project to be viable and would not have been constructed, expanded or conducted if the project did not exist.

[3] The decision to spin off KMTT a a stand alone project was taken in September 2019 mainy due to its complexity to be handled as a sub-project under SCDP as well as implementation timeline going well beying the SCDP project closing.

	(from its parent project of SCDP operating under safeguard policies), the following work contracts will be managed and administered by the on-going SCDP, hence coming under the Bank's safeguard policies and ESF requirements. Therefore, for the following contracts safeguards due diligence procedures as agreed in the EAMF for SCDP has been applied, and as such (i) Environmnetal Screening Reports have been prepared and dislosed; and based on the screening recommendation (ii) ESMPs have been prepared and (iii) incorporated into the relevant tender documents. 1. Construction of 09 storied building for railway quarters 2. Construction of two storied timber workshop 3. Construction of 04 storied administration and workshop building KMTT project will be one of the most attractive buildings in the future with its modern facilities and a significant transformation is expected along with the development resulting in an increase in land value at the location in the future. As such there is a high potential for the development of three railway buildings which are listed as historic buildings located near the proposed KMTT site in the future for adaptive reuse. However, when this plan will be executed and the source of funding is unknown at present, hence for the moment the restoration of the old railway buildings will not be considered an associated facility.
Project Management	A Project Management Unit (PMU) will be established in Kandy under the Ministry of Urban Development, Water Supply and Housing Facilities, to implement the proposed KMTT Project. **The PMU will be strengthened with the Environmental and Social staff for effective implementation of ESMP of KMTT. This will include a Senior Environment and Safety Specialist, Senior Social Specialist, Livelihoods Restoration Specialist and Safeguard Officers, as required.** **Agency** Kandy Multimodal Transport Terminal Project Ministry of Urban and Water Supply **Required staff will be recruited along with cabinet approval and negotiation of the KMTT Project. Until such time the following key persons will be serving as the contact persons.** **Contact person -** Mr. KAD Chandradasa, Project Director Strategic Cities Development Project (SCDP), Ministry of Megapolis and Western Development **Tel**: 0112 887320 **Fax**: 0112868188 **Email**: pdscdp19@gmail.com Mrs. Gangadari Ranawaka, Deputy Project Director (Envt.) Strategic Cities Development Project (SCDP), Ministry of Megapolis and Western Development **Tel**:0112 887320 (Exe. 115) **Fax:**0112868188 **Email:**gangadariscdp@gmail.com

Topography and terrain	The project area lies in the physiographic region of Highlands, and the topography range about 512 m - 515 m MSL. The topography in this area consists of an undulating terrain. The Topography map of the proposed project area is shown in the Figure 5.1.

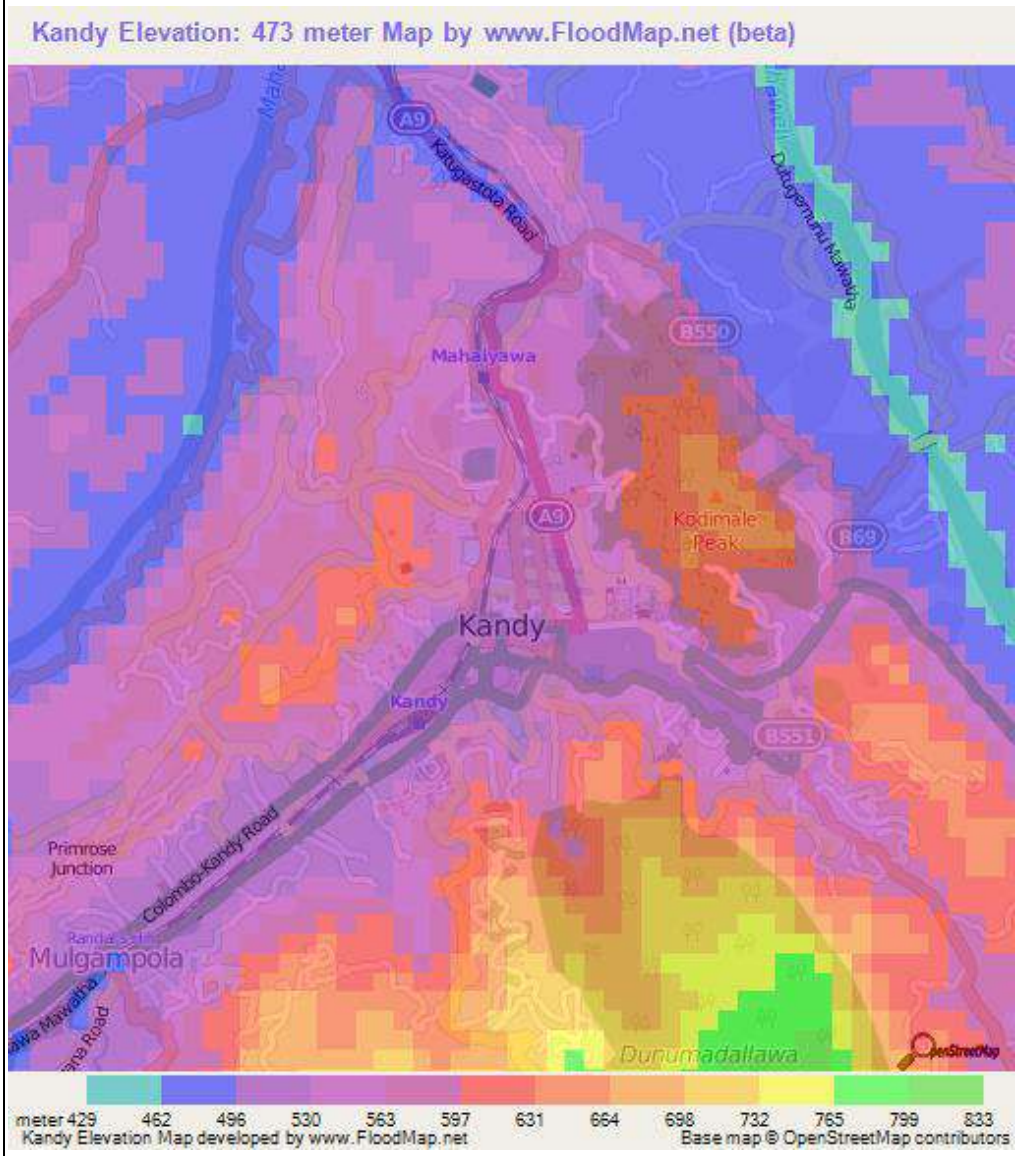
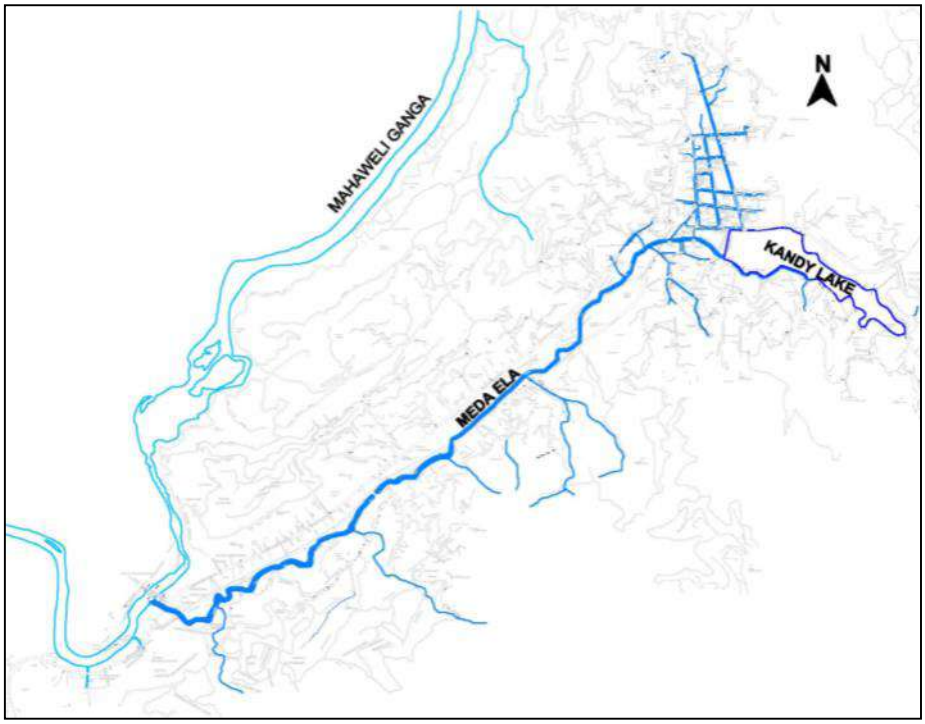


Figure 5.1: Topography map of the Project area (Source: © 2014 FloodMap.net)

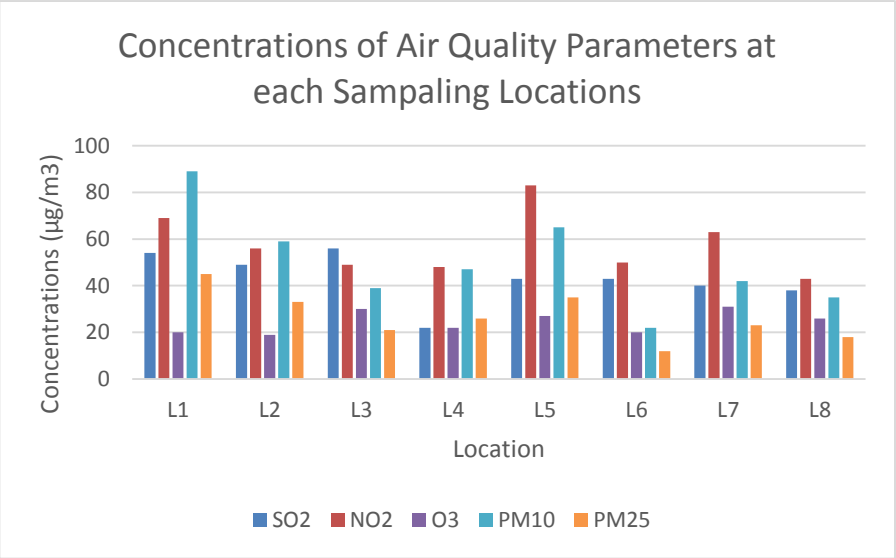
Soil (*type and quality*)	The main soil type is the Reddish Brown Latosolic (RBL) soils and Immature Brown Loams (IBL) made from the weathering of underlying rocks and boulders and rock outcrops. The top soil of RBL soil is reddish brown or brown, while the sub soil is red to dark reddish brown and the top soil color of IBL soil is dark brown to dark gray brown with a dark yellowish brown to brown sub soil. The texture of RBL soil is mostly clay loam and the distinct feature of this soil is well-developed structure with friable consistence to tolerate wide range of moisture conditions. Hence, the RBL soil is very productive. The texture of IBL soil is loam and contains minerals such as mica and feldspar. Both soil types are favorable for the deep rooted trees, which already exists in the area. The central province including the Kandy district is considered as Central Fragile Area due to the vulnerability to landslides and hence the Soil Conservation Act No. 25 of 1951, as amended by Act No.24 of 1996 has been declared as conservation areas. The proposed boundary of the "Conservation Areas" coincides with the 300m contour line with a few exceptions. The National Building Research Organization (NBRO) has delineated such areas in relation to the degree of the potential risk for development activities. As shown in the Landslide hazard zone map (Annex 5) of sheet 54 for Kandy (which includes the project area) published by National Building Research organization and the Survey Department (2000), shows that the proposed project area denoting in "Yellow" color is considered as "Modest Level of Land slide Hazard" where slight danger of landslides exists. Bore hole investigations were done though twenty-five locations for geological survey for representing the entire site. As per the results, Bedrock consists of Biotite Gneiss and weathered Marble rocks, upper most layer is a filling which is lateritic filing mixed ungraded garbage and boulders. From the filled layer to bedrock, dense sand layer is observed. Sand layer is softening closer to groundwater table due to fluctuation of ground water table. (Annex 07 for Borehole locations and Geotechnical reports)
Surface water (*sources, distance from the site, local uses and quality*)	The historic Kandy lake and the associated Meda Ela is the most immediate surface water body in the close proximity to the project site (Figure 5.2). Meda Ela flows underneath the KMTT site and the Kandy Lake is about 1 Km upstream to the east of the city. The water floor is towards the Western reach of the Kandy city, where Meda Ela empties to Mahaweli River at Gatambe junction in Peradeniya (about I Km from the site). The Meda Ela spill canal is the most immediate surface water way found in the project area. The key hydro morphological features of the Kandy Lake is given below;

	 **Figure 5.2: Hydrological network in the project area** This area has no proper drainage system, but due to the slope variation, water is flowing down through gravity towards the Meda Ela and empty into the Mahweli River. Flooding can be anticipated in the downstream of Meda Ela due to the heavy flow of the existing Kandy lake spill way. The Water is not been used for any purposes due to heavy loads of solid and liquid wastes disposals by the city dwellers.
Ground water (*sources, distance from the site, local uses and quality*)	Groundwater in Kandy exists mostly in the form of semi-confined Aquifers in the first 100 m of the bedrock. This groundwater exists both as small pockets of underground reservoirs and as fissure groundwater. The yields of these aquifers are not very well known and are limited as they recharge very slowly. In addition, there exist high-yielding groundwater resources along the alluvial flood plains of Mahaweli River that are mostly recharged by the river water. The amount of groundwater use by the piped water supply schemes within the Kandy region is estimated at 8,567 m^3/day (around 12 % of the total piped water supply). Further, the percentage of the population relying on groundwater in the district is almost 52% and individual domestic groundwater consumers are estimated to be using approximately 15 million m^3 annually. The project site is at a highly urbanized area and the pipe bone water is available for use.

Air quality

(*any pollution issues*)

Air emissions by sources such as vehicular and commercial emissions are the major pollutant sources that contribute baseline ambient air quality levels in the area. Measured ambient air quality levels by NBRO with respect to SO2, NO2, CO, O3 and PM10 and PM25 were below the Ambient Air Quality Standards stipulated by the Ministry of Environment & Natural Resources of Sri Lanka (Extraordinary Gazette No. 1562/22 August 15, 2015)



Source: Monitoring of Baseline Ambient Air Quality Levels measured by National Building Research Organization (NBRO)-2015 for the SCDP

Figure 5.4: Air Pollutant concentrations in the KMC area

Sampling location of the Kandy city for the above measurements.

L1 At The Good Shed area (In front of Post Office)
L2 At the Clock Tower Junction
L3 At the Queens Hotel Junction
L4 In Front of The District Secretariat
L5 At the Ampitiya Junction
L6 At the Mosque Close to Kandy City Centre
L7 At the Katugasthota Market
L8 At the Gatambe Junction

Pollutant	**Maximum Permissible Level 1-hour time average (µg/ m^3)**	**Air Quality levels at Good Shed Bus Stand**	**Remarks**
SO_2	200	54	All recorded levels are below the permissible limits
NO_2	250	69	
CO	30000	5700	
O_3	200	20	

	24-hour time Average		
PM_{10}	100	89	
$PM_{2.5}$	50	45	

Establishment of baseline measurement of noise levels at the site is the responsibility of the Contractor as indicated in the ESMP and it has to be periodicaly monitored enabling the contractor to implement the timely required mitigatory actions

5.2 Ecological features – Eco-system components

Vegetation (*trees, ground cover, aquatic vegetation*)

Biogeographically, the proposed sub-project area lies within the wet zone, but it is closer to the boundary of the intermediate zone. Floristically it is under the Kandy and upper Mahaweli floristic zone. Tropical Wet Evergreen Forests and Humid Zone Dry Patana Grasslands are typical natural vegetation formations in the Kandy and Upper Mahaweli Floristic Zone.

The land in and around the proposed sub-project area are within the Kandy city centre and as such has been under human influence and cleared for human settlements and urban developments for a long time. Therefore, the area is devoid of any significant natural floral and faunal habitats (as the entire landscape of the site and its surround is completely built), excepting a few large scattered trees which will be preserved and integrated to the proposed development. As such, the need for detail floar/fauna assessments were considered not necessary. Instead, an inventory of large trees was undertaken and is provided below.

The following 48 trees belong to 16 species, none of which have a threatened, vulnerable conservation status or are endemic. These species are commonly found in home gardens and on road reservations in the country.

	Location of the tree	**Species name**	**Local Name**	**GBH (cm)**	**CS**
1	From Post Office Edge up to Bo tree (Main KMTT Building)	*Persea americana*	Ali pera	77	
2		*Ficus hispida*	kotadimbula	79	
3		*Tamarindus indica*	Siyambala	315	
4		*Spathodea campanulata*	Kuda-Illa	335	
5		*Eucalyptus Spp.*			
6		*Samenia saman*	Pare Mara	365	
7		*Artocarpus heterophyllus*	Kos	107	

	8			Jam Tree	75	
	9		*Ficus religiose Hanging Bo tree*	Bo Tree		
	10		*Ficus religiosa*	Bo	402	
	11		*Ficus religiosa*	Bo	365	
	12	Car Park	*Mutingia calabura*	Jam tree	162	
	13		*Mutingia calabura*	Jam Tree	168	
	14		*Artocarpus heterophyllus*	Kos	239	
	15		*Artocarpus heterophyllus*	Kos	200	
	16		*Caryota urens*	Kithul	112	
	17		*Mangifera indika*	Amba	182	
	18		*Mangifera indika*	Amba	270	
	19		*Artcarpus Heterophyllus*	Kos	200	
	20		*Artcarpus Heterophyllus*	Kos	210	
	21		*Mangifera indika*	Amba	133	
	22		*Cananga odorata*	vanasapu	187	
	23		*Cocos nucifere*	pol	37	
	24		*Azediracta indika*	Kohomba	156	
	25		*Mangifera indika*	Amba	70	
	26		*Psidium guajava*	Pera	43	
	27		*Persea americana*	Ali pera	127	
	28		*Persea americana*	Ali pera	98	
	29		*Mangifera indika*	Amba	170	
	30		*Ficus religiosa*	Bo	250	
	31	Bus stop	*Terminalia catappa*	Kottamba	87	
	32		*Cananga odorata*	Vanasapu	232	
	33		*Terminalia catappa*	Kottamba	57	
	34		*Spathodea campanulata*	Kuda Illa	126	
	35		*Spathodea campanulata*	Kuda Illa	35	
	36	Quarters Block	*Mangifera indika*	Amba	132	
	37		*Caryota urenus*	Kithul	103	
	38		*Caryota urenus*	Kithul	114	
	39		*Artocarpus heterophyllus*	Kosos	49	
	40		*Persea americana*	Ali Pera	77	
	41		*Cocos Nicifera*	Pol	70	
	42		*Caryota urens*	Kithul	100	
	43		*Caryota urens*	Kithul	99	

	44		*Artocarpus heterophyllus*	kos	70	
	45		*Caryota urens*	Kithul	120	
	46		*Ficus bengalensis*	Nuga		
	47		*Ficus religiosa*	Bo	302	
	48		*Cocos nucifera*	Pol	185	

Note: CS – Conservation Status

The above-mentioned list of trees that are considered impinging on the construction footprint will be validated against the final design and building foot print. The green building approach of the project would ensure that minimum number of trees will be removed and that as many as possible will be integrated into the landscape plan. As such, the contractor will be required to provide a justification for removal against each tree and this will be approved by the engineer subject to review by the Environmental Specialist of the PMU.

The responsibility of cutting of trees that are identified for removal will lie with the contractor while the tree logs will be property of the government of Sri Lanka. As such, the PMU will liaise with the KMC and the Sri Lanka timber coporration for the removal of the cut trees. (those that have a timber value will be acquired by the Timber Corporation while the balance will be disposed by the KMC)

Overgrown grass and shrubbery will be cleared to make space for additional parking space.

Presence of wetlands	No wetlands are present at the proposed site
Fish and fish habitats	Medaela runs through the KMTT site, however, no fish species have been recorded in the canal due to high pollution levels of its water.
Birds (*waterfowl, migratory birds, others*)	No waterfowls and migratory bird species encountered within the sub-project area. Few terrestrial bird species were identified in and surrounding area of the proposed project. Crows, Kingfisher and Minas were observed at the area during the field visits.
Presence of special habitat areas (*special designations and identified sensitive zones*)	There are no special habitats around the area as the area surrounding the proposed site is highly urbanized and built up area.

5.2 Socio-economic features

(Note: the following summary has been extracted from the social impact assessment conducted as part of the RAP preparation for KMTT. The SIA considers only 8-acre extent of the land within which the KMTT will be constructed. For full details refer the RAP at https://www.scdp.lk/social_report

The KMTT site comprise of a business population operating within the Goodsheds bus stand and its surrounds providing direct/indirect services to the large commuter population. The RAP prepared by SCDP records a total population of 820, who include 726 men and 94 women, who operate within the construction footprint, i.e., the technical boundary (ITB) and its immediate buffer zone (IBZ) [4] who will be affected by the KMTT. The following table provides a summary of the population within the GSBS site who will suffer impacts.

SN	AP Category	ITB	IBZ	Transitional sites	Total
Business Operators					
1	KMC leaseholder business operators	7	-	-	7
2	SLR leaseholder business operators	4	1	-	5
3	*Idakada* business operators	15	-	-	15
4	Titleholder business operators	-	7	-	7
	Sub-total	**26**	**8**		**34**
Tenant Business Operators					
5	Tenant business operators of KMC leaseholders	87	-	-	87
6	Tenant business operators of SLR Leaseholders	2	-	-	2
7	Tenant business operators of *Idakada* occupants	18	-	-	18
8	Tenant business operators of titleholders	-	20	-	20
	Sub-total	**107**	**20**		**127**
Rentiers of Business Premises					
9	KMC leaseholder (*kadalabin)* Rentiers	137	-	-	137
10	SLR leaseholder rentiers	1	-	-	1
11	*Idakada* occupant rentiers	43	-	-	43
12	Titleholder rentiers	-	11	-	11
	Sub-total	**181**	**11**	**-**	**192**
Others					
13	Mobile Vendors	150	-	-	150
14	Shop Assistants	132	113	-	245
15	Three wheel operators	65	-	-	65
16	Titleholder landowners	2	-	-	2
	Sub-total	**349**	**113**	**-**	**462**
Operators of Public Utilities in GSBS and Bogambara Transitional Site					
17	Leaseholders providing public utilities	1	-	2	3
18	Employees public utilities	-	-	2	2
	Sub-total	**1**	**-**	**4**	**5**
	TOTAL	**664**	**152**	**4**	**820**

The project will affect a total household population of 3,688 distributed among the 820 households with a mean household size of 4.5.

[4] ***Note****:*

ITB*: Inside Technical Boundary – Project stipulated boundary of the developmet project marked out in a map and or using boundary markers on the ground*

IBZ*: Immediate Buffer Zone – Area adjoining the technical boundary of the project likely to experience direct or indirect project impcts*

TS*: Transitional Sites- the sites where an interim measure intended for the purpose of maintaining services until such time it is replaced by a permanent arrangement in keeping with the longterm design.*

Place of residence of the APs	A large number of APs (nearly 29%) comes from the KMC area itself (consisting of people listed under nearby neighbourhoods and elsewhere in KMC/Gangawata DSD) but the rest of APs are drawn from the surrounding areas or elsewhere in Sri Lanka. While the three-wheel operators and mobile vendors are mainly from urban low-income communities in the vicinity of GSBS, some of them and the other categories of APs, are drawn from a larger area covering several administrative divisions. Refer annex 19 for statistics.
Length of operation in the GSBS	Of the larger categories of APs, mobile vendors reported the longest duration of presence in GSBS (nearly 22 years), followed by leaseholder business operators (17 years), three wheel operators (nearly 17 years), rentiers of business premises (16 years), tenant business operators (9 years) and shop assistants (7.3 years – with 50% having less than 5 years).
Demographics	**Gender** With regard to gender distribution, there is significant variation depending on the category of APs. All the three-wheel operators are men, which is not surprising since the participation of women as three-wheel operators is significantly low across the country. In all other categories of APs too, men out number women. The percentage of women is highest among rentiers (20%) of whom the majority are in the KMC leaseholder rentiers category. Most of the original grantees of shops (*kadalabin*) are men, but there are some women too who are from politically connected families though not necessarily involved in business. As expected, they rent out these premises to others drawing a regular rent income in the process. Some female descendants of the male shop grantees too have inherited the tenure of these shops, following the death or onset of old age of the original grantees. This pattern explains the relatively higher presence of females among rentiers compared to other categories of APs. While tough competition for business in GSBS tends to wean out women from most enterprises, women have established a niche market in a limited number of trades such as cooking, tailoring, processing and selling of betel quids and selling of bags, purses and fancy goods. Female representation among business operators and tenant business operators is equal in number. The proportion of women among shop assistants and mobile vendors is 9%.
	Education levels The educational levels vary significantly with the business operators, tenant business operators, rentiers and shop assistants reporting relatively higher levels of education than the other categories of APs. As shown in Annex 19, 61% of the APs have higher level of education having completed 11-13 years of schooling and reached the standards of General Certificate of Education (Ordinary Level) or General Certificate of Education (Advanced Level). Another 34% of the APs reported having completed 10 years of schooling but without a formal certificate of education. Only 5% of the APs have not attended a school and they are mainly among the elderly group of APs. The relatively higher level of education among shop assistants is an important factor to be considered in that it may give them a head start in possible retraining and efforts at skill enhancement programmes also considering that they have the second lowest average age.
	Ethnicity and religion

	The largest number of project affected persons is Sinhalese, followed by Muslims and Tamils. Taking into account all categories of APs, Sinhalese comprise nearly 50% of APs as compared to 74.4% of the district population. In contrast, the Muslims who constituted 15.9% of all APs constitute 14.1% of the district population. The Tamils constituting 11.2% of the district population make up 11.3% of all APs. In other words, there is an underrepresentation of Sinhalese and a corresponding over representation of Muslims among the project affected persons. Various categories of business operators in GSBS are neither socially nor spatially segregated along ethnic lines, with business and social ties commonly cutting across ethnic divisions in this venue. There are, however, ethnic preference for certain trades. For instance, mobile phone business, which is one of the largest single business operations in this transport hub, is largely controlled by Muslims who are connected with one another since they generally come from Muslim towns such as Akurana. Similarly, Sinhalese dominate in the fruit trade from wholesale trade downwards. The two farm shops in GSBS are run by Tamil traders. These patterns indicate possible recruitment of traders, shop assistants, mobile traders and three-wheel operators along ethnic and kinship lines by those first established in these enterprises. The same social ties are also mobilized for mutual support and protection of each other in the relevant trades. As for religious activities in GSBS, the Sinhalese Buddhist traders lead the daily ritual operations near the Buddha statue and Bodhi tree at the southern entrance of GSBS. The Muslim traders visit the nearby mosques for their Friday prayers, in particular. The Tamil traders make daily ritual observances within their shops themselves. On the other hand, the traders from different communities often come together to celebrate major religious festivals such as Vesak, Poson or Christmas.
Livelihoods	Both owner business operators as well as tenant business operators are engaged in a variety of businesses of different scale. As evident from the SIA carried out as part of the RAP (Dec 2017), the main business catering to bus commuters in GSBS is mobile phones and related services, followed by fruits, water and snacks, service centres such as barber saloons, tailor shops, lottery sales and betting centres etc., sale of other products such as fancy goods, toys and handbags etc. and a range of tea houses and eating places. Out of 161 businesses, 48 persons (29.8%) are engaged in selling and repairing of mobile phones and other electronic devices; 39 persons (24.2%) are engaged in selling fruits, water and snacks; 26 persons (16.1%) are running hotels, restaurants and eatery places; 25 persons (15.5%) are providing a variety of services such as communication centres, tailoring shops, salons; and 23 persons (14.2%) are selling a mix of various other commodities. The mobile vendors are part of a supply chain that operates in the Kandy region. Generally, these vendors prepare their own supplies (e.g. making vade or cooking gram), obtained them on credit from wholesalers in the central market (e.g. fruits), shops in GSBS (e.g. water, cool drinks, snacks) or suppliers who bring commodities in bulk in three wheelers or other vehicles. When they obtain supplies from other traders, these mobile vendors usually earn a commission from the sales. Thus, the mobile vendors are part of a network of traders catering to over 300,000 commuters passing through GSBS. The mobile vendors are usually at the lowest level of the supply chain with a subsistence level of livelihood

	and the associated risks, vulnerabilities and shocks. Mobile vendors work in shifts with late night mobile vendors catering to the needs of long-distance commuters. There is a variety of employees in the business establishments in GSBS. They include salespeople, waiters, cooks, cleaners, tailors, barbers and day labourers. They are drawn from a wider geographical area, inclusive of low-income urban communities near GSBS (e.g. Deiyannewela, Suduhumpola, Hantana Road and Atupattiya), marginal plantation communities in Galaha and from elsewhere in the country. For instance, a number of cooks employed in eating houses as *kotthu*[5] makers (*koththu bas*) commuted to work in GSBS from Galaha situated some 25km away from Kandy. There are many three-wheeler taxi drivers who operate near the GSBS whose main income is from hires.
	Refer annex 19 detail breakdown of statistics according to AP category on the social dimensions discussed above.

5.3 Other features	
Residential/Sensitive Areas (*Eg, Hospitals, Schools*)	Proposed project area is situated facing the Kandy Peradeniya road, which is one of the most congested roads in Kandy during School and office hours. Kandy General Hospital is located within 500m radius. Girls' High School and Swarnamali Girls' College are also situated very close to the proposed site. In addition to these government schools, private educational institutions, few residential places, commercial shopping complexes, hotels and private business places are situated around the proposed project area.
Traditional economic and cultural activities	The sacred Temple of Tooth Relic and associated activities take place once a year during the Kandy Esala Perahera Festival is the main cultural event happens in the area. The Kandyan art, paintings and hand crafts and Kandyan cultural dancing, Brass and wooden carvings are the most famous traditional economic activities found in and around the Kandy area.
Archeological resources (*recorded or potential to exist)*	The Department of Archaeology has investigated locations for artifacts of high historical and archaeological interest in the surrounding but none has been found within the project location. The project will not damage any heritage buildings in the world heritage city. Proposed sub project involves on the interventions related to improvement of existing facilities in the site and hence, there will be no interference with the archeological objects. However, there could be chance finds during ground

[5] . "Kottu" is a popular local snack made from chopping of vegetables, meat, spices and wheat flour, the process involving sound effects and instant preparation.

	excavations etc and if such situations are encountered, the chance find procedures mentioned in the ESMP will be triggered. The Bodhi Tree at the entrance to Goodsheds Bus Stand from SWRD Bandaranayaka Road remains an important cultural asset within the site. Many of those who operate within the bus stand contribute to and take part in daily rituals connected with this sacred place. The project will not damage either the Bodhi tree or the structure built around it. The daily ritual and the maintenance of the place, however, will be affected by the displacement of the current set of operators. In order to minimize this impact, the contractor and his workers would be encouraged to maintain the daily ritual activities of the shrine as part of their routine activities during the construction period. Further, the railway station itself is an important landmark in the city and the project will maintain the railway station building intact.

6. Consultations

Stakeholder consultation meetings were held with the SCDP PMU, KMC, UDA-Kandy, Central Province –Provincial Transport Services Authority, SLTB, Central Province- Road Passenger Transport Authority and other stakeholders in Kandy between Jan to Dec 2017 followed by field visits and subsequently inputs were obtained for the design. Community consultations including the business community were also conducted in order to obtain the views of the project. All the designs were presented in the stakeholder forums and thier valuable inputs were taken into consideration.

In addition, approximately about 40 people were consulted in Januray 2018 and between Audit to November 2019, inside the GSBS to hear their feedback on the proposed development. This group included passengers froma wide range of backgrounds and a few who use the GSBS on a daily basis for livelihood purposes. Annex 20 summarises a snapshot of the informal consultations conducted onsite, in addition to the city-wide consultations the PMU has held in which safeguard concerns have been covered.

In keeping with ESS 10, Stakeholder engagements and consultations will continue in the future during design finalization and implementation as per the Stakeholder Engagament Plan (SEP) prepared by the Ministry of Urban Development, Water Supply and Housing Facilities for the KMTT project.

7. Environmental and Social Impacts and Mitigation Measures

7a. Screening for Potential Environmental and Social Impacts

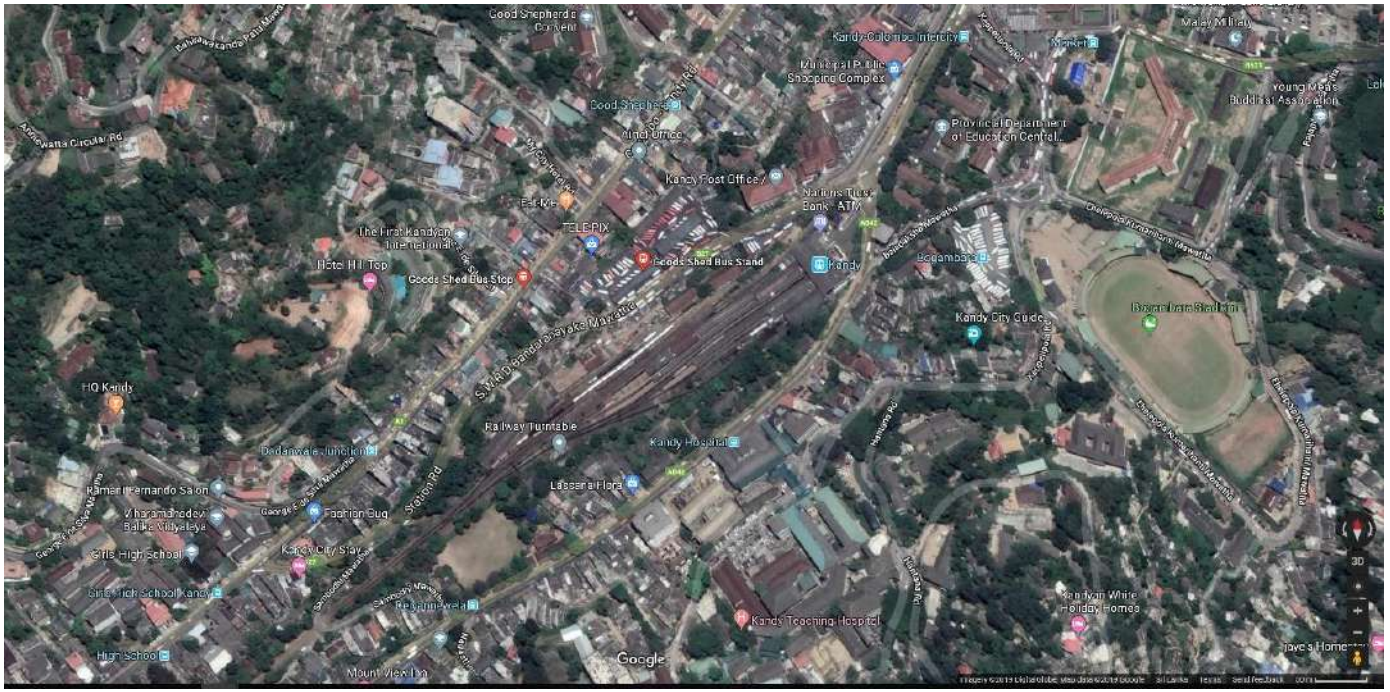
	Screening question	**Yes**	**No**	**Significance of the effect** **(Low, moderate, high)**	**Remarks**
1	Will construction and operation of the Project involve actions which will cause physical changes in the locality	✓		High The built environment within the proposed KMTT site will be significantly changed and improved. The physical changes within the site include the partial diversion of Meda Ela, establishment of the state of the art KMTT main Structure and the allied constructions. The area will be reorganized to offer a more efficient and streamlined service with modernize structures which will enhance the surrounding environment and offer better services.	Changes will be adopted to the nature
2	Will the Project involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the	√		High Dust, noise and vibration issues, traffic congestion expected to be significantly high during the construction period. Parallel to KMTT construction the public transport operation plan will be implemented in order to reduce the traffic congestion. Impacts will have to be managed by delineating the entire site with a continuous line of fencing restricting public entry during the construction period. Fuel dispensing facilities will be provided along with the terminal building and the existing fueling and storage facility will be relocated. Both activities are subject to handling of hazardous substances. Risk is high on human health. Precautions must be taken while using paints, spray guns during the construction. During the operational period, waste oil from the buses can be expected, which is classified as a hazardous waste under the CEA Hazardous waste Regulation and therefore has to be handled and disposed them properly. Fuel station, repair bay and parking bay areas will be designed and constructed in comply with CEA regulations to avoid contaminated risks.	Mitigation required

	environment or raise concerns about actual or perceived risks to human health?			Usage of Asbestos containing material is strictly prohibited for construction of KMTT. The current goodshed's bus stand contains many buildings with asbest0s-cement roofing sheets, which during demolition of the current building complex will be collected and disposed. The ESMP for the demolition contract includes necessary provisions on health and safety of workers and collection, storage and disposal of asbestos roofing sheets. Hence, the issue is not included in the current ESIA. ESS Standard the impact and mitigation relates to : ESS 1	
3	Will the Project produce solid wastes during construction or operation?	✓		High Significance of the effect is **High** during construction and operational phase. Construction waste, spoil, waste from labor camps are expected during the construction phase while a considerable amount of solid waste and liquid waste will be produced on a daily basis during the operation stage. ESS Standard the impact and mitigation relates to : ESS 1	Mitigation required
4	Will the Project release pollutants or any hazardous, toxic or noxious substances to air?	✓		Low During construction, only possible pollutant is Dust particles and other exhaust emissions from vehicles and machineries used for construction activities. Other than that there will be no any pollutants or any hazardous toxic or noxious substance released to the air. Since the hazardous materials are not encouraged during construction	Mitigation required
5	Will the Project cause noise and	✓		Moderate	Mitigation required

	vibration or release of light, heat energy or electromagnetic radiation?			Removal of existing tar surface and activities such as piling and excavation for leveling of the site will produce a significantly moderate levels of noise and vibration. But it will be limited to a shorter period of time. Release of light, heat energy and electromagnetic radiation will not be expected due to the proposed construction activities. ESS Standard the impact and mitigation relates to : ESS 1	
6	Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into surface waters, groundwater or coastal wasters?	√		During construction period, erosion and siltation is expected due to modifications to the ground and it will cause **moderate** impact to the runoff. In addition, oils and greases and can be expected to be mixed with the runoff due to the use of many construction machinery. Proper storm water drainage management within the site is required prior to discharge to the Meda Ela canal. ESS Standard the impact and mitigation relates to : ESS 1 & ESS 6	Mitigation required
7	Will the project cause localized flooding and poor drainage during construction Is the project area located in	✓		Project will not cause any localized flooding. A proper construction method is essential to avoid flooding during Meda Ela canal construction. Drainage plan for the construction site is required.	Mitigation required

	a flooding location?				
8	Will there be any risks and vulnerabilities to public safety due to physical hazards during construction or operation of the Project?	✓		Moderate The site will be completely delineated and restricted to the public during construction and the entire bus operation will be temporarily relocated to pre-identified sites within the city (which has been incrementally implemented already), this risk will be moderate. It is kept moderate in view of the fact that the site is in the middle of a busy city and there could be passerby padestrians who could be eposed to hazards unknowingly. However, the probability of this risk materializing is considered low as the site is bodered on one side by the railways where people aren't allowed to walk and on another side by an access road used ny buses to access the GSBT which will be closed. Warning signs and other precautionary measures require to be adopted in order to minimize risks. Sufficient resources will have to be deployed by the contractor to manage the risks and to provide with maximum safety management measures ensuring workers and public safety. Contractor shall hire a Safety Advisor and a safety management plan shall be prepared and implemented during construction and operational phases. Workers training is compulsory on the safety aspects and strict monitoring is required. ESS Standard the impact and mitigation relates to : ESS 1 and ESS 4	Mitigation required
9	Are there any transport routes on or around the location which are susceptible to congestion or which cause environmental problems,	✓		High Since the site is located in a highly urbanized area the surrounding road network consists of main transport routes within and into the city and cannot be restricted to the public, the impact is likely to be high. These routes will very much be susceptible to congestion. During the construction phase, comprehensive traffic plan will have to be implemented to reduce the transportation impacts. Transportation of building material should be encouraged during night time. ESS Standard the impact and mitigation relates to : ESS 1	Mitigation required

	which could be affected by the project?				
10	Are there any routes or facilities on or around the location which are used by the public for access to recreation or other facilities, which could be affected by the project?	✓		There are two roads that will be directly affected significantly because of the proposed construction. The S W R D Bandaranayaike Road which is between the Goodshed bus stand and the railway station and the old Kandy Peradeniya road which borders the Goodshed on its northern boundary. The old Peradeniya road is a main artery into the city and carries a heavy load of traffic including tourists and pilgrims who visit the city. The S W R D Bandaranaiyake Mw in the affected section is used mainly by the buses entering the Goodshed bus stand. On the southern boundary, Williman Gopollawa Mawatha, which is the other main artery to Kandy is located. This road too will be affected with increased congestion due to the KMTT construction. A sound traffic management plan has been prepared by the project in conjunction with the Kandy transport, police, KMC and the project and is being incrementally implemented. **Access to Adjacent Institutions** The Kandy Post Office, the Kandy Regional Mail Sorting Centre, the Kandy Postal Training Institute, Sri Lanka Telecom Regional Office etc. are located adjacent to the KMTT site. Access to these premises is via the SWRD Bandaranayake Mawatha may be interrupted during the construction phase but the area is well connected and hence alternative routes are available. **Access to Samagi Mawatha** There will be an interruption to Samagi Mawatha from Good Shed during the construction phase of KMTT. However, Samagi Mawatha can be accessed from Peradeniya Road. Around six to seven vehicle accesses will be affected in terms during the construction phase from Good Shed. There are a number of vulnerable families living in Samagi Mawatha. A clause in the contract will state that the contractor will always keep an ambulance with a driver, inclusive of first aid, available at all times during the construction phase to take any patients to hospital in an emergency situation. Alternative vehicle parking arrangements have been arranged at the Sri Lanka Railways car park and at the Sri Lanka Telecom car park.	Mitigation required

				ESS Standard the impact and mitigation relates to : ESS 1 and ESS 4  Parallel to KMTT construction the public transport operational plan will be implemented and the transitional sites will also be ready by the time of contactor mobilization. This plan has been trialed out and the smooth vehicular movement has been observed and it has been commended as effective by the Police. The proposed site is not subject to any recreational facility. The routes connected to the site is mainly for buses but some of the private vehicles are passing through. Since the entire site is proposed to be closed the traffic through the existing road will be restricted. It is necessary to display the direction signage indicating alternative routes to facilitate the public.	

11	Are there any areas or features of high landscape or scenic value on or around the location which could be affected by the project?		✓	None At the proposed project area or close proximity to the project area there are no high landscape or aesthetically attractive places that exist as viewing areas and area of scenic value. There is no such affection due to the project.	
12	Are there any other areas on or around the location which are important or sensitive for reasons of their ecology e.g. wetlands, watercourses or other water bodies, the coastal zone, mountains, forests which could be affected by the project?		✓	Low The Kandy lake and associated hydrological network which is considered as an environmentally sensitive area under the CEA sensitive area classification and Dunumadalawa Forest reserve and Rosenith Lake is located away from more than 1km radius of the project area. The Meda Ela that flows through the site is heavily polluted and modified with concrete bedding and embankments especially in its upper to middle reaches. It discharges to the Mahaweli River at Gatembe and hence indirect impacts from runoff to river habitats can be expected. However, these will be no serious consequences on the Meda Ela. The Ela has a had a long history of pollution which continues to date and is currently devoid of any significant natural feature or biological life. As such, there will be **No** significant impact from the proposed project activities as the project site is situated at a lower elevation and far away from the above-mentioned sensitive ecosystems. ESS Standard the impact and mitigation relates to : ESS 6 (on protecting the river downstream from adverse WQ impacts from upstream construction)	**Runoff management and mitigation required**

13	Are there any areas on or around the location which are used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, migration, which could be affected by the project?		✓	None Most of the species of Fauna and Flora in and around the project site within 100 m distance are common and exist in the disturbed habitats, and no any threatened or vulnerable species or migratory birds recorded. As stated before, given the complete built up nature of the site (which holds the busiest bus stand of the country) no formal biodoiverisry assessments were undertaken as it was considered not necessary, rather what was undertaken was an inventory of trees within the current foot print of the KMTT (which is to be finalized with the final design) Hence, there will be no such impact for breeding, nesting, and foraging, resting, migration activities.	
14	Is the project located in a previously undeveloped area where there will be loss of green-field land		✓	None Total project location is at a highly developed area and there will be no loss of green field land	

<table>
<tr>
<td>15</td>
<td>Will the project cause the removal of trees in the locality?</td>
<td>✓</td>
<td></td>
<td>The list of trees that will be affected as follows; It is expected to protect as many trees as possible. The list will be finalized after setting out of final the layout designs. The design approach of KMTT is such that every effort will be taken to integrate the trees into the final design, however, some tree removal will be unavoidable. The lost trees will be compensated through planting (onsite and offsite) at least double the number of removed trees through the landscaping plan for the site.
<table>
<tr><th></th><th>Location of the tree</th><th>Species name</th><th>Local Name</th><th>GBH (cm)</th><th>Conservation Status</th></tr>
<tr><td>1</td><td>From Post Office Edge up to Bo tree (Main KMTT Building)</td><td>Persea americana</td><td>Ali pera</td><td>77</td><td>IUCN Least Concern category</td></tr>
<tr><td>2</td><td></td><td>Ficus hispida</td><td>kotadimbula</td><td>79</td><td>Do</td></tr>
<tr><td>3</td><td></td><td>Tamarindus indica</td><td>Siyambala</td><td>315</td><td>Do</td></tr>
<tr><td>4</td><td></td><td>Spathodea campanulata</td><td>Kuda-Illa</td><td>335</td><td>Do</td></tr>
<tr><td>5</td><td></td><td>Eucalyptus Spp.</td><td></td><td></td><td>Do</td></tr>
<tr><td>6</td><td></td><td>Samenia saman</td><td>Pare Mara</td><td>365</td><td>Do</td></tr>
<tr><td>7</td><td></td><td>Artocarpus heterophyllus</td><td>Kos</td><td>107</td><td>Do</td></tr>
<tr><td>8</td><td></td><td>Mutingia calabura</td><td>Jam Tree</td><td>75</td><td>Do</td></tr>
<tr><td>9</td><td></td><td>Ficus religiose Hanging Bo tree</td><td>Bo Tree</td><td></td><td>Do</td></tr>
<tr><td>10</td><td></td><td>Ficus religiosa</td><td>Bo</td><td>402</td><td>Do</td></tr>
<tr><td>11</td><td></td><td>Ficus religiosa</td><td>Bo</td><td>365</td><td>Do</td></tr>
<tr><td>12</td><td>Car Park building area</td><td>Mutingia calabura</td><td>Jam tree</td><td>162</td><td>Do</td></tr>
</table>
</td>
<td>Mitigation and compensation required</td>
</tr>
</table>

				13		*Mutingia calabura*	Jam Tree	168	Do
				14		*Artocarpus heterophyllus*	Kos	239	Do
				15		*Artocarpus heterophyllus*	Kos	200	Do
				16		*Caryota urens*	Kithul	112	Do
				17		*Mangifera indika*	Amba	182	Do
				18		*Mangifera indika*	Amba	270	Do
				19		*Artcarpus Heterophyllus*	Kos	200	Do
				20		*Artcarpus Heterophyllus*	Kos	210	Do
				21		*Mangifera indika*	Amba	133	Do
				22		*Cananga odorata*	vanasapu	187	Do
				23		*Cocos nucifere*	Pol	37	Do
				24		*Azediracta indika*	Kohomba	156	Do
				25		*Mangifera indika*	Amba	70	Do
				26		*Psidium guajava*	Pera	43	Do
				27		*Persea Americana*	Ali pera	127	Do
				28		*Persea Americana*	Ali pera	98	Do
				29		*Mangifera indika*	Amba	170	Do
				30		*Ficus religiosa*	Bo	250	Do
				31	Bus stop	*Terminalia catappa*	Kottamba	87	Do
				32		*Cananga odorata*	Vanasapu	232	Do
				33		*Terminalia catappa*	Kottamba	57	Do
				34		*Spathodea campanulata*	Kuda Illa	126	Do
				35		*Spathodea campanulata*	Kuda Illa	35	Do

				36	Quarters Block	*Mangifera indika*	Amba	132	Do
				37		*Caryota urenus*	Kithul	103	Do
				38		*Caryota urenus*	Kithul	114	Do
				39		*Artocarpus heterophyllus*	Kosos	49	Do
				40		*Persea americana*	Ali Pera	77	Do
				41		*Cocos Nicifera*	Pol	70	Do
				42		*Caryota urens*	Kithul	100	Do
				43		*Caryota urens*	Kithul	99	Do
				44		*Artocarpus heterophyllus*	Kos	70	Do
				45		*Caryota urens*	Kithul	120	Do
				46		*Ficus bengalensis*	Nuga		Do
				47		*Ficus religiosa*	Bo	302	Do
				48		*Cocos nucifera*	Pol	185	Do
				ESS Standard the impact and mitigation relates to : ESS 6					
16	Are there any areas or features of historic or cultural importance on or around the location which could be	✓		Kandy city is a declared UNESCO world heritage site given its historic importance as the country's last kingdom and the presence of the Temple of the Tooth which is one of the most holy sites in the buddhist world. The proposed KMTT site is devoid of any historical or archaeological sites and this has been confirmed by the Department of Archaeology. Extensive consultations have been held with the Kandy Heritage Committee and their approval for the project has been obtained. The Kandy city and its urban heritage has been maintained in the proposed building designs ensuring historical and cultural identity of the Kandy city. The design features were decided upon receiving inputs from all the stakeholders including the Kandy city Heritage Committee. The final designs were presented to concern parties and the guidance was obtained. External and internal features were proposed ensuring the cultural heritage of Kandy.					

	affected by the project?			ESS Standard the impact and mitigation relates to : ESS 8	
17	Are there existing land uses on or around the location e.g. homes, gardens, other private property, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, mining or quarrying which could be affected by the project?	√		The existing land use of the project area is the bus stand and the railway station. The surrounding area is highly built up and comprise of mainly commercial and other service outlets, city roads and private property. Accesses to the commercial & private properties outside of the project boundary will be disturbed during the construction period. Compensations and alternative accesses are proposed under the Resettlement Action Plan of the KMTT. However, the construction impacts will have to be mitigated appropriately.	Mitigation required

Please not for mitigation activities for screening questions 22 to 27 are addressed in the EMP to the extent of what is relevant to the KMTT

18	Are there any areas on or around the location which are densely populated or built-up, which could be affected by the project?	✓		High The project area is densely built up and accompanied with high urban activity. During the construction period additional traffic congestions can be expected and this could be mitigated with proper traffic management plan. ESS Standard the impact and mitigation relates to: ESS 1 and ESS 4	Mitigation required
19	Are there any areas on or around the location which are occupied by sensitive land uses e.g. hospitals, schools, places of worship, community facilities, which could be affected by the project	√		Moderate The project area is located near the Kandy-Preadeniya road and the Kandy General Hospital, Suwasewana Private Hospital and 4 government schools, all of which are situated within a 1km radius of the project site. But no other sensitive places such as places of worship are located close by and hence the impact would be moderate during construction phase ESS Standard the impact and mitigation relates to: ESS 1 and ESS 4	Mitigation required
20	Are there any areas on or		✓	None	

	around the location which contain important, high quality or scarce resources e.g. groundwater, surface waters, forestry, agriculture, fisheries, tourism, minerals, which could be affected by the project?			There are no any ground water or surface water sources, forestry, agriculture or other mentioned activities within the site or close proximity to the site	
21	Are there any areas on or around the location which are already subject to pollution or environmental damage e.g. where existing legal	P		Meda Ela the urban storm water drainage canal has a long history of pollution due to direct discharge of sewer, waste water and solid waste from city activity. Management of solid waste within the project area is sub-optimal with open dumping in drainage channels a common occurrence. The current traffic volume is a considerable source of air pollution although existing air quality measurements show contaminant levels is below stipulated national standards. The KMTT, once operational, is expected to positively contribute towards improving air quality in the city by bringing better order into traffic flow. Wastewater in the city will be collected by the new wastewater collecting network funded by JICA and directed to the new treatment plant which has been completed in Gatembe (approximately about 3 Km away). While the collection system is currently being laid, it is scheduled to be completed and fully operational by end of 2021 before KMTT will be operationalized. It may be possible to connect construction related domestic wastewater arising from workers to the Kandy Wastewater system, however, this is to be confirmed with the recently updated construction schedule. As such the Meda Ela water quality is expected to be	Mitigation required

<table>
<tr><td></td><td>environmental standards are exceeded, which could be affected by the project?</td><td></td><td></td><td>enhanced gradually. Solid waste management and vehicular management is expected to be vastly improved within the KMTT.</td><td></td></tr>
<tr><td>22</td><td>Will the projet require private land to be acquired?</td><td>✓</td><td></td><td>Low

The total land requirement for KMTT is estimated at 3.6741ha. Private land to be acquired for the project is 0.0189 ha which constitutes only 0.5% of the total land requirement for the construction of the KMTT.

<table>
<tr><th colspan="2" rowspan="2">Name Of AP</th><th rowspan="2"></th><th rowspan="2">Gender</th><th colspan="3">Land Extent (Perch)</th><th colspan="2">Impact on Structure</th><th rowspan="2">Monthly Profit (SLRs)</th></tr>
<tr><th>Existing</th><th>To be acquired</th><th>%</th><th>Type</th><th>Sq.ft.</th></tr>
<tr><td colspan="2">K.D.U. Karunaratne</td><td></td><td>Female</td><td>20.0</td><td>1.48</td><td>7.4</td><td>Hotel & Eatery</td><td>200.0</td><td>780,000</td></tr>
<tr><td colspan="2">R.M. Jinasena</td><td></td><td>Male</td><td>4.5</td><td>4.5</td><td>100.0</td><td>Sub structure (Basement of building)</td><td>800.0</td><td>NA</td></tr>
<tr><td></td><td>Total</td><td colspan="3"></td><td>5.98</td><td></td><td></td><td>1,000.0</td><td>780,000</td></tr>
</table>

The rest comprises crown land vested in state agencies directly or indirectly responsible for providing public transport services (see below for more details). The total extent of land needed for construction of KMTT and its peripheral services and the sources from which this land is to be secured are presented in Table 4. Compensation for the acquired land and structures will be paid at replacement cost as provided in the Land Acquisition Act of 1950, Land Acquisition Regulations of 2013, and the RPF prepared under SCDP.

Estimated land requirements for KMTT as of May 31, 2018
<table>
<tr><th>Lot No</th><th>Total Extent (in Ha)</th><th>Ownership</th><th>% of Total Extent</th></tr>
<tr><td>1</td><td>0.0189</td><td>Private</td><td>0.5</td></tr>
<tr><td>2</td><td>0.9778</td><td>SLTB</td><td>26.6</td></tr>
</table></td><td>Managed through the implementation of the land acquisition process under the Government of Sri Lanka.</td></tr>
</table>

3	0.7356	RDA	20.0
4	1.9216	SLR	52.3
5	0.0087	RDA	0.2
6	0.0115	Hospital land	0.3
TOTAL	**3.6741**		100.0

The land will be released by the respective project partner agencies for the construction of KMTT, on the basis of a Memorandum of Understanding to be signed with the relevant agencies (SLTB, SLR, RDA and Ministry of Health) prior to the commencement of the construction work relating to the project.

A total land extent of 5.98 perches (0.0189 ha) will be acquired from two private parties (one a commercial establishment and the other a private land) situated along Sirimavo Bandaranayaka Mawatha for the purpose of erecting the sky walk. In consultation with the relevant stakeholders, efforts have been made to minimize the impact of private land acquisitions for KMTT. The compensation for acquired private land will be paid at replacement cost as specified in the RPF of SCDP and the RAP for KMTT.

ESS Standard the impact and mitigation relates to: ESS 5

23	Will the project cause any impacts on physical structures?	✓		High The construction of KMTT will result in demolition of all buildings and various structures within KMTT's technical boundary (ITB), full demolition ofo several buildings within the railway premises and partial damage to one of the buildings in IBZ. Together these structures include 225 business units, 9 public utilities (2 toilet blocks and 7 bus stand shelters) and 4 buildings and 3 utilities belonging to transport authorities and Ceylon Petroleum Corporation located within ITB and 1 partially affected commercial building in the IBZ. Most of the structures that would be fully affected are commercial buildings owned by KMC or SLR or held by non-title holder private individuals followed by public utilities in GSBS managed by SLTB, Central Province Road Passenger Transport Authority (CPRPTA) or Ceylon Petroleum Corporation. Furthermore, 9 buildings containing 52 residential and resting units currently occupied by 52 staff members together with 45 members of their families, and 4 other vacant units belonging to SLR will also be fully physically affected. The project related damages to various categories of buildings are given in the following table. **Project impacts on physical structures in GSBS (ITB and IBZ)**	Managed through the implementation of the RAP which is almost in its final stages

				<table><tr><th>Type of structure</th><th>No. Structures/Units</th><th>Type of ownership/occupancy</th><th>Type of impact</th></tr><tr><td rowspan="2">Shops</td><td>153</td><td>KMC Leaseholders</td><td>Full</td></tr><tr><td>6</td><td>SLR Leaseholders</td><td>Full</td></tr><tr><td>Semi-permanent stalls</td><td>65</td><td>KMC sanctioned non-titleholders</td><td>Full</td></tr><tr><td>Commercial (Hotel)</td><td>1</td><td>Private Titleholder</td><td>Partial</td></tr><tr><td>Toilet Blocks</td><td>2</td><td>KMC/ Leaseholder</td><td>Full</td></tr><tr><td>Bus stand shelters</td><td>7</td><td>SLTB</td><td>Full</td></tr><tr><td>Fuel pumps</td><td>2</td><td>SLTB</td><td>Full</td></tr><tr><td>Time Keepers' office</td><td>3</td><td>CPRPTA</td><td>Full</td></tr><tr><td>Fuel pumps</td><td>1</td><td>Ceylon Petroleum Cooperation</td><td>Full</td></tr><tr><td>Stores</td><td>1</td><td>Ceylon Petroleum Cooperation</td><td>Full</td></tr><tr><td>Total</td><td>241</td><td></td><td></td></tr></table> *Source: Social Impact Assessment, December 2017* The affected parties have been already compensated by the Government through Entitlement Assessment Committee (EAC) and Land Acquisition & Resettlement Committee (LARC) following and complying with ESS5. ESS Standard the impact and mitigation relates to: ESS 5.	
24	Will the project cause any resettlement impacts?	✓		High The KMTT will have significant resettlement impacts largely on the business population operating within its construction footprint, i.e., the technical boundary (ITB) and its immediate buffer zone (IBZ). Altogether, the project will affect a total population of 820 persons who include 726 men and 94 women amounting to a total household population of 3,688 with a mean household size of 4.5. <table><tr><th>SN</th><th>AP Category</th><th>ITB</th><th>IBZ</th><th>Transitional sites</th><th>Total</th></tr><tr><td colspan="6">Business Operators</td></tr><tr><td>1</td><td>KMC leaseholder business operators</td><td>7</td><td>-</td><td>-</td><td>7</td></tr><tr><td>2</td><td>SLR leaseholder business operators</td><td>4</td><td>1</td><td>-</td><td>5</td></tr></table>	Managed through the implementation of the RAP which is almost in its final stages

3	*Idakada* business operators	15	-	-	15		
4	Titleholder business operators	-	7	-	7		
	Sub-total	**26**	**8**		**34**		
Tenant Business Operators							
5	Tenant business operators of KMC leaseholders	87	-	-	87		
6	Tenant business operators of SLR Leaseholders	2	-	-	2		
7	Tenant business operators of *Idakada* occupants	18	-	-	18		
8	Tenant business operators of titleholders	-	20	-	20		
	Sub-total	**107**	**20**		**127**		
Rentiers of Business Premises							
9	KMC leaseholder (*kadalabin)* Rentiers	137	-	-	137		
10	SLR leaseholder rentiers	1	-	-	1		
11	*Idakada* occupant rentiers	43	-	-	43		
12	Titleholder rentiers	-	11	-	11		
	Sub-total	**181**	**11**	**-**	**192**		
Others							
13	Mobile Vendors	150	-	-	150		
14	Shop Assistants	132	113	-	245		
15	Three wheel operators	65	-	-	65		
16	Titleholder landowners	2	-	-	2		
	Sub-total	**349**	**113**	**-**	**462**		
Operators of Public Utilities in GSBS and Bogambara Transitional Site							
17	Leaseholders providing public utilities	1	-	2	3		
18	Employees public utilities	-	-	2	2		
	Sub-total	**1**	**-**	**4**	**5**		
	TOTAL	**664**	**152**	**4**	**820**		

The KMTT project extends to Kandy railway premises where there will be some project related constructions that will require demolition of some existing railway quarters and workers' rest rooms. Specifically, the project will cause demolition of 9 buildings containing 52 residential and resting units occupied by 52 staff members together with 45 members of their families, and 4 other vacant units belonging to SLR

			No. Units		

<table>
<tr>
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<td></td>
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<table>
<tr><th>Railway worker category</th><th>Type of quarters occupied</th><th>Number of Buildings</th><th>Occupied</th><th>Vacant</th><th>No. workers</th><th>No. Family members</th></tr>
<tr><td>Engine Driver</td><td>Flats</td><td rowspan="2">1</td><td>2</td><td>1</td><td>2</td><td>9</td></tr>
<tr><td>Guard</td><td>Flats</td><td>2</td><td>1</td><td>2</td><td>8</td></tr>
<tr><td>Engine Driver/Guard</td><td>Bungalow</td><td>1</td><td>11</td><td></td><td>11</td><td>0</td></tr>
<tr><td>Engine Driver/Guard</td><td>Outstation rest rooms</td><td>1</td><td>10</td><td></td><td>10</td><td>0</td></tr>
<tr><td>Assistant Engine Driver</td><td>Outstation rest rooms</td><td>1</td><td>18</td><td></td><td>18</td><td>0</td></tr>
<tr><td>Labourer</td><td>Labourer quarters</td><td>5</td><td>9</td><td>2</td><td>9</td><td>28</td></tr>
<tr><td>TOTAL</td><td></td><td>9</td><td>52</td><td>4</td><td>52</td><td>45</td></tr>
</table>

These impacts have been well studied, documented and disclosed through the RAP December 2017. The RAP is being implemented with many of its activities already completed. In December 2019 an audit of the RAP was conducted and the report will be disclosed once necessary clearances are obtained.

ESS Standard the impact and mitigation relates to: ESS 5.
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<tr>
<td>25</td>
<td>Will the project cause any economic and livelihood impacts?</td>
<td>✓</td>
<td></td>
<td>High
Of the different categories of APs, the impact on properties and physical assets will be highest among lease holding business operators, tenant business operators and rentiers of business premises in ITB. This is because there be total damage to their structures and physical assets due to the demolition of all physical structures within ITB when construction work begins. As for property-owning business operators, tenant business operators and rentiers in IBZ, their physical structures or assets will not be damaged due to KMTT construction work except in the case of one commercial building, but the access disturbances and loss of client base connected with bus services, will result in economic losses for them particularly during the construction period. On the other hand, there is a possibility that their property values will appreciate following the establishment of KMTT because of improved infrastructure and possible new economic opportunities that may open up with the construction of KMTT as a modern transport terminal at their door step. The mobile vendors, employees of business operators and three-wheel operators irrespective of where they operate, will not experience property loss or asset loss due to project interventions but will experience potential loss of income.

The following table summarizes the resettlement impacts on different business operators</td>
<td>Managed through the implementation of the RAP which is almost in its final stages</td>
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</table>

AP Category	Ownership/ tenurial rights	No. APs	No. Units Occupied	Type of resettlement impact
Titleholder, Leaseholder or Non-titleholder business operators	KMC	7	11	Fully affected
	SLR	4	4	Fully affected
		1	1	No structural damages
	Idakada	15	17	Fully affected
	Titleholders	7	7	No structural damages
			1	Partially affected
Sub-Total		**34**	**41**	
Tenant business operators	KMC	87	142	Fully affected
	SLR	2	2	Fully affected
	Idakada tenants	18	48	Fully affected
	Tenants of titleholders	20	20	No structural damage
Sub-Total		**127**	**212**	
Rentiers of business operators	KMC	137	142	Fully affected
	SLR	1	2	Fully affected
	Idakada	43	48	Fully affected
	Titleholders	11	20	No structural damage
Sub-Total		**192**	**212**	

Titleholder, Leaseholder & Non-titleholder Business Operators

The census covered a total of 34 business operators consisting of 7 KMC leaseholder business operators in ITB (*kadalabiya*), 5 SLR leaseholder business operators (4 in ITB and 1 in IBZ), 15 *idakada* business operators in ITB, and 7 titleholder business operators in IBZ. The males and females among the business operators are 24 and 10 respectively. The 26 business operators in the ITB operate 33 business units whereas those in the IBZ (8) occupy 8 units. Altogether, 34 business operators occupy 41 commercial business units. The project will affect these business operators in terms of loss of their business premises, loss of capital investments made for their businesses and incomes generated therein. Apart from the loss of business premises which had gained commercial value and the capital investments of the concerned business operators in their respective businesses in the ITB over the years, the project

				will also cause loss of incomes to the business operators. The monthly mean incomes generated by business operators in ITB are estimated to be between SLRs. 66,857 (418 USD) and SLRs. 71,250 (445 USD) with a mean income of SLRs. 69,336 (433 USD). Meanwhile, as evident from IOL, monthly incomes of the business operators in IBZ who will lose their business operations during KMTT construction period vary from SLRs. 35,000 (219 USD) to SLRs. 240,428 (1,503 USD) with a mean income of SLRs. 137,714 (861 USD). ***Tenant Business Operators*** The majority of the business operators in GSBS comprised the tenants. They represented 127 individuals, with 107 in ITB and 20 in IBZ. Among them, 117 are men and 10 women. Four sub-categories of tenant business operators were identified in the census. They include 87 tenants of KMC leaseholders (*kadalabiya*s), 2 tenants of SLR leaseholders and 18 tenants of *idakada* occupiers, all in ITB, and 20 tenants of titleholders in IBZ. The 107 tenants of ITB operated 192 building units with multiple building units forming an average business unit while the 20 in the IBZ occupied 20 building units. Like in the case of business operators who are title holders, lease holders or land occupants, the project will cause loss of business premises, loss of capital investments made on the businesses and incomes of the tenant business operators as well. The average monthly incomes generated by tenant business operators in ITB are in the range of SLRs. 98,408 (615 USD) to SLRs. 180,000 (1,125 USD) with a mean income of SLRs. 126,538 (791 USD). The average monthly income of tenant business operators in IBZ is SLRs. 139,850 (874 USD). ***Rentiers of Business Premises*** The rentiers who have rented out or sub-let their business premises to others constituted the largest affected population with 192 individuals. The rentiers included four sub-categories, namely (i) 137 KMC leaseholders (*kadalabiyas*); (ii) 1 SLR leaseholder; (iii) 43 *Idakada* non-titleholders who had encroached some demarcated space (*idakada*) within GSBS and operate with the tacit approval of KMC; and (iv) 11 titleholder businessmen. The first three categories are located in the ITB whereas the fourth category is in the IBZ. The demolition of the business structures as well as access restrictions imposed by the construction contractors will lead to the full loss of business premises, rental incomes, and any capital investments made on the construction and development of the business structures to the rentiers in the ITB and partial losses to those in the IBZ. Moreover, the monthly rental incomes received by the rentiers are diverse and range from SLRs. 15,553 (97 USD) to SLRs. 175,045 (1,094 USD) with a mean monthly rental income of SLRs.	

				59,027 (369 USD). This reflects the average monthly rental incomes of SLRs. 20,354 (127 USD) for rentiers in the ITB and SLRs. 175,045 (1,094 USD) for rentiers in the IBZ. ***Mobile Vendors*** 150 mobile vendors were covered in the census. The average monthly income of a mobile vendor was SLRs. 42,667 (267 USD). The project will have the effect of displacing these vendors from GSBS where they had been operating for many years as part of the embedded supply chain. ***Economic and Social Impacts on Operators of Public Utilities in GSBS and Bogambara*** The construction of the Bogambara transitional bus terminal will altogether affect eight persons engaged in various business activities within the Bogambara site. They include two leaseholders of public utilities and one unauthorized individual and their helpers whose income will be affected by loss of business and loss of access to business. ESS Standard the impact and mitigation relate to: ESS 5.	
26	Will the project cause any adverse impacts from influx of construction labour	✓		Moderate The scope of construction work of KMTT is comparatively large, and thus requires a substantial work force, which is estimated to be around 150-200 persons. The contractor/s may or may not be able to find the required labour force and associated goods and services locally for a number of reasons, among them worker unavailability and lack of technical skills and capacity. Therefore, a sizeable proportion of the labour force may have to be brought in from outside the project area. On the other hand, it is anticipated, as in many cases, that thisinflux will be compounded by an influx of other people ("followers") who follow the incoming workforce with the aim of selling them goods and services, or in pursuit of job or business opportunities. The in-migration of labour can provide potential benefits for the community, including economic opportunities through employment and/or training by the project, contributions to the local economy by selling goods and services, the provision of local infrastructure (such as access roads, power, or water connection) which is developed for the project and which serves the community beyond the project duration. However, labour camps are likely to be located within the city/suburbs or within the project site itself. Either way the camps will be close to establishments and resdiences (an estimated labor strength of 200) and as such a certain level of risks pertaining to social conflicts, spread of diseases increase of illict behavior and crime, discontent among local community, burden on existing public utilities, alcohol	To be managed as per the LMP prepared fort KMTT

				and drug abuse among the workforce, gender-based violence etc etc can be envisaged. However, given Kandy is such a busy tourist city with a large migratory population who enter the city for numerous purposes and numerous ongoing construction sites, the risk posed by 200 labourers (most of whom would be from Kandy itself) is not considered very significant. A labor management procedure has been prepared for the KMTT and is currently being finalised. ESS Standard the impact and mitigation relate to: ESS 2	
27	Will the project cause any impacts from gender-based violence	✓		A GBV Risk Assessment was conducted and the project received a low risk rating of 8.75 for the construction phase. However, GBV risk mitigating measures have been included in the ESMP and the implementing agency will be fully sensitivzed to this particular risk. Also, GBV reporting will be integreated in the GRM mechanism and requirements will be included in the bidding documents for a Code of Conduct (CoC) which addresses GBV. Given the reasons above, this risk posed by the project ongender-based violence is not assessed to be significantly adverse.	

construction contract. All land aqcsuition, resettlement, livelihood related impacts mentioned above have been duly dealt with the implementation of the RAP which is at its final stages as of present.

7.b Environmental and Social Management Plan for Construction of Multimodal Transport Terminal Main Building and Infrastructure Facilities

Design Stage	Design Responsibility	Implementation responsibility
1.Inclusion of Green design aspects (recommendations in reference to ESS 3)		

The following Green Design Considerations have been integrated with the design of KMTT building and its facilities enabling to obtain the green building certification.
1. Energy efficiency
• Safe and sustainable energy consumption during the operational stage of KMTT; the following required measures have been incorporated into the design appropriately.
  • Exterior lighting to comply with dark sky standard.
  • Provisions for polycrystalline solar photovoltaic panels.
  • Use of high efficient LED lights. Outdoor light fittings will be IP 65.
  • General purpose lights - minimum efficacy of 100 lm/W and all the high bay lamps, flood lamps and street lamps will be of a minimum efficacy of 130 lm/W.
• Lighting of public areas to be controlled by light dependent relays (LDR) and lighting for toilets and washroom areas to be generally controlled by local passive infra-red (PIR) occupancy sensors. Lighting for office areas will be occupancy sensor controlled and will be dimmable with daylight sensing.
• Maximum use of day lighting has been provided to minimize electricity usage. Light shelves, skylights and light pipes will be incorporated for interior lighting.
• Lighting up the sky walk, the paths and the steps, the trees, the bridges, the arches, the colonnades and the frontage panels with RGB LED bracket mounted landscape lights, LED step lamps, wall mounted solar lamps, RGB LED wall washers and adjustable LED upright lights. Solar street lamps will also be used.
	Design Consultant/PMU (these measures have already been incorporated into the current design of the KMTT)	Contractor /SC

• Establishment of electric charging facility with sufficient number of charging points to meet with the future demand. **2. Water efficiency** • The inclusion of low flow fixtures is considered to reduce water consumption and greywater/ sewage generation without affecting the health and safety of occupants. • Low flush toilet systems via a dual flush system are included expecting less quantity of water usage, saving resources reducing water bills. Low flow urinals, wash basins with water saving pipes will also be used. • Rainwater will be recycled via a rainwater harvesting system. The rainwater collected will be stored in a sump built underground within the premises and pumped up for non-potable purposes. (Garden taps to water the gardens and connected to flush the toilets via cisterns)		
2.Preparation of Stakeholder Engagement Plan (recommendations in reference to ESS 10)		SC/PMU
Stakeholder engagement plan with a realistic timeframe covering preliminary, construction and operation phases has been **prepared and approved (prior to project appraisal)** and implemented effectively ensuring engagement of stakeholders throughout the project cycle.	PMU	PMU
Monitor and report the environmental and social performance against the ESS as relevant to the design stage on a quarterly basis.		PMU
3. Preparation of the Labour Management Procedures (recommendations in reference to ESS 2)		
Labour Management Procedures has been **prepared and approved (prior to project appraisal)** and implemented effectively throughout the project period.	PMU	
4. Permits to be obtained		
Obtain letter of clearance from the NBRO on the final project proposal prior to commencement of any civil works.	PMU	PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
1.0 Pre-construction Stage (recommendations in reference to ESS 1, 4, 6 and 8)						
		The contractor shall submit to the Egineer's approval the contractor's Environmental and Social Management Plan (C-ESMP) to ensure that environmental and social objectives of the projects are met. This ESMP will be used by the contractor to be guided on the structure and control of potential environmental and social issues that are required to be managed to avoide or mitigated adverse consequences. The C-ESMP will address all of the issues addressed here, but not limited to, and wil consists of different sub-plans that will cover health and safety, traffic management, worker camp management, material sourcing, waste disposal	On availability of detail deisgns prior to commencement of any civil works	Engineering Cost	Contractor	SC, PMU
1.1	**Information Disclosure to Stakeholders**					
	(a)	Establish an **Information Center** to share project details to public, stakeholders and to receive complaints	At front yard of Kandy railway station After contract mobilization till end of project	Engineering Cost	Contractor	SC, PMU, KMC
	(b)	Display contact details for public to lodge their complaints/concerns to the contractor at the information centre and at the entrance to the site (refer	At site	Engineering Cost	Contractor,	SC, PMU, KMC
	(c)	Display notice boards and make public announcements on new bus schedules and parking places to inform the public and commuters	Information center Good shed bus stand Railway station and 10 strategic pPublic places in city	-Do-	-Do-	-Do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(d)	Provide sign boards for pedestrians to inform nature and duration of construction works	S.W.R.D. Bandaranayake Road Samagi Mawatha	Contractor's cost	-Do-	-Do-
	(e)	Provide alternative access road for residents via Peradeniya road	-Do-	-Do-	-Do	-Do
	(f)	Carry out discussions with the communities and small, medium & large-scale business owners residing around the immediate vicinity of the Construction sites for the proposed KMTT Main Building at Good Shed & Railway premises, temporary bus terminals set up while KMTT is in construction, alternative roads/routes etc provide them with information on the project activities and implementation of ESMP and GRM through appropriate means such as information boards, leaflets and public notices.	Immediate vicinity of the Construction sites for the proposed Main KMTT Building in Good shed and Railway premises	Engineering Cost	Contractor	SC, PMU,
	(g)	Develop and establish contractor's own procedure for receiving, documenting and addressing complaints from the affected public and nearby communities that is fully in line with and guided by the project's GRM.	Immediately before commencement of civil works	Engineering Cost	Contractor	SC, PMU
	(d)	Ensure to keep a copy of the C-ESMP at all times at the project supervision office on site.	During all Stages of the Project		Contractor	SC, PMU
1.2	**Site Access Closure**					
	(a)	All public access to the site via adequate fencing and signage which prohibit public access completely, in order to avoid risk to the public	During the Construction Stage	Engineering Cost	Contractor	SC, PMU
	(b)	The site entrance will include adequate signage indicating the details of the proposed subproject, implementing agencies etc. as well as safety signage to keep public away.	-do-	-do-	-do-	-do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(c)	A fence shall be erected to cover the entire perimeter of the facility using cost effective fence materials consisting of chain link fence fabric, concrete post, etc. as specified in the Technical Specifications in order to ensure, animals and public are unable to access the site. Full Site covering is required ensuring no access to railway lines. To avoid land disturbance and movement, the fence shall generally follow the contour of the ground. Grading shall be performed where necessary to provide a neat appearance	-do-	-do-	-do-	-do-
1.3	**Work Site Management**					
	(a)	The contractor should provide in the C-ESMP a proposed site layout plan that identifies various zones within the construction site for designated use such as material and equipmebt storage areas, contruction vehcile parking areas, vehicle/equipment maintenance areas, labour camps (if any onsite), temporary spoil storage areas etc which shall be approved by the engineer	During all Stages of the Project	Engineering Cost	Contractor	SC, PMU
	(b)	Parking, repairing vehicles, machinery and equipment shall be stationed only within the work site and/or in any other designated areas by the engineer.	-do-	-do-	-do-	-do-
	(c)	The contractor should provide instruction and advice to drivers and operators (both companies owned and hired) to park vehicles and store equipment at this designated area.	-do-	-do-	-do-	-do-
1.4	**Labor Training and Code of Conduct**					

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(a)	The contractor is required to develop a labor code of conduct indicating specific labour management procedures applicable to different categories of workers including direct and third party contract workers. The labour code of conduct shall be consistent with and part of the overall Labour Management Procedures approved for the KMTT project. (refer 1 above) The labour Code of Conduct shall be translated into local languages upon clearance from the Engineer. The code of conduct must be made available to all staff and displayed in the work site in local languages.	During all Stages of the Project	Engineering Cost	Contractor	SC, PMU
	(b)	Labour Management Plan including labour influx management plan and workers OHS Plan required to be prepared by the Contractor and submit for the approval of the Engineer	Pre construction stage	Engineering cost	Contractor	SC,PMU
	(c)	Labor awareness programs to educate the laborers about the code of conduct, general conduct, the Environmental and SocialManagement Plan, Public and Occupational Health and Safety Plan etc. should be conducted throughout the contract period as per the Labour management plan and OSH plan approved by the Engineer.	During all Stages of the Project	-do-	-do-	-do-
	(d)	No labor under the age of 18 can be hired for work under this contract.		-do-	-do-	-do-
1.5	**Siting of Construction Camps and stock yards**					
	(a)	**The Contractor will prepare oheworker camp management plan and obtain approval from the Engineer**	Preconstruction stage – for all the workers camp sites	Engineering cost	Contractor	SC

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(b)	Care will be taken not to disturb the sensitive areas when selecting sites to locate construction camps, labour camps, stock yards, vehicle refueling areas etc. In addition, strict labour supervision should be undertaken. There should be labour awareness programs to educate the labourers about their general behavior while at work as well as their own safety. Labour supervision, and labour welfare should be on site.	All possible sites in/near the project sites	Engineering Cost	Contractor	PMU
	(c)	Submit the location, layout and basic facility provision of labor camps to Engineer prior to their construction and obtain the written approval of the Engineer before the commencements of the constructions	Prior to commencement of the Construction Activities	Engineering Cost	Contractor	SC, PMU
	(d)	The contractor shall provide necessary living accommodation and ancillary facilities in functional and hygienic manner and as approved by the Engineer.	Labor Camps	Engineering Cost	Contractor	SC, PMU
	(e)	All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage/solid waste disposal system for the camp must be planned and implemented with concurrence from the Local Public Health Inspector (PHI)	Labor Camps	Engineering Cost	Contractor	SC, PMU
	(f)	Provide adequate health care for the work force. The layout of the construction camp and details of the facilities provided should be prepared and shall be approved by the engineer.	Design Stage	Engineering Cost	Contractor	SC, PMU
	(g)	Clear labor camp sites after use and the site should be reinstated to previous condition at the close of the construction work	Labour Camps	Engineering Cost	Contractor	SC, PMU
1.6	**Material Sourcing**					

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(a)	**Preparation of Material Sourcing Plan and submit to Engineer**	**Pre construction**	**Engineering cost**	**contractor**	**SC**
	(b)	The contractor is required to ensure that sand, aggregates and other quarry material is sourced from licensed sources.	Borrow Sites	Engineering Cost	Contractor	SC, PMU
		The contractor is required to obtain the necessary licenses and environmental clearances for all burrow and quarry material they are sourcing to obtain soil, fine aggregate and coarse aggregate. The contractor is required to submit in writing all the relevant copies, numbers and relevant details of all pre-requisite licenses etc. and report of their status to the engineer on a quarterly basis.	Borrow Sites	Engineering Cost	Contractor	SC, PMU
	(c)	Sourcing of any material from protected areas and/or designated natural areas are strictly prohibited.	Borrow Sites		Contractor	SC, PMU
	(d)	If the contractor uses non-commercial borrow/quarry sites, the sites should be remediated accordingly once material sourcing has been completed. The Project Supervision Engineer will require maintaining the numbers and relevant details of all necessary licenses etc. and report of their status accordingly.	Non- commercial burrow sites/quarry sites	Engineering Cost	Contractor	SC, PMU
1.7	**Traffic Safety assessment**					
	1.7.1	Carryout a road safety assessment in order to establish traffic control and safety measures such as road humps, fixing of signage etc. prior to commencement of construction.	Prior to construction	Engineering Cost	Contractor	SC, PMU
		Based on the initial road safety analysis a monitoring plan shall be prepared and submitted to the Engineer.				
	1.7.2	**Safety driver training**				
	(a)	Prepare a driver training plan and establishment of driver safety monitoring system.		Engineering cost	Contractor	SC/PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(b)	Conduct driver training programmes to improve driver and vehicle safety.		Engineering cost	Contractor	SC/PMU
1.8	**Planning of Traffic Arrangements**					
	(a)	The Contractor will prepare a **Traffic Management Plan** in consultation with the KMC, CTB, CP-PTSA and Traffic Police. Information boards on routing of traffic etc. should be pre-installed. Congestion will be an issue due to the high traffic movement during peak hours. So, it is essential to have an approved traffic plan and ensure the contractor sticks to in-out times accordingly. (Effective implementation of the traffic management plan from the preliminary stage of the project is required avoiding unnecessary traffic congestions. The actions towards the reduction of emissions is required for minimizing air pollution. Proper traffic control devices as per the Manual on Traffic Control Devices published by RDA (August 2007) should be used together with traffic diversion and control in order to provide adequate safety measures to ensure the safety of road users and workmen.  	Prior to Construction Activities	Engineering Cost	Contractor	KMC, PMU, Traffic Police, SLTB, CP-PTSA

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		 				
1.9	**Stakeholder engagement plan**					
		Execute the stakeholder engagement plan during the pre-construction stage. **Please note this provision should be read in conjuction with 1.1 above.**	Prior to commencement of construction	PMU cost	PMU	PMU
2.0 Construction Phase						
2.1	**Earthwork and Soil Conservation**					
	2.1.1	**Disposal of Sediments/debris**				
	(a)	The contractor will prepare a **Waste Management and Disposal Plan** that will identify (i) the type and quantity was waste expected to be generated throughout the construction phase and (ii) proposed locations for disposal. This shall be either a stand alone plan or part of the C-ESMP.	Prior to the commencmenet of civil works on site.	Engineering Cost	Contractor	SC, PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(a)	All debris, waste generation from construction activiy, labour camps etc will be disposed only at locations approved by the engineer for such purpose and subjected to the clauses 2.1.1.b and 2.1.1.c.	Disposal sites identified by the contractor prior to commencement of construction work and approved by Engineer are subjected to approval of CEA, DS, LA & Engineer	Engineering Cost	Contractor	SC, PMU
	(b)	Contractor shall obtain the approval from the relevant Local Authority (LA) such as Pradeshiya Sabha, Municipal Council and other government agencies (as required) for disposal of soil at the specified location. Soil transport licenses should be obtained from GSMB to transport excavated soil from the site to the approved locations.	Disposal sites (including temporary and permanent) identified by the contractor and approved by Engineer are subjected to approval of DS, Engineer & KMC	Engineering cost	Contractor	PMU, LA, SC, KMC, CEA, GSMB
	(c)	The debris and spoil shall be disposed in such a manner that; (i) waterways and drainage paths are not blocked (ii) the disposed material should not be washed away by runoff and (iii) should not be a nuisance to the public	-do-	-do-	-do-	-do-
	(d)	If consented by the engineer, contractor can dispose construction debris as land filling material provided that the contractor can ensure that such material is used for legally acceptable purposes and is disposed in a manner that will not be harmful to the surrounding environment.	In identified filling sites subjected to the approval of engineer	- do-	-do-	-do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		The contractor shall do what is necessary in the minimum to ensure the disposal sites are made safe after disposal of the waste (level the waste, ensure drainage and safety)				
	(e)	The contractor shall maintain a waste register in the site office which will keep records of types and quantities of waste removed from the site and places of disposal. The waste registry will be monitored by the PMU staff during project implementation.	At the site office	-do-	Contractor	SC, PMU
	(f)	The contractor shall as much as possible dispose waste on a daily basis (or as necessary given the waste quantities generated and onsite stockpiling space) without allowing to stockpile onsite, at identified locations for debris disposal, recommended by the engineer. During transportation, dispose materials should be covered with tarpaulin.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises	-do-	Contractor	SC, PMU
	2.1.2	**Protection of Ground Cover and Vegetation**				
	(a)	Construction vehicle, machinery and equipment shall be used and stationed only in the areas of work and in any other area designated/ approved by the engineer. Ad-hoc and scattered parking and placement of machinery should be avoided to minimize harm to roadside ground cover. The contractor shall include in the C-ESMP submitted to the engineer a construction site layout plan indicating various areas identified for designated use including parking areas.	Designated vehicle yards	-do-	Contractor	SC, PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(b)	Contractor should provide necessary instructions to drivers, operators and other construction workers not to destroy ground vegetation cover unnecessarily. Designated vehicle parks and maintenance yards must be informed to labour force.	-do-	-do-	-do-	-do-
	(c)	Top soil of productive areas where it has to be removed for the purpose of this project shall be stripped to a specified depth of 150mm and stored in stockpiles of height not exceeding 2m, if directed by the engineer. If the contractor is in any doubt on whether to conserve the topsoil or not for any given area he/she shall obtain the direction from the engineer in writing Removed top soil could be used as a productive soil when replanting/establishing vegetation under landscaping plans Stockpiled topsoil must be returned to cover the areas including cut slopes where the topsoil has been removed due to project activities. Residual topsoil must be distributed on adjoining/proximate barren areas as identified by the engineer in a layer of thickness of 75mm – 150mm. Topsoil thus stockpiled for reuse shall not be surcharged or overburdened. As far as possible multiple handling of topsoil stockpiles should be kept to a minimum.	-do-	-do-	-do-	-do-
	2.1.3	**Contamination of Soil by fuel & Lubrications**				
	(a)	Vehicle/machinery and equipment servicing and maintenance work shall be carried out only in designated locations/ service stations approved by the engineer.	Servicing yards to be used for vehicle servicing	Engineering cost	Contractor	SC, PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		The contractor shall include in the C-ESMP submitted to the engineer a construction site layout plan indicating various areas identified for designated use including equipment/vehicle service areas.				
	(b)	Approval from CEA in the form of an Environmental Protection Licenses (EPL) should be secured by the contractor if he intends to establish his own vehicle servicing yard	-do-	-	-do-	SC, PMU
	(c)	Waste oil, other petroleum products and untreated wastewater shall not be discharged on ground so that to avoid soil pollution. Clean up measures shall be taken against pollution of soil by spillage of petroleum/oil products from storage tanks and containers. All waste petroleum products shall be disposed of in accordance with the guidelines issued by the CEA or the engineer (See Annexure 2 & 3)	Servicing yards to be used for vehicle servicing and locations where vehicles will be temporarily stationed	Engineering cost	-do-	SC, PMU
	(d)	Sites used for vehicle and plant service and maintenance shall be restored back to its initial status. Site restoration will be considered as incidental to work.	New servicing yards developed by the contractor for the project	Engineering cost	-do-	-do-
	2.1.4	**Management of hazardous waste**				
	(a)	Contractor prior to the commencement of work shall provide list of harmful, hazardous and risky chemicals/ material that will be used in the project work to the Engineer. Contractor shall also provide the list of places where such chemicals/materials or their containers or other harmful	Locations identified to store chemicals and waste disposal	-	Contractor	SC, PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		materials have been dumped as waste at the end of the project, via the waste register.				
	(b)	Handling of hazardous waste shall be according to the guidelines stipulated as per the national framework (annexure 15)	-Do-	-	-do-	SC, PMU
	(c)	Asbestos Containing Materials (ACM) shall not be used for any temporary and permanent work on the KMTT site.				
	(d)	All disposal sites should be approved by the engineer and approved by CEA and relevant local authority.	-Do-	-	-do-	SC, PMU
	(d)	The contractor shall clean up any area including water-bodies affected/contaminated (if any) as directed by the engineer at his own cost.	All affected water bodies close to material storage and waste disposal sites	Engineering cost	-do-	-do-
2.2	**Storage, transport and handling of construction material**					
	2.2.1	**Emission of Dust**				
	(a)	Dust emissions should be controlled by wet spraying of construction sites and roads which are used for transportation of Construction materials at regular intervals. Tarpaulin covering is mandatory on trucks /lorries which are used for transporting materials All stockpiles including temporary storage of debris and construction materials should be covered using tarpaulin covering.	At all material storage locations	Engineering cost	contractor	SC, PMU
	(b)	Noise and Dust barriers with minimum height of 4m should be erected around entire working sites to control dust emission to the ambient air. Selection of the suitable material	Construction sites for the proposed KMTT Main Building at	Engineering cost	Contractor	SC, PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		for the barriers is subject to approval of the Engineer. Dust barriers shall be established along with the construction to cover the entire site.	Good Shed and Railway premises			
	(c)	Vehicles should be maintained in good condition regularly so that noise generating from wear and tear will be minimal.	-do-	Engineering cost	Contractor	SC, PMU
	(d)	The construction materials intended for temporarily storage should be properly stockpiled in most appropriate areas in the Site to avoid disturbance to site mobility, traffic and stored away from drainage paths and suitably covered (with artificial barriers or vegetation) to avoid washout. The contractor shall include in the C-ESMP submitted to the engineer a construction site layout plan indicating various areas identified for designated use including material storage areas	-do-	Engineering cost	Contractor	SC, PMU
	(e)	All vehicles delivering materials shall be covered to avoid spillage and dust emission.	-do-		Contractor	SC, PMU
	(f)	The contractor should enforce vehicle speed limits to minimize dust generation. Please refer section 1.9.2 on traffic management for transport routes and times of the day that transport of construction material to the site is allowed.	-do-		Contractor	SC, PMU
	2.2.2	**Storage of fuel, oil and chemicals (avoid fumes and offensive odor)**				
	(a)	All cement, bitumen (barrels), oil and other chemicals should be stored and handled on an impervious surface (metal sheet, concrete slab) above ground level.	At all material storage locations (cement, bitumen, fuel, oil and other chemicals used for	Engineering cost	-do-	-do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		Storage facility of cement, bitumen (barrels), oil and other chemicals should be an enclosed structure ensuring that no storm water flows in to the structure. Alternatively, if the storage is not enclosed a ridge should be placed around the storage facility to avoid runoff getting in to the structure. Adequate ventilation should be kept to avoid accumulation of fumes and offensive odour that could be harmful to material handlers.	construction activities)			
	2.2.3	**Efficient use of materials**				
		Efficient use of all construction material in order to reduce waste generation.	All material use locations	Engineering cost	-do-	-do-
	2.2.4	**Use of hazardous materials**				
		All use of chemicals and hazardous materials will be subject to national and international regulations and requirements. Their use will be minimized and their release will be controlled.	All material use locations	Engineering cost	-do-	-do-
2.3	**Water – Protection of Water Sources, Water Quality and Dewatering**					
	2.3.1	**Loss of minor water sources and disruption to water users**				
	(a)	Arrange adequate supply of water for the project purpose throughout the construction period in consultation with the Kandy Municipal Council (KMC). The contractor should discuss the daily requirement for potable and non-potable water and confirm with the KMC that the demand can be met through their supply connection.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises, labour camps and	Engineering cost	-do-	-do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
			vehicle servicing yards.			
	(b)	Do not extract water from surface water bodies or water sources without the permission from Engineer & relevant authority. Obtain permission for extracting ground water, if needed, prior to the commencing of the project, from the relevant authority.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises	-do-	-do-	-do-
	(c)	Water and wastewater contaminated with engineering chemical should not be directly diverted to the common drains. Water from dewatering actitvity, contaminated water with silt, cement or any other chemicals should not be directly diverted to the main drains or Meda Ela but first directed to settling tank on site and only the treated effluent shall be discharged to the Meda Ela. Similarly, the contractor shall control contamination of run-off water during maintenance & operation of equipment by directing the wasteqwater to a settling tank and oil separator prior to discharging to the Meda ela/other public drains. All types of wastewater discharged from the site should meet the minimum standards stipulated by the CEA for discharge into local waterbodies.	-do-	-do-	-do-	-do-
	(d)	Adopt low flow fixtures to reduce fresh water consumption and recycle grey water as technically and financially feasible within the labour camps and construction site.	Construction sites	-do-	-do-	-do-
	2.3.2	**Locating, sanitation and waste disposal in construction camps**				

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(a)	Locations selected for labour camps should be approved by engineer and comply with guidelines/ recommendations issued by the CEA/Local Authority (LA). Construction of labour camps shall not be located within 200m from waterways (onsite or offsite) or near to a site or premises of religious, cultural or archeological importance and school.	Sensitive locations such as Temples, Kovils, Churches, Schools, etc.	Engineering cost	Contractor	SC, PMU
	(b)	Labour camps shall be provided with adequate and appropriate facilities for disposal of sewerage and solid waste. The sewage systems shall be properly designed, built and operated so that no pollution to ground or adjacent water bodies/watercourses takes place. Garbage bins shall be provided the camps and regularly emptied. Garbage should be disposed in a hygienic manner, to the satisfaction of the relevant norms. Compliance with the relevant regulations and guidelines issued by the CEA/LA shall be strictly adhered to.	At all labour camps	Engineering cost	-do-	-do-
	(c)	Contractor shall ensure that all camps are kept clean and hygienic. Necessary measures shall be taken to prevent breeding of vectors	-Do-	Engineering cost	-do-	-do-
	(d)	Contractor shall report any outbreak of infectious disease of importance in a labour camp to the engineer and the Medical Officer of Health (MOH) or to the Public Health Inspector (PHI) of the area immediately. Contractor shall carry out all instructions issued by the authorities, if any.	With special attention near to labour camps		-do-	-do-
	(e)	Contractor shall adhere to the CEA recommendations on disposal of wastewater. Wastewater shall not be discharged to ground or waterways in a manner that will cause unacceptable surface or ground water pollution.	At all labour camps		-do-	-do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(f)	All relevant provisions of the Factories Act and any other relevant regulations aimed at safety and health of workers shall be adhered to.	-Do-		-do-	-do-
	(g)	Contractor shall remove all labour camps fully after its need is over, empty septic tanks, remove all garbage, debris and clean and restore the area back to its former condition.	-Do-	Engineering cost	-do-	-do-
	2.3.3	**Wastage of water and waste minimization**				
	(a)	The contractor will minimize wastage of water in the construction process/operations by reusing water as much as possible, utilizing only the required amount of water for the construction works etc. The contractor shall maintain a record of usage of water for various purposes and sources tapped.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises, labour camps and vehicle servicing yards.		Contractor	PMU, KMC, CEA,SC
		The contractor will adopt measures that are technically and financially feasible that avoid or minimize water usage throughout the construction period.	All construction sites	Engineering cost	Contractor	PMU, SC
2.4	**Flood Prevention due to blocked drainage and control of soil erosion**					
	2.4.1	**Blockage of drainage paths and drains**				
	(a)	The contractor is required to implement a proper on-site storm water drainage management system avoiding blocking of Meda Ela and connecting streams leading to floods directly caused by any construction activity. The contractor shall first obtain the Engineer's approval in writing for the Drainage Management Plan. Contractor shall	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises	Engineering cost	Contractor	PMU, SC, KMC,RDA

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		carry out a prior investigation on potential flood situations and report to the Consultant. Contractor shall maintain the Meda Ela (section within the site) and if the canal structures are damaged the Contractor is responsible to restore the drainage path back to its original status ensuring smooth water flow.				
	(b)	The on-ste storm water drainage management plan will identify specific locations for silt traps, catch pits and retention ponds within the site, if any, that will be installed during the construction period (and as instructed by the Engineer) to avoid excessive mixing of fines and potentially contaminated material being released into Meda Ela and Connected Drains. A permanent silt trap should be constructed and properly maintained at the end point of the underground section of Meda Ela during the construction period to minimize downstream siltation of the stream. Regular maintaining and desilting of the silt traps and catch pits should be done in order to maintain the proper functioning of silt traps and catch pits. Disposal of the silt shall be done by the contractor at sites approved by the KMC.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises, Kandy lake, labour camps and vehicle servicing yards.	Engineering cost	Contractor	PMU, SC,
	(c)	If flooding or stagnation of water is caused by contractor's activities, contractors shall provide suitable means to (a) prevent loss of access to any land or property and (b) prevent damage to land and property. Contractor shall compensate for any loss of income or damage as a result.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises	Engineering cost	Contractor	PMU,SC, KMC

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(d)	Significant quantity of slurry will be generated due to piling actions and it has to be managed with proper engineering intervention avoiding direct disposal to the Meda Ela, connecting streams and onsite drainage paths. Residues shall be disposed on regular basis to maintain a proper site management. Bentonite mixed wastewater from piling activity will be directed to a settlement tank where the Bentonite will be separated and reused. The contractor will check the quality of he effluent and subject it to further treatement, if necessary, prior to discharge into the Meda Ela or other public drains.	Construction sites for the proposed KMTT Main Building	Engineering cost	Contractor	SC,PMU, KMC
	2.4.2	**Soil erosion control**				
		The contractor shall ensure drainage paths within the construction site are well defined and that soil erosion and sediment control devices are installed, at appropriate locations, inspected and maintained as required, especially to ensure that Meda Ela does not receive large amounts of silt and soil particles. (Typical measures include the use of berms, dikes sediment basins, fiber mats, drains etc). The contractor shall indicate on a site layout plan the drainage network and strategic locations in wich soil erosion control devices will be installed and shall include so in the C-ESMP. The contractor shall, to the extent possible, schedule/stage works to minimise cleared areas and exposed soils at a given time. Barricades such as humps shall be erected around excavated areas for culverts, silttraps, foundations, as some work in	Construction sites for the proposed KMTT Main Building	Engineering cost	Contractor	SC, PMU, KMC

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		these sections will have to be stopped during heavy rains due to heavy erosion. To prevent soil erosion in these excavated areas, proper earth drain system should be introduced complete with silt traps/silt curtains, as most appropriate. The ground shall not be unduly exposed to erosive forces, such exposed slopes shall be covered by a geotextile or other suitable materials per the specifications (especially in wet weather periods). Work that lead to heavy erosion shall be avoided during the raining season. If such activities need to be continued during rainy season prior approval must be obtained from the Engineer by submitting a proposal on actions that will be undertaken by the contractor to prevent erosion. All sedimentation and pollution control works and maintenance thereof are deemed, as incidental to the earthwork.				
	2.5.1	**Generation of Dust**				
	(a)	The contractor shall effectively manage the dust generating activities such as handling and transporting sand, rubble, bitumen, and cement during periods of high winds or during more stable conditions with winds directed towards adjacent residences and other facilities. The Contractor shall erect a dust/noise barrier has around the site, especially in the northern and southern perimeters that border buildings and railway station, respectively.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises, labour camps and vehicle servicing yards., storage locations of sand, rubble, bitumen,	Engineering cost	Contractor	SC, PMU
	(b)	All vehicles delivering materials shall be covered to avoid spillage and dust emission.		-do-	-do-	-do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(c)	The Contractor should avoid, where possible and take suitable action to prevent dirt and mud being carried to the roadway (particularly following wet weather).	cement and all roads used for material transportation,	-do-	-do-	-do-
	(d)	The contractor should enforce vehicle speed limits to minimize dust generation.		-do-	-do-	-do-
	(e)	The Contractor shall employ a water truck to sprinkle water for dust suppression on all exposed areas as required (note: the use of waste water / waste oil for dust suppression is prohibited)		-do-	-do-	-do-
	(f)	All existing roads used by vehicles of the contractor, or any of his sub-contractor or supplies of materials or plant and similar roads which are part of the works shall be kept clean and clear of all dust/mud or other extraneous materials dropped by such vehicles or their tyres.		-do-	-do-	-do-
	(g)	Clearance shall be affected immediately by manual sweeping and removal of debris, or, if so directed by the Engineer, by mechanical sweeping and clearing equipment. Additionally, if so directed by the Engineer, the road surface will be hosed or sprinkled water using appropriate equipment's.		-do-	-do-	-do-
	(h)	Plants, machinery and equipment shall be handled (including dismantling) so as to minimize generation of dust.		-do-	-do-	-do-
	2.5.2	**Odour and offensive smells**				
	(a)	Contractor shall take all precautions such as storing all chemicals used for construction works in properly closed containers with good ventilations to prevent odour and offensive smell emanating from chemicals and processes applied in construction works or from labour camps. In a situation when/where odour or offensive smell does occur	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises, labor camps and	Engineering cost	Contractor	SC, PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		contractor shall take immediate action to rectify the situation. Contractor is responsible for any compensation involved with any health issue arisen out of bad odour and offensive smells.	vehicle servicing yards. Storage locations of bitumen and chemicals.			
	2.5.3.	**Emission from construction Vehicles, Equipment and Machinery**				
	(a)	The emission standards promulgated under the National Environment Act shall be strictly adhered to.	All plants, machinery and vehicles used for construction	-	Contractor	SC, PMU
	(b)	All vehicles, equipment and machinery used for construction shall be regularly serviced and well maintained to ensure that emission levels comply with the relevant standards.	-Do-	Engineering cost	-do-	-do-
	(c)	Contractor should obtain the certificate issued by the Vehicular Emission Test (VET) for all construction vehicles, plants and other machineries and it should be renewed annually. The contractor shall subnmit copies of VET certificates to the Engineer.	-Do-	-Do-	-do-	-do-
2.6.	**Noise Pollution and Vibration**					
	2.6.1	**Noise from Vehicles, Plants and Equipment.**				
	(a)	The contractor shall maintain the average noise levels within the constructin site during the day time to 75 dB and night time to 50dB (National Standards stipulated by the CEA)[6]				
	(b)	Noise barriers (cum dust) with minimum height of 4m shall be installed around the site as shown in the following figures and the construction noise levels outside the noise barriers should be maintained below 75dB during day time.	Around the site or as justified on the northern and southern perimeters of the site.	Engineering Cost	Contractor	SC, PMU

[6] Maximum permissible noise levels stipulated under the Extraordinary Gazette No. 924/12- Thursday, May 23, 1996 by the Central Environmental Authority (CEA) of Sri Lanka for construction sites.

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		  Within the site, the contractor shall measure noise levels on a monthly basis, or as per requirement, and report to the Engineer through through the constractor's monthly progress reports. Where, exceedences are noted, that can adversely affect construction workers, the contractor shall propose methods to control noise levels. All machinery and equipment should be well maintained and fitted with noise reduction devices in accordance with manufacturer's instructions.	SLCTB buildings at Good Shed Bus Terminal, SLR buildings.at Railway Premises, KMC buildings/shops and & other buildings and vehicle servicing areas. All machinery and vehicles			

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(c)	All vehicles and equipment used in construction shall be fitted with exhaust silences. During routine servicing operations, the effectiveness of exhaust silencers shall be checked and if found to be defective shall be replaced. Notwithstanding any other conditions of contract, noise level from any item of plant(s) must comply with the relevant legislation for levels of sound emission. Non-compliant plant shall be removed from site.	All equipment, machinery and vehicles used for underground drainage improvement works	Engineering cost	-do-	-do-
	(d)	Maintenance of vehicles, equipment and machinery shall be regular and proper, to the satisfaction of the Engineer, to keep noise from these at a minimum.	-do-	Engineering cost	-do-	-do-
	(e)	Workers in vicinity of strong noise, and workers working with or in crushing, compaction, batching or concrete mixing operations shall be provided with protective gear.	-do-	Engineering cost	-do-	-do-
	(f)	The contractor shall carry out noise measurements to ensure compliance with CEA standards. The locations and frequency of measurements shall be decided and mapped and submitted to the PMU in the contractor's method statement.				
	2.6.2	**Vibration**				
	(a)	Contractor shall take appropriate action to ensure that construction works do not result in damage to the adjacent properties due to vibration.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises	-	Contractor	PMU,SC
	(b)	Prior to commencement of the construction activities at the Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises, a pre- construction crack	Construction sites for the propose Construction sites for	-	-do-	-do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		survey of permanent structures shall be carried out 50 m distance from the outer boundary of the existing structure. This pre-condition crack survey should be a well-documented detailed survey including all existing cracks of the structures with sketch of the building including photographic evidences, marked in position to indicate the present condition with the date on which it was checked, if necessary to paste a microscopic glass slide across the crack to monitor the propagation of cracks and should be approved by the Engineer prior to work commencing on sites. .	the proposed KMTT Main Building at Good Shed and Railway premises			
	(c)	Contractor shall pay due consideration on vibration impacts of construction on adjoining structures. In the event vibration levels are found to be exceeding national standards, he shall modify the method of construction until compliance with stipulated national vibration standards are met.	-do-	-	-do-	-do-
	(e)	The contractor shall carry out vibration measurements to ensure compliance with national standards. The locations and frequency of measurements shall be decided and mapped and submitted to the PMU in the contractor's C-ESMP.	Locations to be identified during project implementation that are considered most strategic for the purpose of monitoring.			
2.7	**Impacts to Flora**					
	2.7.1	**Loss or Damage to Trees and Vegetation**				

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(a)	All construction works shall be carried out in a manner that the destruction to flora and their habitats is minimized. Trees and vegetation shall be felled / removed only if that impinges directly on the permanent works or necessary temporary works. The tentative list of trees that impinges on the construction footpint of the KMTT is identified and provided in page 28, this list will need to be validated against the finalized building layout and each tree removal justified. In all such cases of tree removal contractor shall take prior approval from the Engineer prior to removal with a justification as to why the removal is unavoidable.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises, disposal sites, labour camps, vehicle servicing yards. Offsite areas such as burrow pits, quarries and batching plants, disposal sites, parking/vehicle service yards etc,if any.	Engineering Cost	Contractor	PMU, DS, DoF, CEA,SC
	2.7.2	**Chance found important Flora**				
	(a)	During construction, if rare/threatened/endangered flora species is found, it shall be immediately informed to the PMU by the contractor. All activities that could destroy such flora and/or its habitat shall be stopped with immediate effect. Such activities shall be started only after obtaining the Engineer's approval. Contractor shall carry out all activities and plans that the Engineer instructed him to undertake to conserve such flora and/or its habitat.	Construction sites for the proposed KMTT main building at Good Shed and Railway premises, disposal sites, labour camps, vehicle servicing yards. Offsite areas such as burrow pits, quarries and batching plants, disposal sites, parking/vehicle	-	Contractor	PMU, DoF, DWLC,SC

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
			service yards etc,if any.			
2.8	**Impact on Fauna**					
	2.8.1	**Loss, Damage or Disruption to Fauna**				
	(a)	All works shall be carried out in such a manner that the destruction or disruption to the fauna and their habitats is minimum.	Construction sites for the proposed KMTT main building at Good Shed and Railway premises. Offsite areas such as burrow pits, quarries and batching plants, disposal sites, parking/vehicle service yards etc, if any.		Contractor	PMU, SC
	(b)	Construction workers shall be instructed to protect fauna including birds and animals as well as their habitats. Hunting shall be strictly prohibited.	-do-		Contractor	PMU, SC
	2.8.2	**Chance find important Fauna**				
	(a)	During construction, if a rare/threatened/endangered fauna species is found, it shall be immediately informed to the PMU by the contractor. All activities that could destroy such fauna and/or its habitat shall be stopped with immediate effect. Such activities shall be started only after obtaining the Engineer's approval. Contractor shall carry out all activities and plans that the Engineer instructed him to undertake to conserve such fauna and/or its habitat.	-do-	-	Contractor	PMU, SC, DWLC

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
2.9	**Disruption to Users**					
	2.9.1	**Traffic Jams & Congestion**				
	(a)	The contractor will prepare a **Traffic management plan** in consultation of the city traffic committee and duly disclosed to the public. In order to ease traffic within the city, transport of construction material and machinery will be done prior to 6.00 am and after 8.00 pm. During school traffic hour's transportation of construction materials and heavy machinery shall not be done. If directed by the Engineer the contractor shall obtain the consent for the traffic arrangement from the Police Traffic Division, Kandy.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises, disposal sites, labour camps, vehicle servicing yards	-	Contractor	PMU, RDA LA,Police, SLTB, CP-PTSA
	(b)	Special consideration shall be given in the preparation of the traffic management plan ensuring the safety of pedestrians and workers at night.	-do-	-	-do-	-do-
	(c)	Personnel used for traffic control by the contractor shall be properly trained, provided with proper gear including communication equipment, luminous jackets for night use. All signs, barricades, pavement markings used for traffic management should be to the standards and approved by the Engineer/ Police.	-do-	-do-	-do-	-do-
	(d)	The manual of traffic control devices of RDA Should be followed during construction period in order to ensure the safety and traffic control.	-do-	-	-do-	-do-
	2.9.2	**Traffic Control and Safety**				

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(a)	The Contractor shall take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as may be required by the Engineer for the information and protection of traffic. The provision of traffic safety measures shall be considered incidental to work and follow The Institute for Construction Training and Development (ICTAD) guidelines and instructions given by the Police, if any.	Railway premises, disposal sites,	Engineering cost	Contractor	SC, PMU,
	(b)	Informing the public through newspapers/ announcements/ radio/ TV etc. about the construction activities in order to avoid any inconveniences due to the construction activities.	Project influence area	Engineering cost	-do-	-do-
	(c)	Provide information and boards at each strategic locations indicating basic info – times of closure, diversion routes etc.	-do-	Engineering cost	Contractor	SC, PMU
2.10	**Traffic Safety assessment**					
	(a)	**Road safety monitoring plan** shall be implemented throughout the construction period. Monitoring incidents and accidents and monthly reporting shall be required.	During the construction	Engineering Cost	Contractor	SC, PMU
	(b)	Appropriate safety improvement measures shall be implemented avoiding incidents due to movement of construction vehicles based on the periodic review of reports.	During the construction	Engineering Cost	Contractor	SC, PMU
2.11	**Public and Worker Health and Safety**					
	2.11.1	**Accidents and risks**				
	(a)	The contractor will employ a qualified **Helath and Safety Specialist** in his team. He/she will submit to the engineer a comprehensive **Health and Safety Plan** for the site which will be based on an assessment of OSH ad public safety risks	Construction period	Engineering cost	Contractor	SC, PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		in relation to various types of construction activity and which covers the entire construction period. The H&S specialist will oversee its implementation regularly assessing the risk of various hazards and adopting mitigation measures (a suggested TOR for the specialist is attached to the EMP) *The following sections highlight some of the key aspects the H&S plan should cover but not be limited to;*				
	(b)	Entrance to the construction sites for general public shall be strictly restricted during the construction period. All reasonable precautions will be taken to prevent danger of the workers and the public from accidents such as fire, explosions, blasts, falling rocks, falling to excavated pits, chemical sprays, unsafe power supply lines etc.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises, Labour camps, vehicle servicing yards, temporary storage site, contractor's own burrow/quarry/plant sites and all disposal sites	Engineering cost	Contractor	SC, PMU
	(c)	The Contractor shall comply with requirements for the safety of the workmen as per the international labor organization (ILO) convention No. 62 and Safety and Health regulations of the Factory Ordinance of Sri Lanka to the extent that those are applicable to this contract. The contractor shall supply all necessary safety appliances such as safety goggles, helmets, masks, boots, etc., to the workers and staff. The contractor has to comply with all regulations regarding safe scaffolding,	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises, Labour camps, vehicle servicing yards, temporary	Engineering Cost	Contractor	SC, PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		ladders, working platforms, gangway, excavations, trenches and safe means of entry. Fixing of ion structures for sky walk will be an activity carried out while the railway is functioning. Special safety arrangement is required and these shall be clearly spelt out in the H&S plan.	storage site and all disposal sites			
	(d)	Safety measures should be applied to prevent from falling of workers, equipment and materials from the higher elevation to the ground for the safety of general public and workers.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises	Engineering Cost	Contractor	SC, PMU
	2.11.2	**Prevention of Risks due to Electrocution**				
		All electrical wiring and supply related work should confirm to British Standards (BS) or relevant Sri Lankan Standards. Adequate precautions will be taken to prevent danger of electrocuting from electrical equipment and power supply lines including distribution boards, transformers, etc. Measures such as danger signboards, danger/red lights, fencing and lights will be provided to protect the public and workers. All electric power driven machines to be used in the construction shall be free from defect, be properly maintained and kept in good working order, be regularly inspected and as per BS provisions and to the satisfaction of the Engineer.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises, material storage and worker camps contractor's own burrow/quarry/plant sites and all disposal sites	Engineering cost	Contractor	SC, PMU
	2.11.3	**Prevention of Risks at Hazardous Activities associated with construction activities.**				
	(a)	All workers employed in hazardous activities shall be provided with necessary protective gear. These activities	Construction sites for the proposed KMTT	Engineering cost	Contractor	SC, PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		include mixing asphalt material, cement, lime mortars, concrete etc., welding work, work at crushing plants, operators of machinery and equipment such as power saws, etc.	Main Building at Good Shed and Railway premises, Labour camps, vehicle servicing yards, temporary storage site and all disposal sites, contractor's own burrow/quarry/plant sites			
	(b)	The use of any toxic chemicals shall be done strictly in accordance with the manufacturer's instructions. The Engineer shall be notified of toxic chemicals that are planned to be used in all contract related activities. A register of all toxic chemicals delivered to the site shall be kept and maintained up to date by the Contractor. The register shall include the trade name, physical properties and characteristics, chemical ingredients, health and safety hazard information, safe handling and storage procedures, and emergency and first aid procedures for the product.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises, Labour camps, vehicle servicing yards, temporary storage site and all disposal sites, contractor's own burrow/quarry/plant sites	Engineering cost	Contractor	SC, PMU
	2.11.4	**Lead Pollution**				
	(a)	No paint containing lead or lead products will be used except in the form of paste or readymade paint. Facemasks shall be supplied to workers who are working in spray painting or scraping lead paints.	Construction sites for the proposed KMTT Main Building at Good Shed and	-	Contractor	SC/PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
			Railway premises where spray painting is done			
2.12	**Health and Safety**					
	2.12.1	**Prevention of Vector based Diseases**				
	(a)	Contractor shall take necessary actions to prevent breeding of mosquitoes at places of work, labour camps, plus office and store buildings. Stagnation of water in all areas including gutters, used and empty cans, containers, tyres, etc shall be prevented. Approved chemicals to destroy mosquitoes and larvae should be regularly applied. All borrow sites should be rehabilitated at the end of their use by the contractor in accordance with the requirements/guidelines issued by the Central Environmental authority and relevant local authorities	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises, Labour camps, vehicle servicing yards, temporary storage site, contractor's own burrow/quarry/plant sites and all disposal sites.	Engineering cost	Contractor	SC/PMU, LA
	(b)	Contractor shall keep all places of work, labour camps, plus office and store buildings clean devoid of garbage to prevent breeding of rats and other vectors such as flies.	-do-	-do-	-do-	-do-
	2.12.2	**Prevention of water-borne, water-based, water related diseases**				
	(a)	Extra precautions should be given for; Use good environmental management practices to clean the work site and labour camps regularly.	All construction sites, labour camps	Engineers cost	Contractor	SC, PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		Make the work force aware to practice good personal hygiene measures. Make aware of food safety precautions to make the work force aware of the fundamentals of food safety. Supply properly treated water for the workers.				
	2.12.3	**Managing Gender Base Issues of Workers, Risk of Adverse Impacts on Communities from Project Induced Labor Influx** (Absence of enough sanitary facility for women workers, use of child labor, wage disparity, entitlement of leave, lack of awareness among workers, encouraging local community for works. The risks of adverse impacts on communities from temporary project induced labor influx E.g: sexually transmitted diseases)				
	(a)	The contractor shall give priority to selecting labor from project influenced areas so as to minimize the need for erecting labor camps and minimizing labor influx.	N/A	N/A	Contractor,	Supervision Consultant, KMC, PMU
	(b)	Frequent supervision of laborers' activities, labor welfare needs, and action to ensure hygienic conditions in the work sites/ camps	Camps/ Yards/ Construction area	N/A	-Do-	-Do-
	(c)	The contractor will ensure to avoid illegal lodging arrangements by workers recuited by contractors	Project Influence Area	Engineer's Cost	-Do-	-Do-
	(d)	Avoid social conflicts among contactor's labor force and the surrounding community or tension and prevalence of gender-based violence through the implementation of LMP.	-Do-	-Do-	Contractor,	Supervision Consultant, KMC, Police, PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(e)	Conduct awareness programs to labor force on good hygienic practices and dangers of sexually transmitted diseases such as HIV/AIDS.	Camps/Yards	Engineer's Cost	Contractor	Supervision Consultant, KMC, MOH, PMU
	(f)	Conduct awareness program to host community on Gender Based Violence (GBV), good hygienic practices and dangers of sexually transmitted diseases such as HIV/AIDS.	Project Influence Area	Engineer's Cost	-Do-	-Do-
	(g)	Introduce a code of conduct for labor teams to prevent alcohol and drug abuse, violence, sexual abuse etc	Camps/ Yards/ Construction area	Contractor Cost	Contractor,	Supervision Consultant, PMU
	(h)	Continue consultation and interaction with host community	Project Influence Area	Contractor Cost	Contractor,	Supervision Consultant, KMC, MOH, PMU
	(i)	Prepare an inventory (including names/ National ID numbers/ addresses etc) of entire labor force employed by contractor, and share with the Engineer. This inventory shall be updated at each recruitment or resignation of labours..	N/A	N/A	Contractor,	Supervision Consultant, PMU
	(j)	The contractor shall have a clear recruitment procedure for workers to avoid adhoc recruitments. Contractor shall sign agreements on conditions and rights of each labour before recruitment	N/A	N/A	-Do-	-Do-
	(k)	The contractor shall provide water and sanitation facilities for employees/laborers (1 toilet/15 persons) and separate facilities for men and women (refer 2.3.2).	Camps/Yards/Site	-Do-	-Do-	-Do-
	(l)	Contractor shall provide a source of potable water and clean eating place for workers, at a location not exposed to hazardous or noxious substances (refer 2.3.2).	-Do-	-Do-	-Do-	-Do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(m)	Equal participation of women for work shall be encouraged and ensure wage parity during implementation of the project according to the policy of Sri Lankan Government sector recruitment; women are given equal pay for work of equal value. (This will be included in the contractual agreements)	N/A	-Do-	-Do-	-Do-
	(n)	The contractor shall not employ children less than 16 years of age and not employ young persons between ages between 16 and 18 and women in dangerous jobs such as mining, excavation, operating heavy vehicles & machinery, electric works, blasting & explosive works.	N/A	-Do-	-Do	-Do
	(o)	The contractor shall ensure entitlement of leave for workers according to the Shop and Office Employees (Regulation of Employment and Remuneration) Act.	-Do-	N/A	-Do	-Do
	(p)	The contractor shall refrain from trafficking of men, women and children for labour work	-Do	-Do	Contractor,	Supervision Consultant, KMC, MOH, PMU
	(o)	GBV reporting will be integreated in the GRM mechanism	Project Influence Area	Do	Contractor	Supervision Consultant, PMU
	2.12.4	**First Aid**				
	(a)	At every workplace, first aid kit shall be provided as per the regulations. At every workplace an ambulance room containing the prescribed equipment and nursing staff shall be provided.	Construction sites for the proposed KMTT Main Building at Good Shed and Railway premises, Labour camps, vehicle servicing	Engineering cost	Contractor	SC, PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
			yards, temporary storage site, contractor's own burrow/quarry/plant sites and all disposal sites			
	2.12.5	**Potable Water**				
	(a)	In every workplace and labour camps portable water shall be available throughout the day in sufficient quantities.	-do-	-do-	-do-	-do-
	2.12.6	Incident/accident notification system is missing in the table. There should be an incident classification and notification system between contractor-PMU and PMU-WB. The incident/accident investigation system (especially in case of fatalities/serious accidents) should also be described here.				
2.13	**Protection of Archeological Properties**					
	2.13.1	**Prevention of damage to Cultural and Religious Places and Properties**				
	(a)	During construction activities the contractor should take all necessary and adequate care to minimize impacts on cultural properties which includes cultural sites and remains, places of worship. Workers should not be allowed to trespass in to such areas.	Potentially in disposal sites, storage areas, labour camps, contructor's own burrow/quarry/plant sites.	-	Contractor	PMU, SC, & Department of Archeology, religious leaders
	2.13.2	**Chance found Archaeological property. (Procedures to be followed :Reference annexure 17)**				
	(a)	All fossils, coins, articles of value of antiquity and structures and other remains or things of geological or archaeological	Construction sites for the proposed KMTT	-	Contractor	PMU, SC, & Department

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		interest etc. discovered on the site and/or during construction work shall be the property of the Government of Sri Lanka, and shall be dealt with as per provisions of Antiquities Ordinance of 1940 (Revised in 1956 & 1998)	Main Building at Good Shed and Railway premises, Labour camps, vehicle servicing yards, temporary storage site and all disposal sites			of Archeology, religious leaders
	(b)	Upon such discovery, the contractor shall take reasonable precaution to prevent his workmen or any other persons from removing/damaging any such article and shall immediately inform the Engineer. Upon instruction from the Engineer, the contractor shall follow the following steps; • Immediately stop construction activities (in discussion with the Engineer construction work may be stopped within a 100m or so, if not the entire site). • Delineate the discovered site area and secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remains, a night guard should be present until the responsible authority takes over. • Through the Engineer, notify the responsible authorities, the Department of Archaeology and local authorities within 24 hours. • Submit a brief chance find report, within a specified time period, with date and time of discovery, location of			Contractor	PMU, SC, & Department of Archeology, religious leaders

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		discovery, description of finding, estimated weight and dimension of PCR and temporary protection implemented. • Responsible authorities would be in charge of protecting and preserving the site before deciding on follow up procedures to be carried out. • Co-operate with the Department of Archaeoloy who may decide to either remove the PCR deemed to be of significance, further excavate within a specified distance of the discovery point and conserve on-site, and/or extend/reduce the areas demarcated by the contractor etc. This should ideally take place within about 7 days. • Construction work shall resume only when permission is given from the Department of Archaeology.				
2.14	**Environmental Enhancement**					
	(a)	On completion of the works, the temporary structures shall be cleared away in full, all rubbish removed to waste dumps and septic tank emptied/filled for proper closure and roadsides/workplaces/labour camps cleared and cleaned.	-do-	-do-	-do-	-do-
2.15	**Handling Environmental Issues during Construction**					
	(a)	The Contractor will appoint a suitably qualified Safety, Health, Environment and Social (SHES) officer following the award of the contract. The SHES Officer will be the primary point of contact for assistance with all environmental and social issues during the pre-construction and construction phases. He/she shall be responsible for ensuring the	All Project Sites	-do-	-do-	-do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		implementation of the C-ESMP, monitoring its implementation and reporting progress to the employer. Depending on the need and if the situation commands, the contractor shall recruit a SHE assistant to assist the SHES Officer.				
	(b)	The Contractor shall direct the SHE Officer to be responsible for community liaison and to handle public complaints regarding environmental/ social related matters. All public complaints will be entered into the Complaints Register. The SHE Officer will promptly investigate and review environmental complaints and implement the appropriate corrective actions to arrest or mitigate the cause of the complaints. A register of all complaints is to be passed to the Engineer within 24 hrs they are received, with the action taken by the SHE Officer on complains thereof.	-do-			
2.16	**Disturbance to Accesses** Access to business places and government and private institutions may be constrained and made inconvenient during the construction period. The contractor shall ensure; All potentially affected stakeholders are duly informed of temporary access disturbances Alyernative access ways are identified, discussed and implemented		Samagi Mawatha and Sirimawo Bandaranaiyake Mawatha	Engineer's cost	Contractor	SC, PMU
2.17	**Grievance Redress Mechanism**					
		Grievances are inevitable during the entire construction period. The contractor shall receive/handle grievances fully in line with the projects GRM.	Throughout the project construction period			SC, PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		Grievances submitted in writing shall be referred to the PMU by the SHES Officer of the Contractor through the Engineer. Verbal communications shall be directed to PMU through Engineer. Contact information of Engineer/PMU/KMC in print form shall be available at the site. The grievances shall be submitted to the Engineer on the same day of receiving. It has to be recorded and the safeguard officer of the Engineer shall ensure the timely redress through the PMU				
2.18	**Incidnets and Accidents Notification**					
		The engineer through the PMU shall promptly notify the Bank of any incident, including GBV, or accident related to the Project which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	Contruction phase	Egineering cost	Supervision consultant/Contractor	PMU
		The SC will furnish sufficient detail regarding the incident or accident, indicating immediate measures taken or that are planned to be taken to address it, and any information provided by any contractor and supervising entity, as appropriate.	Construction Phase		Supervision consultant/ Contractor	PMU
		The PMU shall prepare a report on the incident or accident and propose any measures to prevent its recurrence.	Construction Phase		-do-	PMU
2.19	**Site Closure & demobilizing**					
	(a) (b) (c)	Site Restoration Plan for all the sites used for the KMTT project will have to be prepared The contractor will remove all excess material, equipment, vehicles from the project site prior to complete demobilization.	Construction phase Final Phase of the project	Engineering cost Engineering cost	Contractor Contractor	SC, PMU

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
	(d) (e)	Coffer dams, if erected need to be completely removed and associated debris has to be cleared from the. All temporary site offices will be dismantled and removed from the site. If the parking site has been dilapidated in any way as per the evaluation of the engineer, the contractor will reinstate it to the original condition prior to demobilization. The contractor will remove all excess material, equipment, vehicles from the project site prior to complete demobilization.	All project sites under the purview of the contractor			
2.20	**Natural habitats relevant to primary suppliers**					
		The contractor will include an evaluation of the systems and verification practices used by the primary suppliers of construction material such as stone, sand and brick. The contractor will ensure that the primary suppliers are protecting and not adversely impacting the natural habitat.	Throughout construction phase	Engineering cost	SC	PMU
2.21	**Overall ESMP monitoring and reporting**					
		Monitor and report the environmental and social performance against the ESS as relevant to the construction stage on a quarterly basis.	Construction phase	SC Cost	SC	PMU
2.22	**Stakeholder Engagement Plan**					
		Executing the stakeholder engagement plan during the construction stage.	Construction phase	PMU	PMU	PMU
2.23	**Integrating with bid / contract documents**					

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implement	Supervision
		All the above requirements during the construction state will be included in the bid / contract documents as special conditions to the contract.	Construction phase	PMU	SC	PMU

7b.3 Environmental Management Plan (EMP) for Operational Stage.

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implemention	Supervision
1.0 Establishment of Operational Management and Maintenance Unit						
	(a)	A new entity will be established for the operational management of KMTT and it shall prepare an Operational and Maintenance plan in consultation with the PMU for the operation of KMTT. The said entity shall nominate a responsible person such as Mechanical Engineer/ Municipal Engineer for implementing the O&M plan efficiently. If possible, the said entity will consider the posiibility of establishing a separate O&M unit.	Entire KMTT	KMTT O&M Fund	KMTT Operation Management Unit	KMTT Operation Management Unit
	(b)	The above said entity is responsible for allocating the sufficient annual funds that required for implementation of the O&M plan	-do-	-do	-do	-do-
2.0 Maintenance of Licence/Approvals						
(a)		The said entity shall apply for the EPL from CEA before commencing the operations entire KMTT and it will obtain the EPL form the CEA as per the regulation of the National Environmental Act No: 47 of 1980 amended by Acts No 56 of 1988 and No 53 of 2000.	Entire KMTT	KMTT O&M Fund	KMTT Operation Management Unit, Environmental Division/	KMTT Operation Management Unit, Environmental Division /CEA
(b)		EPL will be valid for certain time period (maximum of 3 years). The said entity is responsible for renewal the EPL before it is expired.	-do-	-do	-do-	-do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implemention	Supervision
(c)	The said unit shall maintain discharges and emissions into the environment from entire KMTT activities in compliance with national discharge and emission standards.		-do-	-do	-do-	-do-
(c)	The said entity shall monitor the environmental parameters such as water quality, noise and vibration periodically (at least once in every six months) and submit the monitoring reports along with renewal application to the CEA.		-do-	-do	-do-	-do-
3.0 Environmental Impact and Mitigation Measure Management						
	3.1.1 Storm water and Water Quality Management					
	(a)	There will be no discharging of rubbish, chemicals, or fuels, into the Meda Ela and peripheral drainage network. The KMTT will be, as designed, connected to the Kandy Wastewater system and as such all black and grey warer shall be discharged only into this system.	-do-	-do	-do-	-do-
	(b)	The Property Manager will ensure that the relevant officials are aware of the location of the emergency spill kits (including bunds and clean up material) to be use at the events of a spillage in order to arrest the contaminations.	-do-	-do	-do-	-do-
	(c)	Regular visual inspection of the ground to ensure there is no accidental spillage of waste, chemicals, lubricants or fuels such that they could be washed into the peripheral drainage network in a rain event and such incidence shall be informed property manager immediately.	-do-	-do	-do-	-do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implemention	Supervision
		Any spillage of liquid waste, chemicals or fuels will be contained and cleaned up as soon as practical in a manner which minimises any discharge to the environment under the supervision of property manager				
3.2 Air Pollution						
	3.2.1 Vehicle/Bus Maintenance work inside the KMTT					
	(a)	The activities such as repairing, testing and tuning of engines or any other activities which are generating fogs and oil aerosols are prohibited to execute inside the KMTT premises	Bus Bay and Vehicle Parking Area of the KMTT	KMTT O&M Fund	KMTT Operation Management Unit,	KMTT Operation Management Unit,
	(b)	Containers of volatile chemicals shall not be exposed to environment so that such chemicals will be released to the environment	Bus Bay and Vehicle Parking Area of the KMTT	KMTT O&M Fund	KMTT Operation Management Unit,	KMTT Operation Management Unit,
	(c)	Space for Mobile Air Pollution Monitoring Unit of the CEA shall be allocated as per the requirement and Management Unit shall facilitate monitoring air quality periodically.	KMTT	CEA	CEA	CEA
	3.2.2 Vehicle servicing					
	(a)	Proper barriers shall be provided to prevent spread of water mixed with chemicals or petroleum products sprayed for serving vehicles with the winds	Quick service area of the KMTT	KMTT O&M Fund	KMTT Operation Management Unit,	KMTT Operation Management Unit,

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implemention	Supervision
	(b)	Workers shall be trained in service to prevent inadvertent air pollution	-do-	-do -	-do-	-do -
	3.2.3 Fuelling Vehicles					
	(a)	It is need to take all precautions to minimize volatilizations of gasolines in to the air according to regulations and guidleines of the Ceylon Petrolium Corporation. Regular inspection for leakages from the equipment shall be carried out by the officials under the supervision of property manager.	Fuel Station area	KMTT O&M Fund	KMTT Operation Management Unit,	KMTT Operation Management Unit,
	(b)	Train and aware workers to avoid malpractices which cause leaking volatile substances to the air.	-do-	-do -	-do-	-do -
	3.2.4 Air Pollution due to Waste					
	(a)	All perishable waste shall be collected and disposed of the site daily basis without letting them smelly and attracting rodents and flies	Entire KMTT	KMTT O&M Fund	KMTT Operation Management Unit,	KMTT Operation Management Unit, / KMC Public Health Division
	(b)	Toilets and sewerage disposal system shall be maintained and cleaned regularly	-do-	-do-	-do-	-do-
3.2 Noise Pollution						
	3.2.1 Noise barriers					

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implemention	Supervision
	(a)	Upon commissioning of the KMTT, the management entity should obtain a baseline noise measurement to check the compliance with regulation and take necessary remedial measures including erection of additional noise barriers as required.	KMTT	KMTT O&M Fund	KMTT Operation Management Unit	CEA
	3.2.2 Proper operation and maintenance of equipment					
	(a)	Workers should be trained for proper operation of machines so that noise can be minimized	Entire KMTT	KMTT O&M Fund	KMTT Operation Management Unit	KMTT Operation Management Unit,
	(b)	All equipment shall be maintained as specified by the manufactures and check the installations regularly and correct any imbalance in installation	-do-	-do-	-do-	-do-
	3.2.3 Operational hours					
	(a)	High noise activities shall not take place after 20.00hrs until 5.00 hrs in the morning	Entire KMTT	KMTT O&M Fund	KMTT Operation Management Unit	KMTT Operation Management Unit,
3.3 Traffic and Congestion						
	3.3.1 Vehicle parking					
	(a)	Traffic impacts has to be monitored closely and contingency plan shall be prepared to activate in any emergency event to arrest traffic impact.	Vehicle parking area of KMTT	KMTT O&M Fund	KMTT Operation Management Unit	KMTT Operation Management Unit,

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implemention	Supervision
3.4 Sanitation						
	3.4.1 Collection and Disposal of Waste					
	(a)	All types of waste shall be collected in separate bins and disposed as specified by the KMC. Perishable waste shall be disposed on daily basis to prevent smell, breeding of rodents and flies	Entire KMTT	KMTT O&M Fund	KMTT Operation Management Unit	KMTT Operation Management Unit,
	3.4.1 Toilets and Wastewater Management					
	(a)	Toilets shall be kept clean without smelling and becoming unhygienic, disinfectants shall be applied daily	Entire KMTT	KMTT O&M Fund	KMTT Operation Management Unit	KMTT Operation Management Unit,
	4.2 Wastewater Management					
	(a)	Sewerage disposal connections to the Kandy Wastewater System shall be maintained properly with routine maintenance of plumbing/pums diligently carried out.	Entire KMTT	KMTT O&M Fund	KMTT Operation Management Unit	KMTT Operation Management Unit,
	(b)	Industrial wastewater shall not be maintained and operated as per the design and operational guidelines	Entire KMTT	KMTT O&M Fund	KMTT Operation Management Unit	KMTT Operation Management Unit,
4.0 Maintenance of Greenery						
	(a)	Trees shall be managed properly that includes watering, fertilizing, weeding, pest controlling, pruning and training of trees timely.	Entire KMTT specially in roof top garden area	KMTT O&M Fund	KMTT Operation Management Unit	KMTT Operation Management Unit,

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implemention	Supervision
	(b)	Any causality of trees shall be replaced/transplant with appropriate trees.	-do-	-do-	-do-	-do-
	(c)	Irrigation system shall be monitored closely and maintain properly.	-do-	-do-	-do-	-do-
5.0 Health and Safety of the Community and the Workers						
	(a)	KMTT Operation Management Unit shall take necessary action to prevent the breeding of mosquitoes within the KMTT premises. Stagnation of water in all areas including gutters, used and empty cans, containers, tyres, etc. shall be prevented.	Entire KMTT	KMTT O&M Fund	KMTT Operation Management Unit	KMTT Operation Management Unit,
	(b)	KMTT Operation Management Unit shall keep the Entire KMTT and surrounding environment clean devoid of garbage to prevent the breeding of rats and other vectors such as flies.	-do	-do	-do	-do-
	(c)	KMTT Operation Management Unit shall organize safety workshops, morning musters and safety drills to aware workers on health and safety	-do	-do	-do	-do-
	(d)	KMTT Operation Management Unit shall test the safety precautions of the KMTT including fire system regularly, once in every six months and keep update safety systems always.	-do	-do	-do	-do-
	(e)	KMTT Operation Management Unit shall maintain the first aid room/first aid box with required medicine and other supplements which are need to use in accident.	-do	-do	-do	-do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implemention	Supervision
	(f)	Periodical third-party inspections and audits for safety arrangements and status of machinery shall be carried out in consultation with district factory engineer.	-do-	-do-	-do-	-do-
	(g)	The KMTT will implement a system of notification of accidents and incidents, including GBV, injuries likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	-do-	-do-	-do-	-do-
		It will have a system of reporting with sufficient detail regarding the incident or accident, indicating immediate measures taken or that are planned to be taken to address it, and any information provided by sub-contractors and supervising entity, as appropriate.				
5.0 General Environmental Management						
	5.1 Compliance Monitoring					
	(a)	Should have valid EPL all the time and shall meet all the requirement to that is required by the ESMP	Entire KMTT	KMTT Funds	KMTT Operation Management	KMTT Operation Manageme
	(b)	Any changes or modification in the KMTT design or functions, it is required to inform all licencing authorities and get their recommendations and approvals.	-do-	-do-	-do-	-do-
	(c)	It is need to monitor the environmental parameters (wastewater, Noise & Vibration) regular and check with CEA standards. If test results are high than the threshold levels, KMC is react quickly to take necessary actions to apply relevant modifications and bring back the environmental parameters into the permissible level/range.	-do-	-do-	-do-	-do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implemention	Supervision
	5.2 Effect Monitoring					
	(a)	**Air Quality Monitoring** CEA shall establish a mobile air quality monitoring unit within the KMTT premises to monitor air quality periodically **Monitoring Frequency**: Regular monitoring shall be done once in every three months and when a complaint is received and when the complaint is considered as important to order air quality measurement **Monitoring Standard:** Air quality standards published by the CEA	KMTT premises and surrounding	O&M Fund of KMTT	KMTT Operation Management Unit	KMTT Operation Management Unit and CEA
	(b)	**Noise Monitoring** **Monitoring Points:** Boundary of where complain is raised and within the KMTT premises **Monitoring Frequency:** If a complaint is received **Monitoring Standard:** Existing noise standard issued by the CEA	-do-	-do-	-do-	-do-

Environmental Issues		Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
					Implemention	Supervision
	(c)	**Water Quality Monitoring** **Monitoring Points:** • Upstream and Downstream of the Medaela • Rainwater harvesting tank **Monitoring Frequency:** Once in every six months **Monitoring Standard:** Water Quality Standards for discharge inland waterbody issued by the CEA	-do-	-do-	-do-	-do-
6.0 Social Issues						
	(a)	KMTT Operation Management Unit shall conduct a social assessment at the beginning of KMTT operations and then once in six months for three years to identify social impact and address any issues	Entire KMTT	KMTT O&M Fund	KMTT Operation Management Unit	KMTT Operation Management Unit,
	(b)	KMTT Operation Management Unit shall establish a GRM to attract grievances of the surrounding community and workers and a mechanism to address grievances/complains of the community and the workers.	-do-	-do-	-do-	-do-
	(c)	KMTT Operation Management Unit shall monitor incidents and accidents, maintain records and prepare periodic reports on their safety performance.	-do-	-do-	-do-	-do-
7.0	**Road safety**					

Environmental Issues	Protection and preventive measures	Locations/ Project phase	Mitigation cost	Institutional Responsibility	
				Implemention	Supervision
	KMTT Operation Management Unit shall establish a proper processes including driver training, to improve driver and vehicle safety, as well as systems for monitoring and enforcement relevant road safety meausres	-do-	-do-	-do-	-do-
8.0	**Overall monitoring and reporting**	-do-	-do-	-do-	-do-
	Monitor and report the environmental and social performance against the ESS as relevant to the operational stage on a quarterly basis.	-do-	-do-	-do-	
9.0	**Stakeholder engagement plan**		-do-	-do-	-do-
	Executing the stakeholder engagement plan during the construction stage.	-do-	-do-	-do-	-do-

Contractor's Cost of Enviornmental and Social Mitigation

	Cost Item	Unit	Quantity	Rate	Estimated Amount (LKR)
1	Recruitment of Health and Safety specialist	**PS**	**36 man months (@ Rs 500,000 a month)**		**18,000,000**
2	Recruitment of SHES Officer	**PS**	**36man Months (@ Rs 250,000 a month)**		**9,000,000**
3	Preparation of the C-ESMP and its sub-plans	The cost associated with this item will be mostly the professional time of the H&S Specialist and the SHES Officer			
4	Setting up and maintaining the Information Centre and implementing measures to disclose information	**Item**			**20,000,000**
5	Obtaining Approvals such as night-time works, CEA clearances, etc (if required)	**PS**			**500,000.00**
6	Site access closure – delineating fence	**Item**			**10,000,000**
7	Training of labour amd provision of PPEs	**PS**			**20,000,000**
8	Implementation of site level safety measures as specified in the H&S Plan	**PS**			**100,000,000**
9	Traffic safety assessment and implementation of traffic management plan	**PS**			**15,000,000**
10	Disposal of non-hhazardous and hazardous waste (if any) and mianting site to acceptable levels of hygiene	**PS**			**75,000,000**
11	Containment of possible spills and clean up	**PS**			**10,000,000**
12	Provision of an onsite drainage system, soil erosion control measures	**PS**			**50,000,000**
13	Erection of dust and noise barriers around the construction site.	**Item**			**10,000,000**
14	Implementation of other dust/noise control measures	**PS**			**15,000,000**

15	Preparation/maintenance of disposal yards and maintaining acceptable levels of hygiene within the construction site (including vector bourne diseases)	**Item**			**15,000,000**
16	Maintaining acceptable levels of hygiene in labour camps (setting up of labour camps and provision of facilities is considered incidental to civil works cost)	**PS**			**5,000,000**
17	Noise, vibration and air quality monitoring	**PS**			**25,000,000**
18	Comepensation for any construction related damage to surrounding communities and civic facilities (mainly from vibration and accidental damage)				**100,000,000**
19	Management and restoration of offsite facilities such as burrow/quarry/plant sites (if any)	**PS**			**15,000,000**
20	Site closure and rehabilitation	**PS**			**15,000,000**
21	Ccontingencies and emergencies	**PS**			**50,000,000**
	Total				**577,500,000**

Other than above mentioned line items of cost of mitigation related to environment safeguards, all the other line items relevant to general environmental, social, health and safety requirements are as part of the contractors costs and /or are included in the Engineering Bill of Quantities.

PMU's Cost of Enviornmental and Social Mitigation

	Cost Item	Unit	Quantity	Rate	Estimated Amount (LKR)
1	Recruitment of Senior Safety, Environmnetal and Health specialist	**PS**	**36 man months (@ Rs 200,000 a month)**		**7,200,000**
2	Recruitment of Senior Social Officer	**PS**	**36man Months (@ Rs 200,000 a month)**		**7,200,000**
3	Hiring of specialist consultant firm to carry out GHG emission study for the KMTT as per ESS3 covering (i) emissions during the construction phase and mitigation plan and (ii) anticipated improvements in	**PS**			**10,000,000**

	GHG emissions from the operationalization of the KMTT.				
4	Implemention and operationalization of the GRM	**PS**			**5,000,000**
5	Implemenation of the SEP	**PS**			**7,500,000**
6	Overhead costs associated with environment and social monitoing (other than professional time)	**PS**			**15,000,000**
7	Contingencies	**PS**			**10,000,000**
	Total				**60,900,000**

The following TOR is part of the EMP and should go into the tender document.

Terms of Reference for a Health & Safety Specialist (Contractor)

The Health & Safety (H & S) Specialist will have the following scope of work. The Specialist will

1. Will develop an implementation H & S plan in line with the ESMP, the Bank's ESF requirements and H & S compliance requirements.

2. Will establish and maintain H & S management arrangements in line with the H & S plan.

3. Will conduct the day-to-day activities in administering the safety aspects of the H & S plan that includes the following:
   - Build safety awareness among all the contractor employees and sub-contractor.
   - Arrange to provide personal protective equipment (PPE) such as hand gloves, safety shoes, safety goggles, hard safety helmets, ear plugs and ear muffs to all the contractor employees and sub-contractor as needed.
   - Identify construction-related safety hazards on an ongoing basis.
   - Conduct risk assessments in relation to these hazards as required
   - Develop specific safety management procedures in order to address these risks. For instance, the handling of asbestos roofing sheets should be carried out taking adequate specific precautions.

- Train the relevant workers on special safety arrangements that are requited in particular situations.
- Conduct and arrange to conduct periodic (daily) tool box talks in order to heighten the awareness on construction-related safety hazards.
- Sign-off on safety procedures as required by the H & S plan as and when request.
- Ensure that chemicals are stored only in assigned areas, sign boards are in place and labelling is done. Make available the MSDS as required.
- Adopt and maintain safe working practices with the use / display of appropriate signage in local language at the construction sites.
- Ensure that the fire protection systems are in place where required and these are properly inspected and maintained.
- Establish and maintain an incident reporting system so that preventive and corrective actions are regularly undertaken.
- Monitor safety parameters on an ongoing basis
- Conduct internal safety audits to identify areas for improvement, take corrective and preventive actions to address the non-conformities.
- Ensure the safety aspects of equipment maintenance is adequately covered.
- Arrange to conduct periodic third-party safety audits with a view improve safety performance.
- Report on the safety performance on a periodic basis (monthly with the PMC and quarterly for the Client)
- Report on compliance on safety aspects as per the legal requirements.

4. Will conduct the day-to-day activities in administering the occupational health aspects of the H & S plan that includes the following:

- Conduct a basic medical check-up for all workers and personnel on site.
- Ensure that only medically fit and competent persons are doing the various tasks assigned.
- Conduct periodical medical checkups for all the contractor staff and sub-contractors as required.
- Make available basic first aid kit with an adequate supply of sterilised dressing materials on site.
- Ensure access to the ambulance services to the nearest hospital in the case of emergency.
- Ensure availability of good quality drinking water at all site locations.
- Verify that proper hygiene and sanitation is maintained at all site locations.
- Monitor the occupational health status of the contractor employees and other workers engaged through sub-contractors.
- Report on compliance on safety aspects as per the legal requirements.

5. Will oversee all aspects on H & S management on an ongoing basis, and report to the Contractor’s Team Leader.

9. Conclusion on Impact Assessment

Summary of environmental effects:

The following section summarizes the most important potential environmental and social impacts related to the proposed KMTT as per the key project components defined in the project brief document and the list of works identified during the detail design carried out by the design consultants. The details of the mitigation and monitoring requirements are described in the Environmental and social Management Plan (ESMP) given in the Section B of this document.

Key project activities	**Potential Environmental and social impacts**	**Significance of environmental effect with mitigation in place** N/S - Effect not significant, or can be rendered insignificant with mitigation SP - Significant positive effect SN - Significant negative effect U - Outcome unknown or cannot be predicted, even with mitigation
Siting of Construction Camps	If construction camps, labor camps, stock yards, vehicle refueling areas etc. are located near sensitive areas such as wetlands, conservation zones and places of scenic beauty or recreational value, or any waterbody, those areas may be adversely affected. Such impacts to the natural environment are unlikely, as labour camps would be located within the city/suburbs or within the project site itself. Either way the camps will be close to establishments and resdiences (an estimated labor strength of 200) and as such a certain level of risks pertaining to social conflicts, spread of diseases etc can be envidaged. However, given Kandy is such a busy tourist city with a large migratory population who enter the city for numerous purposes and numerous ongoing construction sites, the risk posed by	SN

	200 labourers (most of whom would be from Kandy itself) is not considered very significant.	
	Gender based Violence – given reasons above, this risk posed by the project is not assessed to be significantly adverse.	NS
Planning of temporary traffic arrangements	Construction material and excavated soil and debris transportation may cause temporary disruption to road traffic. Transportation is highly encouraged during off-peak hours.	SN
Construction Activities	Project activities could potentially pose signficnat occupational health and safety and community health and safety risks. The project would involve heavy contruction work and risky operatons such as working at heights and deep excavations, use of heavy and hazardous equipment, frequent movement of heavy consruction vehicles, piling, structural damage from vibrations etc. These impacts can be very much mitigated with the implementation of a comprehensive H&S plan.	SN
	High noise and vibration levels are likely from equipment and machinery. Impacts are temporary in nature.	SN
	Pollution of Meda Ela is likely unless strict controls for stormwater management, soil erosion control and waste management on site are not implemented as planned.	SN
Solid and Hazardous Waste Management	Stockpiling of excavated material mainly during Meda ela construction may block surface drainage paths causing localized flooding during construction period. This is not expected to be of serious nature as the diversion path is expected to be contructed with minimum disturbance to flow.	N/S

	If not properly stored and adequately covered washout of fine material may contribute to further deterioration of surface water quality in the downstream of Meda Ela and may increase risk of siltation and blockage of structures. If not properly disposed the excavated material will pollute water sources at location where it is disposed.	
Slurry management due to piling action	Significant quantity of Slurry will be generated during the piling operation and management of the same without direct disposal to the Meda Ela is required. Best engineering solution shall be implemented to manage the slurry avoiding blocking of drainage paths and site management. Slurry contains Bentonite which is categorized as hazardous waste and the final safe disposal is required ensuring no land and groundwater contamination.	SN
Transportation and storage of construction materials	Transportation of material and equipment will cause dust, noise and vehicle emissions along the canal. Storage of construction material will lead to access issues. Since free space at the site is minimal, a suitable material storage yard will have to be hired by the contractor. Depending on the space availability this yard will have to be hired at a location close to the site.. Material transportation time will have to be controlled and managed as per the traffic management Plan. Kandy being a highly busiest cities the contractor's vehicle management is very vital avoiding unnecessary traffic issues.	S/N
Movement of vehicles, equipment and machineries	Vehicles, Machineries and equipment's cause air and noise pollution which could be a nuisance in populated areas. Proper site covering is very essential. Sufficient allocation of human resources is needed with standard safety management practices. Heavy duty machines and equipment will be deployed for the construction.	SN

Refurbishment of existing fuel filling point	Environmental issues due to construction and operation of retail petroleum filling station primarily includes; leaks and spills, wastewater generation, waste management and emissions to air. They will be managed under specific guidleline issued by the Ceylon Petroleum Corporation.	N/S

10. ESMP Implementation responsibilities and Costs

The overall responsibility of ensuring compliance with safeguard requirements lie with the PMU/KMTT supported by the Supervision Consultant while the contractor will be responsible for implementing the provisions of the C-ESMP and all the sub-plans specified in this ESMP as required to be prepared by the contractor. It is a mandatory requirement and the responsibility of all the contractors employed at the pre-construction, construction and operation stages of KMTT project to adhere to the stipulated actions to meet the Environmental and Social Standards (ESSs) of the World Bank. The Contractor is responsible for deploying the competent staff and an operational ESMP shall be prepared and submitted for the approval of the Client.

In addition, the PMU will be directly responsible for reviewing the proposed design to ensure the green building considerations are integrated with the designs appropriately and all design related mitigation measures mentioned herein are also incorporated. The overall supervision will be carried out by the Supervision Consultant hired by the SCDP and the Social and Environmental safeguard team of SCDP as indicated in the Resettlement Action Plan will be available for facilitation on monitoring of the safeguard compliances.

Environmental monitoring will be carried out largely through visual observations and compliance monitoring using the Environmental Monitoring Data Sheet provided by the PMU. The Environmental Officer of the contractual party is expected to carry out field visit daily basis and shall report the issues and performance on ESMP implementation to the Consultant.

Site specific method statement for ESMP implementation is required considering the practical ground situation ensuring effective mitigation of environmental impacts during the pre-construction, construction and operation stages of KMTT.

11. ESIA recommendation

The KMTT project is subject to rehabilitation of canal structures and construction of new KMTT building. As per the proposed activities under the project the potential environmental impacts can be classified as general construction related impacts and can be mitigated on site with known technology. The environmental and social management plans prepared for the construction of Meda Ela and construction of KMTT building provided with this report would

be sufficient to mitigate the identified impacts. The project will not influence significantly on the natural surroundings of the locality.

Considering the physical characteristics of the area and the proposed interventions, most of the environmental impacts described in the ESMP caused by project activities are not expected to have any significant or irreversible impacts and are related to dust/noise generation, siltation, safety hazards, traffic congestion and other general impacts which can be mitigated with good construction, site management and public safety practices. The areas affected during construction work are mainly confined to the KMTT construction site.

Material storage, transportation, establishment of labour camps, safe machinery handling are challenges in this project since the site is at the heart of the city and the construction will have to carry out while the city functions are live. Therefore, the public safety should be given the first priority while deploying the sufficient labour force and efficient machineries.

During the construction period public entering to the site has to be restricted. Instruction boards have to be displayed for public awareness and the directions has to be displayed facilitating the community. Dust barriers covering the entire site is necessary to be fixed starting from the ground preparation to the completion of the project. Drainage paths should be placed ensuring proper storm water diversion to the existing main drainage path. Silt traps will have to be established avoiding siltation in the main drain and the road side drains.

As such a sufficient cost allocation by the contractor for implementation ESMP is highly recommended. Continues Monitoring of impacts is very much essential enabling to initiate corrective actions in time avoiding unnecessary environmental consequences during construction and operation stages of KMTT.

Since the Kandy city has been declared as a highly fragile zone, the approval of the NBRO has to be obtained prior to awarding the contract. Consent of the planning committee is required prior to commence the construction work.

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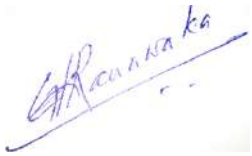
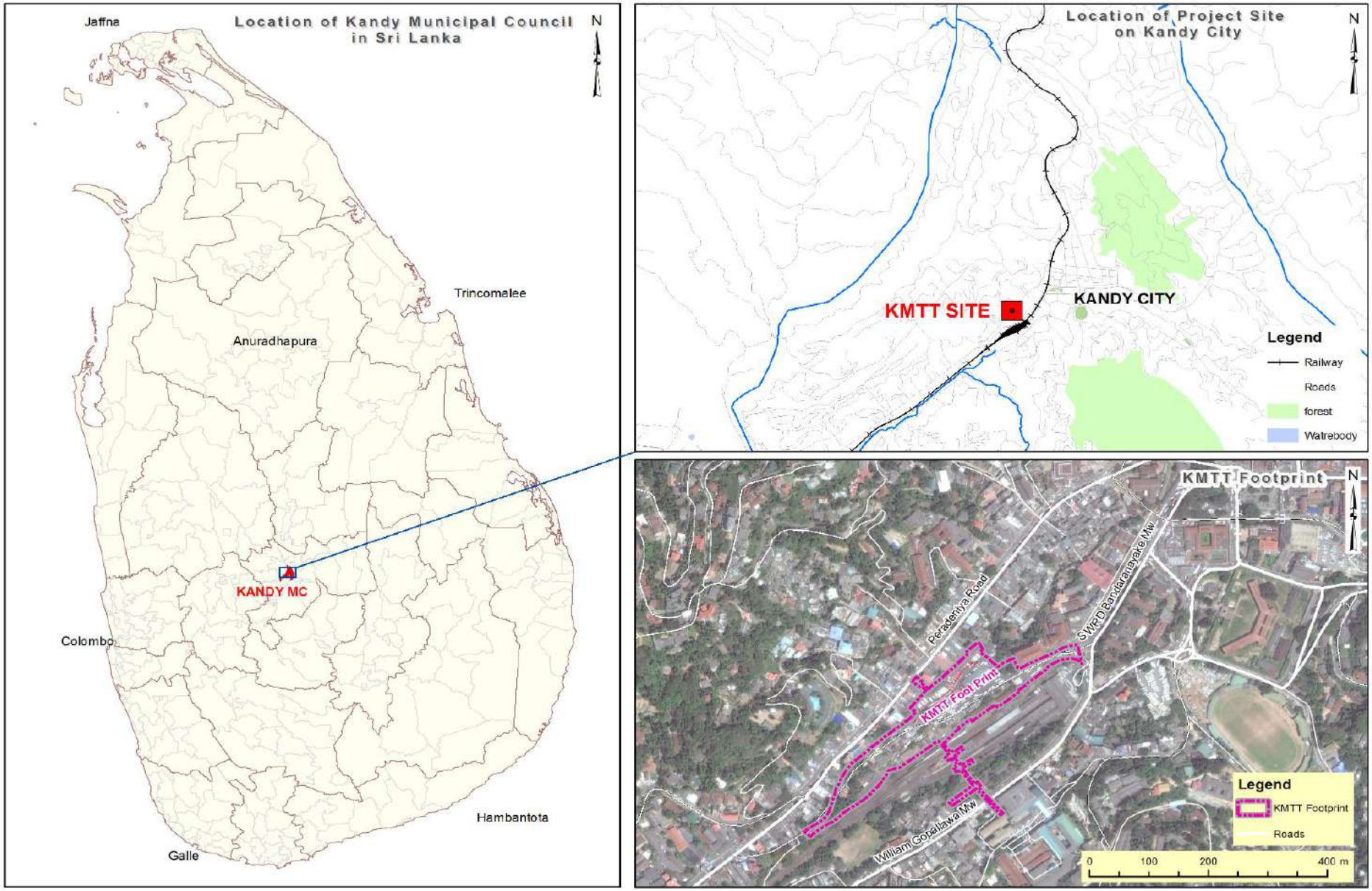
12. Details of Persons Responsible for reviewing the ESIA from PMU

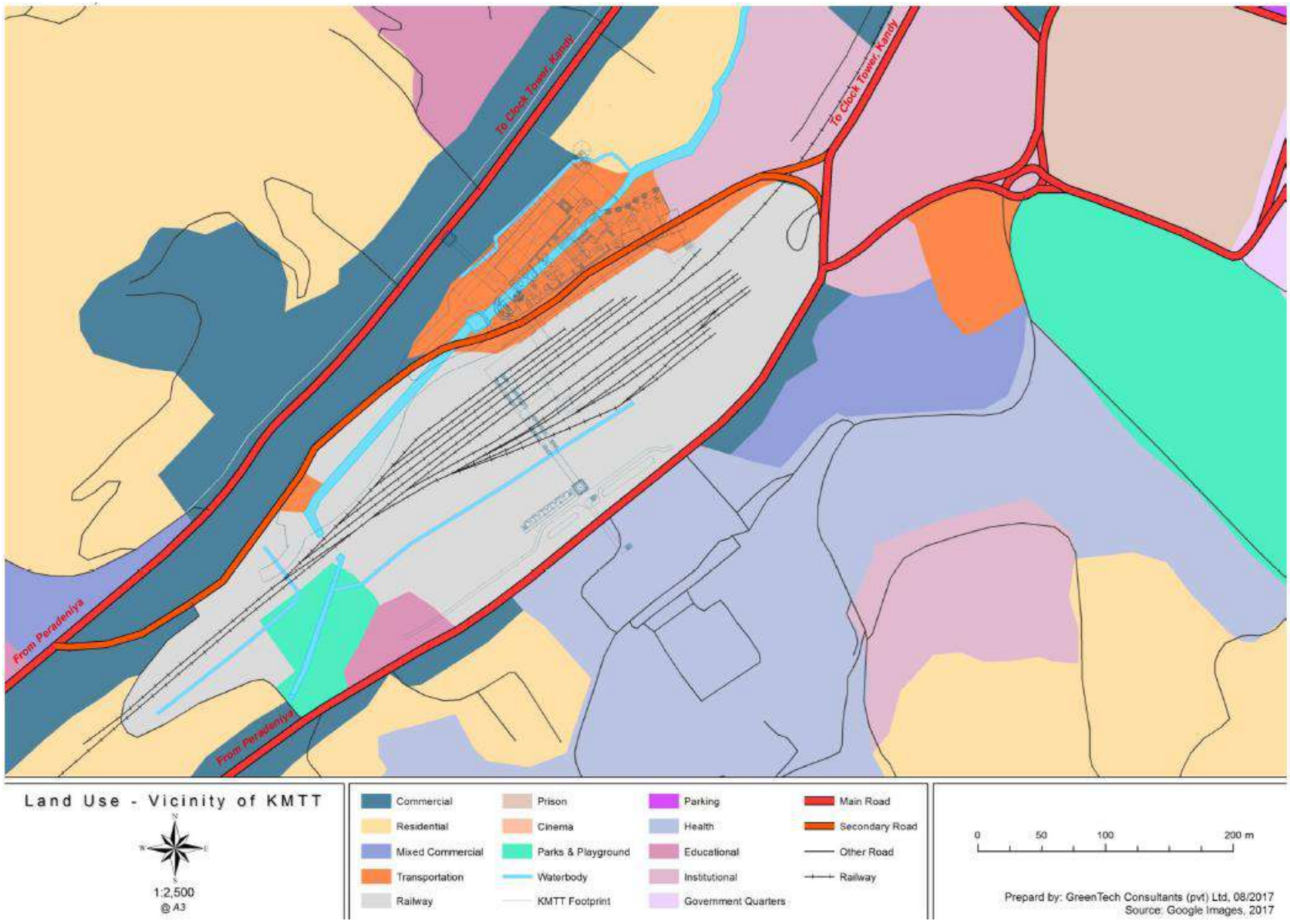
Report reviewed by **Ajith U K Ethugala** Assistant Project Director (Envt) ehtugalascdp@gmail.com ***Name/Designation/Contact information***	**Date 05.11.2019**  ***Signature***
Report recommended by Gangadari Ranawaka Deputy Project Director (Envt) gangadariscdp@gmail.com ***Name/Designation/Contact information***	**Date 05.11.2019**  ***Signature***

Annex 01: Location Map of KMTT

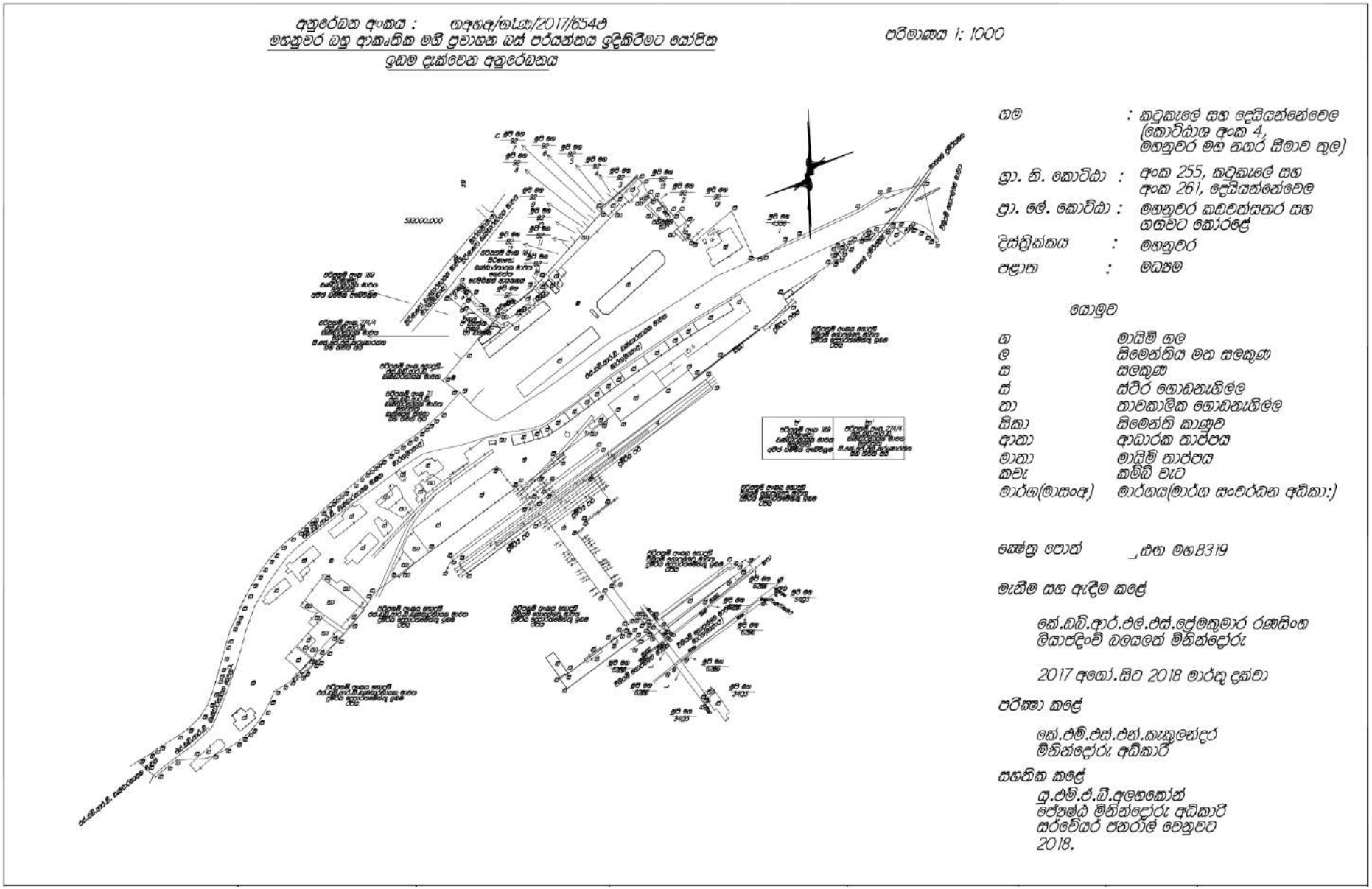


Annex 02: Detaild Site Plan of KMTT foot print with existing buildings

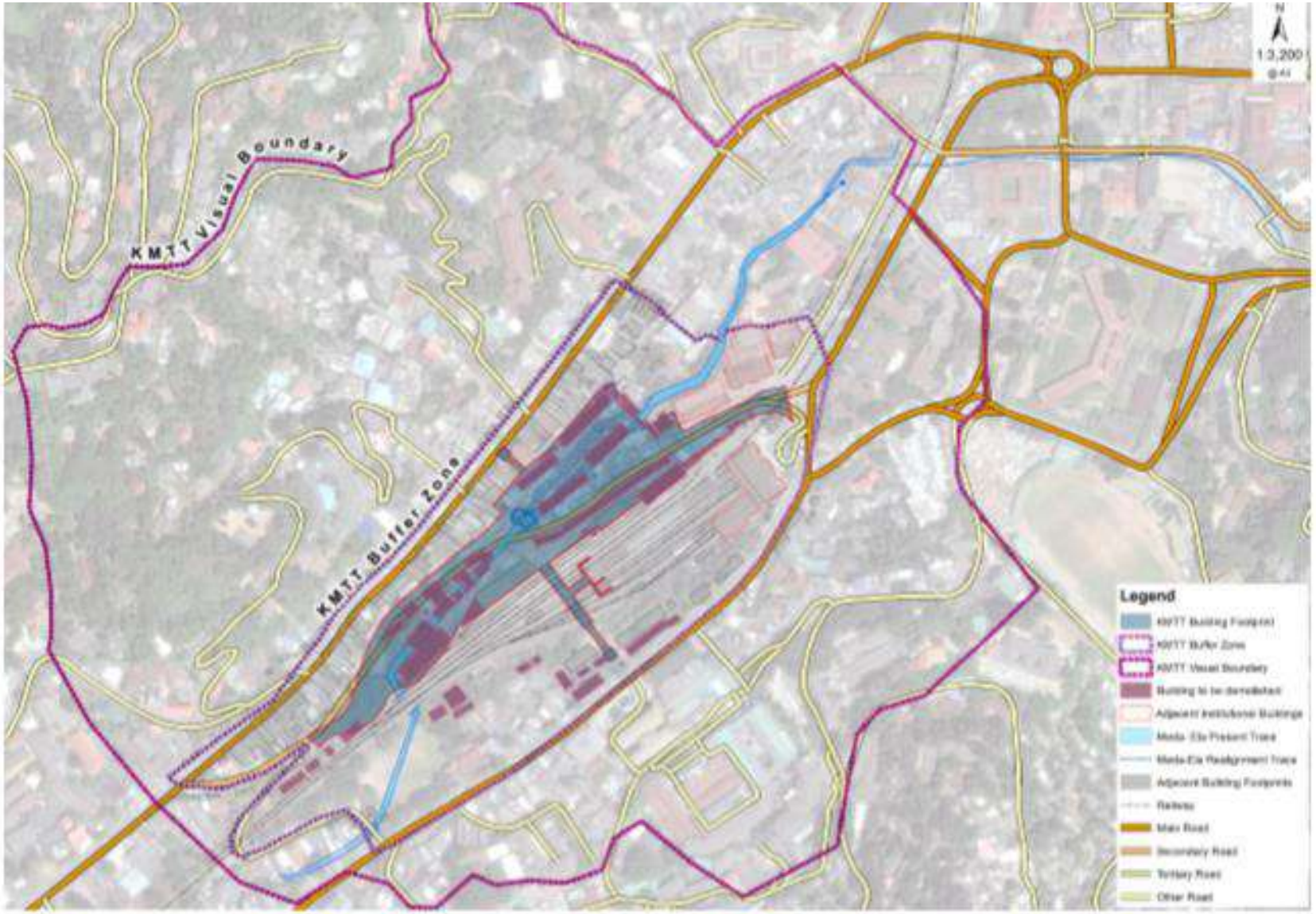
Annex 03: Existing Land use around KMTT



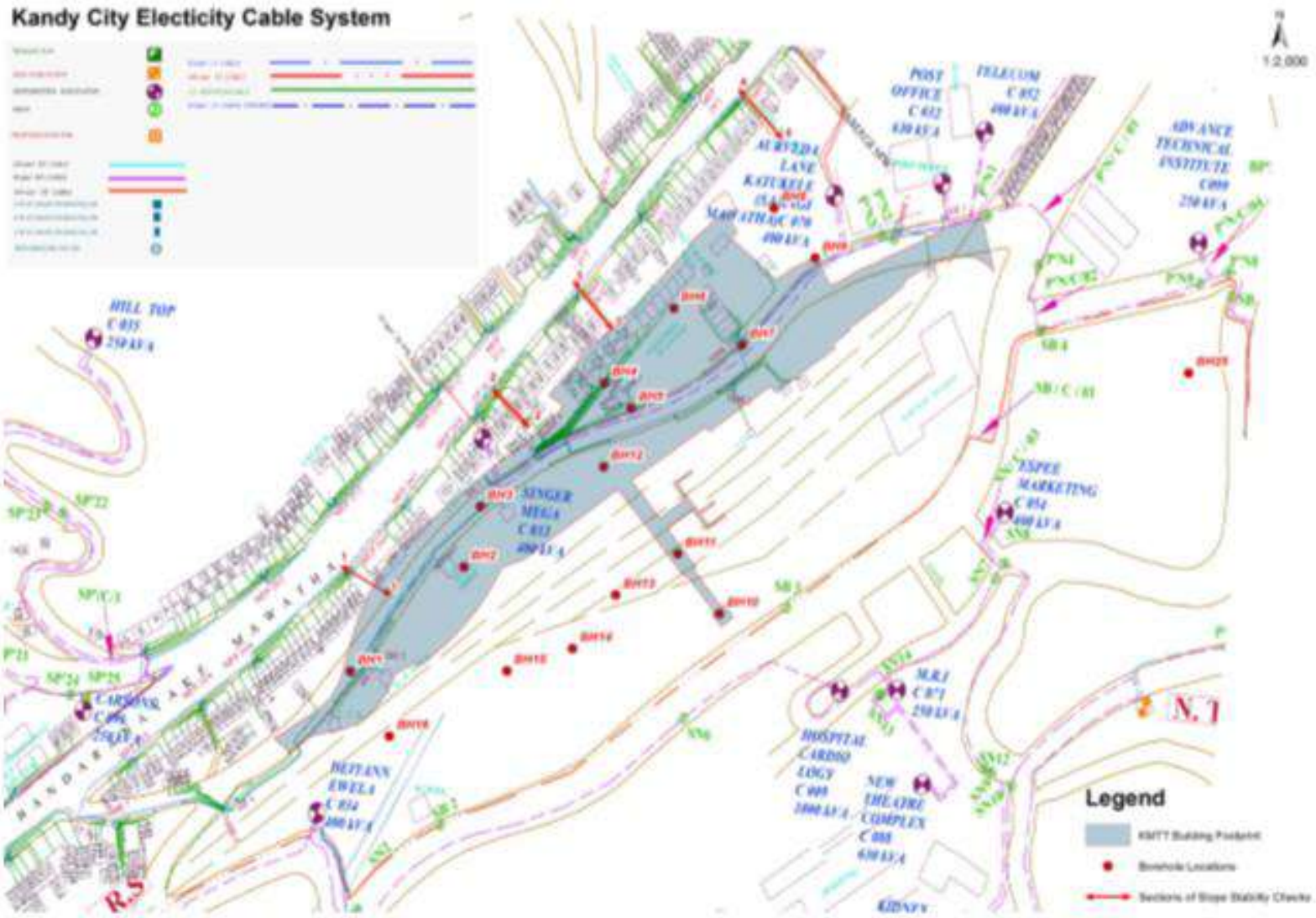
Annex 04: Survey map of KMTT area



Annex 05: Site boundaries and buildings to be demeolished for proposed KMTT area



Annexure 06. Borehole Locations of KMTT & Geotechnical Investigation Reports



WINJE International Company (Pvt.) Ltd.

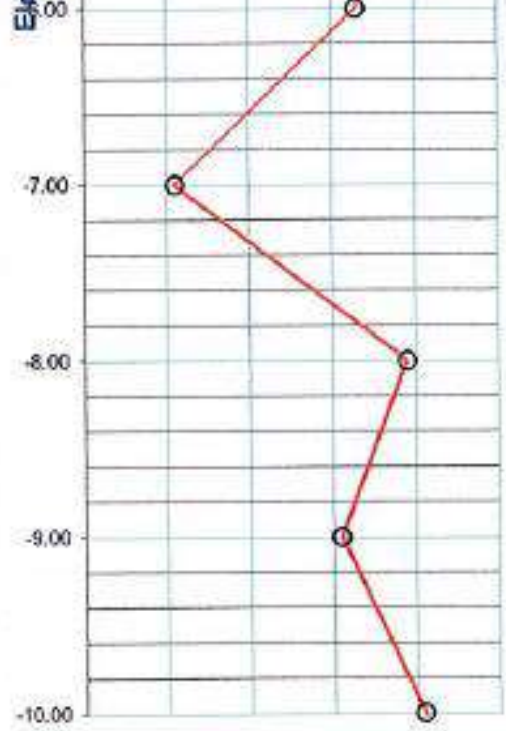
PROJECT	: Geotechnical Investigation for the Kandy Multimodel Transport Terminal		
CLIENT	: Greentech Consultants (Pvt.) Ltd.		
BORE HOLE NO	: BH - 01	DEPTH OF DRILLING	: 30.00 m
GROUND ELEVATION	: 487.753 from msl	LOCATION	: KMTT site
DRILLING MACHINE	: KOKEN Boring Machine	DRILLING TYPE	: Rotary Hydraulic
COORDINATES	484022 531725	DATE	: 08-12-2017 - 10-12-2017

ELEVATION (m)	DEPTH (m)	SOIL SAMPLES	DESCRIPTION OF MATERIAL	SOIL SYMBOLS	SYMBOLIC LOGS
487.75	0.00				
			Garbage dump		
484.75	3.00	D/S	Brown medium dense coarse to medium SAND with gravel trace of clay (Filling)		
483.75	4.00	D/S	Boulders and clay with sand (Filling)		
482.75	5.00	D/S	Dark brown dense fine to medium SAND with clay	SC	
481.75	6.00	D/S	Blackish brown dense medium to coarse SAND with clay	SC	
480.75	7.00	D/S	Light brown medium dense medium to coarse SAND with clay	SC	
479.75	8.00	D/S	Brown to dark brown dense fine to medium SAND with clay	SC	
		D/S			
477.75	10.00				

STANDARD PENETRATION TEST

DEPTH	N VALUES	
1.0		
2.0		
	6	
3.0	8	23
	15	
4.0	CR% 7	RQD% 0
	N Values	
	19	
5.0	18	35
	17	
	5	
6.0	15	33
	18	
	3	
7.0	4	11
	7	
	11	
8.0	16	39
	23	
	2	
9.0	12	31
	19	
10.0		

PENETRATION TEST VALUES



KEY : Sand, Clay, Rock, Gravel

R - Rock WR - Weathered Rock

HB - Hammer Rebounding - No Penetration

U/S - 60 mm dia undisturbed Sample

D/S - Disturbed Sample

- Ground Water Level - 7.20m

REMARKS :

DRILLED BY:

LOGGED BY: *Kanishka*

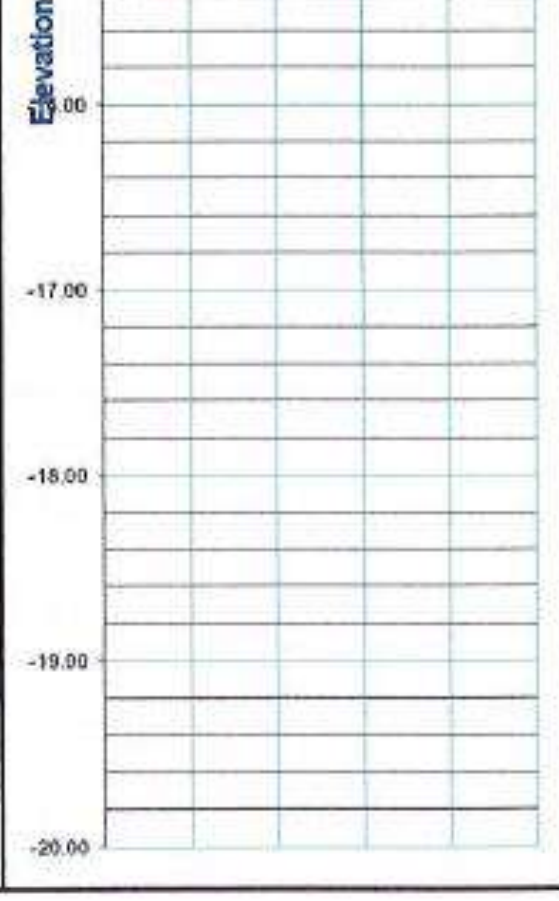
CHECKED BY: *Prabhath Samaranayake*

BOREHOLE LOG

WINJE International Company (Pvt.) Ltd.

PROJECT	: Geotechnical Investigation for the Kandy Multimodel Transport Terminal		
CLIENT	: Greentech Consultants (Pvt.) Ltd.		
BORE HOLE NO	: BH - 01	DEPTH OF DRILLING	: 30.00 m
GROUND ELEVATION	: 487.753 from msl	LOCATION	: KMTT site
DRILLING MACHINE	: KOKEN Boring Machine	DRILLING TYPE	: Rotary Hydraulic
COORDINATES	484022 531725	DATE	: 08-12-2017 - 10-12-2017

ELEVATION (m)	DEPTH (m)	SOIL SAMPLES	DESCRIPTION OF MATERIAL	SOIL SYMBOLS	SYMBOLIC LOGS	STANDARD PENETRATION TEST DEPTH	N VALUES		CR%	RQD%
477.75	10.00	D/S	dark brown dense fine to medium SAND with clay	SC		10.0	14 21 20	41		
		D/S				11.0	16 34	>50		
466.33	11.42	W/S	Dark brown fine SAND (Completely Weathered Rock)	WR		12.0	>50			
475.25	12.50	W/S	Blackish brown fine SAND (Completely Weathered Rock)	WR		13.0				
		W/S				14.0				
			Rock Level			15.0				
462.75	15.00	D/S	Blackish grey medium to fine grained moderately to highly weathered GARNET BIOTITE GNEISS	R		16.0	25	0		
461.25	16.50	D/S	Blackish grey medium to fine grained moderately to highly weathered GARNET BIOTITE GNEISS	R		17.0	24	0		
459.75	18.00	D/S	Blackish grey medium to fine grained moderately to highly weathered GARNET BIOTITE GNEISS	R		18.0	32	0		
458.25	19.50	D/S		R		19.0	19	8		
						20.0				



PENETRATION TEST VALUES

KEY : Sand, Clay, Rock, Gravel

R - Rock WR - Weathered Rock
HB - Hammer Rebounding - No Penetration
U/S - 60 mm dia undisturbed Sample
D/S - Disturbed Sample
V - Ground Water Level - 7.20m

REMARKS :

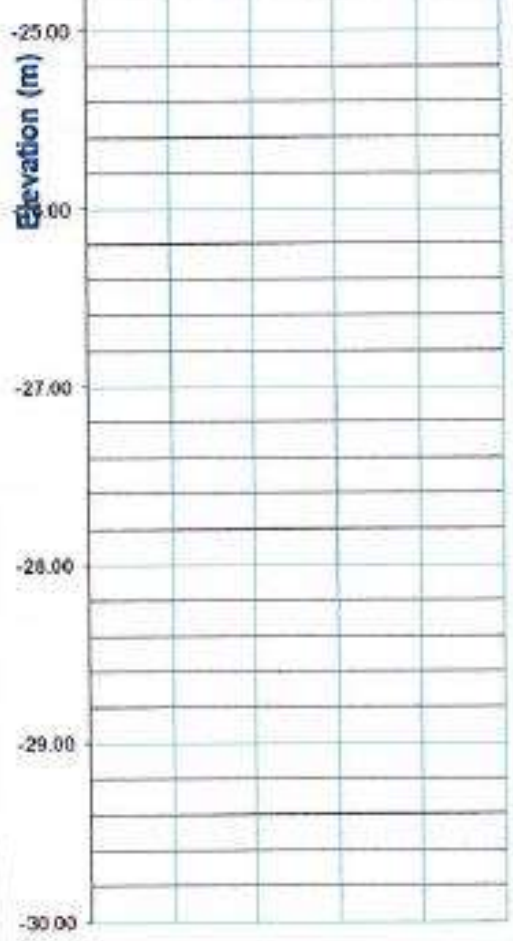
DRILLED BY:
LOGGED BY: *Kanishka*
CHECKED BY: *Prabhath Samaranayake*

WINJE International Company (Pvt.) Ltd.

PROJECT	: Geotechnical Investigation for the Kandy Multimodel Transport Terminal		
CLIENT	: Greentech Consultants (Pvt.) Ltd.		
BORE HOLE NO	: BH - 01	DEPTH OF DRILLING	: 30.00 m
GROUND ELEVATION	: 487.753 from msl	LOCATION	: KMTT site
DRILLING MACHINE	: KOKEN Boring Machine	DRILLING TYPE	: Rotary Hydraulic
COORDINATES	484021.9 531725	DATE	: 08-12-2017 - 10-12-2017

ELEVATION (m)	DEPTH (m)	SOIL SAMPLES	DESCRIPTION OF MATERIAL	SOIL SYMBOLS	SYMBOLIC LOGS	STANDARD PENETRATION TEST DEPTH	CR%	RQD%
467.75	20.00		Blackish grey medium to fine grained moderately to highly weathered GARNET BIOTITE GNEISS	R		20.0	19	8
466.75	21.00	W/S	Blackish brown fine SAND (Completely Weathered Rock)	WR		21.0		
465.75	22.00		White coarse to medium grained slightly weathered MARBLE with patches of Biotite	R		22.0	59	43
464.75	23.00		White coarse to medium grained slightly weathered MARBLE with patches of Biotite	R		23.0	18	12
463.25	24.50		White coarse to medium grained moderately weathered MARBLE with patches of Biotite	R		24.0		
461.75	26.00		White coarse to medium grained moderately weathered MARBLE with patches of Biotite	R		25.0	24	7
460.75	27.00		White coarse to medium grained moderately weathered MARBLE with patches of Biotite	R		26.0	32	0
459.25	28.50		White medium to fine grained moderately weathered BIOTITE GNEISS	R		27.0	31	0
457.75	30.00		**End of the Borehole at 30.00m**			28.0		
						29.0	54	39
						30.0		

PENETRATION TEST VALUES



KEY : Sand, Clay, Rock, Gravel

R - Rock WR - Weathered Rock

HB - Hammer Rebounding - No Penetration

U/S - 60 mm dia undisturbed Sample

D/S - Disturbed Sample

V - Ground Water Level - 7.20m

REMARKS :

DRILLED BY:

LOGGED BY: *Kanishka*

CHECKED BY: *Prabhath Samaranayake*

BOREHOLE LOG

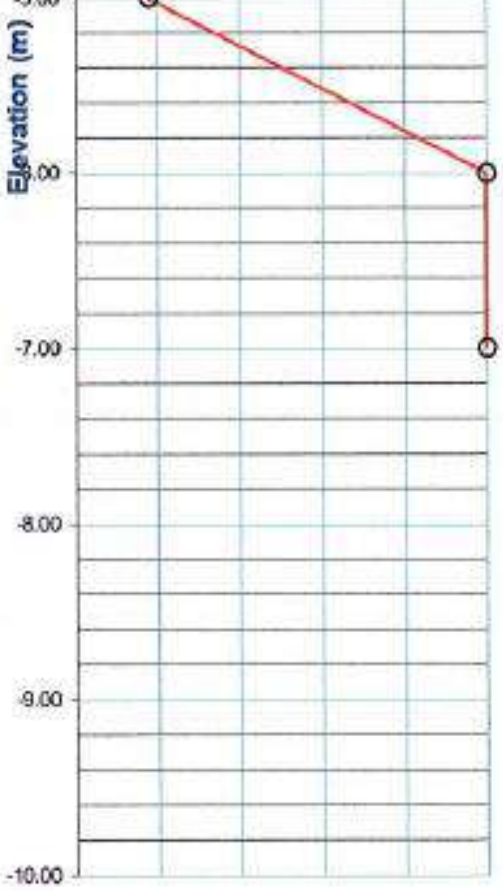
3 of 3

WINJE International Company (Pvt.) Ltd.

PROJECT	: Geotechnical Investigation for the Kandy Multimodel Transport Terminal		
CLIENT	: Greentech Consultants (Pvt.) Ltd.		
BORE HOLE NO	: BH - 02	DEPTH OF DRILLING	: 20.0m
GROUND ELEVATION	: 487.69 msl	LOCATION	: Railway Site
DRILLING MACHINE	: KOKEN Boring Machine	DRILLING TYPE	: Rotary Hydraulic
COORDINATES (X,Y)	484092.5 531790.0	DATE	: 08-11-2017 - 11-11-2017

ELEVATION (m)	DEPTH (m)	SOIL SAMPLES	DESCRIPTION OF MATERIAL	SOIL SYMBOLS	SYMBOLIC LOGS	STANDARD PENETRATION TEST DEPTH	N VALUES		CR %	RQD %
487.69	0.00									
486.69	1.00	D/S	Dark brown loose fine to coarse SAND some of clay with medium to coarse gravel with brick particles (Filling)			1.0	3 2 4	6		
485.69	2.00	D/S				2.0	2 3 3	6		
484.69	3.00	D/S	Light brown loose coarse to medium SAND some of clay	SC		3.0	2 2 6	8		
483.69	4.00	D/S	Greyish brown loose coarse to medium SAND some of clay	SC		4.0	1 3 4	7		
482.69	5.00	D/S	Dark greyish brown loose coarse to medium SAND some of clay	SC		5.0	3 3 6	9		
481.69	6.00	D/S	Light brown very dense fine to coarse SAND			6.0	8 >50 HB	>50		
480.69	7.00	D/S	Black very dense fine to coarse SAND some of coarse to medium gravel trace of clay			7.0	50 HB HB	>50		
480.49	7.20		**Rock Level**							
			Blackish grey fine to medium grained highly weathered BIOTITE GNIESS	R		8.0	14	10		
479.49	8.20		Completely weathered BIOTITE GNIESS	R		9.0	-	-		
-9.50	9.50		Blackish grey fine to medium grained highly weathered BIOTITE GNIESS	R		10.0	44	11		

PENETRATION TEST VALUES



KEY : Sand, Clay, Rock, Gravel

R - Rock WR - Weathered Rock
HB - Hammer Rebounding - No Penetration
U/S - 60 mm dia undisturbed Sample
D/S - Disturbed Sample
- Ground Water Level - 3.40m

REMARKS :

DRILLED BY:
LOGGED BY: *Kanishka*
CHECKED BY: *Prabhath Samaranayake*

BOREHOLE LOG

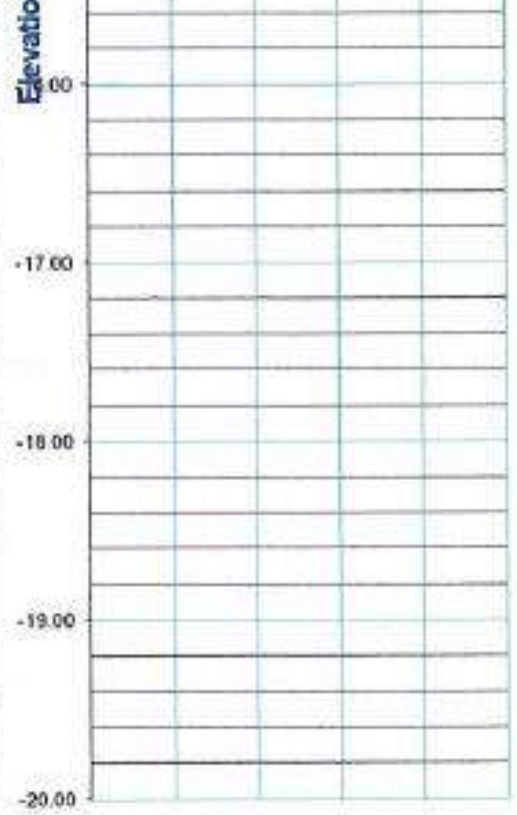
1 of 2

WINIJE International Company (Pvt.) Ltd.

PROJECT	: Geotechnical Investigation for the Kandy Multimodel Transport Terminal		
CLIENT	: Greentech Consultants (Pvt.) Ltd.		
BORE HOLE NO	: BH - 03	DEPTH OF DRILLING	: 30.0 m
GROUND ELEVATION	: 488.149	LOCATION	: KMT Site
DRILLING MACHINE	: KOKEN Boring Machine	DRILLING TYPE	: Rotary Hydraulic
COORDINATES	484102.6 531827.5	DATE	: 19-11-2017 - 21-11-2017

ELEVATION (m)	DEPTH (m)	SOIL SAMPLES	DESCRIPTION OF MATERIAL	SOIL SYMBOLS	SYMBOLIC LOGS	STANDARD PENETRATION TEST DEPTH	CR %	RQD %
478.15	10.00	D/S	Completely Weathered Rock	WR		10.0		
						11.0	6	0
476.65	11.50	W/S	Light brown fine SAND (Completely weathered rock)	WR		12.0		
						13.0		
475.15	13.00	W/S	Light brown fine SAND (Completely weathered rock)	WR		14.0		
474.15	14.00	W/S	Light brown fine SAND (Completely weathered rock)	WR		15.0		
473.15	15.00	W/S	Light brown fine SAND (Completely weathered rock)	WR		16.0		
472.15	16.00	D/S	Yellowish brown CLAY with fine to medium sand trace gravel (Completely weathered rock)	WR				
			Rock Level			17.0		
471.15	17.00		White coarse to medium grained moderately weathered Impure MARBLE	R		18.0	65	51
469.65	18.50		White coarse to medium grained fresh Impure MARBLE	R		19.0	99	86
						20.0		

PENETRATION TEST VALUES



KEY : Sand, Clay, Rock, Gravel

R - Rock WR - Weathered Rock

HB - Hammer Rebounding - No Penetration

U/S - 60 mm dia undisturbed Sample

D/S - Disturbed Sample

- Ground Water Level - 4.0m

REMARKS :

DRILLED BY:

LOGGED BY: *Kanishka*

CHECKED BY: *Prabhath Samaranayake*

BOREHOLE LOG

WINJE International Company (Pvt.) Ltd.

PROJECT	: Geotechnical Investigation for the Kandy Multimodel Transport Terminal		
CLIENT	: Greentech Consultants (Pvt.) Ltd.		
BORE HOLE NO	: BH - 02	DEPTH OF DRILLING	: 20.0m
GROUND ELEVATION	: 487.69 msl	LOCATION	: Railway Site
DRILLING MACHINE	: KOKEN Boring Machine	DRILLING TYPE	: Rotary Hydraulic
COORDINATES (X,Y)	484092.5 531789.98 0	DATE	: 08-11-2017 - 11-11-2017

ELEVATION (m)	DEPTH (m)	SOIL SAMPLES	DESCRIPTION OF MATERIAL	SOIL SYMBOLS	SYMBOLIC LOGS	STANDARD PENETRATION TEST: DEPTH	CR%	RQD%	PENETRATION TEST VALUES
477.69	10.00		Blackish grey fine to medium grained highly weathered BIOTITE GNIESS	R		10.0	44	11	
476.69	11.00		Blackish grey fine to medium grained moderately weathered BIOTITE GNIESS	R		11.0 12.0	66	26	
475.19	12.50		Blackish grey fine to medium grained Slightly weathered BIOTITE GNIESS	R		13.0	95	56	
473.69	14.00		Blackish grey fine to medium grained Slightly weathered BIOTITE GNIESS	R		14.0 15.0	80	51	
472.19	15.50		Blackish grey fine to medium grained Slightly weathered BIOTITE GNIESS	R		16.0	90	65	
470.69	17.00		Blackish grey fine to medium grained Slightly weathered BIOTITE GNIESS	R		17.0 18.0	80	51	
469.19	18.50		Blackish grey fine to medium grained Slightly weathered BIOTITE GNIESS	R		19.0	97	72	
467.69	20.00		End of the borehole at 20.0m			20.0			

KEY : Sand, Clay, Rock, Gravel

R - Rock WR - Weathered Rock
HB - Hammer Rebounding - No Penetration
S - 60 mm dia undisturbed Sample
D/S - Disturbed Sample
V - Ground Water Level - 3.40m

REMARKS :

DRILLED BY:
LOGGED BY: *Kanishka*
CHECKED BY: *Prabhath Samarancvake*

BOREHOLE LOG

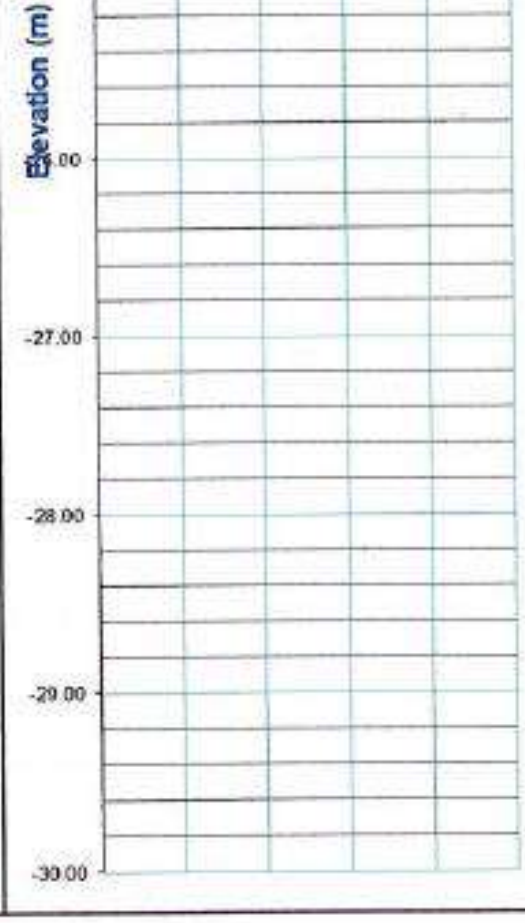
2 of 2

WINJE International Company (Pvt.) Ltd.

PROJECT	: Geotechnical Investigation for the Kandy Multimodel Transport Terminal		
CLIENT	: Greentech Consultants (Pvt.) Ltd.		
BORE HOLE NO	: BH - 03	DEPTH OF DRILLING	: 30.0 m
GROUND ELEVATION	: 488.149	LOCATION	: KMT Site
DRILLING MACHINE	: KOKEN Boring Machine	DRILLING TYPE	: Rotary Hydraulic
COORDINATES	484102.6 531827.5	DATE	: 19-11-2017 - 21-11-2017

ELEVATION (m)	DEPTH (m)	SOIL SAMPLES	DESCRIPTION OF MATERIAL	SOIL SYMBOLS	SYMBOLIC LOGS	STANDARD PENETRATION TEST DEPTH	CR %	RQD %
468.15	20.00		White coarse to medium grained slightly weathered Impure MARBLE	R		20.0 21.0	79	73
466.65	21.50		White coarse to medium grained moderately weathered Impure MARBLE	R		22.0 23.0	51	82
465.15	23.00		White coarse to medium grained moderately weathered Impure MARBLE	R		24.0	58	33
463.65	24.50		White coarse to medium grained slightly weathered Impure MARBLE	R		25.0 26.0	94	64
462.15	26.00		White coarse to medium grained highly weathered Impure MARBLE	R		27.0	36	0
460.65	27.50		White coarse to medium grained highly weathered Impure MARBLE	R		28.0 29.0	39	0
459.15	29.00		White coarse to medium grained highly weathered Impure MARBLE	R			24	0
458.15	30.00		End of the Borehole at 30.0m			30.0		

PENETRATION TEST VALUES



KEY : Sand, Clay, Rock, Gravel

R - Rock WR - Weathered Rock
HB - Hammer Rebounding - No Penetration
U/S - 60 mm dia undisturbed Sample
D/S - Disturbed Sample
▽ - Ground Water Level - 4.0m

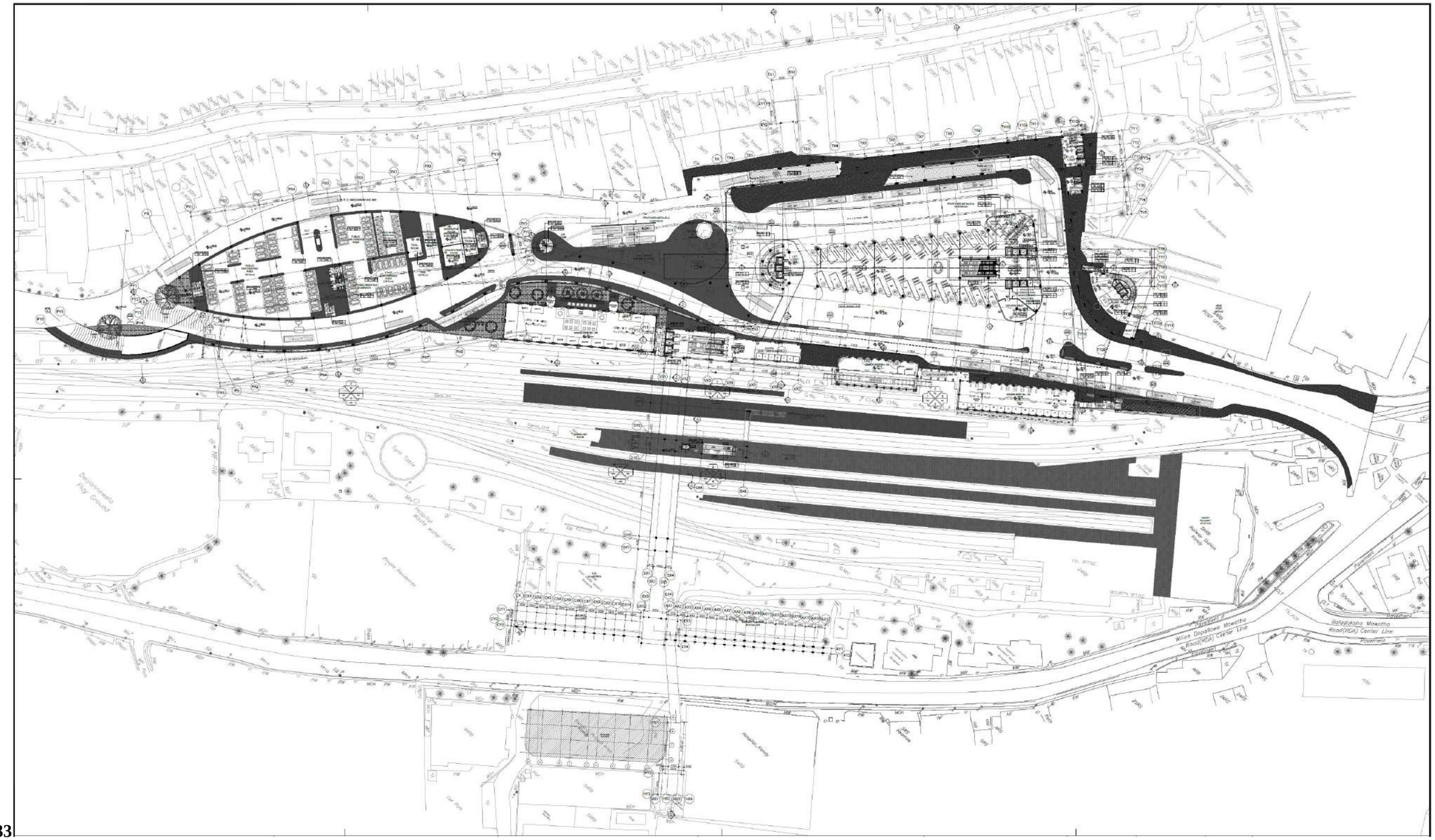
REMARKS :

DRILLED BY:
LOGGED BY: Kanishka
CHECKED BY: Prabhath Samaranayake

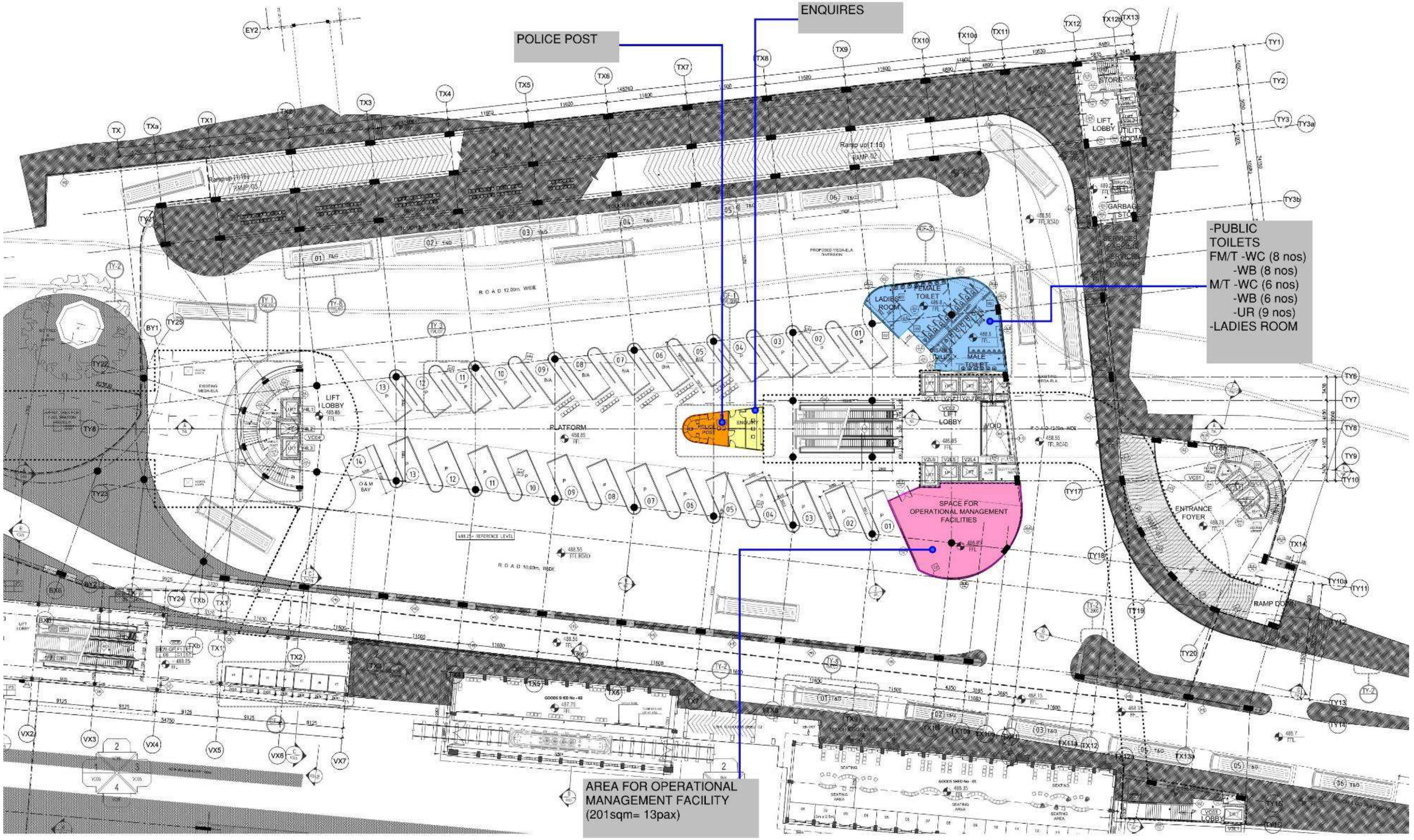
BOREHOLE LOG

Annex. 07 Design Drawings with details for Main KMTT Building

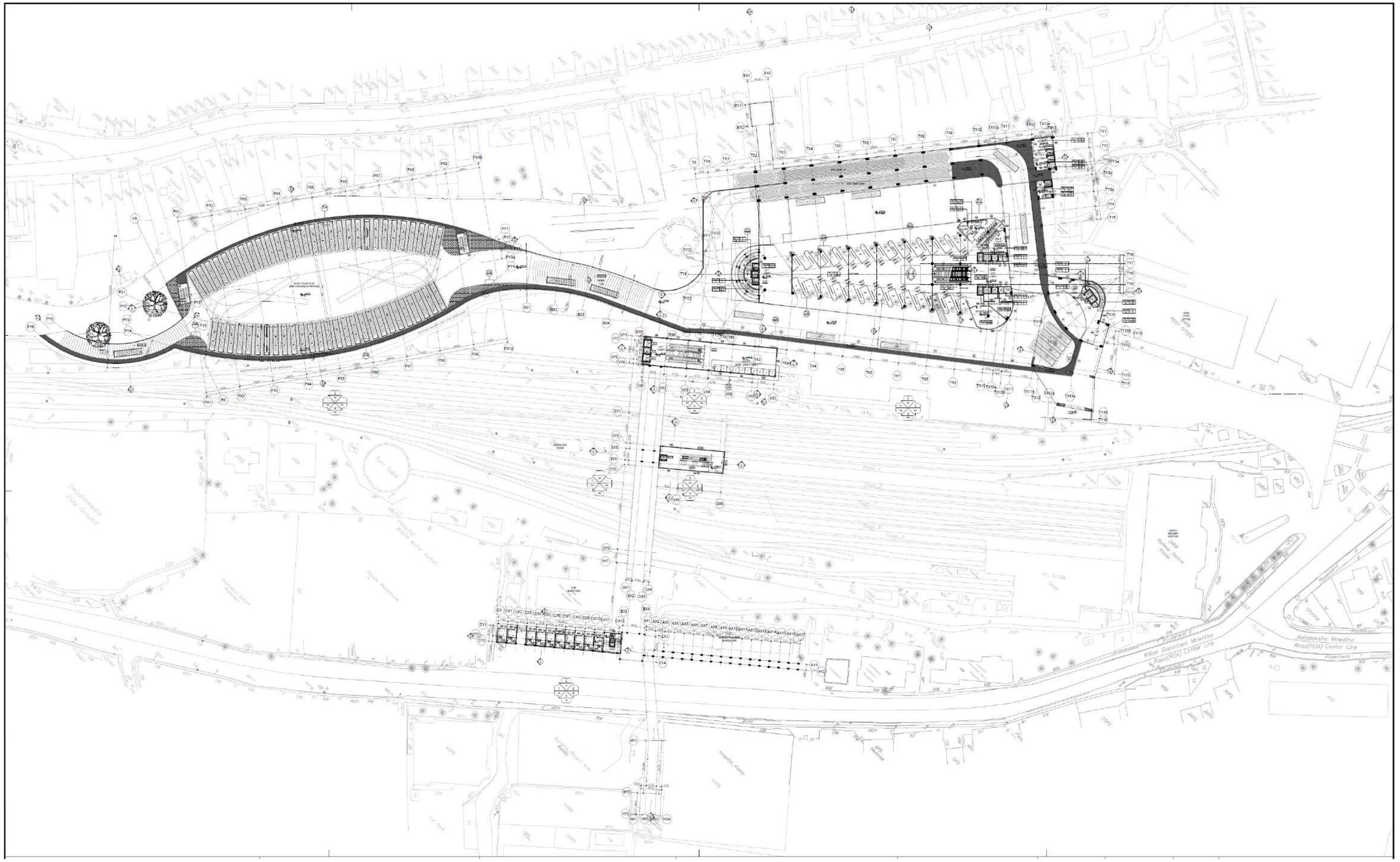
7.1 Ground Floor

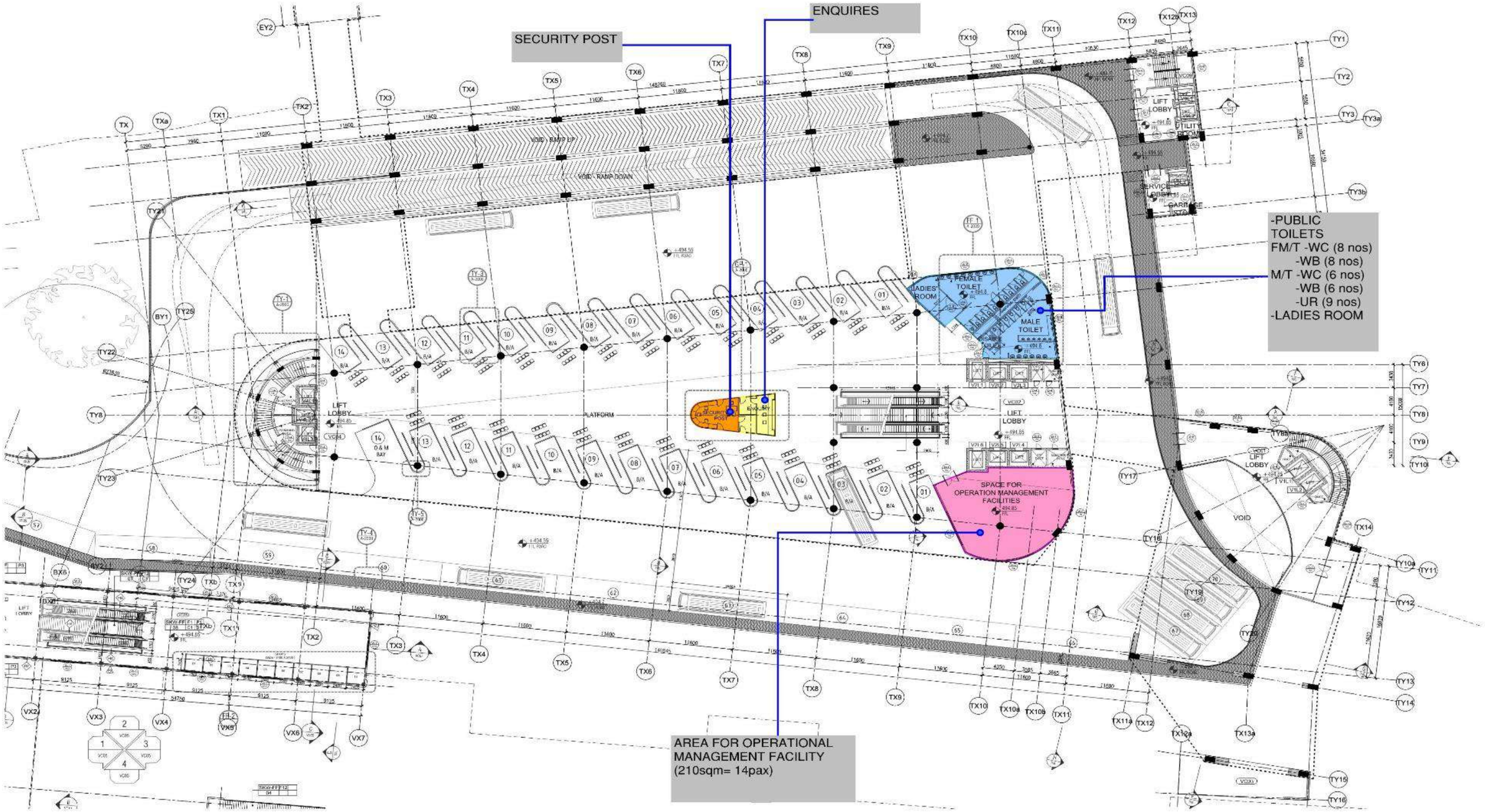


3333

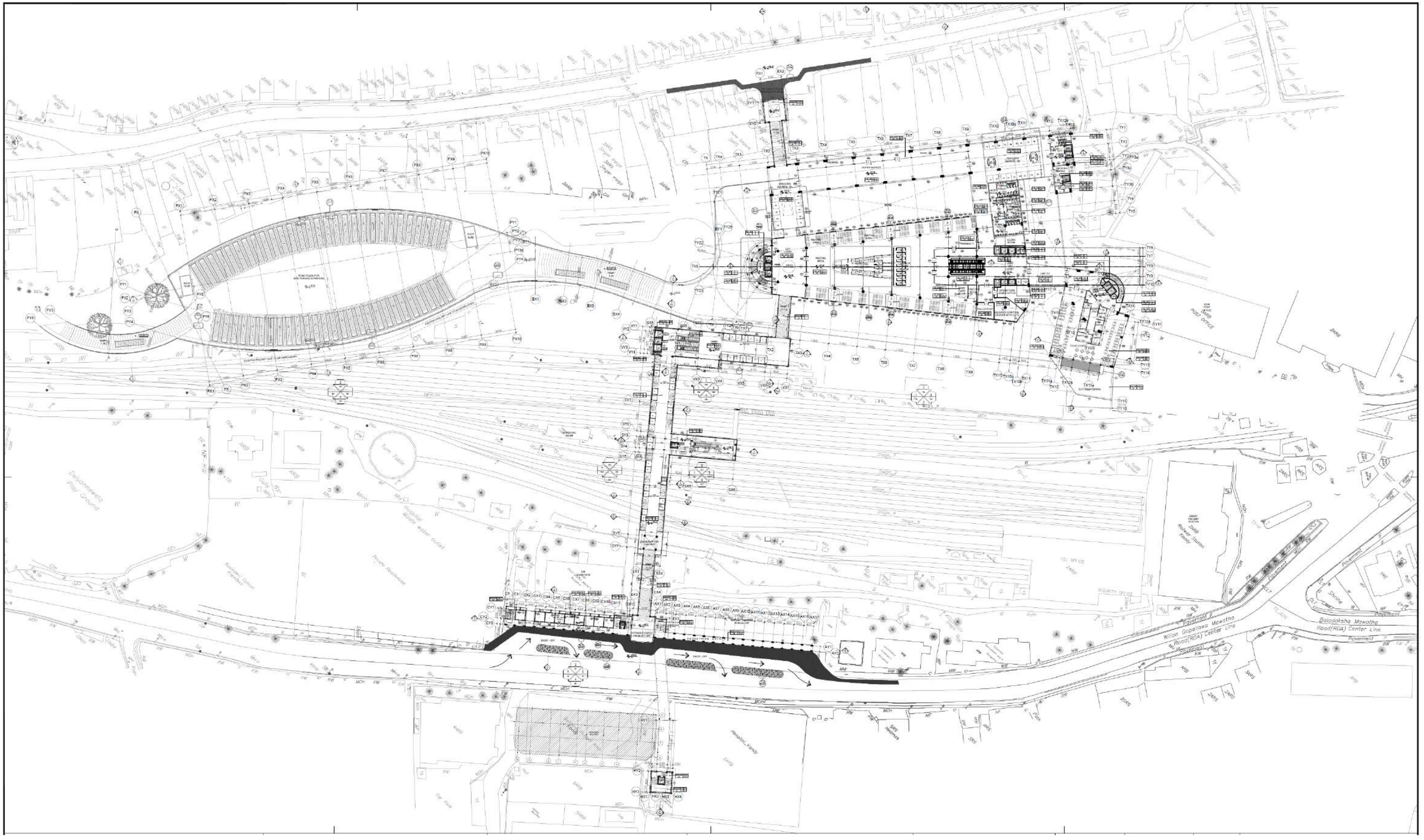

POLICE POST
ENQUIRES
-PUBLIC TOILETS
FM/T -WC (8 nos)
-WB (8 nos)
M/T -WC (6 nos)
-WB (6 nos)
-UR (9 nos)
-LADIES ROOM
SPACE FOR OPERATIONAL MANAGEMENT FACILITIES
AREA FOR OPERATIONAL MANAGEMENT FACILITY (201sqm= 13pax)
ROAD 12.00m. WIDE
ROAD 10.00m. WIDE
PLATFORM
LIFT LOBBY
LADIES ROOM
FEMALE TOILET
MALE TOILET
DISABLES TOILET
STORE
GARBAGE STORE
ENTRANCE FOYER
RAMP DOWN
VOID
Ramp up(1:15)
RAMP 02
Ramp up(1:15)
RAMP 05

7.2 First Floor


Wilson Gopallawa Mawatha
Road(RDA) Center Line
Pavement


SECURITY POST
ENQUIRES
-PUBLIC TOILETS
FM/T -WC (8 nos)
-WB (8 nos)
M/T -WC (6 nos)
-WB (6 nos)
-UR (9 nos)
-LADIES ROOM
AREA FOR OPERATIONAL MANAGEMENT FACILITY (210sqm= 14pax)
SPACE FOR OPERATION MANAGEMENT FACILITIES
LIFT LOBBY
PLATFORM
VOID
FEMALE TOILET
MALE TOILET
LADIES' ROOM
SERVICE LOBBY
GARBAGE STORE

7.3 Second Floor



SECOND FLOOR

VENDOR'S SQUARE - 02
8' x 10' Shops 18nos

SUPER MARKET (600 sqm)

VENDOR'S SQUARE - 01
9' x 10' Shops 10nos

DISPLAY PLATFORM

KIOSK (Phones, Ice creamoutlet, Newspaper, Refreshments, etc

RECEPTION
TICKETS COUNTERS
(12 nos)
- SLTB (04nos)
- CP -RPTA/ NTC
- RAILWAY
- VAULTS (1.6 x 3m x 4nos)
- LEFT LUGGAGE ROOM
(1.6 x 3m)

ATM/ CDM (8nos)

MINI BANKS (20sqm x 2nos)

(600seats)

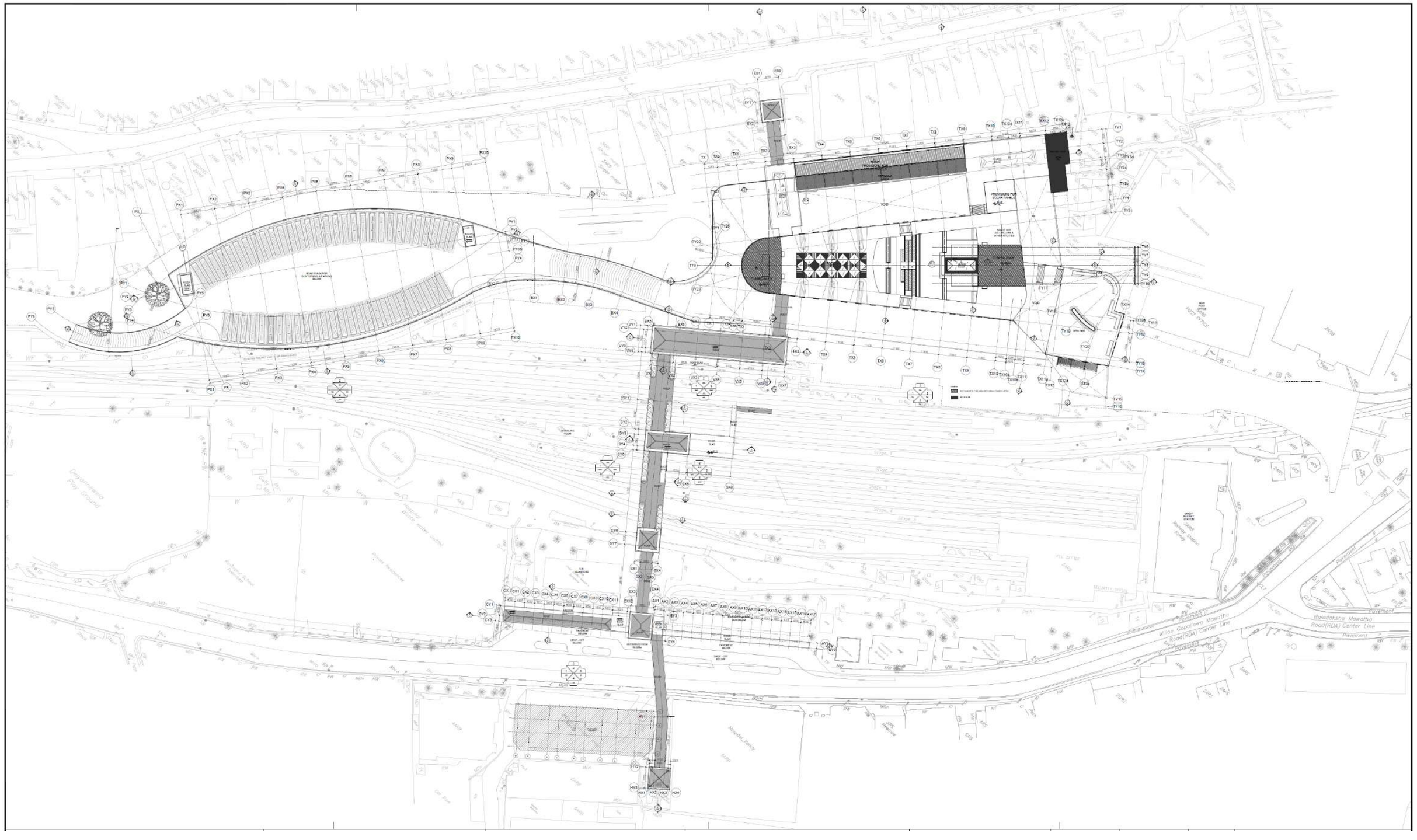
- PHARMACY (40sqm)
- BABY-CARE ROOM
- FIRST-AID ROOM

- OPERATOR
ADMIN OFFICE
(268sqm - 18pax)

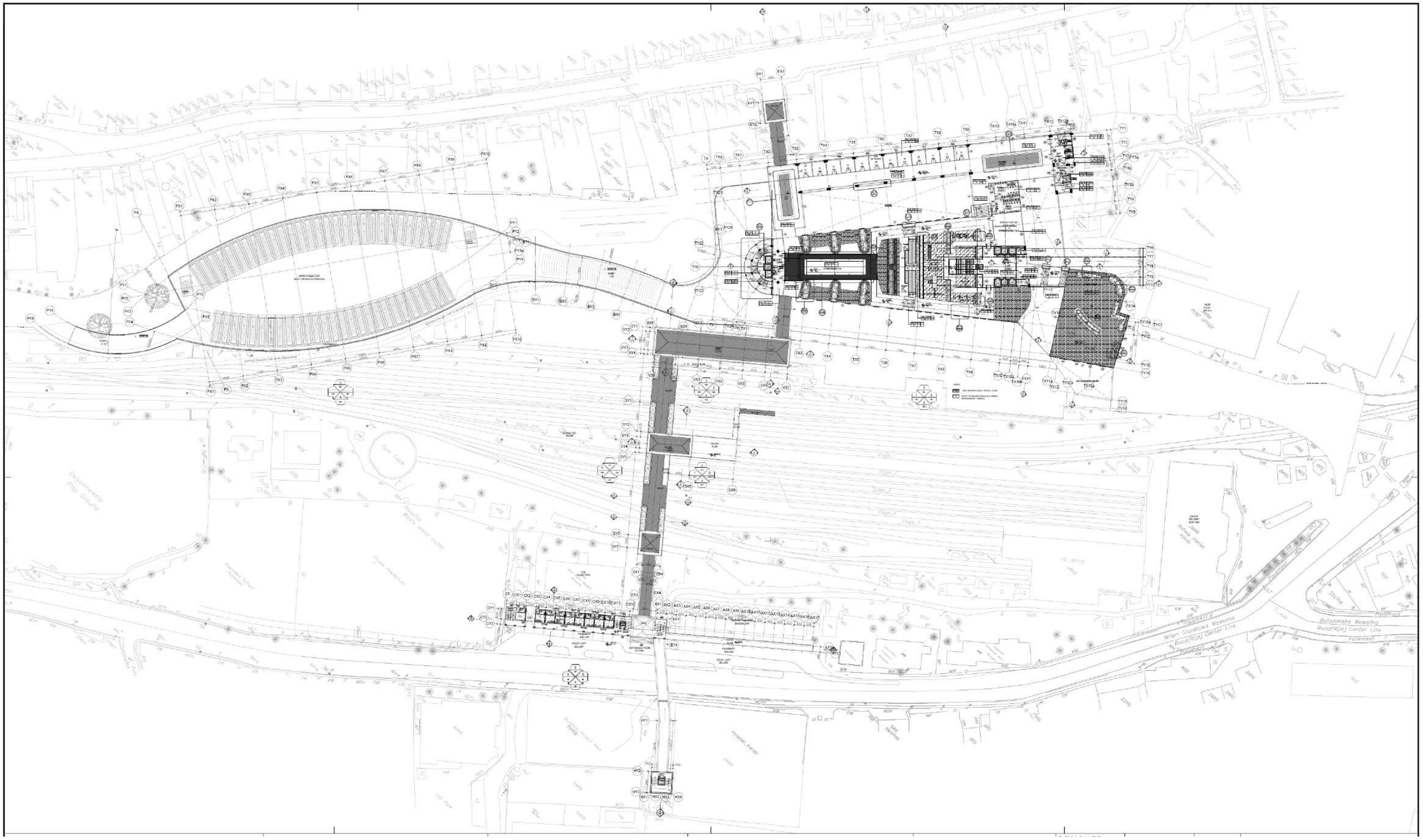
FOOD COURT
- OUTLETS(15sqm X 7 nos)
- RESTAURANT (116sqm)
- Indoor dinning space (500 seats)
- outdoor dinning area (275sqm)

-PUBLIC TOILETS
FM/T -WC (8 nos)
-WB (8 nos)
M/T -WC (5 nos)
-WB (5 nos)
-UR (7 nos)
-STAFF TOILETS
FM/T -WC (3 nos)
-WB (3 nos)
M/T -WC (3 nos)
-WB (3 nos)
-UR (4 nos)
- CLOAKROOM

7.4 Roof Top


Wilson Gopallawa Mawatha Road(RDA) Center Line
Pavement
Pavement
Holadaksha Mawatha Road(RDA) Center Line
Pavement

7.5 Roof Terrece



ROOF TERRACE

TENANT AREA (420m2)
18' x 18' Shops 12nos/
Tuition Classes/
Professional Offices/
Channeling Center , etc..

OPEN PAVILION/
PASSAGE
Rentable space for
Various Exhibitions,
Martial Art, Yoga &
Performance Art
activates, open dining
space (eg. Hela Bojun)

TERRACE LANDSCAPE
- Intensive type roof garden.
- The trees are placed on the roof beam structure and covered with soil layer and turf
- The trees have to be maintained upto 3 to 5m ht and watering with drip irrigation system.

Recommended Trees

Amherstia nobilis - "Kukulkakul"

Cassia fistula - "Ehela"

Phanera purpurea - ""Kobolile""

Plumeria obtusa - "Araliya"

CHILDREN PLAY AREA

CLIMBING DOME

SEESAW

SWING SET

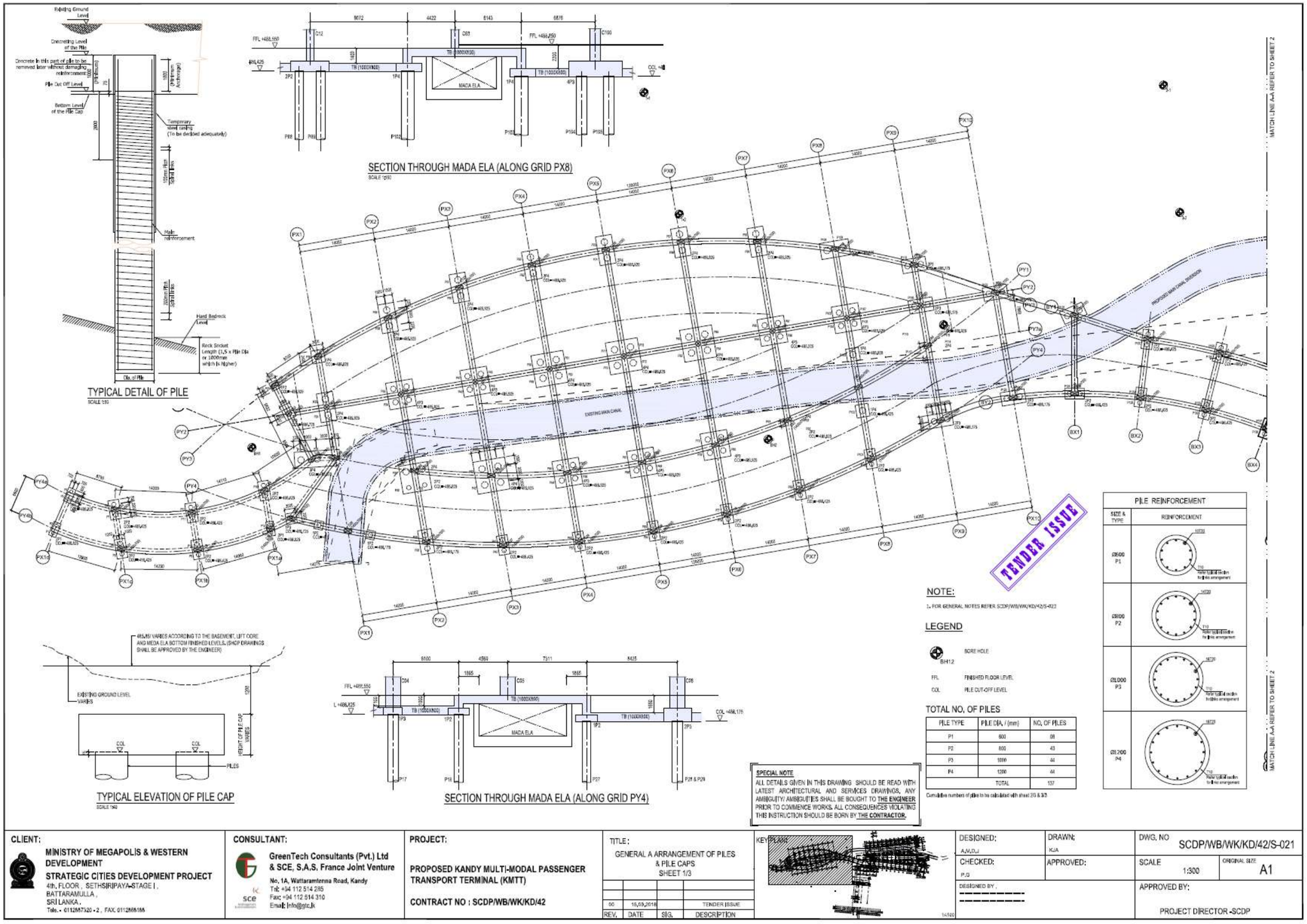
MERRY-GO-ROUND

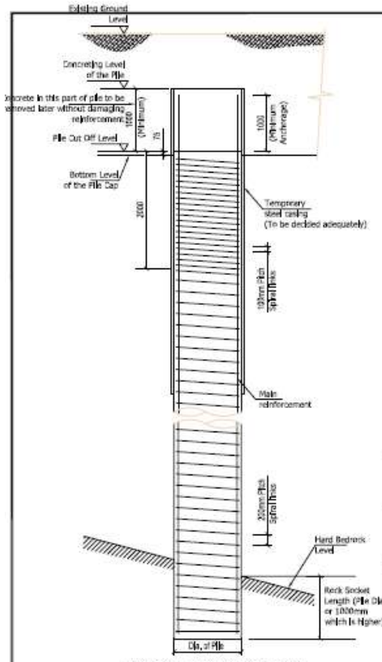
OPEN PARK


SIGNAGE
SIGNAGE
SIGNAGE
SIGNAGE
SIGNAGE

7.6 Underpass Level

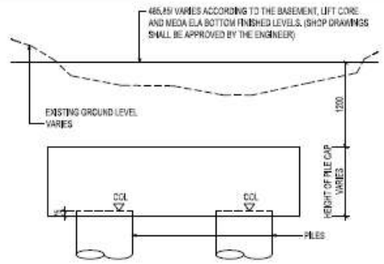
Annex 09: Design drawing of general arrangements of pile and pile caps.





TYPICAL DETAIL OF PILE

SCALE 1:50



SPECIAL NOTE

ALL DETAILS GIVEN IN THIS DRAWING SHOULD BE READ WITH LATEST ARCHITECTURAL AND SERVICES DRAWINGS, ANY AMBIGUITY/ AMBIGUITIES SHALL BE BOUGHT TO **THE ENGINEER** PRIOR TO COMMENCE WORKS. ALL CONSEQUENCES VIOLATING THIS INSTRUCTION SHOULD BE BORN BY **THE CONTRACTOR.**

TOTAL NO. OF PILES

PILE TYPE	PILE DIA. / (mm)	NO. OF PILES
P1	600	84
P2	800	62
P3	1000	156
P4	1200	196
TOTAL		377

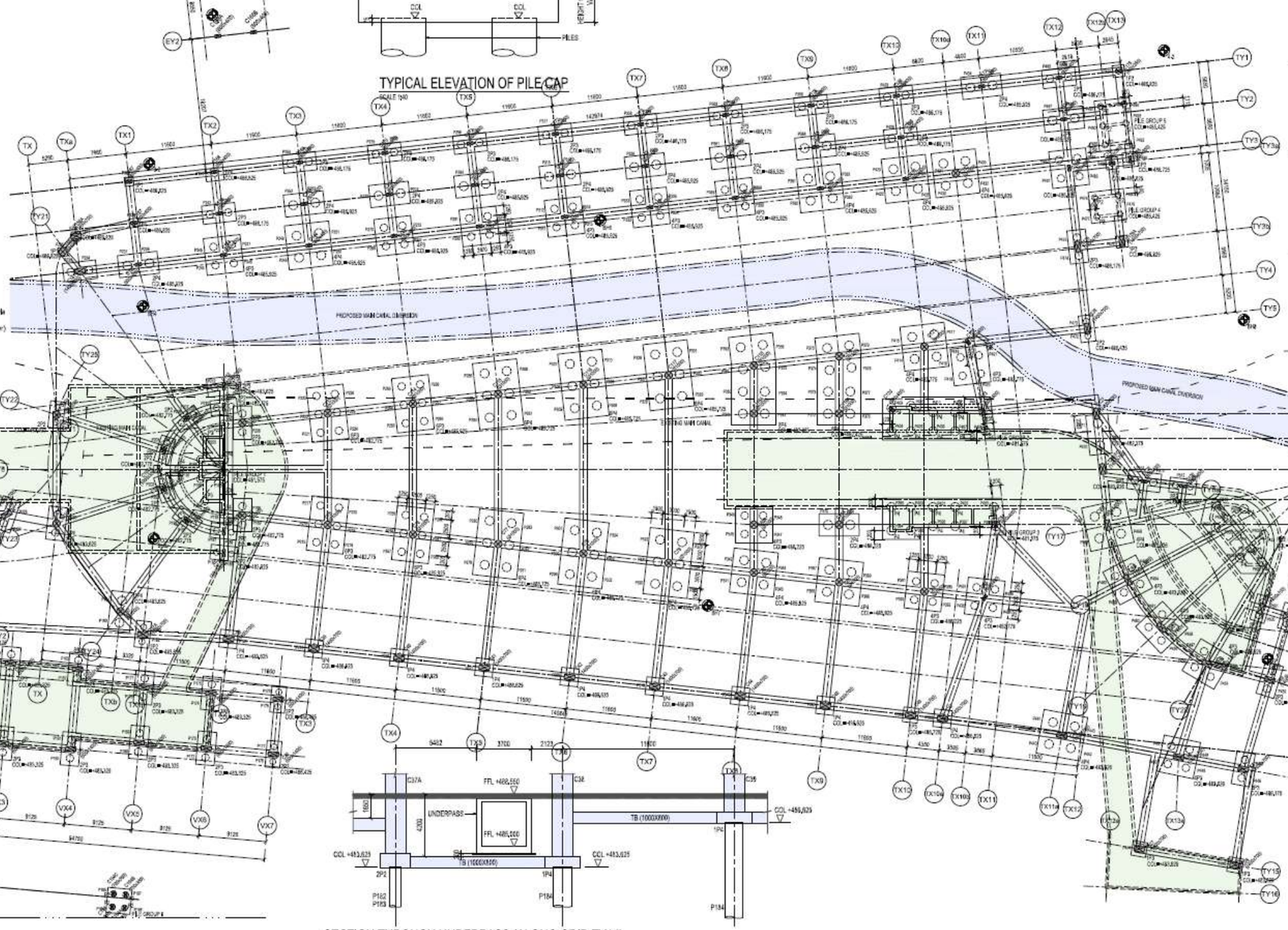
Cumulative numbers of piles to be calculated with sheet 1/3 & 3/3

PILE REINFORCEMENT

SIZE & TYPE	REINFORCEMENT
Ø600 P1	10T32 / T12 Refer typical section for links arrangement
Ø800 P2	14T32 / T12 Refer typical section for links arrangement
Ø1000 P3	18T32 / T12 Refer typical section for links arrangement
Ø1200 P4	18T35 / T12 Refer typical section for links arrangement

TYPICAL ELEVATION OF PILE CAP

SCALE 1:300



SECTION THROUGH UNDERPASS (ALONG GRID TY14)

LEGEND

BH12 — BORE HOLE

FFL — FINISHED FLOOR LEVEL

COL — PILE CUT-OFF LEVEL

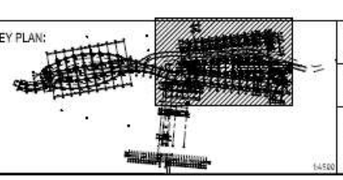
TENDER ISSUE

NOTE:

1. FOR GENERAL NOTES REFER SCDP/WB/WK/KD/42/S-023

CLIENT: MINISTRY OF MEGAPOLIS & WESTERN DEVELOPMENT STRATEGIC CITIES DEVELOPMENT PROJECT 4th, FLOOR , SETHSIRIPAYA-STAGE I , BATTARAMULLA , SRI LANKA . Tele. - 0112867320 - 2 , FAX. 0112866186	**CONSULTANT:** GreenTech Consultants (Pvt.) Ltd & SCE, S.A.S, France Joint Venture No. 1A, Wattaramtenna Road, Kandy Tel: +94 112 514 285 Fax: +94 112 514 310 Email: info@gtc.lk	**PROJECT:** PROPOSED KANDY MULTI-MODAL PASSENGER TRANSPORT TERMINAL (KMTT) **CONTRACT NO : SCDP/WB/WK/KD/42**	TITLE : GENERAL A ARRANGEMENT OF PILES & PILE CAPS SHEET 2/3 00 — 16.09.2018 — TENDER ISSUE REV. — DATE — SIG. — DESCRIPTION

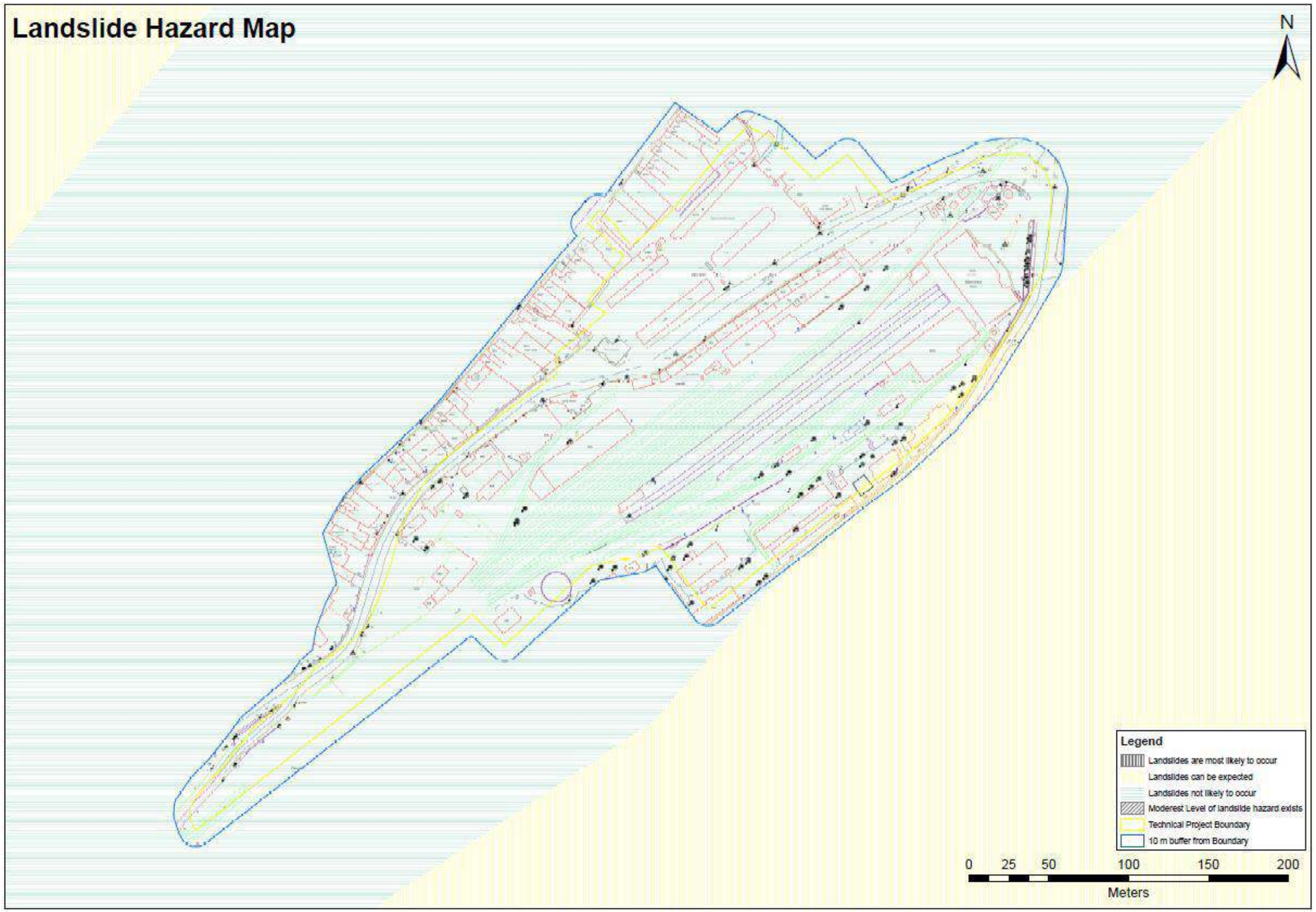
KEY PLAN:



DESIGNED: A.M.D.J	DRAWN: KJA	DWG. NO	SCDP/WB/WK/KD/42/S-022
CHECKED: P.G	APPROVED:	SCALE 1:300	ORIGINAL SIZE A1
DESIGNED BY ,		APPROVED BY: PROJECT DIRECTOR -SCDP	

Annex 08: Meda Ela diversion layout

Annex 9: Land Hazards Map



Annex 10: Summary of Procedure to Obtain Mining License for Borrow Pit Operation

1. Identify the site and verify ownership (land clearing)
2. Obtain letters of consent from the owners (Private / Government)
3. Contractor applies for site clearance from CEA
4. CEA may request an lEE or EIA to be carried out by the contractor
5. CEA gives clearance.
6. Contractor applies for Mining License (IML/A, IML/B or IML/C) from GSMB.
7. GMSB conducts joint inspection with a committee comprising with CEA, DS, and PS.
8. Contractor has to make bank guarantee specified by the GSMB based on the situation of the land, prior to issuing Mining License.
9. Contractor applies for Trade License from PS.

Annex 11: Summary of Procedure to Obtain Mining License for Quarry Operation

1. Identify the site and verify ownership (land clearing)
2. Obtain letters of consent from the owners (Private/ Government)
3. Contractor applies for site clearance from CEA
4. CEA may request an lEE or EIA to be carried out by the contractor
5. CEA gives clearance
6. Contractor applies for Mining License (IML/A, IML/B or IML/C) from GSMB.
7. GMSB conducts joint inspection with a committee comprising with CEA, DS, and PS who would decide whether the test blast is needed for IML-A and IML-B which depends on the sensitivity of the site. Test blast will be carried out prior to issuing Mining License
8. Contractor applies for EPL from CEA
9. EPL is issued by CEA
10. GSMB monitors noise and vibrations annually and renews license
11. Contractor applies for explosive license from the Ministry of Defense
12. Contractor applies for Trade license/ Approval from PS

Annex 12: Waste Management General Guidelines

1. General requirements

Priorities must be given for promoting source separation and sorted waste collection.

In the waste management plan priorities must be given on waste recycling and resource recovery and to reduce the amount of final disposal

The existing recommended colour code must be used for waste collecting bins and garbage bags. (Please see the Annexure A below)

When handling biodegradable waste and waste not containing any toxic contaminants priorities must be given for biological processing such as composting, anaerobic digestion or any other appropriate biological processing for stabilization of waste.

Land filling shall be encouraged to non-biodegradable, inert waste and other waste that are not suitable either for recycling or for biological processing.

Labour Ordinance, Factory Ordinance, other relevant regulations and guidelines stipulated by the Central Environmental Authority (CEA) approval procedures and relevant Local Authority approval procedures shall be followed. All designs shall comply with the requirements of relevant agencies. Operator should take adequate mitigatory measures to minimize possible pollution of air, water and soil.

Adequate training should be given to workers involved in solid waste management operations and operator should endeavor to involve trained workers as far as possible.

Any person wishing to operate a solid waste disposal (including transfer station, materials recovery, incineration, composting etc.) shall provide to the CEA the following information and any further information as may be requested by the CEA for approval procedure.

A topographic map showing the location and boundaries of the proposed site and land use within one Kilometer radius of the proposed site

A clear lay out plan with appropriate scale showing full details of the proposed locations for different activities.

The capacity of the facility, all machineries and equipment to be used in the facility, operating hours, number of working days, number of workers for each activity.

The details of the operation flow diagram for the proposed facility, origin, composition, and expected weight or volume of solid waste to be accepted as well as the projected waste quantity expected in future years.

2. Legal requirement

If any of the solid waste management facilities mentioned hereinafter meets the requirement of the Gazette (Extra Ordinary) No. 772/22 of 24th June 1993 and the subsequent amendments,

then it shall follow the Environmental Impact Assessment Process in order to obtain the environmental clearance.

The noise levels shall be maintained at the boundaries of the site as stipulated in the Gazette (Extra Ordinary) No. 924/12 dated 23rd May 1996.

Effluents or leachate quality should be monitored and treated to conform to the standards /tolerance limits as mentioned in the CEA guidelines.

Prior approval for the building plan needs to be obtained from the relevant Local Authority

An environmental recommendation prior to initiate any activity and a permit for construction and operation of the facility shall be obtained from the CEA

3. Operational requirement

Authorized officer shall be on duty during operating and non-operating hours at the waste reception point to control unauthorized access. (This is not applicable in the case of Waste Collection System)

Any infectious waste or hazardous waste should not be accepted into the facility. A proper screening procedure or mechanism shall be established for preventing the solid waste from the infectious waste or hazardous waste that may be mixed.

Litter, insects, odour and vectors shall be controlled to prevent sanitary nuisance and unsightly appearance.

Adequate fire protection shall be installed and available at all times.

A contingency plan to cover the machine / vehicle breakdown or any operation interruptions and delay.

Attention should be given to collect and transport obnoxious waste separately as much as possible

4. Waste collection

4.1 Introduction

Waste collection is the act of picking up wastes at homes, businesses, institutions, commercial and industrial plants and other locations; loading them into a collection vehicle and hauling them to a facility for further processing or transfer to a disposal site. Collection of wastes is the one of the basic elements of any waste management system.

Collection of unseparated (commingled) and separated solid waste in an urban area is difficult and complex because the generation of wastes takes place in every house, every apartment building and commercial and individual facility as well as in the streets, parks, and even vacant areas. Therefore in any waste collection operation it is important to look into; types of waste

collection services/systems, type of equipment to be used and associated labour requirements, collection routes etc.

Any person wishing to operate a waste collection system shall have the following information given under general requirements below.

4.2 General Requirements

The waste collection areas and transport routes, the number and type of the collection vehicles to be used, frequency of waste collection and the schedule for collection and transport.

4.3 Design Requirements

Specifications of all machineries, equipment and vehicles to be used in the facility.
Type, numbers, capacities shall be detailed.

Collection vehicles shall be fully covered and leachate collection box shall also be prepared to prevent littering and leachate spill during transportation.

4.4 Operational Requirements

Heavily travelled roads should not be served or used during rush hours.

Any infectious waste or hazardous waste should not be accepted into the normal waste collection vehicles.

Daily records of the quantity of solid waste collected, the origin of waste, the quantity of solid waste transferred to disposal site, shall be maintained.

The Proposed Colour Codes for Garbage Bags

Green Colour - Organic Waste
Blue Colour - Paper
Red Colour - Glass Bottles
Brown Colour - Metals / Coconut shells
Orange Colour - Plastic & Polythene

Waste Type	Waste Materials	Trade Contractor	Best Practice			
			Waste Minimizations	On site Re-use/Recycling/Recovery	Off-site Re-use/Recycling/Recovery	Disposal
Inert	Concrete	Construction	Retention of concrete onsite where possible. Only order what is required.	Use as secondary aggregate on site.	Segregate for re-processing and reuse as recycled secondary aggregate.	Landfill and cover
	Rubble (hardcore)	Construction	Only order what is required.	Opportunities to reuse cut material as fill in proposed noise bund	Segregate for reprocessing and reuse as recycled secondary aggregate.	Landfill and cover
Non-hazardous	Soil/Green waste/vegetation	Construction		Opportunities to reuse cut material as fill in proposed noise bund		Landfill and cover
	Mixed waste	Construction	Use of standard sizes. Arrange take back of unused materials with the supplier.	N/A	Segregate for reprocessing and reuse as recycled secondary aggregate.	Landfill/ Incineration
	Metal	Construction	Made to measure, correct ordering just in time delivery store correctly. Arrange take back of unused materials with the supplier.		Segregate for reprocessing and reuse as recycled secondary aggregate.	Landfill
	Timber	Construction	Avoid over ordering. Provision of suitable storage to avoid damage. Arrange take back of unused materials with the supplier.		Re-use/Recycle if feasible	Landfill/ Incineration
	Plasterboard	Construction	Avoid over ordering. Provision of suitable storage to avoid damage. Arrange take back of unused materials with the supplier.	Cannot reuse	Recycle if feasible	Landfill
	Packaging	Construction	Ask suppliers to send products with minimal packaging/ reusable containers, buy bulk not individually wrapped products. Return pallet to supplier or use plastic pallets.	N/A	Segregate for reprocessing and reuse as recycled secondary aggregate.	Landfill/ Incineration
	Cabal & wiring	Construction	Avoid over ordering. Arrange take back of unused materials with the supplier.	Reuse onsite if appropriate	Segregate and recycle to reclaim plastics and metal.	Landfill
	General office waste	Site Management	Print double sided and send documents electronically, reusable crockery and cutlery.	Reuse paper, cartridges, plastic cups, tins and cardboards.	Segregate and recycle white papers. Send for composting (food waste only)	Landfill
	Glass	Construction	Avoid over ordering, appropriate storage to avoid accidents. Arrange take back of unused materials with the supplier.	N/A	Segregate and send for recycling	Landfill and cover

	WEEE	Construction	Arrange take back of unused materials with the supplier.	Reuse elsewhere onsite	Send to dedicated recycling facility for recovery and recycling.	Landfill
Hazardous	Asbestos	Construction	N/A/	N/A	N/A	Landfill
	Contaminated Land	Construction	Avoid excavation where unnecessary	Consider onsite treatment methods	Treatment contaminated land hubs.	Landfill
	Paintings, line markers, mastic	Construction	Use solvent free paits that are not disposed of as hazardous waste, maximum use of mechanical fitting rather than adhesives. Arrange take back of unused materials with the supplier.	Use lockable COSHH container for storage	N/A	Landfill
	WEEE	Construction	N/A	Re-use elsewhere on-site	Send to dedicated recycling facility for recovery and recycling.	Landfill

Annex 13: Environmental Pollution Control Standard

1. Emission Standards

1.1 Regulations

The National Environmental (Ambient Air Quality) Regulations, 1994, published in *Gazette Extraordinary*, No. 850/4 of December, 1994 are hereby amended by the substitution for the Schedule to that regulation of the following :-

Pollutant	Time Average	Emission Standards (µg/ m^3)	Emission Standards (ppm)
SO_2	1 hr	200	0.08
	8 hrs	120	0.05
	24 hrs	80	0.03
NO_2	1 hr	250	0.13
	8 hrs	150	0.08
	24 hrs	100	0.05
CO	1 hr	30000	26.00
	8 hrs	10000	9.00
	anytime	58000	50.0
O_3	1 hr	200	0.10
PM_{10}	24 hrs	100	-
	Annual	50	-
$PM_{2.5}$	24 hrs	50	-
	Annual	25	-

* Minimum number of observations required to determine the average over the specified period —
03 hour average - 03 consecutive hourly average
08 hour average - 08 hourly average
24 hour average - 18 hourly average
Yearly average - 09 monthly average with at least 02 monthly average each quarter.

+ By using Chemicals or Automatic Analyzers.

FIRST SCHEDULE

A: Petrol Vehicles:-

Type of Vehicles	***Emission standards (Effective From April 1, 2008)***		***Remarks***
	Carbon Monoxide CO (% v/v)	**Hydrocarban HC (ppm v/v)**	
1. Petrol Vehicles other than motor cycles and motor tricycles	4.5	1200	Both idling and 2500 RPM/ No load
2. Petrol Motor cycles and motor tricycles	6	9000	

Abbreviations:
% v/v - percent by volume
ppm v/v - parts per million by volume
RPM - revolutions per minute

B: Diesel Vehicles:-

Type of Vehicles	***Emission Standards*** **(Effective from April 1, 2008) Smoke Opacity on Snap Acceleration k factor (m^{-1})**
Diesel Vehicles	8.0

Abbreviations:
k factor - Absorption co-efficient
Snap acceleration - has the same meaning as defined in SAE RECOMMWNDED PRACTICEJ 1667

2. Noise Level Regulations

Area	L_{Aeq}' *T - Day Time*	L_{Aeq}' *T- Night Time*
Schedule I		
Low Noise	55	45
Medium Noise	63	50
High Noise	70	60
Silent Zone	50	45
Schedule III		
For Construction Activities	75	50
Schedule IV		
Rural Residential	55	45
Urban Residential	60	50
Noise Sensitive	50	45
Mix residential	63	55
Commercial	65	55
Industrial	70	60

ILO Standards of Noise Levels

Noise level (dB(A))	**Maximum exposure (times per day)**
80	16 hours
85	8 hours
90	4 hours
95	2 hours
100	1 hour
105	1/2 hours
110	1/4 hours
115	1/8 hours

“day time” from 06.00 hours to 18.00 hrs,:

“night time” means from 18.00 to 06.00 hours

“Noise sensitive area” includes any area in which a courthouse, hospital, public library, school, zoo sacred area and areas set a part for recreation or environmental purposes are depicted in a noise zone map;

3. Interim Vibration Standards

Interim standards for Vibration Control

Table 2.1: Interim Standards vibration of the Operation of Machinery, Construction Activities and Vehicle Movements Traffic

Category of the structure as given in Table 1.1	Type of Vibration	Frequency of Vibration (Hz)	Vibration in PPV (mm/Sec.)
Type 1	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	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	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	Continuous	0 – 10	0.25
		10 – 50	0.5
		Over 50	1.0
	Intermittent	0 – 10	0.5
		10 – 50	1.0
		Over 50	2.0

Notes

1. Please see separate measurement methods
2. The values given above are in such a way that minor damage is unlikely as the nearby house/buking

Table 2.2: Interim Standards on Air Blast Over Pressure and Ground Vibration for Blasting Activities

Category of the structure as given in Table 1.1	Type of Vibration	Type of Blasting	Ground Vibration in PPV (mm/sec.)	Air blast over Pressure (dB (L)
Type 1	Impulsive	Single bore hole	8.0	105
		Multi bore hole with delay detonators	10.0	115
Type 2	Impulsive	Single bore hole	6.0	105
		Multi bore hole with delay detonators	7.0	11.5
Type 3	Impulsive	Single bore hole	4.0	115
		Multi bore hole with delay detonators	5.0	120
Type 4	Impulsive	Single bore hole	0.5	95
		Multi bore hole with delay detonators	0.75	100

Note

1. **Please see separate measurement methods**
2. **The values given above are in such a way that minor damage is unlikely as the nearby house/buking**

4. Wastewater Discharge Standards

4.1 GENERAL STANDARDS FOR DISCHARGE OF EFFLUENTS INTO INLAND SURFACE WATERS

No	*Determinant*	*Tolerance limit*
1	Total suspended solids, mg/l, max	50
2	Particle size of total suspended solids	Shall pass sieve of aperture size 850 micro m.
3	P^{11} value of ambient temperature	6.0 to 8.5
4	Biochemical Oxygen Demand-BOD5 in 5 days At 20 ^{o} C, mg/I max	30
5	Temperature of Discharge	Shall not exceed 40 ^{o} C in any of Section of the Stream form the effluent outlet.
6	Oils and greases, mg/ I max	10.0
7	Phenolic Compounds (as phenolic OH)mg/I, max	1.0
8	Cyanides as (CN) mg/I, max	0.2
9	Sulfides, mg/I, max	2.0
10	Fluorides, mg/I, max	2.0
11	Total residual chlorine mg/I, max	1.0
12	Arsenic, mg/I, max	0.2
13	Cadmium total, mg/I, max	0.1
14	Chromium total, mg/I, max	0.1
15	Copper total, mg/I, max	3.0
16	Lead, total, mg/I, max	0.1
17	Mercury total, mg/I, max	0.0005
18	Nickel total, mg/I, max	3.0
19	Selenium total, mg/I, max	0.5
20	Zinc total, mg/I, max	5.0
21	Ammoniacal nitrogen, mg/I, max	50.0
22	Pesticides	Undetectable
23	(a) Alpha-emitters micro curie/ml	10^{-7}
	(b) Beta-emitters micro curie/ml	10^{-8}
25	Chemical Oxygen Demand (COD), mg/I, max	250

***Note 1* :** All efforts should be made to remove colour and unpleasant odour as far as practicable.

***Note 2* :** These values are based on dilution of effluents by at least 8 volumes of clean receiving water. If the dilution is below 8 times, the permissible limits are multiplied by 1/8 of the actual dilution.

***Note 3*:** The above mentioned General Standards shall cease to apply with regard to a particular industry when industry specific standards are notified for that industry.

4.2 DISCHARGED ON LAND FOR IRRIGATION PURPOSE

No	*Determinant*	*Tolerance Limit*
1	Total dissolved solid, mg/I, max	2100
2	PH value at ambient temperature	5.5 to 9.0
3	Biochemical Oxygen demand (BOD_5) in 5 days at 20 ^{o} C, mg/I, max	250
4	Oils and grease, mg/I, max	10
5	Chloride (as CI), mg/I, max	600
6	Sulfate (as So_4) mg/I, max	1000
7	Boron (as B) mg/I, max	2.0
8	Arsenic (as As), mg/I, max	0.2
9	Cadmium as (as Cd) mg/I, max	2.0
10	Chromium (as Cr) mg/I, max	1.0
11	Lead (as Pb), mg/I, max	1.0
12	Mercury (as Hg) mg/I, max	0.01
13	Sodium adsorption ratio: (SAR)	10 to 15
14	Residual Sodium Carbonate, mol/I, max	2.5
15	Radioactive material:	
	(a) Alpha emitters, micro curie/ml	10^{-9}
	(b) Beta emitters, micro curie/ml	10^{-8}

Annex 14: IFC Environmental, Health and Safety (EHS) Guidelines

WB ESH Guidelines

The World Bank Groups Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). EHS Guidelines are applied as required by their respective policies and standards. These industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors.

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each project on the basis of the results of an environmental assessment in which site-specific variables, such as host country context, assimilative capacity of the Defined as the exercise of professional skill, diligence, prudence and foresight that would be reasonably expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally. The circumstances that skilled and experienced professionals may find when evaluating the range of pollution prevention and control techniques available to a project may include, but are not limited to, varying levels of environmental degradation and environmental assimilative capacity as well as varying levels of financial and technical feasibility. Environment, and other project factors, are taken into account.

The applicability of specific technical recommendations should be based on the professional opinion of qualified and experienced persons. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures than those provided in these EHS Guidelines are appropriate, in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

The **World Bank Group General EHS Guidelines** contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sector and can be downloaded via the following link.

- ***https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines***

15.1 General EHS Guidelines: Occupational Health and Safety

2.0 Occupational Health and Safety

Applicability and Approach

Employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. This section provides guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety. Although the focus is placed on the operational phase of projects, much of the guidance also applies to construction and decommissioning activities. Companies should hire contractors that have the technical capability to manage the occupational health and safety issues of their employees, extending the application of the hazard management activities through formal procurement agreements.

Preventive and protective measures should be introduced according to the following order of priority:

- *Eliminating the hazard* by removing the activity from the work process. Examples include substitution with less hazardous chemicals, using different manufacturing processes etc;
- *Controlling the hazard* at its source through use of engineering controls. Examples include local exhaust ventilation, isolation rooms, machine guarding, acoustic insulating etc;
- *Minimizing the hazard* through design of safe work systems and administrative or institutional control measures. Examples include job rotation, training safe work procedures, lock-out and tag-out, workplace monitoring, limiting exposure or work duration etc; and
- *Providing appropriate personal protective equipment (PPE)* in conjunction with training, use, and maintenance of the PPE.

The application of prevention and control measures to occupational hazards should be based on comprehensive job safety or job hazard analyses. The results of these analyses should be prioritized as part of an action plan based on the likelihood and severity of the consequence of exposure to the identified hazards. An example of a qualitative risk ranking or analysis matrix to help identify priorities is described in Table 2.1.1.

Table 2.1.1 Risk Ranking Table to Classify Worker Scenarios on Likelihood and Consequence

	Consequences				
Likelihood	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
A. Almost Certain	L	M	E	E	E
B Likely	L	M	H	E	E
C Moderate	L	M	H	E	E
D Unlikely	L	L	M	H	E
E Rare	L	L	M	H	H

Legend:
E: extreme risk; immediate action required
H: high risk; senior management attention needed
M: moderate risk; management responsibility should be specified

2.1 General Facility Design and Operation

Integrity of Workplace Structures

Permanent and recurrent places of work should be designed and equipped to protect OHS:

- Surfaces, structures and installations should be easy to clean and maintain and not allow for accumulation of hazardous compounds.
- Buildings should be structurally safe, provide appropriate protection against the climate and have acceptable light and noise conditions.
- Fire resistant, noise-absorbing materials should, to the extent feasible, be used for cladding on ceilings and walls.
- Floors should be level, even and non-skid. Heavy oscillating, rotating or alternating equipment should be located in dedicated buildings or structurally isolated sections.

Severe Weather and Facility Shutdown

- Work place structures should be designed and constructed to withstand the expected elements for the region and have an area designated for safe refuge, if appropriate.
- Standard Operating Procedures (SOPs) should be developed for project or process shut-down, including an evacuation plan. Drills to practice the procedure and plan should also be undertaken annually.

Workspace and Exit

- The space provided for each worker, and in total, should be adequate for safe execution of all activities, including transport and interim storage of materials and products.
- Passages to emergency exits should be unobstructed at all times. Exits should be clearly marked to be visible in total darkness. The number and capacity of emergency exits should be sufficient for safe and orderly evacuation of the greatest number of people present at any time and there should be a minimum two exits from any work area.
- Facilities also should be designed and built taking into account the needs of disabled persons.

Fire Precautions

The workplace should be designed to prevent the start of fires through the implementation of fire codes applicable to industrial settings. Other essential measures include:

- Equipping facilities with fire detectors, alarm systems and fire-fighting equipment. The equipment should be maintained in good working order and be readily accessible. It should be adequate for the dimensions and use of the premises, equipment installed, physical and chemical properties of substances present and the maximum number of people present.
- Provision of manual fire fighting equipment that is easily accessible and simple to use.
- Fire and emergency alarm systems that are both audible and visible.

The IFC Life and Fire Safety Guideline should apply to buildings accessible to the public.

Lavatories and Showers

- Adequate lavatory facilities (toilets and washing areas) should be provided for the number of people expected to work in the facility and allowances made for segregated facilities, or for indicating whether the toilet facility is “In Use” or “Vacant”. Toilet facilities should

also be provided with adequate supplies of hot and cold running water, soap and hand drying devices.

- Where workers may be exposed to substances poisonous by ingestion and skin contamination may occur, facilities for showering and changing into and out of street and work clothes should be provided.

Potable Water Supply

- Adequate supplies of potable drinking water should be provided from a fountain with an upward jet or with a sanitary means of collecting the water for the purposes of drinking.
- Water supplied to areas of food preparation or for the purpose of personal hygiene (washing or bathing) should meet drinking water quality standards.

Clean Eating Area

Where there is potential for exposure to substances poisonous by ingestion, suitable arrangements are to be made for provision of clean eating areas where workers are not exposed to the hazardous or noxious substances.

Lighting

- Workplaces should, to the degree feasible, receive natural light and be supplemented with sufficient artificial illumination to promote workers' safety and health and enable safe equipment operation. Supplemental 'task lighting' may be required where specific visual acuity requirements should be met.
- Emergency lighting of adequate intensity should be installed and automatically activated upon failure of the principal artificial light source to ensure safe shut-down, evacuation etc.

Safe Access

- Passageways for pedestrians and vehicles within and outside buildings should be segregated and provide for easy, safe and appropriate access.
- Equipment and installations requiring servicing, inspection and/or cleaning should have unobstructed, unrestricted and ready access
- Hand, knee and foot railings should be installed on stairs, fixed ladders, platforms, permanent and interim floor openings, loading bays, ramps etc.
- Openings should be sealed by gates or removable chains
- Covers should, if feasible, be installed to protect against falling items
- Measures to prevent unauthorized access to dangerous areas should be in place

First Aid

- The employer should ensure that qualified first-aid can be provided at all times. Appropriately equipped first-aid stations should be easily accessible throughout the place of work.
- Eye-wash stations and/ or emergency showers should be provided close to all workstations where immediate flushing with water is the recommended first-aid response.
- Where the scale of work or the type of activity being carried out so requires, dedicated and appropriately equipped first aid room(s) should be provided. First aid stations and rooms

should be equipped with gloves, gowns and masks for protection against direct contact with blood and other body fluids.

- Remote sites should have written emergency procedures in place for dealing with cases of trauma or serious illness up to the point at which patient care can be transferred to an appropriate medical facility.

Air Supply

- Sufficient fresh air should be supplied for indoor and confined work spaces. Factors to be considered in ventilation design include physical activity, substances in use and process related emissions. Air distribution systems should be designed so as not to expose workers to draughts.
- Mechanical ventilation systems should be maintained in good working order. Point-source exhaust systems required for maintaining a safe ambient environment should have local indicators of correct functioning.
- Re-circulation of contaminated air is not acceptable. Air inlet filters should be kept clean and free of dust and micro-organisms. Heating, ventilation and air conditioning (HVAC) and industrial evaporative cooling systems should be equipped, maintained and operated so as to prevent growth and spreading of disease agents (e.g. Legionnella pneumophilia) or breeding of vectors (e.g. mosquitoes and flies) of public health concern.

Work Environment Temperature

The temperature in work, rest room and other welfare facilities should, during service hours, be maintained at a level appropriate for the purpose of the facility.

2.2 Communication and Training

OHS Training

- Provisions should be made to provide OHS orientation training to all new employees to ensure they are apprised of the basic site rules of work at /on the site and of personal protection and preventing injury to fellow employees.
- Training should consist of basic hazard awareness, site-specific hazards, safe work practices and emergency procedures for fire, evacuation and natural disaster, as appropriate. Any site-specific hazard or colour coding in use should be thoroughly reviewed as part of orientation training.

Visitor Orientation

If visitors to the site can gain access to areas where hazardous conditions or substances may be present, a visitor orientation and control program should be established to ensure visitors do not enter hazard areas unescorted.

New Task Employee and Contractor Training

The employer should ensure that workers and contractors, prior to commencement of new assignments, have received adequate training and information enabling them to understand work hazards and to protect their health from hazardous ambient factors that may be present.

The training should adequately cover:

- Knowledge of materials, equipment and tools

- Known hazards in the operations and how they are controlled
- Potential risks to health
- Precautions to prevent exposure
- Hygiene requirements
- Wearing and use of protective equipment and clothing
- Appropriate response to operation extremes, incidents and accidents

Basic OHS Training

- A basic occupational training program and specialty courses should be provided, as needed, to ensure that workers are oriented to the specific hazards of individual work assignments. Training should generally be provided to management, supervisors, workers and occasional visitors to areas of risks and hazards.
- Workers with rescue and first-aid duties should receive dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co-workers. Training would include the risks of becoming infected with blood–borne pathogens through contact with bodily fluids and tissue.
- Through appropriate contract specifications and monitoring, the employer should ensure that service providers, as well as contracted and sub-contracted labour, are trained adequately before assignments begin.

Area Signage

- Hazardous areas (electrical rooms, compressor rooms etc.), installations, materials, safety measures and emergency exits etc. should be marked appropriately.
- Signage should be in accordance with international standards and be well known to, and easily understood by workers, visitors and the general public as appropriate.

Labelling of Equipment

- All vessels that may contain substances that are hazardous as a result of chemical or toxicological properties, or temperature or pressure, should be labelled as to the contents and hazard, or appropriately colour coded.
- Similarly, piping systems that contain hazardous substances should be labelled with the direction of flow and contents of the pipe, or colour coded whenever the pipe is passing through a wall or floor is interrupted by a valve or junction device.

Communicate Hazard Codes

- Copies of the hazard coding system should be posted outside the facility at emergency entrance doors and fire emergency connection systems where they are likely to come to the attention of emergency services personnel.
- Information regarding the types of hazardous materials stored, handled or used at the facility, including typical maximum inventories and storage locations, should be shared pro-actively with emergency services and security personnel to expedite emergency response when needed.
- Representatives of local emergency and security services should be invited to participate in periodic (annual) orientation tours and site inspections to ensure familiarity with potential hazards present.

2.3 Physical Hazards

Physical hazards represent potential for accident or injury or illness due to repetitive exposure to mechanical action or work activity. Single exposure to physical hazards may result in a wide range of injuries, from minor and medical aid only, to disabling, catastrophic and/or fatal. Multiple exposures over prolonged periods can result in disabling injuries of comparable significance and consequence.

Rotating and Moving Equipment

Injury or death can occur from being trapped, entangled, or struck by machinery parts due to unexpected starting of equipment or unobvious movement during operations. Recommended protective measures include:

- Designing machines to eliminate trap hazards and ensuring that extremities are kept out of harm's way under normal operating conditions. Examples of proper design considerations include two-hand operated machines to prevent amputations or the availability of emergency stops dedicated to the machine and placed in strategic locations. Where a machine or equipment has an exposed moving part or exposed pinch point that may endanger the safety of any worker, the machine or equipment should be equipped with, and protected by, a guard or other device that prevents access to the moving part or pinch point. Guards should be designed and installed in conformance with appropriate machine safety standards.
- Turning off, disconnecting, isolating and de-energizing (Locked Out and Tagged Out) machinery with exposed or guarded moving parts, or in which energy can be stored (e.g. compressed air, electrical components) during servicing or maintenance, in conformance with a standard such as CSA Z460 Lockout or equivalent ISO or ANSI standard.
- Designing and installing equipment, where feasible, to enable routine service, such as lubrication, without removal of the guarding devices or mechanisms.

Noise

Noise limits for different working environments are provided in Table 2.3.1.

- No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
- The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB(A).
- Although hearing protection is preferred for any period of noise exposure in excess of 85 dB(A), an equivalent level of protection can be obtained, but less easily managed, by limiting the duration of noise exposure. For every 3 dB(A) increase in sound levels, the 'allowed' exposure period or duration should be reduced by 50 percent.
- Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source and other engineering controls should be investigated and implemented, where feasible.

- Periodic medical hearing checks should be performed on workers exposed to high noise levels.

Vibration

Exposure to hand-arm vibration from equipment such as hand and power tools, or whole-body vibrations from surfaces on which the worker stands or sits, should be controlled through choice of equipment, installation of vibration dampening pads or devices, and limiting the duration of exposure. Limits for vibration and action values, (i.e. the level of exposure at which remediation should be initiated) are provided by the ACGIH. Exposure levels should be checked on the basis of daily exposure time and data provided by equipment manufacturers.

Table 2.3.1 Noise Limits for Various Working Environments

Location/ Activity	Equivalent Level LAeq, 8h	Maximum, LA max, fast
Heavy industry (no demand for oral communication)	85 dB(A)	110 dB(A)
Light industry (decreasing demand for oral communication)	50-65 dB(A)	110 dB(A)
Open offices, control rooms, service counters or similar	45-50 dB(A)	-
Individual offices (no disturbing noise)	40-45 dB(A)	-
Classrooms, lecture halls	35-40 dB(A)	-
Hospitals	30-35 dB(A)	40 dB(A)

Electrical

Exposed or faulty electrical devices, such as circuit breakers, panels, cables, cords and hand tools, can pose a serious risk to workers. Overhead wires can be struck by metal devices, such as poles or ladders, and by vehicles with metal booms. Vehicles or grounded metal objects brought into close proximity with overhead wires can result in arcing between the wires and the object, without actual contact. Recommended actions include:

- Marking all energized electrical devices and lines with warning signs
- Locking out (de-charging and leaving open with a controlled locking device) and tagging-out (warning sign placed on the lock) devices during service or maintenance
- Checking all electrical cords, cables and hand power tools for frayed or exposed cords and following manufacturer recommendations for maximum permitted operating voltage of the portable hand tools

- Double insulating/ grounding all electrical equipment used in environments that are, or may become, wet; using equipment with ground fault interrupter (GFI) protected circuits
- Protecting power cords and extension cords against damage from traffic by shielding or suspending above traffic areas
- Appropriate labelling of service rooms housing high voltage equipment ('electrical hazard') and where entry is controlled or prohibited
- Establishing "No Approach" zones around or under high voltage power lines in conformance with Table 2.3.2. Rubber tired construction or other vehicles that come into direct contact with, or arcing between, high voltage wires may need to be taken out of service for periods of 48 hours and have the tires replaced to prevent catastrophic tire and wheel assembly failure, potentially causing serious injury or death
- Conducting detailed identification and marking of all buried electrical wiring prior to any excavation work

Table 2.3.2 No Approach Zones for High Voltage Power Lines	
Nominal phase-to-phase voltage rating	Minimum Distance
750 or more volts, but no more than 150,000 volts	3 metres
More than 150,000 volts, but no more than 250,000 volts	4.5 metres
More than 250,000 volts	6 metres

Eye Hazards

Solid particles from a wide variety of industrial operations, and/ or a liquid chemical spray may strike a worker in the eye causing an eye injury or permanent blindness. Recommended measures include:

- Use of machine guards or splash shields and/ or face and eye protection devices, such as safety glasses with side shields, goggles, and/ or a full face shield. Specific Safe Operating Procedures (SOPs) may be required for use of sanding and grinding tools and/ or when working around liquid chemicals. Frequent checks of these types of equipment prior to use to ensure mechanical integrity is also good practice. Machine and equipment guarding should conform to standards published by organizations such as CSA, ANSI and ISO.
- Moving areas where the discharge of solid fragments, liquid or gaseous emissions can reasonably be predicted (e.g. discharge of sparks from a metal cutting station, pressure relief valve discharge) away from places expected to be occupied or transited by workers or visitors. Where machine or work fragments could present a hazard to transient workers or passers-by, extra area guarding or proximity restricting systems should be implemented, or PPE required for transients and visitors.
- Provisions should be made for persons who have to wear prescription glasses either through the use of overglasses or prescription hardened glasses.

Welding/ Hot Work

Welding creates an extremely bright and intense light that may seriously injure a worker's eyesight. In extreme cases, blindness may result. Additionally, welding may produce noxious fumes to which prolonged exposure can cause serious chronic diseases. Recommended measures include:

- Provision of proper eye protection such as welder goggles and/ or a full-face eye shield for all personnel involved in, or assisting, welding operations. Additional methods may include the use of welding barrier screens around the specific work station (a solid piece of light metal, canvas or plywood designed to block welding light from others). Devices to extract and remove noxious fumes at the source may also be required.
- Special hot work and fire prevention precautions and Standard Operating Procedures (SOPs) should be implemented if welding or hot cutting is undertaken outside established welding work stations, including 'Hot Work Permits, stand-by fire extinguishers, stand-by fire watch, and maintaining the fire watch for up to one hour after welding or hot cutting has terminated. Special procedures are required for hotwork on tanks or vessels that have contained flammable materials.

Industrial Vehicle Driving and Site Traffic

Poorly trained or inexperienced industrial vehicle drivers have increased risk of accident with other vehicles, pedestrians and equipment. Industrial vehicles and delivery vehicles, as well as private vehicles on-site, also represent potential collision scenarios. Industrial vehicle driving and site traffic safety practices include:

- Training and licensing industrial vehicle operators in the safe operation of specialized vehicles such as forklifts, including safe loading/ unloading, load limits.
- Ensuring drivers undergo medical surveillance.
- Ensuring moving equipment with restricted rear visibility is outfitted with audible back-up alarms.
- Establishing rights-of-way, site speed limits, vehicle inspection requirements, operating rules and procedures (e.g. prohibiting operation of forklifts with forks in down position) and control of traffic patterns or direction.
- Restricting the circulation of delivery and private vehicles to defined routes and areas, giving preference to 'one-way' circulation, where appropriate.

Working Environment Temperature

Exposure to hot or cold working conditions in indoor or outdoor environments can result in temperature stress-related injury or death. Use of personal protective equipment (PPE) to protect against other occupational hazards can accentuate and aggravate heat-related illnesses. Extreme temperatures in permanent work environments should be avoided through implementation of engineering controls and ventilation. Where this is not possible, such as during short-term outdoor work, temperature-related stress management procedures should be implemented which include:

- Monitoring weather forecasts for outdoor work to provide advance warning of extreme weather and scheduling work accordingly
- Adjustment of work and rest periods according to temperature stress management procedures provided by ACGIH67, depending on the temperature and workloads
- Providing temporary shelters to protect against the elements during working activities or for use as rest areas

- Use of protective clothing
- Providing easy access to adequate hydration such as drinking water or electrolyte drinks and avoiding consumption of alcoholic beverages

Ergonomics, Repetitive Motion, Manual Handling

Injuries due to ergonomic factors, such as repetitive motion, overexertion and manual handling, take prolonged and repeated exposures to develop, and typically require periods of weeks to months for recovery. These OHS problems should be minimized or eliminated to maintain a productive workplace. Controls may include:

- Facility and workstation design with 5^{th} to 95^{th} percentile operational and maintenance workers in mind
- Use of mechanical assists to eliminate or reduce exertions required to lift materials, hold tools and work objects, and requiring multi-person lifts if weights exceed thresholds
- Selecting and designing tools that reduce force requirements and holding times and improve postures
- Providing user adjustable work stations
- Incorporating rest and stretch breaks into work processes and conducting job rotation
- Implementing quality control and maintenance programs that reduce unnecessary forces and exertions
- Taking into consideration additional special conditions such as left handed persons

Working at Heights

Fall prevention and protection measures should be implemented whenever a worker is exposed to the hazard of falling more than two meters; into operating machinery; into water or other liquid; into hazardous substances; or through an opening in a work surface. Fall prevention/ protection measures may also be warranted on a case-specific basis when there are risks of falling from lesser heights. Fall prevention may include:

- Installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area
- Proper use of ladders and scaffolds by trained employees
- Use of fall prevention devices, including safety belt and lanyard travel limiting devices to prevent access to fall hazard area, or fall protection devices such as full body harnesses used in conjunction with shock absorbing lanyards or self-retracting inertial fall arrest devices attached to fixed anchor point or horizontal life-lines
- Appropriate training in use, serviceability and integrity of the necessary PPE
- Inclusion of rescue and/ or recovery plans and equipment to respond to workers after an arrested fall

Illumination

Work area light intensity should be adequate for the general purpose of the location and type of activity and should be supplemented with dedicated work station illumination, as needed. The minimum limits for illumination intensity for a range of locations/ activities appear in Table 2.3.3.

Table 2.3.3 Minimum Limits for Workplace Illumination Intensity	
Location/ Activity	Light Intensity
Emergency light	10 lux
Outdoor non working areas	20 lux
Simple orientation and temporary visits (machine storage, garage, warehouse)	50 lux
Workspace with occasional visual tasks only (corridors, stairways, lobby, elevator, auditorium etc.)	100 lux
Medium precision work (simple assembly, rough machine works, welding, packing etc.)	200 lux
Precision work (reading, moderately difficult assembly, sorting, checking, medium bench and machine works etc.), offices	500 lux
High precision work (difficult assembly, sewing, colour inspection, fine sorting etc.)	1,000-3,000 lux

Controls should include:

- Use of energy efficient light sources with minimum heat emission
- Undertaking measures to eliminate glare/ reflections and flickering of lights
- Taking precautions to minimize and control optical radiation including direct sunlight. Exposure to high intensity UV and IR radiation and high intensity visible light should also be controlled
- Controlling laser hazards in accordance with equipment specifications, certifications and recognized safety standards. The lowest feasible class laser should be applied to minimize risks

2.4 Chemical Hazards

Chemical hazards represent potential for illness or injury due to single acute exposure or chronic repetitive exposure to toxic, corrosive, sensitizing or oxidative substances. They also represent a risk of uncontrolled reaction, including the risk of fire and explosion, if incompatible chemicals are inadvertently mixed. Chemical hazards can most effectively be prevented through a hierarchical approach that includes:

- Replacement of the hazardous substance with a less hazardous substitute
- Implementation of engineering and administrative control measures to avoid or minimize the release of hazardous substances into the work environment keeping the level of exposure below internationally established or recognized limits
- Keeping the number of employees exposed, or likely to become exposed, to a minimum
- Communicating chemical hazards to workers through labelling and marking according to national and internationally recognized requirements and standards, including the International Chemical Safety Cards (ICSC), Materials Safety Data Sheets (MSDS) or equivalent. Any means of written communication should be in an easily understood language and be readily available to exposed workers and first-aid personnel
- Training workers in the use of the available information (such as MSDSs), safe work practices and appropriate use of PPE

Air Quality

Poor air quality due to the release of contaminants into the work place can result in possible respiratory irritation, discomfort or illness to workers. Employers should take appropriate measures to maintain air quality in the work area. These include:

- Maintaining levels of contaminant dusts, vapours and gases in the work environment at concentrations below those recommended by the ACGIH68 as TWA-TLV's (threshold limit value)—concentrations to which most workers can be exposed repeatedly (8 hours/day, 40 hrs/week, week-after week), without sustaining adverse health effects.
- Developing and implementing work practices to minimize release of contaminants into the work environment including:
  - ~ Direct piping of liquid and gaseous materials
  - ~ Minimized handling of dry powdered materials
  - ~ Enclosed operations
  - ~ Local exhaust ventilation at emission/ release points
  - ~ Vacuum transfer of dry material rather than mechanical or pneumatic conveyance
  - ~ Indoor secure storage and sealed containers rather than loose storage
- Where ambient air contains several materials that have similar effects on the same body organs (additive effects), taking into account combined exposures using calculations recommended by the ACGIH
- Where work shifts extend beyond eight (8) hours, calculating adjusted workplace exposure criteria recommended by the ACGIH

Fire and Explosions

Fires and or explosions resulting from ignition of flammable materials or gases can lead to loss of property as well as possible injury or fatalities to project workers. Prevention and control strategies include:

- Storing flammables away from ignition sources and oxidizing materials. Further, flammables storage area should be:
  - ~ Remote from entry and exit points into buildings
  - ~ Away from facility ventilation intakes or vents
  - ~ Have natural or passive floor and ceiling level ventilation and explosion venting
  - ~ Use spark-proof fixtures
  - ~ Be equipped with fire extinguishing devices and self-closing doors, and constructed of materials made to withstand flame impingement for a moderate period of time

- Providing bonding and grounding of, and between, containers and additional mechanical floor level ventilation if materials are being, or could be, dispensed in the storage area
- Where the flammable material is mainly comprised of dust, providing electrical grounding, spark detection, and, if needed, quenching systems
- Defining and labelling fire hazards areas to warn of special rules (e.g. prohibition in use of smoking materials, cellular phones or other potential spark generating equipment)

- Providing specific worker training in handling of flammable materials and in fire prevention or suppression

Corrosive, Oxidizing and Reactive Chemicals

Corrosive, oxidizing and reactive chemicals present similar hazards and require similar control measures as flammable materials. However, the added hazard of these chemicals is that inadvertent mixing or intermixing may cause serious adverse reactions. This can lead to the release of flammable or toxic materials and gases and may lead directly to fires and explosions. These types of substances have the additional hazard of causing significant personal injury upon direct contact, regardless of any intermixing issues. The following controls should be observed in the work environment when handling such chemicals:

- Corrosive, oxidizing and reactive chemicals should be segregated from flammable materials and from other chemicals of incompatible class (acids vs. bases, oxidizers vs. reducers, water sensitive vs. water based etc.), stored in ventilated areas and in containers with appropriate secondary containment to minimize intermixing during spills.
- Workers who are required to handle corrosive, oxidizing or reactive chemicals should be provided with specialized training and provided with, and wear, appropriate PPE (gloves, apron, splash suits, face shield or goggles etc.).
- Where corrosive, oxidizing or reactive chemicals are used, handled, or stored, qualified first-aid should be ensured at all times. Appropriately equipped first-aid stations should be easily accessible throughout the place of work and eye-wash stations and/or emergency showers should be provided close to all workstations where the recommended first-aid response is immediate flushing with water.

Asbestos Containing Materials (ACM)

The use of asbestos containing materials (ACM) should be avoided in new buildings or as a new material in re-modelling or renovation activities. Existing facilities with ACM should develop an asbestos management plan which clearly identifies the locations where the ACM is present, its condition (e.g. whether it is in a friable form with the potential to release fibres), procedures for monitoring its condition, procedures to access the locations where ACM is present to avoid damage, and training of staff who can potentially come into contact with the material to avoid damage and prevent exposure. The plan should be made available to all persons involved in operations and maintenance activities. Repair or removal and disposal of existing ACM in buildings should only be performed by specially trained personnel following host country requirements, or in their absence, internationally recognized procedures.

2.5 Biological Hazards

Biological agents represent potential for illness or injury due to single acute exposure or chronic repetitive exposure. Biological hazards can be prevented most effectively by implementing the following measures:

- If the nature of the activity permits, use of any harmful biological agents should be avoided and replaced with an agent that, under normal conditions of use, is not dangerous or less dangerous to workers. If use of harmful agents cannot be avoided, precautions should be taken to keep the risk of exposure as low as possible and maintained below internationally established and recognized exposure limits.
- Work processes, engineering and administrative controls should be designed, maintained and operated to avoid or minimize release of biological agents into the working environment. The number of employees exposed or likely to become exposed should be kept at a minimum.
- The employer should review and assess known and suspected presence of biological agents at the place of work and implement appropriate safety measures, monitoring, training and training verification programs.
- Measures to eliminate and control hazards from known and suspected biological agents at the place of work should be designed, implemented and maintained in close co-operation with the local health authorities and according to recognized international standards.

Biological agents should be classified into four groups:

- Group 1: Biological agents unlikely to cause human disease and consequently only require controls similar to those required for hazardous or reactive chemical substances;
- Group 2: Biological agents that can cause human disease and are thereby likely to require additional controls, but are unlikely to spread to the community;
- Group 3: Biological agents that can cause severe human disease, present a serious hazard to workers, and may present a risk of spreading to the community, for which there usually is effective prophylaxis or treatment available and are thereby likely to require extensive additional controls;
- Group 4: Biological agents that can cause severe human disease, are a serious hazard to workers, and present a high risk of spreading to the community, for which there is usually no effective prophylaxis or treatment available and are thereby likely to require very extensive additional controls

The employer should at all times encourage and enforce the highest level of hygiene and personal protection, especially for activities employing biological agents of Groups 3 and 4 above. Work involving agents in Groups 3 and 4 should be restricted only to those persons who have received specific verifiable training in working with and controlling such materials.

Areas used for the handling of Groups 3 and 4 biological agents should be designed to enable their full segregation and isolation in emergency circumstances, include independent ventilation systems, and be subject to SOPs requiring routine disinfection and sterilization of the work surfaces.

HVAC systems serving areas handling Groups 3 and 4 biological agents should be equipped with High Efficiency Particulate Air (HEPA) filtration systems. Equipment should readily enable their disinfection and sterilization and maintained and operated so as to prevent growth and spreading of disease agents, amplification of the biological agents, or breeding of vectors e.g. mosquitoes and flies of public health concern.

2.6 Radiological Hazards

Radiation exposure can lead to potential discomfort, injury or serious illness to workers. Prevention and control strategies include:

- Places of work involving occupational and/or natural exposure to ionizing radiation should be established and operated in accordance with recognized international safety standards and guidelines. The acceptable effective dose limits appear in Table 2.6.1.
- Exposure to non-ionizing radiation (including static magnetic fields; sub-radio frequency magnetic fields; static electric fields; radio frequency and microwave radiation; light and near-infrared radiation; and ultraviolet radiation) should be controlled to internationally recommended limits
- In the case of both ionizing and non-ionizing radiation, the preferred method for controlling exposure is shielding and limiting the radiation source. Personal protective equipment is supplemental only or for emergency use. Personal protective equipment for near-infrared, visible and ultraviolet range radiation can include appropriate sun block creams, with or without appropriate screening clothing.

Table 2.6.1 Acceptable Effective Dose Limits for Workplace Radiological Hazards

Exposure	Workers (min.19 years of age)	Apprentices and students (16-18 years of age)
Five consecutive year average – effective dose	20 mSv/year	
Single year exposure – effective dose	50 mSv/year	6 mSv/year
Equivalent dose to the lens of the eye	150 mSv/year	50 mSv/year
Equivalent dose to the extremities (hands, feet) or the skin	500 mSv/year	150 mSv/year

2.7 Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) provides additional protection to workers exposed to workplace hazards in conjunction with other facility controls and safety systems.

PPE is considered to be a last resort that is above and beyond the other facility controls and provides the worker with an extra level of personal protection. Table 2.7.1 presents general examples of occupational hazards and types of PPE available for different purposes. Recommended measures for use of PPE in the workplace include:

- Active use of PPE if alternative technologies, work plans or procedures cannot eliminate, or sufficiently reduce, a hazard or exposure.
- Identification and provision of appropriate PPE that offers adequate protection to the worker, co-workers and occasional visitors, without incurring unnecessary inconvenience to the individual.

- Proper maintenance of PPE, including cleaning when dirty and replacement when damaged or worn out. Proper use of PPE should be part of the recurrent training programs for employees.
- Selection of PPE should be based on the hazard and risk ranking described earlier in this section, and selected according to criteria on performance and testing established by recognized organizations.

Table 2.7.1 Summary of Recommended Personal Protective Equipment According to Hazard

Objective	Workplace Hazards	Suggested PPE
Eye and face protection	Flying particles, molten metal, liquid chemicals, gases or vapours, light radiation	Safety glasses with side-shields, protective shades etc.
Head protection	Falling objects, inadequate height clearance and overhead power cords	Plastic helmets with top and side impact protection
Hearing protection	Noise, ultra sound	Hearing protectors (ear plugs or ear muffs)
Foot protection	Falling or rolling objects, pointed objects, corrosive or hot liquids	Safety shoes and boots for protection against moving and falling objects, liquids and chemicals
Hand protection	Hazardous materials, cuts or lacerations, vibrations, extreme temperatures	Gloves made of rubber or synthetic materials (Neoprene) leather, steel, insulating materials etc.
Respiratory protection	Dust, fogs, fumes, mists, gases, smokes, vapours	Facemasks with appropriate filters for dust removal and air purification (chemicals, mists, vapours and gases). Single or multi-gas personal monitors, if available
	Oxygen deficiency	Portable or supplied air (fixed lines), On-site equipment
Body/ leg protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration	Insulating clothing, body suits, aprons etc. of appropriate materials

2.8 Special Hazard Environments

Special hazard environments are work situations where all of the previously described hazards may exist under unique or especially hazardous circumstances. Accordingly, extra precautions or rigor in application of precautions is required.

Confined Space

A confined space is defined as a wholly or partially enclosed space not designed or intended for human occupancy and in which a hazardous atmosphere could develop as a result of the contents, location or construction of the confined space or due to work done in or around the confined space. A "permit-required" confined space is one that also contains physical or atmospheric hazards that could trap or engulf the person.

Confined spaces can occur in enclosed or open structures or locations. Serious injury or fatality can result from inadequate preparation to enter a confined space or in attempting a rescue from a confined space. Recommended management approaches include:

- Engineering measures should be implemented to eliminate, to the degree feasible, the existence and adverse character of confined spaces.
- Permit-required confined spaces should be provided with permanent safety measures for venting, monitoring and rescue operations, to the extent possible. The area adjoining an access to a confined space should provide ample room for emergency and rescue operations.

Access hatches should accommodate 90% of the worker population with adjustments for tools and protective clothing. The most current ISO and EN standards should be consulted for design specifications.

- Prior to entry into a permit-required confined space:
  - ~ Process or feed lines into the space should be disconnected or drained and blanked and locked-out.
  - ~ Mechanical equipment in the space should be disconnected, de-energized, locked-out and braced, as appropriate.
  - ~ The atmosphere within the confined space should be tested to assure the oxygen content is between 19.5 percent and 23 percent and that the presence of any flammable gas or vapour does not exceed 25 percent of its respective Lower Explosive Limit (LEL).
  - ~ If the atmospheric conditions are not met, the confined space should be ventilated until the target safe atmosphere is achieved, or entry is only to be undertaken with appropriate and additional PPE.

- Safety precautions should include Self Contained Breathing Apparatus (SCBA), life lines and safety watch workers stationed outside the confined space, with rescue and first aid equipment readily available.
- Before workers are required to enter a permit-required confined space, adequate and appropriate training in confined space hazard control, atmospheric testing, use of the necessary PPE, as well as the serviceability and integrity of the PPE should be verified. Further, adequate and appropriate rescue and/ or recovery plans and equipment should be in place before the worker enters the confined space.

Lone and Isolated Workers

A lone and isolated worker is a worker out of verbal and line of sight communication with a supervisor, other workers, or other persons capable of providing aid and assistance, for continuous periods exceeding one hour. The worker is therefore at increased risk should an accident or injury occur.

- Where workers may be required to perform work under lone or isolated circumstances, Standard Operating Procedures (SOPs) should be developed and implemented to ensure all PPE and safety measures are in place before the worker starts work. SOPs should establish, at

a minimum, verbal contact with the worker at least once every hour and ensure the worker has a capability for summoning emergency aid.

- If the worker is potentially exposed to highly toxic or corrosive chemicals, emergency eye-wash and shower facilities should be equipped with audible and visible alarms to summon aid whenever the eye-wash or shower is activated by the worker and without intervention by the worker.

2.9 Monitoring

Occupational health and safety monitoring programs should verify the effectiveness of prevention and control strategies. The selected indicators should be representative of the most significant occupational, health and safety hazards, and the implementation of prevention and control strategies. The occupational health and safety monitoring program should include:

- *Safety inspection, testing and calibration:* This should include regular inspection and testing of all safety features and hazard control measures focusing on engineering and personal protective features, work procedures, places of work, installations, equipment and tools used. The inspection should verify that issued PPE continues to provide adequate protection and is being worn as required. All instruments installed or used for monitoring and recording of working environment parameters should be regularly tested and calibrated and the respective records maintained.

- *Surveillance of the working environment:* Employers should document compliance using an appropriate combination of portable and stationary sampling and monitoring instruments. Monitoring and analyses should be conducted according to internationally recognized methods and standards. Monitoring methodology, locations, frequencies and parameters should be established individually for each project following a review of the hazards. Generally, monitoring should be performed during commissioning of facilities or equipment and at the end of the defect and liability period and otherwise repeated according to the monitoring plan.

- *Surveillance of workers health:* When extraordinary protective measures are required (for example, against biological agents Groups 3 and 4 and/or hazardous compounds), workers should be provided appropriate and relevant health surveillance prior to first exposure and at regular intervals thereafter. The surveillance should, if deemed necessary, be continued after termination of the employment.

- *Training:* Training activities for employees and visitors should be adequately monitored and documented (curriculum, duration and participants). Emergency exercises, including fire drills, should be documented adequately. Service providers and contractors should be contractually required to submit to the employer adequate training documentation before start of their assignment.

Accidents and Diseases Monitoring

- The employer should establish procedures and systems for reporting and recording:
  - ~ Occupational accidents and diseases
  - ~ Dangerous occurrences and incidents

These systems should enable workers to report immediately to their immediate supervisor any situation they believe presents a serious danger to life or health.

- The systems and the employer should further enable and encourage workers to report to management all:
  - ~ Occupational injuries and near misses
  - ~ Suspected cases of occupational disease
  - ~ Dangerous occurrences and incidents
- All reported occupational accidents, occupational diseases, dangerous occurrences and incidents together with near misses should be investigated with the assistance of a person knowledgeable/ competent in occupational safety. The investigation should:
  - ~ Establish what happened
  - ~ Determine the cause of what happened
  - ~ Identify measures necessary to prevent a recurrence

Occupational accidents and diseases should, at a minimum, be classified according to Table 2.10.1. Distinction is made between fatal and non-fatal injuries. The two main categories are divided into three sub-categories according to time of death or duration of the incapacity to work. The total work hours during the specified reporting period should be reported to the appropriate regulatory agency.

Table 2.9.1 Occupational Accident Reporting		
a. Fatalities (number)	b. Non-fatal injuries (number)	c. Total time lost non-fatal injuries (days)
a.1 Immediate	b.1 Less than one day	
a.2 Within a month	b.2 Up to 3 days	c.1 Category b.2
a.3 Within a year	b.3 More than 3 days	c.2 Category b.3

15.2 General EHS Guidelines: Construction and Decommissioning

4.2 Occupational Health and Safety

Over-exertion

Over-exertion and ergonomic injuries and illnesses, such as repetitive motion, over-exertion and manual handling are among the most common causes of injuries in construction and decommissioning sites. Recommendations for their prevention and control include:

- Training of workers in lifting and materials handling techniques in construction and decommissioning projects, including the placement of weight limits above which mechanical assists or two-person lifts are necessary
- Planning work site layout to minimize the need for manual transfer of heavy loads
- Selecting tools and designing work stations that reduce force requirements and holding times and which promote improved postures, including, where applicable, user adjustable work stations
- Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks

Slips and Falls

Slips and falls on the same elevation associated with poor housekeeping, such as excessive waste debris, loose construction materials, liquid spills and uncontrolled use of electrical cords and ropes on the ground are also among the most frequent cause of lost time accidents at construction and decommissioning sites.

Recommended methods for the prevention of slips and falls from, or on, the same elevation include:

- Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from footpaths
- Cleaning up excessive waste debris and liquid spills regularly
- Locating electrical cords and ropes in common areas and marked corridors
- Use of slip retardant footwear

Work in Heights

Falls from elevation associated with working with ladders, scaffolding and partially built or demolished structures are among the most common cause of fatal or permanent disabling injury at construction or decommissioning sites. If fall hazards exist, a fall protection plan should be in place which includes one or more of the following aspects, depending on the nature of the fall hazard.

- Training and use of temporary fall prevention devices, such as rails or other barriers able to support a weight of 200 pounds, when working at heights equal or greater than two metres or at any height if the risk includes falling into operating machinery, into water or other liquid, into hazardous substances or through an opening in a work surface
- Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support 5000 pounds (also described in this section in Working at

Heights above), as well as fall rescue procedures to deal with workers whose fall has been successfully arrested. The tie in point of the fall arresting system should also be able to support 5000 pounds

- Use of control zones and safety monitoring systems to warn workers of their proximity to fall hazard zones, as well as securing, marking and labelling covers for openings in floors, roofs or walking surfaces

Struck By Objects

Construction and demolition activities may pose significant hazards related to the potential fall of materials or tools as well as ejection of solid particles from abrasive or other types of power tools which can result in injury to the head, eyes and extremities. Techniques for the prevention and control of these hazards include:

- Using a designated and restricted waste drop or discharge zones and/ or a chute for safe movement of wastes from upper to lower levels
- Conducting sawing, cutting, grinding, sanding, chipping or chiselling with proper guards and anchoring as applicable
- Maintaining clear traffic ways to avoid driving of heavy equipment over loose scrap
- Use of temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as hand rails and toe boards to prevent materials from being dislodged
- Evacuating work areas during blasting operations and using blast mats or other means of deflection to minimize fly rock or ejection of demolition debris if work is conducted in proximity to people or structures
- Wearing appropriate PPE, such as safety glasses with side shields, face shields, hard hats and safety shoes

Moving Machinery

Vehicle traffic and use of lifting equipment in the movement of machinery and materials on a construction site may pose temporary hazards, such as physical contact, spills, dust, emissions and noise. Heavy equipment operators have limited fields of view close to their equipment and may not see pedestrians close to the vehicle. Centre-articulated vehicles create a significant impact or crush hazard zone on the outboard side of a turn while moving. Techniques for the prevention and control of these impacts include:

- Planning and segregating the location of vehicle traffic, machine operation and walking areas and controlling vehicle traffic through the use of one-way traffic routes, establishment of speed limits and on-site trained flag-people wearing high-visibility vests or outer clothing covering to direct traffic
- Ensuring the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas and training of workers to verify eye contact with equipment operators before approaching the operating vehicle
- Ensuring moving equipment is outfitted with audible back-up alarms
- Using inspected and well-maintained lifting devices that are appropriate for the load, such as cranes and securing loads when lifting them to higher job-site elevations

Dust

- Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements
- PPE, such as dusk masks, should be used where dust levels are excessive

Confined Spaces and Excavations

Examples of confined spaces that may be present in construction or demolition sites include: silos, vats, hoppers, utility vaults, tanks, sewers, pipes and access shafts. Ditches and trenches may also be considered a confined space when access or egress is limited. In addition to the guidance provided in Section 2.8 the occupational hazards associated with confined spaces and excavations in construction and decommissioning sites should be prevented according to the following recommendations:

- Controlling site-specific factors which may contribute to excavation slope instability including, for example, the use of excavation dewatering, side-walls support and slope gradient adjustments that eliminate or minimize the risk of collapse, entrapment or drowning
- Providing safe means of access and egress from excavations, such as graded slopes, graded access route or stairs and ladders
- Avoiding the operation of combustion equipment for prolonged periods inside excavations areas where other workers are required to enter unless the area is actively ventilated

Other Site Hazards

Construction and decommissioning sites may pose a risk of exposure to dust, chemicals, hazardous or flammable materials and wastes in a combination of liquid, solid or gaseous forms, which should be prevented through the implementation of project specific plans and other applicable management practices including:

- Use of specially trained personnel to identify and remove waste materials from tanks, vessels, processing equipment or contaminated land as a first step in decommissioning activities to allow for safe excavation, construction, dismantling or demolition
- Use of specially trained personnel to identify and selectively remove potentially hazardous materials in building elements prior to dismantling or demolition including, for example, insulation or structural elements containing asbestos and Polychlorinated Biphenyls (PCBs), electrical components containing mercury
- Use of waste-specific PPE based on the results of an occupational health and safety assessment, including respirators, clothing/ protective suits, gloves and eye protection

15.3 Guidelines: Environmental Waste Management

Applicability and Approach

These guidelines apply to projects that generate, store, or handle any quantity of waste across a range of industry sectors. It is not intended to apply to projects or facilities where the primary business is the collection, transportation, treatment, or disposal of wastes. Specific guidance for these types of facilities is presented in the Environmental Health and Safety (EHS) Guidelines for Waste Management Facilities.

A *waste* is any solid, liquid, or contained gaseous material that is being discarded by disposal, recycling, burning or incineration. It can be a by-product of a manufacturing process or an obsolete commercial product that can no longer be used for intended purpose and requires disposal.

Solid *(non-hazardous)* wastes generally include any garbage, refuse. Examples of such waste include domestic trash and garbage; inert construction/ demolition materials; refuse, such as metal scrap and empty containers (except those previously used to contain hazardous materials which should, in principle, be managed as a hazardous waste); and residual waste from industrial operations, such as boiler slag, clinker and fly ash.

Hazardous waste shares the properties of a hazardous material (e.g. ignitability, corrosivity, reactivity or toxicity), or other physical, chemical or biological characteristics that may pose a potential risk to human health or the environment if improperly managed. Wastes may also be defined as "hazardous" by local regulations or international conventions, based on the origin of the waste and its inclusion on hazardous waste lists or based on its characteristics.

Sludge from a waste treatment plant, water supply treatment plant or air pollution control facility, and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial operations needs to be evaluated on a case-by-case basis to establish whether it constitutes a hazardous or a non-hazardous waste.

Facilities that generate and store wastes should practice the following:

- Establishing waste management priorities at the outset of activities based on an understanding of potential Environmental, Health, and Safety (EHS) risks and impacts and considering waste generation and its consequences
- Establishing a waste management hierarchy that considers prevention, reduction, re-use, recovery, recycling, removal and finally disposal of wastes
- Avoiding or minimizing the generation waste materials, as far as practicable
- Where waste generation cannot be avoided but has been minimized, recovering and re-using waste
- Where waste cannot be recovered or re-used, treating, destroying and disposing of it in an environmentally sound manner

General Waste Management

The following guidance applies to the management of non-hazardous and hazardous waste. Additional guidance specifically applicable to hazardous wastes is presented below. Waste

management should be addressed through a waste management system that addresses issues linked to waste minimization, generation, transport, disposal and monitoring.

Waste Management Planning

Facilities that generate waste should characterize their waste according to composition, source, types of wastes produced, generation rates or according to local regulatory requirements. Effective planning and implementation of waste management strategies should include:

- Review of new waste sources during planning, siting and design activities, including during equipment modifications and process alterations, to identify expected waste generation, pollution prevention opportunities, and necessary treatment, storage and disposal infrastructure
- Collection of data and information about the process and waste streams in existing facilities, including characterization of waste streams by type, quantities and potential use/ disposition
- Establishment of priorities based on a risk analysis that takes into account the potential EHS risks during the waste cycle and the availability of infrastructure to manage the waste in an environmentally sound manner
- Definition of opportunities for source reduction as well as re-use and recycling
- Definition of procedures and operational controls for on-site storage
- Definition of options/ procedures/ operational controls for treatment and final disposal

Waste Prevention

Processes should be designed and operated to prevent or minimize the quantities of wastes generated and hazards associated with the wastes generated in accordance with the following strategy:

- Substituting raw materials or inputs with less hazardous or toxic materials, or with those where processing generates lower waste volumes
- Applying manufacturing process that convert materials efficiently, providing higher product output yields, including modification of design of the production process, operating conditions and process controls
- Instituting good housekeeping and operating practices, including inventory control to reduce the amount of waste resulting from materials that are out-of-date, off-specification, contaminated, damaged or excess to plant needs
- Instituting procurement measures that recognize opportunities to return usable materials such as containers and which prevents the over ordering of materials
- Minimizing hazardous waste generation by implementing stringent waste segregation to prevent the co-mingling of non-hazardous and hazardous waste to be managed

Recycling and Re-use

In addition to the implementation of waste prevention strategies, the total amount of waste may be significantly reduced through the implementation of recycling plans, which should consider the following elements:

- Evaluation of waste production processes and identification of potentially recyclable materials
- Identification and recycling of products that can be re-introduced into the manufacturing process or industry activity at the site
- Investigation of external markets for recycling by other industrial processing operations located in the neighbourhood or region of the facility (e.g. waste exchange)
- Establishing recycling objectives and formal tracking of waste generation and recycling rates
- Providing training and incentives to employees in order to meet objectives

Treatment and Disposal

If waste materials are still generated after the implementation of feasible waste prevention, reduction, re-use, recovery and recycling measures, waste materials should be treated and disposed of and all measures should be taken to avoid potential impacts to human health and the environment. Selected management approaches should be consistent with the characteristics of the waste and local regulations and may include one or more of the following:

- On-site or off-site biological, chemical or physical treatment of the waste material to render it non-hazardous prior to final disposal
- Treatment or disposal at permitted facilities specially designed to receive the waste. Examples include: composting operations for organic non-hazardous wastes; properly designed, permitted and operated landfills or incinerators designed for the respective type of waste; or other methods known to be effective in the safe, final disposal of waste materials such as bio-remediation.

Hazardous Waste Management

Hazardous wastes should always be segregated from nonhazardous wastes. If generation of hazardous waste cannot be prevented through the implementation of the above general waste management practices, its management should focus on the prevention of harm to health, safety and the environment, according to the following additional principles:

- Understanding potential impacts and risks associated with the management of any generated hazardous waste during its complete life cycle
- Ensuring that contractors handling, treating and disposing of hazardous waste are reputable and legitimate enterprises, licensed by the relevant regulatory agencies and following good international industry practice for the waste being handled
- Ensuring compliance with applicable local and international regulations

Waste Storage

Hazardous waste should be stored so as to prevent or control accidental releases to air, soil, and water resources in area location where:

- Waste is stored in a manner that prevents the co-mingling or contact between incompatible wastes and allows for inspection between containers to monitor leaks or

spills. Examples include sufficient space between incompatibles or physical separation such as walls or containment curbs
- Store in closed containers away from direct sunlight, wind and rain
- Secondary containment systems should be constructed with materials appropriate for the wastes being contained and adequate to prevent loss to the environment
- Secondary containment is included wherever liquid wastes are stored in volumes greater than 220 litres. The available volume of secondary containment should be at least 110 percent of the largest storage container or 25 percent of the total storage capacity (whichever is greater), in that specific location
- Provide adequate ventilation where volatile wastes are stored

Hazardous waste storage activities should also be subject to special management actions, conducted by employees who have received specific training in handling and storage of hazardous wastes:

- Provision of readily available information on chemical compatibility to employees, including labelling each container to identify its contents
- Limiting access to hazardous waste storage areas to employees who have received proper training
- Clearly identifying (label) and demarcating the area, including documentation of its location on a facility map or site plan
- Conducting periodic inspections of waste storage areas and documenting the findings
- Preparing and implementing spill response and emergency plans to address their accidental release
- Avoiding underground storage tanks and underground piping of hazardous waste

Transportation

On-site and off-site transportation of waste should be conducted so as to prevent or minimize spills, releases, and exposures to employees and the public. All waste containers designated for off-site shipment should be secured and labelled with the contents and associated hazards, be properly loaded on the transport vehicles before leaving the site and be accompanied by a shipping paper (i.e., manifest) that describes the load and its associated hazards, consistent with the guidance provided in Section 3.4 on the Transport of Hazardous Materials.

Treatment and Disposal

In addition to the recommendations for treatment and disposal applicable to general wastes, the following issues specific to hazardous wastes should be considered:

Commercial or Government Waste Contractors

In the absence of qualified commercial or government-owned waste vendors (taking into consideration proximity and transportation requirements), facilities generating waste should consider using:

- Have the technical capability to manage the waste in a manner that reduces immediate and future impact to the environment

- Have all required permits, certifications and approvals, of applicable government authorities
- Have been secured through the use of formal procurement agreements

In the absence of qualified commercial or government-owned waste disposal operators (taking into consideration proximity and transportation requirements), project sponsors should consider using:

- Installing on-site waste treatment or recycling processes
- As a final option, constructing facilities that will provide for the environmental sound long-term storage of wastes on-site (as described elsewhere in the General EHS Guidelines) or at an alternative appropriate location up until external commercial options become available

Small Quantities of Hazardous Waste

Hazardous waste materials are frequently generated in small quantities by many projects through a variety of activities such as equipment and building maintenance activities. Examples of these types of wastes include: spent solvents and oily rags, empty paint cans, chemical containers; used lubricating oil; used batteries (such as nickel-cadmium or lead acid); and lighting equipment, such as lamps or lamp ballasts. These wastes should be managed following the guidance provided in the above sections.

Monitoring

Monitoring activities associated with the management of hazardous and non-hazardous waste should include:

- Regular visual inspection of all waste storage collection and storage areas for evidence of accidental releases and to verify that wastes are properly labelled and stored. When significant quantities of hazardous wastes are generated and stored on site, monitoring activities should include:

  ~ Inspection of vessels for leaks, drips or other indications of loss
  ~ Identification of cracks, corrosion or damage to tanks, protective equipment or floors
  ~ Verification of locks, emergency valves and other safety devices for easy operation (lubricating if required and employing the practice of keeping locks and safety equipment in standby position when the area is not occupied)
  ~ Checking the operability of emergency systems
  ~ Documenting results of testing for integrity, emissions or monitoring stations (air, soil vapour, or groundwater)
  ~ Documenting any changes to the storage facility and any significant changes in the quantity of materials in storage

- Regular audits of waste segregation and collection practices
- Tracking of waste generation trends by type and amount of waste generated, preferably by facility departments
- Characterizing waste at the beginning of generation of a new waste stream and periodically documenting the characteristics and proper management of the waste, especially hazardous wastes

- Keeping manifests or other records that document the amount of waste generated and its destination
- Periodic auditing of third party treatment, and disposal services including re-use and recycling facilities when significant quantities of hazardous wastes are managed by third parties. Whenever possible, audits should include site visits to the treatment storage and disposal location
- Regular monitoring of groundwater quality in cases of Hazardous Waste on site storage and/ or pre-treatment and disposal
- Monitoring records for hazardous waste collected, stored, or shipped should include:

  ~ Name and identification number of the material(s) composing the hazardous waste
  ~ Physical state (i.e., solid, liquid, gaseous or a combination of one, or more, of these)
  ~ Quantity (e.g. kilograms or litres, number of containers)
  ~ Waste shipment tracking documentation to include, quantity and type, date dispatched, date transported and date received, record of the originator, the receiver and the transporter
  ~ Method and date of storing, repacking, treating or disposing at the facility, cross-referenced to specific manifest document numbers applicable to the hazardous waste
  ~ Location of each hazardous waste within the facility and the quantity at each location

Annex 15: Factory Ordinance, ILO Guidelines and SCDP Environmental Management and Assessment Framework Guidelines

(1) Factory ordinance can be downloaded from this link:

http://www.employers.lk/factories-ordinance-i

(2) SCDP Environmental Management and Assessment Framework Guidelines

Health and Safety Guidelines

Health and safety of workers and the public should be designed into constructions, before and during and after the building phase. It is cheaper and easier to control risks in construction to workers as well as the public before work starts on site by proper planning, training, site induction, worker consultation and incorporating strict safety procedures in construction plans. The proposed project interventions will mostly involve small to medium scale construction sites. As such, extreme dangers posed by working in environments such as great heights, deep water and involving dangerous chemicals and radioactive material will not be present. Potential dangers associated with SCDP sites will include falling from moderate heights, vehicle/pedestrian accidents, falling into trenches, being buried in underground drains/excavations, breathing dust and other air pollutants, back aches caused by handling heavy material, suffering hearing loss from noise etc and can be mitigated with following safety guidelines.

EA for each site should mandatorily include a risk assessment as to what are the hazards involved in the work site, who might be harmed and how seriously, how likely this harm might happen and what actions are required to eliminate or reduce the risk and incorporate such measures in the EMP and clearly set out in the tender documents. All sub-projects must observe health and safety regulations, hence during implementation it is important to check if these control measures are put in place and are meeting the legal requirement.

Training

• Ensure constructors carry out suitable training programs on occupational health and safety for workers prior to commencement of construction.
• Ensure only experienced and well trained workers are used for the handling of machinery, equipment and material processing plants
• Ensure all persons, including managers, are trained and able to carry out their work without risk to the safety or health of themselves, other workers or the public

Personal Protective Equipment

• Ensure appropriate safety equipment, tools and protective clothing are provided to workers and that safe working methods are applied. A safety inspection checklist should be prepared taking into consideration what the workers are supposed to be wearing and monitored.
- Any person who works or operates in an area where there is a risk of flying objects, such as splinters, should wear safety goggles at all time. These should be securely fitted to the face. Welders should protect the entire face from hot sparks and bright rays by using a welding mask.

• Any person exposed to high levels of dust or hazardous gases (when working in underground drains) should wear respiratory protection in the form of disposal masks or respiratory masks which fit more snugly around the nose and mouth.
• Any person working in an area where there is the risk of being struck on the head by a falling or flying object should wear a hard hat at all times. These should be well maintained in order to be fully effective, and any helmets or hard hats that are damaged or cracked should immediately be replaced.
• All workers will be required to wear shoes or strong boots to prevent sharp objects from penetrating or crushing the foot. Those working in muddy conditions and in canals with polluted water should avoid hand/foot contact with water and should never wear slippers.
• Road workers should wear reflective vests to avoid being hit by moving vehicular traffic.

Site Delineation and Warning Signs

• Ensure delineation devices such as cones, lights, tubular markers, orange and white strips and barricades are erected to inform oncoming vehicular traffic and pedestrians in the area about work zones.

• Ensure all digging and installing work items that are not accomplished are isolated and warned of by signposts and flash lamps in nighttime.

• Ensure dangerous warning signs are raised to inform public of particular dangers and to keep the public away from such hazards.

• Ensure rehabilitation of trenches progressively once work is completed.

• The safety inspection checklist must look to see that the delineation devices are used, whether they are appropriately positioned, if they are easily identifiable and whether they are reflective.

Equipment safety

• Work zone workers use tools, equipment and machinery that could be dangerous if used incorrectly or if the equipment malfunctions Inspections must be carried out to test the equipment before it is used, so that worker safety can be secured. Inspections should look for evidence of wear and tear, frays, missing parts and mechanical or electrical problems.

Traffic management

• Ensure traffic control plans and procedures are in place when work zone is set up and how to handle full or partial road closure, blocked intersections, sidewalk closure etc

• Ensure installation of transport signs and lighting systems in conspicuous places to assure transport safety. Transport signs should be installed at places where accidents may be easily happened (populated centers, schools, hospitals, commercial areas etc)

Material management

 Ensure easily flammable materials are not be stored in construction site and that they are transported out of project site

Emergency Procedures

• Ensure an emergency aid service is in place in the work zone.

• Ensure all site staff is properly briefed as to what to do in the event of an emergency, such as who to notify and where to assemble for a head count. This information must be conveyed to employees by the site manager on the first occasion a worker visits the site.

Construction camps

• Ensure installation of adequate construction camps and sanitation facilities for construction workers to control of transmission of infectious diseases.

Information management

• Develop and establish contractor's own procedure for receiving, documenting and addressing complaints that is easily accessible, culturally appropriate and understandable to affected communities.

• Provide advance notice to local communities by way of information boards about the schedule of construction activities.

Worker consultation

• Consulting the workforce on health and safety measures is not only a legal requirement, it is an effective way to ensure that workers are committed to health and safety procedures and improvements. Employees should be consulted on health and safety measures and before the introduction of new technology or products.

3 The occupational safety and health management system in the organization

Occupational safety and health, including compliance with the OSH requirements pursuant to national laws and regulations, are the responsibility and duty of the employer. The employer should show strong leadership and commitment to OHS activities in the *organization*, and make appropriate arrangements for the establishment of an OHS management system. The system should contain the main elements of policy, organizing, planning and implementation, evaluation and action for improvement, as shown in figure 2.

Figure 2. Main elements of the OHS managements system

Policy

3.1. Occupational safety and health policy

3.1.1. The employer, in consultation with workers and their representatives, should set cost in writing an OHS policy, which should be:

(a) Specific to the organization and appropriate to its size and nature of its activities;

(b) Concise, clearly written, dated and made effective by the signature or endorsement of the employer or the most senior accountable person in the organization;

(c) Communicated and readily accessible to all persons at their place of work:
(d) Reviewed for continuing suitability: and
(e) Made available to relevant external interested parties, as appropriate.

3.1.2. The OSH policy should include, as a minimum, the following key principles and objectives to which the organization is committed;

(a) Protecting the safety and health of all members of the organization by preventing work – related injuries, ill health, diseases and incident;
(b) Complying with relevant OHS national laws and regulation, voluntary programs, collective agreements on OHS and other requirements to which the *organization* subscribes;
(c) Ensuring that workers and their representative are consulted and encouraged to participate actively in all elements of the OSH management system; and
(d) Continually improving the performance of the OSH management system.

3.1.3. The OSH management system should be compatible with or integrated in other management systems in the *organization*.

3.2. Worker participation

3.2.1. Worker participation is an essential elements of the OSH management system in the *organization*

3.2.2. The employer should ensure that workers and their safety and health representatives are consulted, informed and trained on all aspects of OSH, including emergency arrangements, associated with their work.

3.2.3. The employer should make arrangements for workers and their safety and health representatives to have the time and resources to participate actively in the processes of organizing, planning and implementation, evaluation and action for improvement of the OSH management system.

3.2.4. The employer should ensure, as appropriate, the establishment and efficient functioning of a safety and health committee and the recognition of workers safety and health representatives, in accordance with national laws and practice.

Organizing

3.3. Responsibility and accountability

3.3.1. The employer should have overall responsibility for the protection of workers' safety and health, and provide leadership for OSH activities in the *organization*.

3.3.2. The employer and senior management should allocate responsibility, accountability and authority for the development, implementation and performance of the OSH management system and the achievement of the relevant OSH objectives. Structures and processes should be established which;

(a) Ensure that OSH is a time – management responsibility which is known and accepted at all levels;
(b) Define and communicate to the members of the *organization* the responsibility, accountability and authority of person who identify, evaluate or control OSH hazards and risks;
(c) Provide effective supervision, as necessary, to ensure the protection of workers' safety and health;
(d) Promote cooperation and communication among members of the *organization,* including workers and their representatives, to implement the elements of the o*rganization's* OSH management system;
(e) Fulfil the principles of OSH management system contained in relevant national guidelines, tailored guidelines or voluntary programs, as appropriate, to which the *organization* subscribes;

(f) Establish and implement a clear OSH policy and measurable objectives;
(g) Establish effective arrangements to identify and eliminate or control work – related hazards and risks, and promote health at work;
(h) Establish prevention and health promotion programmers;
(i) Ensure effective arrangements for the full participation of workers are their representatives in the fulfilment of the OSH policy;
(j) Provide effective arrangements for the full participation of workers and their representatives in safety and health committees, where they exist.

3.3.3. A person or persons at the senior management level should be appointed, where appropriate, with responsibility, accountability and authority for:

(a) The development, implementation, periodic review and evaluation of the OSH management system;
(b) Periodic reporting to the senior management on the performance of the OSH management system; and
(c) Promoting the participation of all members of *organization.*

3.4. Competence and training

3.4.1. The necessary OSH competence requirements should be defined by the employer, and arrangements established and maintained to ensure that all person are competent to carry out the safety and health aspects of their duties and responsibilities.

3.4.2. The employer should have, or should have access to, sufficient OSH competence to identify and eliminate or control work- related hazards and risks, and to implement the OSH management system.

3.4.3. Under the arrangement referred to in paragraph 3.4.1.training programmes should:

(a) Cover all members of the *organization,* as appropriate;
(b) Be conducted by competent persons;
(c) Provide effective and timely initial and refresher training at appropriate intervals;
(d) Include participants' evaluation of their comprehension and retention of the training;
(e) Be reviewed periodically. The review should include the safety and health committee, where it exists, and the training programmes, modified as necessary to ensure their relevance and effectiveness; and
(f) Be documented, as appropriate and according to the size and nature of activity of the *organization.*

3.4.4. Training should be provided to all participants at no cost and should take place during working hours, if possible.

3.5. Occupational safety and health management system documentation

3.5.1. According to the size and nature of activity of the *organization,* OSH management system documentation should be established and maintained, and may cover;

(a) The OSH policy and objectives of the *organization;*
(b) The allocated key OSH management roles and responsibilities for the implementation of the OSH management system;
(c) The significant OSH hazards/risks arising from the organization's activities, and the arrangements for their prevention and control; and
(d) Arrangements, procedures, instructions or other internal documents used within the framework of the OSH management system.

3.5.2. The OSH management system documentation should be:

(a) Clearly written and presented in a way that is understood by those who have to use it; and
(b) Periodically reviewed, revised as necessary, communicated and readily accessible to all appropriate or affected members of the *organization.*

3.5.3. OSH records should be established, managed and maintained locally and according to the needs of the *organization.* They should be identifiable and traceable, and their retention times should be specified.

3.5.4. Workers should have the right to access records relevant to their working environment and health, while respecting the need for confidentiality.

3.5.5. OSH records may include:

(a) Records arising from the implementation of the OSH management system;
(b) Records of work- related injuries, ill health, diseases and incidents;
(c) Records arising from national laws or regulations dealing with OSH;
(d) Records of workers' exposures, surveillance of the working environment and workers' health; and
(e) The results of both active and reactive monitoring.

3.6. Communication

3.6.1. Arrangement and procedures should be established and maintained for:

(a) Receiving, documenting and responding appropriately to internal and external communications related to OSH;
(b) Ensuring the internal communication of OSH information between relevant levels and functions of the organization; and
(c) Ensuring that the concerns, ideas and inputs of workers and their representatives on OSH matters are received, considered and responded to.

Planning and implementation

3.7. Initial review

3.7.1. The *organization's* existing OSH management system and relevant arrangements should be evaluated by an initial review, as appropriate. In the case where no OSH management system exists, or if the *organization* is newly established, the initial review should serve as a basis for establishing an OSH management system.

3.7.2. The initial review should be carried out by competent persons, in consultation with workers and / or their representatives, as appropriate. It should:

(a) Identify and current applicable national laws and regulations, national guidelines, tailored guidelines, voluntary programmes and other requirements to which the *organization* subscribes;
(b) Identify, anticipate and assess hazards and risks to safety and health arising from the existing or proposed work environment and work *organization;* and
(c) Determine whether planned or existing controls are adequate to eliminate hazards or control risks; and
(d) Analyze the data provided from workers' health surveillance.

3.7.3. The result of the initial review should:

(a) Be documented;
(b) Become the basis for marking decisions regarding the implementation of the OSH management system; and
(c) Providing a baseline from which continual improvement of the *organization's* OSH management system can be measured.

3.8. System planning, development and implementation

3.8.1. The purpose of planning should be to create on OSH management system that supports:

(a) As the minimum, compliance with national laws and regulations;
(b) The elements of the *organization's* OSH management system; and
(c) Continual improvement in OSH performance.

3.8.2. Arrangement should be made for adequate and appropriate OSH planning, based on the results of the initial review, subsequent reviews or other available data. These planning arrangements should contribute to the protection of safety and health at work, and should include;

(a) A clear definition, priority setting and quantification, where appropriate, of the *organization's* OSH objectives;
(b) The preparation of a plan for achieving each objective, with defined responsibility and clear performance criteria indicating what is to be done by whom and when;
(c) The selection of measurement criteria for confirming that the objectives are achieved; and
(d) The provision of adequate resources, including Harran and financial resources and technical support, as appropriate.

3.8.3. The OSH planning arrangements of the organization should cover the development and implementation of all the OHS management system elements, as described in Chapter 3 of these guidelines and illustrated in figure 2.

3.9. Occupational safety and health objectives

3.9.1. Consistent with the OSH policy and based on the initial or subsequent reviews, measurable OSH objectives should be established, which are:

(a) Specific to the *organization*, and appropriate to and according to its size and nature of activity;
(b) Consistent with the relevant and applicable national laws and regulations, and the technical and business obligations of the *organization*, with regard to OSH;
(c) Focused towards continually improving workers' OSH Protection to achieve the best OSH performance;
(d) Realistic and achievable;
(e) Documented, and communicated to all relevant functions and levels of the *organization;* and
(f) Periodically evaluated and if necessary updated.

3.10 Hazard prevention

3.10.1. Prevention and control measures

3.10.1.1. Hazards and risks to workers' safety and health should be identified and assessed on an ongoing basis. Preventive and protective measures should be implemented in the following order of priority;

(a) Eliminate the hazard/risk;
(b) Control the hazard/risk at source, through the use of engineering controls or organizational measures;
(c) Minimize the hazard/risk by the design of safe work systems, which include administrative control measures; and
(d) Where residual hazard/risk cannot be controlled by collective measures, the employer should provide for appropriate personal protective equipment, including clothing, at no cost, and should implement measures to ensure its use and maintenance.

3.10.1.2. Hazard prevention and control procedures of arrangements should be established and should:

(a) Be adapted to the hazards and risks encountered by the *organization ;*
(b) Be reviewed and modified if necessary on a regular basis;
(c) Comply with national laws and regulations, and reflect good practice; and

(d) Consider the current state of knowledge, including information or reports from *organizations*, such as labour inspectorates, occupational safety and health services, and other services as appropriate.

3.10.2. Management of change

3.10.2. The impact on OSH of intimal changes (such as those in staffing or due to new processes, working procedures, organizational structures or acquisitions) and of external changes (for example, as a result of amendments of national laws and regulations, organizational mergers, and developments in OSH knowledge and technology) should be evaluated and appropriate preventive steps taken prior to the introduction of changes.

3.10.2.2. A workplace hazard identification and risk assessment should be carried out before any modification or introduction of new work methods, materials, processes or machinery. Such assessment should be done in consultation with and involving workers and their representatives, and the safety and health committee, where appropriate.

3.10.2.3. The implementation of a "decision to change" should ensure that all affected members of the organization are properly informed and trained.

3.10.3. Emergency prevention, preparedness and response

3.10.3.1. Emergency prevention, preparedness and response arrangements should be established and maintained. These arrangements should identify the potential for accidents and emergency situations, and address the prevention of Osh risks associated with them. The arrangements should be made according to the size and nature of activity of the organization. They should;

(a) Ensure that the necessary information, internal communication and coordination are provided to protect all people in the event of an emergency at the worksite;
(b) Provide information to, and communication with the relevant competent authorities, and the neighborhood and emergency response services;
(c) Address first – aid and medical assistance, firefighting and evacuation of all people at the worksite; and
(d) Provide relevant information and training to all members of the organization, at all levels, including regular exercises in emergency prevention, preparedness and responses procedures.

3.10.3.2. Emergency prevention, preparedness and response arrangements should be established in cooperation with external emergency services and other bodies where applicable.

3.10.4. Procurement

3.10.4.1. Procedures should be established and maintained to ensure that:

(a) Compliance with safety and health requirements for the *organization* is identified. evaluation and incorporated into purchasing and leasing specifications;
(b) National laws and regulations and the organizations own OSH requirements are identified prior to the procurement of goods and services; and
(c) Arrangement are made to achieve conformance to the requirements prior to their use.

3.10.5. Contracting

3.10.5.1. Arrangements should be established and maintained for ensuring that the organization's safety and health requirements, or at least the equivalent, are applied to contractors and their workers.

3.10.5.2. Arrangements for contractors working on site should:

(a) Include OSH criteria in procedures for evaluating and selecting contractors;
(b) Establish effective ongoing communication and coordination between appropriate levels of the *organization* and the contractor prior to commencing work. This should include provisions for communicating hazards and the measures to prevent and control them;

(c) Include arrangement for reporting of work-related injuries, ill health, diseases and incidents among the contractors' workers while performing work for the organization;
(d) Provide relevant workplace safety and health hazard awareness and training to contractors or their workers prior to commencing work and as work progresses, as necessary;
(e) Regularly monitor OSH performance of contractor activities on site; and
(f) Ensure that on- site OSH performance of contractor activities on site; and
(g) Ensure that on-site OSH procedure and arrangements are followed by the contractor(s).

Evaluation

3.11. Performance monitoring and measurement

3.11.1. Procedures to monitor, measure and record OSH performance on a regular basis should be developed, established and periodically reviewed. Responsibility, accountability and authority for monitoring at different levels in the management structure should be allocated.

3.11.2. The selection of performance, indicators should be according to the size and nature of activity of the *organization* and the OSH objectives.

3.11.3. Both qualitative and quantitative measures appropriate to the needs of the *organization* should be considered. These should;

(a) Be based on the *organization's* identified hazards and risks, the commitments in the OSH policy and the OSH objectives; and
(b) Support the *organization's* evaluation process, including the management review.

3.11.4. Performance monitoring and measurement should:

(a) Be used as a means of determining the extent t which OSH policy and objectives are being implemented and risks are controlled;
(b) Include both active and reactive monitoring, and not be based only upon work-related injury, ill health, disease and incident statistics; and
(c) Be recorded.

3.11.5. Monitoring should provide;

(a) Feedback on OSH performance;
(b) Information to determine whether the day-to-day arrangements for hazard and risk identification, prevention and control are in place and operating effectively; and
(c) The basis for decisions about improvement in hazard identification and risk control, and the OSH management system.

3.11.6. Active monitoring should contain the elements necessary to have a proactive system and should include;

(a) monitoring of the achievement of specific plans, established performance criteria and objectives;
(b) the systematic inspection of work systems, premises, plant and equipment;
(c) surveillance of working environment, including work organization;
(d) surveillance of workers' health, where appropriate, through suitable medical monitoring or follow-up of workers for early detection of signs and symptoms of harm to health in order to determine the effectiveness of prevention and control measures; and
(e) compliance with applicable national laws and regulations, collective agreements and other commitments on OSH to which the *organization* subscribes.

3.11.7. Reactive monitoring should include the identification, reporting and investigation of;

(a) work-related injuries, ill health (including monitoring of aggregate sickness absence records), diseases and incidents;
(b) other losses, such as damage to property;
(c) deficient safety and health performance, and OSH management system failures; and
(d) Workers' rehabilitation and health-restoration programmes.

3.12. Investigation of work-related injuries, ill health, diseases and incidents, and their impact on safety and health performance

3.12.1. The investigation of the origin and underlying causes of work-related injuries, ill health, diseases and incidents should identify any failures in the OSH management system and should be documented.
3.12.2. Such investigations should be carried out by competent persons, with the appropriate participation of workers and their representatives.
3.12.3. The results of such investigations, should be communicated to the safety and health committee, where it exists, and the committee should make appropriate recommendations.
3.12.4. The results of investigations, in addition to any recommendations from the safety and health committee, should be communicated to appropriate persons for corrective action, included in the management review and considered for continual improvement activities.
3.12.5. The corrective action resulting from such investigations should be implemented in order to avoid repetition of work-related injuries, ill health, diseases and incidents.
3.12.6. Reports produced by external investigative agencies, such as inspectorates and social insurance institutions, should be acted upon in the same manner as internal investigations, taking into account issues of confidentiality.

3.13 Audit

3.13.1. Arrangements to conduct periodic audits are to be established in order to determine whether the OSH management system and its elements are in place, adequate, and effective in protecting the safety and health of workers and preventing incidents.
3.13.2. An audit policy and programme should be developed, which including designation of auditor competency, the audit scope, the frequency of audits, audit mythology and reporting.
3.13.3. The audit includes an evaluation of the *organization's* OSH management system elements or a subset of these, as appropriate. The audit should cover.
(a) OSH policy;
(b) Worker participation;
(c) Responsibility and accountability;
(d) Competence and training;
(e) OSH management system documentation;
(f) Communication;
(g) System planning, development and implementation;
(h) Prevention and control measures;
(i) Management of change;
(j) Emergency prevention,
(k) Procurement;
(l) Contracting;
(m) Performance monitoring and measurement;
(n) Investigation of work-related injuries, ill health diseases and incidents, and their impact on safety and health performance;
(o) Audit;
(p) Management review;

(q) Preventive and corrective action;
(r) Continual improvement; and
(s) any other audit criteria or elements that may be appropriate.

3.13.4. The audit conclusion should determine whether the implemented OSH management system elements or a subset of these;

(a) are effective in meeting the *organization's* OSH policy and objectives;
(b) are effective in promoting full worker participation;
(c) respond to the results of OSH performance evaluation and previous audits;
(d) enable the *organization* to achieve compliance with relevant national laws and regulations; and
(e) fulfil the goals of continual improvement and best OSH practice.

3.13.5. Audits should be conducted by competent persons internal or external to the *organization* who are independent of the activity being audited.

3.13.6. The audit results and audit conclusions should be communicated to those responsible for corrective action.

3.13.7. Consultation on selection of the auditor and all stages of the workplace audit, including analysis of results, are subject to worker participation, as appropriate.

3.14. Management review

3.14.1. Management reviews should:

(a) evaluate the overall strategy of the OSH management system to determine whether it meets planned performance objectives;
(b) evaluate the OSH management system's ability to meet the overall needs of the *organization* and its stakeholders, including its workers and the regulatory authorities;
(c) evaluate the need for changes to the OSH management system, including OSH policy and objectives;
(d) identify what action is necessary to remedy any deficiencies in a timely manner, including adaptations of other aspects of the *organization's* management structure and performance measurement;
(e) provide the feedback direction, including the determination of priorities, for meaningful planning and continual improvement;
(f) evaluate progress towards the *organization's* OSH objectives and corrective action activities; and
(g) evaluate the effectiveness of follow-up actions from earlier management reviews.

3.14.2. The frequency and scope of periodic reviews of the OSH management system by the *organization's* needs and conditions.

3.14.3. The management review should consider;

(a) the results of work-relate injuries, ill health, diseases and incident investigations; performance monitoring and measurement; and audit activities; and
(b) additional internal and external inputs as well as changes, including organizational changes, that could affect the OSH management system.

3.14.4. The findings of the management review should be recorded and formally communicated to;

(a) the persons responsible for the relevant element(s) of the OSH management system so that they many take appropriate action; and
(b) the safety and health committee, workers and their representatives.

Action for improvement

3.15. Preventive and corrective action

3.15.1. Arrangements should be established and maintained for preventive and corrective action resulting from OSH management system performance monitoring and measurement, OSH management system audits and management reviews. These arrangements should include;

(a) identifying and analyzing the root causes of any non-conformities with relevant OSH regulations and/or OSH management systems arrangements; and
(b) initiating, planning, implementing, checking the effectiveness of and documenting corrective and preventive action, including changes to the OSH management system itself.

3.15.2. When the evaluation of the OSH management system or other sources show that preventive and protective measures for hazards and risks are inadequate or likely to become inadequate, the measures should be addressed according to the recognized hierarchy of prevention and control measures, and completed and documented, as appropriate and in a timely manner.

3.16. Continual improvement

3.16.1. Arrangements should be established and maintained for the continual improvement of the relevant elements of the OSH management system and the system as a whole. These arrangements should take into account;

(a) the OSH objectives of the *organization;*
(b) the results of hazard and risk identifications and assessments;
(c) the results of performance monitoring and measurements;
(d) the investigation of work-related injuries, diseases, ill health and incidents, and the results and recommendations of audits;
(e) the outcomes of the management review;
(f) the recommendations for improvement from all members of the *organization*, including the safety and health committee, voluntary programmes and collective agreements;
(g) changes in national laws and regulations, voluntary programmes and collective agreements;
(h) new relevant information; and
(i) the results of health protection and promotion programmes.

3.16.2. The safety and health processes and performance of the organization should be compared with others in order to improve health and safety performance.

Annexure 16: Chance finds procedures

Contracts for civil works involving earth moving and excavation activities, especially in known archaeological and heritage areas, should normally incorporate procedures for dealing with situations in which buried PCRs are unexpectedly exposed.

Recognition of unknown PCRs – This is the most difficult aspect to cover, especially if the contractor is not full-time accompanied by a specialist. For SCDP contracts, an initial consultation with the Department of Archaeology should be held before work commencement to identify the likelihood of such material being uncovered, especially where trenching work is expected for pipe laying etc.

Upon discovery of such material during execution of work, the contractor should carry out the following;

- Immediately stop construction activities.
- With the approval of the resident engineer delineate the discovered site area.
- Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remains, a night guard should be present until the responsible authority takes over.
- Through the Resident Engineer, notify the responsible authorities, the Department of Archaeology and local authorities within 24 hours.
- Submit a brief chance find report, within a specified time period, with date and time of discovery, location of discovery, description of finding, estimated weight and dimension of PCR and temporary protection implemented.
- Responsible authorities would be in charge of protecting and preserving the site before deciding on the proper procedures to be carried out.
- An evaluation of the finding will be performed by the Department of Archaeology who may decide to either remove the PCR deemed to be of significance, further excavate within a specified distance of the discovery point and conserve on-site, and/or extend/reduce the areas demarcated by the contractor etc. This should ideally take place within about 7 days.
- Construction work could resume only when permission is given from the Department of Archaeology after the decision concerning the safeguard of the heritage is fully executed.

Annexure 17: Terms of Reference for Recruitment of Environmental Safeguard Officer

1. Objectives

To ensure proper implementation of environmental safeguard compliance activities through an appointment of the Safeguard Officer (Environment) who shall assist the Engineer to delegate his duties as required in the ESMP for the subproject.

2. Scope of work

The Contractor through an appointed dedicated Safeguard Officer (Environmental) shall assist the Engineer to delegate his duties as required in the ESMP recommendations implementation by
The contractor through an appointment of dedicated / qualified environmental safeguard officer shall be responsible in implementation of ESMP requirement by

a) Maintaining up-to-date records on actions taken by the contractor with regards to implementation of ESMP recommendations.
b) Ensure specific safety procedures as per the recommendations by the Safety Advisor
c) Carrying out job safety analysis and implement appropriate actions together with the safety officer.
d) Regular site inspections and close monitoring of implementation of measures specified in Factory Ordinance, ILO Guidelines, SCDP Environmental Management and Assessment Framework Guidelines, IFC Environmental, Health and Safety (EHS) Guidelines
e) Timely (weekly) submission of reports, information and data to the Project Management Unit (PMU) / Deputy Project Director (Technical) of SCDP through Supervision consultant (SC).
f) Participating in the meetings conveyed by the Engineer and
g) Any other assistance requested by the Engineer.

The Contractor shall appoint experienced Safeguard Officer (Environmental) following the award of the contract. The Safeguard Officer (Environmental) will be the primary focal point of contact for the assistance with all environmental issues during the pre-construction and construction phases. He/ She shall be responsible for ensuring the implementation of EMP recommendations. The appointed officer should be available on the site fulltime basis during the project period. In addition, Safeguard Officer (Environmental) should prepare an Environmental Management and Social Action Plan in line with ESMP, and submit to the Engineer along with the construction method statement.

The Safeguard Officer (Environmental) will promptly investigate and review environmental and social related complaints and implement the appropriate corrective actions to arrest or mitigate the cause of the complaints as specified in the Grievance Redress Mechanism under the Resettlement Policy Framework (RPF) of SCDP. A register of all complaints is to be passed to the Engineer within 24 hrs. They are received, with the action taken by the Safeguard Officer (Environmental) on complains thereof. In addition, Safeguard Officer required to perform following tasks as well;

1. Participation for the periodic Grievance Redress Committee Meetings at Local and PMU Level
2. Coordinate and liaise with PIU at Kandy related environmental and social activities

3. Support and coordinate with PMU Environmental Safeguard team in carrying out the monitoring assessments such as baseline surveys, progress review, mid-term review, etc.
4. Take actions to mainstream project activities during the period.
5. Take proactive decisions to avoid anticipated social & environmental impacts due to construction.
6. Identify the potential environment and social safeguards issues in accordance provided ESMP/ /EAMF

3. Qualifications required

Dedicated / experienced Safeguard Officer (Environmental) should possess a Bachelor of Science Degree with minimum 3 years of experiences in the similar capacity or Diploma in relevant field with minimum eight (8) years of experiences and out of that three (3) years experiences in the similar capacity. Preferably, experiences in specific project related works is required. Acceptable Qualification on Occupational Health Safety (OHS) (preferably OSHA/NEBOSH) and related experience is also required. It is essential to have both Sinhala & English language ability (Writing /Speaking) and Computer Knowledge of MS Office. .

4. Duty Station

Duty station will be in Kandy closer to the Project site.

Abbreviation:

EMP - Environment Management Plan
EMF - Environment Management framework
RPF - Resettlement Policy Framework
SSR- Social Screening Report
SIMP - Social Impact Mitigation Plan

Annex 18 : Public consultations held during screening for environmental and social impacts

This annex provides the socio-economic statistics of the affected persons in support of the narratives provided in section 5.2 of the main report. This section has been sources from the SIA conducted as part of the preparation of the RAP in December 2017.

A short introduction to different categories of APs is provided in the table below.

Introduction to AP categories

SN	AP Category	Description
1	KMC leaseholder business operator	A vendor who operates business activities in a KMC-owned business structure that is obtained directly from KMC on a formal agreement (*kadalabin*)
2	SLR leaseholder business operator	A vendor who is operating business activities in a business structure built by him/her on land belonging to SLR or on a structure owned by SLR, and is obtained directly by him/her on a formal agreement.
3	*Idakada* business operator	A vendor who is operating business activities in a temporary or semi-permanent structure erected on an encroached land in GSBS without title or formal agreement with the authorities, but has nevertheless obtained a tacit approval and acknowledgement from KMC in the form of an entry in the KMC's *Idakada lekanaya*—a document simply stating that the unspecified extent of space (*idakada*) was provided to the specified person for engaging in trade on a temporary basis.
4	Titleholder business operator	A vendor who operates business activities in his/her own private property and has a title to the land and business structure.
5	Tenant business operator of KMC leaseholder	A vendor who has rented a business structure through a mutual agreement with a KMC's primary leaseholder and carries out business activities therein. The KMC is not involved in this transaction with such a third party which violates the terms and conditions laid out in the original agreement between the KMC and the leaseholder. Thus, for all intentions and purposes, the original leaseholder remains the operating party in KMC records.
6	Tenant business operator of SLR leaseholder	A vendor who has rented a business structure through a mutual agreement with a primary leaseholder from SLR and carries out business activities therein. The SLR is not involved in this transaction with such a third party, and for all intentions and purposes, the original leaseholder remains the operating party in official records.
7	Tenant of *Idakada* occupier	A vendor who has rented the temporary or semi-permanent structure from an *idakada* occupant on the basis of rent payment to the latter. KMC is not involved in this transaction with such a third party and in KMC records, only the name of the original *idakada* occupant is mentioned.

SN	AP Category	Description
8	Tenant of titleholder	A tenant business operator of a private titleholder who may or may not have entered into a formal rental agreement with the owner for the purpose of his/her commercial undertaking.
9	KMC leaseholder (*kadalabin*) rentier	A leaseholder of a KMC business structure who instead of operating his/her own business in the said structure, has rented out the business structure to a business operator and thereby earns a rental income. The difference between what the leaseholder pays to KMC and what s/he draws from the business operator as a rent figures as the net income from the lease held with KMC.
10	SLR leaseholder rentier	A leaseholder of a business structure built on SLR land or a structure belonging to SLR who instead of operating his/her own business in the said structure/land, has rented out the premise to another operator. The difference between what the leaseholder pays to SLR and what s/he receives from the operating tenant as rent, figures as the net income from the lease held with SLR.
11	*Idakada* occupier rentier	An Idakada occupier (a KMC sanctioned non-titled business holder) who has rented out his/her business premise (land/structures) to another business operator on a rental basis. As the *Idakada* occupiers do not make any rent payment to KMC, the entire rent s/he receives from the tenant remains as his/her net income from the concerned structure.
12	Titleholder rentier	A titleholder of a business property who has rented out his/her property to a business operator on the basis of a written or a verbal agreement.
13	Mobile vendor	A vendor who engages in mobile trade in GSBS whether or not registered with KMC or RPTA. A mobile vendor may move from place to place carrying his/her merchandise on head or in a cart or operate from a fixed place along the way to GSBS or inside a bus shelter. Some mobile vendors board buses with their merchandise packed in a tray or basket (*tattuwa*).
14	Shop assistant	A contractual or casual employee employed by a business enterprise located within the GSBS or IBZ.
15	Three-wheel operator	A three-wheel taxi operator working mainly out of the three three-wheel parks serving the GSBS. They may be owner operators or hired drivers and may or mot not be registered with RPTA.
16	Titleholder landowners	Landowners with secure land tenure who are affected by the project because of acquisition of part of their properties for project purposes
17	Operators of Public Utilities	Operators of public utilities such as toilets and bus parks who are engaged on a contractual basis in GSBS and one of the transitional sites

SN	AP Category	Description
18	Employees in Public Utilities	Persons employed in such public utilities (e.g., public toilets, bus parks) who will lose employment due to permanent demolition of the concerned public utilities by the project

Populations Affected by KMTT

15. The KMTT will have significant resettlement impacts largely on the business population operating within its construction footprint, i.e., the technical boundary (ITB) and its immediate buffer zone (IBZ). Altogether, the project will affect a total population of 820 persons who include 726 men and 94 women. Details of the affected population are presented in Table 1 below.

Table 1: KMTT project affected persons by category

SN	AP Category	ITB	IBZ	Transitional sites	Total
Business Operators					
1	KMC leaseholder business operators	7	-	-	7
2	SLR leaseholder business operators	4	1	-	5
3	*Idakada* business operators	15	-	-	15
4	Titleholder business operators	-	7	-	7
	Sub-total	**26**	**8**		**34**
Tenant Business Operators					
5	Tenant business operators of KMC leaseholders	87	-	-	87
6	Tenant business operators of SLR Leaseholders	2	-	-	2
7	Tenant business operators of *Idakada* occupants	18	-	-	18
8	Tenant business operators of titleholders	-	20	-	20
	Sub-total	**107**	**20**		**127**
Rentiers of Business Premises					
9	KMC leaseholder (*kadalabin)* Rentiers	137	-	-	137
10	SLR leaseholder rentiers	1	-	-	1
11	*Idakada* occupant rentiers	43	-	-	43
12	Titleholder rentiers	-	11	-	11
	Sub-total	**181**	**11**	**-**	**192**
Others					
13	Mobile Vendors	150	-	-	150
14	Shop Assistants	132	113	-	245
15	Three wheel operators	65	-	-	65
16	Titleholder landowners	2	-	-	2
	Sub-total	**349**	**113**	**-**	**462**
Operators of Public Utilities in GSBS and Bogambara Transitional Site					
17	Leaseholders providing public utilities	1	-	2	3
18	Employees public utilities	-	-	2	2
	Sub-total	**1**	**-**	**4**	**5**
	TOTAL	**664**	**152**	**4**	**820**

Source: Social Impact Assessment, December 2017

Affected households of APs by category

Table 2: Affected household population of APs by category

SN	AP Category	No. APs	Household Population	%
Business Operators				
1	KMC leaseholder business operators	7	25	0.68
2	SLR leaseholder business operators	5	17	0.46
3	*Idakada* business operators	15	70	1.90
4	Titleholder business operators	7	24	0.65
	Sub-total	**34**	**136**	**3.69**
Tenant Business Operators				
5	Tenant business operators of KMC leaseholders	87	434	11.77
6	Tenant business operators of SLR Leaseholders	2	8	0.22
7	Tenant business operators of *Idakada* occupants	18	91	2.47
8	Tenant business operators of titleholders	20	82	2.22
	Sub-total	**127**	**615**	**16.68**
Rentiers of Business Premises				
9	KMC leaseholder (*kadalabin)* Rentiers	137	597	16.19
10	SLR leaseholder rentiers	1	5	0.14
11	*Idakada* occupant rentiers	43	165	4.47
12	Titleholder rentiers	11	25	0.68
	Sub-total	**192**	**792**	**21.48**
Others				
13	Mobile Vendors	150	730	19.79
14	Shop Assistants	245	1,082	29.34
15	Three wheel operators	65	312	8.46
16	Titleholder landowners	2	6	0.16
	Sub-total	**462**	**2,130**	**57.75**
Occupants of Public Spaces for Livelihoods				
17	Operators of public utilities	3	8	0.22
18	Employees in such public utilities	2	7	0.19
	Sub-total	**5**	**15**	**0.41**
	TOTAL	**820**	**3,688**	**100.00**

Source: Social Impact Assessment, December 2017

Economic and Livelihood Impacts

Table3: Resettlement Impacts on business units occupied by titleholders, leaseholder/Non-titleholder business operators, tenant business operators, and rentiers

AP Category	Ownership/ tenurial rights	No. APs	No. Units Occupied	Type of resettlement impact
Titleholder, Leaseholder or Non-titleholder business operators	KMC	7	11	Fully affected
	SLR	4	4	Fully affected
		1	1	No structural damages
	Idakada	15	17	Fully affected
	Titleholders	7	7	No structural damages

			1	Partially affected
Sub-Total		**34**	**41**	
Tenant business operators	KMC	87	142	Fully affected
	SLR	2	2	Fully affected
	Idakada tenants	18	48	Fully affected
	Tenants of titleholders	20	20	No structural damage
Sub-Total		**127**	**212**	
Rentiers of business operators	KMC	137	142	Fully affected
	SLR	1	2	Fully affected
	Idakada	43	48	Fully affected
	Titleholders	11	20	No structural damage
Sub-Total		**192**	**212**	

Source: Social Impact Assessment, December 2017

Note: The rentier of the business operators have rented business premises to the tenants business operators. Hence, the total number of business structure to be affected is 253 (which includes 28 commericial structures that will be temporarily affected).

The resettlement impacts on the relevant categories of business operators are summarized in Table 4 below.

Table 4: Summary of resettlement impacts on business operators

Resettlement impacts	**KMC leaseholder business operators in ITB**	**SLR leaseholder business operators in ITB**	**SLR leaseholder business operators in IBZ**	***Idakada* business operators in ITB**	**Titleholder business operators in IBZ**
Loss of business premises (mean floor area in sq.ft)	177	117	997	47	1,341
Loss of capital investments on structures, structural improvements, equipment & furniture (mean investment in SLRs.)	400,857	552,125	3,400,000	118,853	2,475,083
Loss of business income (mean monthly incomes in SLRs.)	66,857	71,250	35,000	69,900	240,428

Source: Social Impact Assessment, December 2017

The resettlement impacts on tenant business operators are summarized in Table 5.

Table 5: Summary resettlement impacts on tenant business operators

Resettlement impacts	**Tenants of KMC leaseholders in ITB**	**Tenants of SLR leaseholders in ITB**	**Tenants of *Idakada* occupiers in ITB**	**Tenants of titleholders in IBZ**
Loss of business premises (mean floor area in sq.ft)	110	1,030	31	370

Loss of capital investments on structures, structural improvements, equipment & furniture (mean investment in SLRs.)	484,588	282,500	368,317	865,775
Loss of business income (mean monthly incomes in SLRs.)	98,408	180,000	101,208	139,850

Source: Social Impact Assessment, December 2017

Table 6 below presents the summary resettlement impacts on the four types of rentier population.

Table 6: Resettlement impacts on the rentier population

Resettlement impacts	KMC rentiers in ITB	SLR Rentier in ITB	*Idakada* rentiers in ITB	Titleholder rentiers in IBZ
Loss of business structures (mean floor area in sq.ft)	54	85	22	532
Loss of capital investments on structures/structural improvements (mean investment in SLRs.)	114,504	180,000	82,894	NA
Loss of monthly rental incomes (mean income in SLRs.)	15,523	21,000	24,539	175,045

Source: Social Impact Assessment, December 2017

Resettlement Impacts on Employees of Sri Lanka Railways

The KMTT project extends to Kandy railway premises where there will be some project related constructions that will require demolition of some existing railway quarters and workers' rest rooms. Specifically, the project will cause demolition of 9 buildings containing 52 residential and resting units occupied by 52 staff members together with 45 members of their families, and 4 other vacant units belonging to SLR (Table 7).

Table 7: Details of railway workers to be relocated

Railway worker category	Type of quarters occupied	Number of Buildings	No. Units		No. workers	No. Family members
			Occupied	Vacant		
Engine Driver	Flats	1	2	1	2	9
Guard	Flats		2	1	2	8
Engine Driver/Guard	Bungalow	1	11		11	0
Engine Driver/Guard	Outstation rest rooms	1	10		10	0
Assistant Engine Driver	Outstation rest rooms	1	18		18	0
Labourer	Labourer quarters	5	9	2	9	28
TOTAL		**9**	**52**	**4**	**52**	**45**

Source: Social Impact Assessment, December 2017

Land Acquisition and Related Impacts on Private Individuals

Construction of KMTT requires the acquisition of private land with an extent of 0.0189ha. The land to be acquired from 2 private individuals will be used for the erection of the skywalk to the KMTT. Land acquisitions will have partial impacts on one commercial establishment situated along Sirimavo Bandaranayaka Mawatha operated by one individual and full impact on an abandoned commercial land adjoining Peradeniya Road owned by the another individual (Profile of APs is given in Table 8). Compensation for the acquired land and structures will be paid at replacement cost as provided in the Land Acquisition Act of 1950, Land Acquisition Regulations of 2013, and the RPF prepared under SCDP.

Table 8: Profile of APs

Name Of AP	Gender	Land Extent (Perch)			Impact on Structure		Monthly Profit (SLRs)
		Existing	To be acquired	%	Type	Sq.ft.	
K.D.U. Karunaratne	Female	20.0	1.48	7.4	Hotel & Eatery	200.0	780,000
R.M. Jinasena	Male	4.5	4.5	100.0	Sub structure (Basement of building)	800.0	NA
Total			**5.98**			**1,000.0**	**780,000**

Socioeconomic Profile of the Affected Persons

This section provides a socio-economic profile of the 820 project-affected persons of different categories based on data gathered during the census survey.

Place of Residence

Table 9: Distribution of APs by place of residence

AP Category	KMC Area/ Gagawata DSD		Nearby DSDs	Elsewhere in district	Outside district	Total
	Nearby Neighborhoods	Elsewhere in KMC/Gangawata				
Titleholder, Leaseholder and Non-titleholder business operators	8	10	11	3	2	**34**
Tenant business operators	34	23	37	24	9	**127**
Rentiers of business premises	58	64	50	16	4	**192**
Mobile vendors	59	11	31	39	10	**150**
Shop assistants	29	23	70	101	22	**245**
Three wheel operators	37	11	14	3	0	**65**
Titleholder land owners	2	0	0	0	0	**2**
Operators of public utilities	2	-	-	-	3	**5**
Total	**229**	**142**	**213**	**186**	**50**	**820**
Percentage	28.0	17.0	26.0	23.0	6.0	100

Source: Social Impact Assessment, December 2017

Length of operations in GSBS

Table 10: Length of operation in GSBS by category of AP (Years of operation in GSBS)

AP Category	< 3 years	3-5 Years	5-10 Years	10-25 Years	>25 Years	Total	Mean No. Years
Titleholder, Leaseholder and Non-titleholder business operators	2	4	6	18	4	**34**	17.24
Tenant business operators	38	11	30	44	4	**127**	9.02
Rentiers of business premises	10	10	17	136	19	**192**	16.01
Mobile vendors	5	5	20	65	55	**150**	21.85
Shop assistants	93	42	56	48	6	**245**	7.35
Three wheel operators	3	3	8	43	8	**65**	16.92
Titleholder land owner	-	0	-	-	2	**2**	
Operators of public utilities	5	-	-	-	-	**5**	3
Total	**156**	**75**	**137**	**354**	**98**	**820**	
Percentage	19.0	9.1	16.7	43.2	12.0	100	

Source: Social Impact Assessment, December 2017

Demographic characteristics

Gender

Table 12: Gender distribution of APs

No.	AP Category	Gender		Total
		Male	Female	
Business Operators				
1	KMC leaseholder business operators	5	2	7
2	SLR leaseholder business operators	4	1	5
3	*Idakada* business operators	10	5	15
4	Titleholder business operators	5	2	7
	Sub-total	**24**	**10**	**34**
Tenant Business Operators				
5	Tenant business operators of KMC leaseholders	84	3	87
6	Tenant business operators of SLR Leaseholders	1	1	2
7	Tenant business operators of *Idakada* occupants	14	4	18
8	Tenant business operators of titleholders	18	2	20
	Sub-total	**117**	**10**	**127**
Rentiers of Business Premises				
9	KMC leaseholder (*kadalabin)* Rentiers	105	32	137
10	SLR leaseholder rentiers	1	-	1
11	*Idakada* occupant rentiers	37	6	43
12	Titleholder rentiers	11	-	11
	Sub-total	**154**	**38**	**192**
Others				
13	Mobile Vendors	137	13	150
14	Shop Assistants	224	21	245
15	Three wheel operators	65	-	65
16	Titleholder landowners	1	1	2
	Sub-total	**427**	**35**	**461**
Operators of Public Utilities in GSBS and Bogambara Site				

17	Operators of public utilities	2	1	3
18	Employees in public utilities	2	-	2
	Sub-total	**4**	**1**	**5**
	TOTAL	**726**	**94**	**820**

Source: Social Impact Assessment, December 2017

Age composition

Table 1: Age distribution of APs

AP Category	Age (in years)								
	16-30		31-45		46-60		60 +		Total
	Nos	%	Nos	%	Nos	%	Nos	%	
Titleholder, Leaseholder and Non-titleholder business operators	2	6	11	32	13	38	8	24	**34**
Tenant business operators	20	16	64	50	37	29	6	5	**127**
Rentiers of business premises	5	3	30	16	98	51	59	31	**192**
Mobile vendors	9	6	56	37	68	45	17	11	**150**
Shop assistants	67	27	67	27	71	29	40	16	**245**
Three wheel operators	8	12	34	52	23	35	-		**65**
Titleholder landowners	-		-		1	50	1	50	**2**
Operators of public utilities	-		1	20	4	80	-		**5**
Total	**111**	**14**	**263**	**32**	**315**	**38**	**131**	**16**	**820**

Source: Social Impact Assessment, December 2017

Education

Table 14: Educational Level of APs

AP Category	Educational Levels			
	No schooling	Up to Grade 9	GCE OL/ AL	Total
Titleholder, Leaseholder and non-titleholder business operators	-	9	25	34
Tenant business operators	2	23	102	127
Rentiers of business premises	16	54	122	192
Mobile vendors	18	82	50	150
Shop assistants	7	87	151	245
Three wheel operators	1	17	47	65
Titleholder landowners	-	1	1	2
Operators of public utilities	-	2	3	5
Total	**44**	**275**	**501**	**820**
%	5.4	33.5	61.1	100

Source: Social Impact Assessment, December 2017

Household composition

The majority of APs' households (69%) constitute nuclear families, and the rest, are in extended family arrangements. The percentage of extended families is roughly similar across all categories of APs with operators of public utilities and titleholder landowners reporting the highest presence of extended families.

Table 15: Household composition of APs by category of AP

AP Category	Household composition				
	Nuclear		Extended		Total
	No	%	No	%	
Titleholder, Leaseholder and non-titleholder business operators	28	82.4	6	17.6	34
Tenant business operators	78	61.4	49	38.6	127
Rentiers of business premises	141	73.4	51	26.6	192
Mobile vendors	94	62.7	56	37.3	150
Shop assistants	179	73.1	66	26.9	245
Three wheel operators	45	69.2	20	30.8	65
Titleholder landowners	1	50	1	50	2
Operators of public utilities	2	25	3	75	5
Total	**568**	**69.3**	**252**	**31**	**820**

Source: Social Impact Assessment, December 2017

Ethnicity and religion

Table 16: Distribution of different categories of APs by ethnicity

AP Category	Distribution of ethnic groups								
	Sinhalese		Tamil		Muslims		Other		Total
	No	%	No	%	No	%	No	%	
Titleholder, Leaseholder and non-titleholder business operators	30	88.2	1	2.9	3	8.8	0	0	34
Tenant business operators	68	53.5	8	6.3	50	39.3	1	0.8	127
Rentiers of business premises	154	80.2	3	1.6	34	17.7	1	0.5	192
Mobile vendors	91	60.7	19	12.7	39	2.6	1	0.7	150
Shop assistants	135	55.1	36	14.7	73	29.8	1	0.4	245
Three wheel operators	54	83.1	6	9.2	5	7.7	0	0	65
Titleholder landowners	2	100	0	0	0	0	0	0	2
Operators of public utilities	5	100	0	0	0	0	0	0	5
Total	539	50.37	73	11.34	204	15.85	4	0	820

Source: Social Impact Assessment, December 2017

Table 17: Distribution of different categories of APs by religion

AP Category	Distribution of religious groups								
	Buddhist		Hindu		Islamic		Catholic/ Christian		Total
	No	%	No	%	No	%	No	%	
Leaseholder and non-titleholder business operators	28	82.3	3	8.8	2	5.9	1	2.9	34
Tenant business operators	68	53.5	7	5.5	51	40.1	1	0.7	127
Rentiers of business premises	147	77	5	3	35	18	5	3	192
Mobile vendors	87	58	16	11	40	27	7	5	150
Shop assistants	125	51	36	15	73	30	11	4	245
Three Wheel operators	51	78	4	6	5	8	5	8	65
Titleholder landowner	2	100	0	0		0		0	2
Operators of public utilities	5	100		0		0		0	5
Total	**513**	**63**	**71**	**9**	**206**	**25**	**30**	**4**	**820**

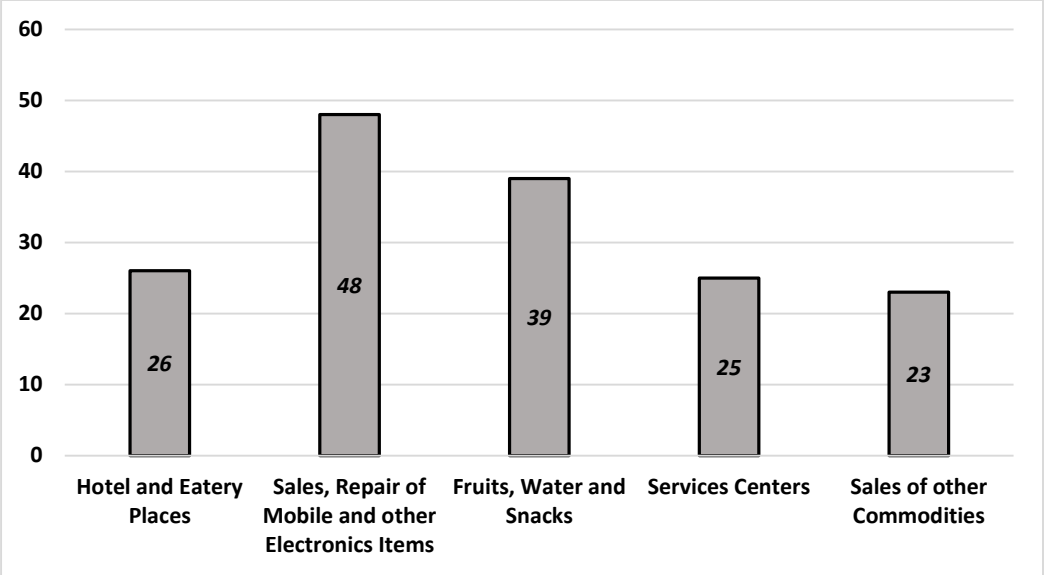
Source: Social Impact Assessment, December 2017

Livelihoods

This section presents a short profile of the livelihood activities of the different AP categories.

Business Operators

Both owner business operators as well as tenant business operators are engaged in a variety of businesses of different scale. As evident from the SIA, the main business catering to bus commuters in GSBS is mobile phones and related services, followed by fruits, water and snacks, service centres such as barber saloons, tailor shops, lottery sales and betting centres etc., sale of other products such as fancy goods, toys and handbags etc. and a range of tea houses and eating places. Details of individual businesses operated by 161 business operators in both ITB and IBZ appear in the inventory of losses (IOL) in Annex 03. Accordingly, 48 persons (29.8%) are engaged in selling and repairing of mobile phones and other electronic devices; 39 persons (24.2%) are engaged in selling fruits, water and snacks; 26 persons (16.1%) are running hotels, restaurants and eatery places; 25 persons (15.5%) are providing a variety of services such as communication centres, tailoring shops, salons; and 23 persons (14.2%) are selling a mix of various other commodities.



Classification of Business Operations in GSBS by Main Business

Table 18: Types of businesses engaged in by mobile vendors

Types of business	No. Mobile Vendors	%
Selling grocery items	2	1.3
Selling fruits	24	16.0
Selling books and newspapers	14	9.3
Selling soft drinks and water	25	16.7
Selling compact discs of music, songs and video films	1	7
Selling *Wade*	25	16.7
Selling betel	8	5.3
Selling lottery tickets	12	8.0
Selling children's toys and other fancy goods	14	9.3
Selling school bags	2	1.3
Selling cocktail mixtures	5	3.3
Selling leather goods like wallets and waist belts	1	.7
Selling mixed commodities	17	11.3
Total	150	100.0

Source: Social Impact Assessment, December 2017

Shop Assistants

Table 19: Types of jobs held by shop assistants

SN	Type of job	ITB		IBZ		Total	
		No. Employees	%	No. Employees	%	No. Employees	%
1	Shop Assistants	25	19	21	19	46	19
2	Barbers	2	2			2	1
3	Cashiers	17	13	14	12	31	13
4	Cleaners			3	3	3	1
5	Cooks	11	8	18	16	29	12
6	Drivers			1	1	1	0
7	Filling Station Attendants	7	5			7	3

8	Helpers	3	2	2	2	5	2
9	Managers	3	2	4	4	7	3
10	Salesmen	45	34	16	14	61	25
11	Short eats makers	1	1			1	0
12	Tailors	3	2			3	1
13	Tea makers	2	2	2	2	4	2
14	Technicians	3	2			3	1
15	Waiters	10	8	32	28	42	17
	Total	**132**		**113**		**245**	

Source: Social Impact Assessment, December 2017

Land ownership

The SIA sought to establish the categories of land owned by APs rather than the extent of land owned because of the complexity in land ownership in Kandy and surrounding areas associated with the presence of temple land, undivided property ownership and the inability of the survey team to check information about land ownership in home areas of APs.

Table 20: Land ownership of APs

AP Category	No. APs	Owning residential plot/home garden		Owning paddy land		Owning other land	
		No	%	No	%	No	%
Titleholder, Leaseholder and non-titleholder business operators	34	26	76.5	2	5.9	11	32.4
Tenant business operators	127	99	78.0	3	2.4	30	23.6
Rentiers of business premises	192	153	80.0	3	1.6	73	38.0
Mobile vendors	150	130	87.0	2	1.3	51	34.0
Shop assistants	245	200	81.6	4	1.6	66	26.9
Three-wheel operators	65	57	87.6	0	-	20	30.8
Titleholder landowners	2	2	100	0	-	2	100
Operators of public utilities	5	5	100	0	-	2	40.0
Total	**820**	**672**	**82.0**	**14**	**1.7**	**255**	**31.0**

Source: Social Impact Assessment, December 2017

Annex 20

	Public consulted	Consultation method	Date	Details/Issues raised
01	T M Rathnayake, Mahakanda (University Staff)	Informal discussions	22/01/2018	Improvement of transport system very essential to the Kandy city. Therefore the people need to tolerate some of inconvenience until it is completed.
02	Sumedha Bandara Occupation – Bus Conductor Address – A 265, Udaperadeniya			A modern bus operating system is a timely need and an important for Kandy City which is becoming a unpleasant place due to increasing traffic.
03	S. A. Senadeera Occupation- Bus Driver Address – 51/ 59 Bogambara Mawatha Kandy			There is no proper waste management system at the site, therefore people dispose waste into drains and around the bus park. Waste management facilities should be established within the bus park
04	J. Francis Occupation – Bus Conductor Address – 16/ 59 kudugala Road Wattagame			Due to the temporary bus park for both CTB and private buses, there may be heavy traffic in the Kandy-Peradeniya road. This may cause disturbances to the nearby school students and general public.
05	K.P.G. Karunaratne Occupation – Businessman Address – No 82, Pattiyalallawatta Ampitya			Bus parking should be facilitated for short distance buses, then the parking time can be managed and can accommodate more buses
06	Palitha Senaratna Occupation- Time Keeper of the Provincial Transport Authority Adress – 1/ 88 Bowela Kandy			Good Shed Bus Park should be modernised to accommodate an increased number of buses. According to the present situation the space is not enough for parking of more buses. During peak times high traffic congestion can be observed along Kandy-Peradeniya Road. Therefore, a proper traffic plan should be implemented during the operation.

07	R. L. Dolaphilla V 54, Lebarty House Pujapetiya (Businessman)			Doubtful if the change will increase the city traffic
08	U.G. Premaratna Occupation – CTB Bus driver Address – B 104 Owatta Higula			During peak hours heavy traffic jams can be observed. According to this situation establishment of the bus park will complicate the situation. Recommends improving the entering point from the Post office end
09	Mr. Parakrama Perera Occupation –Signal Engineer Sri Lanka Railway			As the place has very limited land area designing has to be done very carefully. As the existing roads are very busy, proper traffic management system should be implemented.
10	Shalika Ratnasooriya Mathalapetiya Matale (University Student)	Informal discussions	22/01/2018	Improvement of transport system very essential to the Kandy city. Therefore, the people need to tolerate the inconveniences during constructions until it is completed.
11	Chandana Karunaratna Occupation – Bus Conductor Address – 265, Balagolla Kengalla			Available sanitary facilities inside the premises are inadequate and incorporate adequate sanitary and resting facilities is a must to the proposed design
12	S. A. Senadeera Occupation- Bus Driver Address – 51/ 59 Bogambara Mawatha Kandy			There is no proper waste management system at the existing site, therefore people dispose waste into drains and around the bus park. Waste management facilities should be established within the proposed entity. Punishment for the improper waste disposal should be introduced.
13	J. Francis Occupation – Conductor Address – 16/ 59 kudugala Road Wattagame			The temporary parking of busses for both CTB and private services, may be resulted heavy traffic in the Kandy- Peradeniya road during construction period. This may be disturbances to the nearby school children and general public. Thus, proper traffic management system

				should be introduced during construction period.
14	K.P.G. Karunaratne Occupation – Business Men Address – No 82, Pattiyalallawatta Ampitya			Bus park should be facilitated for short distance buses, then the parking time can be managed and can accommodate more buses
15	Palitha Senaratna Occupation- Time Keeper of the Provincial Transport Authority Adress – 1/ 88 Bowela Kandy			Bus park should be accommodated for limited number of buses. According to the present situation the space is not enough for parking of more buses. During the peak times high traffic jam can be observed along Kandy-Peradeniya Road. Therefore, proper traffic plan should be implemented during the operation.
16	R. L. Dolaphilla V 54, Lebarty House Pujapetiya (Businuss men			There is an uncertainty, on proposed changes? Will it be increased the traffic congestion or not
17	U.G. Premaratna Occupation – CTB Bus driver Address – B 104 Owatta Higula			During the peak hours heavy traffic congestion can be observed. According to this situation establishment of the bus park will complicate the situation. His idea was entering point to the Kandy Peradeniya road from the Depot should be improved
18	Mrs. A.S.F. Ashana Occupation – Planning officer Address – Urban Development Authority Kandy			As the place has very limited land area designing has to be done very carefully. As the existing roads are very busy, proper traffic management system should be implemented.
19	Mr. Mohomad Zariaz, Occupation: Fruit Stall Owner, Address: 219, S.B.M Kandy		07/10/2019	Personally, happy with the development and No Objections for the compensation paid for the loss of business income. There will be enhancement of environmental conditions such as air quality, waste management and scenic beauty with the new development

20	Mr. E M Ravindra (PS25640), Occupation:Traffic Police Constable, Address: Kandy Police Station			This development directly enhances the environmental conditions and the intensity of dust & vehicular emissions will be reduced and the health impacts due to air pollution will be considerable specially for the community who has more day today activities in the city area. On the other hand, the load of pollutants entering to the canal system will also be reduced.
21	Mr. N M Sabeer Occupation – Fruit Stall Owner Address: 274/10, Good Shead, Kandy			Dust, Flood and vehicular emissions are main environmental hazards we faced currently and the proposed development should enhance the quality of the environment. If the new development assets not properly maintained we cannot achieve the objectives and again the same situation will remain. He had the concern over the operational management of the asset.
22	Mrs. A B Sumanawathie Occupation : Building Owner Address: 274/1, Siripura Building, Kandy			The current shelter is with inadequate protection to passengers from rain and flood situation due to blockage of drains with bad smell be barrier for their smooth movements. Frequency of accidents increasing with bad climate conditions as well as improper practices of vehicle driving. As the awareness given by the SCDP officials those impacts will be reduced with the proposed development and we as business owners very happy on it. If the project can allow access from the elevated skywalk to the upper floor of the building will be an advantage for their businesses.
23	Mr. K J S Karunaratne, Occupation : Tannet of the grocerry in Siripura Building Address:			We are happy with the compensation package for loss of business and willing to start new business when the commencement of KMTT constructions. The proposed development will be improved the

	274/4, Good Shead, Kandy			conditions in environment as well as facilities in the premises for passengers, business people as well tourists.
24	Mr. D M B G Yasaratne, Occupation: Manager Address: Perera Hotel, 274/6, Good Shead, Kandy			This will be a remarkable good project if the government will hire a good contractor who perform well according to national and international standards. The employees of the hotel compensated but finding a job for transitional stage will be another burden and there is no job security after completion of the project due to uncertainty of the owner's and thinking of continuation of business.
25	Ms. Malkanthi Madigasekara, Occupation: Government Teacher Address: Muthupanthiya, Bokkawela			Currently the bus timetable is not very much effective due to non-availability of buses as per the schedule. Thus, exposure to dust, vehicular emissions and nasty sound from horns and speakers is creating a significant impact on the community at present and a better environment is expected due to this project.
26	Ms. Chathurika Rathnayake Occupation: Govt. Teacher, Chandananda Buddhist Collage, Asgiriya			As per the awareness programmes conducted by the project a proper bus time table will be established along with the project implementation. It will be reduced the waiting time at the bus terminal resulting low exposure to the bad air, sound and vehicular emissions too. The project information cell established in front of the Kandy Railway Station is helpful to obtain information. Very happy to have this development at least by 2025
27	Mr. N A S Nadarajah Resident Address: 163, Peradeniya Road, Kandy			Currently having general nuisance such due to sound and emissions from vehicles. This house was built in 1970 and no any remarkable cracks on walls. Happy to have this development soon and willing to assist the project with bearing the

				temporary nuisance within the construction period.
28	Mr. Tissa Gunawardene Occupation: Technical Instructor Address: 23 A, Kossinna.			This good shed area is very fragile to environmental disasters. Thus, the large-scale constructions should be properly designed and need to hire a highly capable contractor for the project. If the construction activities are sub divided there should be proper coordination among all activities. Close and proper supervision should be implemented to avoid unexpected environmental impacts.
29	Mr. Sisira Kahagolla Occupation: A/L Student Address 12/3/45, Udaperadeniya Kandy			According to the awareness provided and the articles retrieved from newspapers and the information available in the websites this will be the new experience to the country. Thus, the weight of the construction is a multifaceted one and should be utilised fully proper methods for each and every activity without faults.
30	Mr. Chandana Gunaratne, Occupation: Time Keeper Address: 59/74, Bagamure, Kandy			No proper bus time schedule established due to political interferences. Thus, waiting time at the bus station is vary and due to this, various incidents are happening such as harassing, smuggling, pick pocketing, begging etc. Other than that, these improper schedules make unnecessary traffic congestions along Bandaranayake Mawatha up to Girls High School, Kandy
31	Mr. M A Udayakumara Occupation Three Wheel Driver Address: Suduhumpola, Kandy			It will be a disaster for us and loss our business during construction period. No proper registration system and therefore most of the three-wheel drivers not get equal chances and not compensated for the business losses. After construction also this will be a burden for us.
32	Ms. Suranga Madurajeewani			This is a modern establishment which is new to Sri Lanka and other infrastructure will also be improved

	Occupation: A/L Student Address 12/3, Udabowala Rd., Dangolla, Kandy			to reach the objectives of the total development. Otherwise this is also a disaster like most of the other foreign funded projects.
33	Mr. S M Akram. Occupation: Plumber 113/24, Deyyanewela, Kandy		08.10.2019	After this large-scale project there will be realistic enhancement of environment conditions such as air quality, green spaces, proper waste management & disposal system. Thus, happily accepted the project.
34	Mr. Srinath Wckramasinghe, Occupation: Owner, The Garage Cafe, 195, Peradeniya Road, Kandy			As an affected party who compensated properly by the project established this new business and very much happy if the implementation of the project will be began soon.
35	Mr. Thushara Bandara, Occupation:Deputy General Manager, Address: Telefix Technologies (Pvt) Ltd. 185, Peradeniya Road, Kandy			Since the entrance of the proposed skywalk is adjoining to Telefax premises the customer base will be increased due to the Project. The nuisance will be affected the day today activities but highly accepted project activities. It would be good if the project can adjust the design to give side entrance to the business premises including Tele-Pix.
36	Mr. K Selvaraj, Occupation: Business Owner Address: Asian Traders, 157/A, Peradeniya Rd., Kandy			Happy to see this development soon. It will give us an extra customer base and proper modern facilities to reduce the traffic congestion within the city limit and provide number of easy services. The most important things for successive project will be implementable design and capable contractor
37	Mr. Dulan Rajanayake Occupation: H R M student of NIBM			Sound, Dust, vehicular emissions, odder and frequent flood are the common environmental issues experienced in good shed area. If proposed project addresses those environmental issues with the new

	Address: 95/4B, Ullandupitiya, Werellagama			interventions and management method the future environmental condition will be better. On the other hand, the proposed terminal will be an iconic one to the country and will be very important one for tourism industry.
38	Mrs. S M Indra Kumarihami, Occupation: Passenger Address: 101/2, Madihe, Poojapitiya			Currently the passenger facilities of good shed bus stand are very poor in conditions. No seating facilities even for needy people. Waiting time always drag due to adhoc control system which finally comes as a burden to passengers. The people need improved terminal after construction of the proposed project
39	Mrs Chandra Kumarihami, Occupation: Passenger Address: 92/B, Girihagama, Kamburegama			Most of the passengers facing many troubles when they reach the good shed bus stand to catch the busses. No proper sanitation facilities, seating arrangements, disable accesses etc. The passengers hope for better facilities with the proposed development but we are having bit worry that, it might be having fees for every facility which is not affordable for all the people in the society.