Initial Environmental Examination (Draft)

June 2018

Sri Lanka: Science and Technology Human Resource Development Project —Proposed Faculty of Computing and Technology Building Complex, University of Kelaniya, Sri Lanka (Part III-ESMP)

Prepared by University of Kelaniya, Sri Lanka for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 31 May 2018)

Currency unit	–	Sri Lanka rupee/s (SLRe/SLRs)
SLRe1.00	=	$0.00633
$1.00	=	SLRs158.03

NOTE

In this report, "$" refers to US dollars unless otherwise stated.

INITIAL ENVIRONMENT EXAMINATION FOR UNIVERSITY OF KELANIYA FACULTY OF COMPUTING AND TECHNOLOGY

PART III: ESMP

ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN

Activity Title: Proposed Faculty of Computing and Technology Building Complex in Kelaniya
District: Colombo
Local Authority: - Kelaniya Pradeshiya Saba
Implementing Partner: Ministry of Higher Education /University of Kelaniya

Issue for concern	Environmental Impact	Mitigation measure(s)	Monitoring indicator(s)	Responsible party (ies) I-Implement M-Monitoring	Fund Sources for Implementing Mitigation Measure	Time Frame
PLANNING						
Clearance for the project	Unless Local Authority building approval is obtained for new building it may lead to environmental and social impacts. It will not be in compliance with national environmental and social regulations.	Obtain approval from Kelaniya Pradehsiya Saba and UDA before commencement of construction. Site is nearby wetland and should follow CEA SLLRDCC and Kelaniya Pradeshiya Saba guidelines.	Provisional approval obtained from relevant local authority and UDA	PIU(I) Site Engineer (M)	Project cost	Before construction

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	Lack of sufficient planning to assure long-term sustainability of the improvements and ensure protection of the FCT	Design has to include provisions for ensuring effective maintenance and protection of the FCT in the long-term. The long-term sustainability has been ensured by consideration of relevant authorities for Standards Codes for design (such as UDA), Seismic Zone V coefficient, appropriate wind load factor (corresponding to 22km/h wind speed), and detailed design after carrying geotechnical investigations and topographic survey. The initial designs of FCT academic building should consider that net allowable carrying capacity of 3.0MN/m^2. The carrying capacity in skin friction within the basement rock or the ultimate skin friction coefficient is 140 kN/m^2, which is less than ICTAD recommended guidelines and propose the design. Refer the geotechnical soil assessment recommendation.	Verification of the design parameters Geo technical and topography report in place	PIU (I)	Project cost	Before construction

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DESIGN						
Risk of temporary floods	Lack of drainage within the project site will submerge the land during heavy rains In the absence of a proper storm water drainage system, there will be a risk of water logged conditions around the site. Currently the canal that boarders the western part of the land with the 12m access road is poorly drained resulting in flooding and also stagnant water. The site is located close to main canal that discharges rain water from surrounding areas. This will increase the risk of flooding of the FTC and sewage system.	Consult SLLRDC Kelaniya Pradeshiya Saba and the resident population and develop road side drains. May require and construction of drains to manage the flood waters in the area. Develop a proper drainage mechanism for the project site after careful evaluation. Coordinate with the Kelaniya Pradeshiya Saba, Ministry of Megapolis and Western Development, SLLRDC and Department of Railway to remove pipe culverts that are said to be blocking the water flow in the canal systems around the project site and improve the water flow. a) Establish storm water management system for the site during detail design process b) Maintain design features such as drainage structures c) Select the foundation design that will least impact the surrounding community such as the cast in situ RC pile foundation	Flood situations properly managed and controlled Arrangement for proper diversion of storm water runoff in place	PIU (I) Site Engineer (M)	Incidental to the construction cost	During construction After mobilization of contractor at site and during establishment of construction n camp

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		d) Erosion control measures should be taken				
Integration of energy efficiency and energy conservation programs in design of project components. Noncompliance of green building guidelines	Unsustainable, energy inefficient, and un-economical unviable building that will negatively impact the environment In the absence of water conservation and energy efficiency of the building structure, it may lead to resource constrains and increase the running cost.	The detailed designs for the project should ensure environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, etc.: - Usage of recyclable materials like wood substitutes. - Installation of sustainable energy efficiency certified equipment - Usage of energy efficient lighting fixtures (LED) - Provision of photovoltaic cells on roofs for solar power - Rain water harvesting structures planned for ground water recharge and rain water collection.	Specifications for rain water harvesting structures, electrical fixtures, details of water heating system Observations Check whether energy efficient lighting systems are installed	PIU (I) Site engineer(M)	Project cost	During finalization of detailed designs of FCT buildings PMU
Damage to surround building during piling	Piling activities may cause soil movement underground and also vibrations which may cause cracks etc in surrounding houses and buildings.	-Will have to carry out baseline study of the existing condition of the surrounding buildings. -Provide a fund for compensation if it becomes necessary. - Conduct stakeholder meeting during piling activities.	-Building status assessment report. -Stakeholder meeting minutes	PIU (I) Site engineer (M)	Project	Immediately prior to piling activities. Stakeholder meeting during piling activities.
Solid and liquid waste	Lack of properly designed disposal mechanisms for	Design a waste water treatment plant.	Review waste disposal plan.	PIU (M)	Project cost	During finalization of

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	solid and liquid waste may lead to contamination of surface and ground water resources	Incorporate solid waste storage area in the plan.	Review of the waste water treatment plant	Design architect (I)		detailed designs of FCT buildings Before construction
Establishment of baseline environmental conditions prior to start of civil works	Non-availability of a method to audit the impact. Obtaining a suitable and representative baseline data set will be critical to the whole monitoring and audit process because it forms the standard against which environmental impacts are assessed. Impact of vibration noise, ground water pollution due to solid and waste water disposal etc.	Conduct documentation of areas for construction zone (camp, staging, storage stockpiling, etc.) and surroundings (within direct impact zones). Include photos and GPS coordinates Conduct base line monitoring in respect of ambient air quality, water quality, and noise levels as per monitoring plan. Thus, baseline monitoring for water quality, noise, vibration will be audited prior to the start of construction and in site supervision.	Records and photographs	PIU (M) Contractor (I)	Contactor	Once prior to construction and thereafter quarterly.
Utilities	Establishment of utilities for the FCT such as water, telecommunication and electricity will disrupt the services to the project	-The location of utilizes and operators of utilities to be impacted should be identified and documented in detailed project design documents to prevent unnecessary disruption of services during the construction phase.	List and maps showing establishment of utilities.	PIU will prepare preliminary list and maps of utilities.	Contactor	Preconstruction

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	associated establishments and communities.	-Contractor should prepare a contingency plan to include actions to be done in case of unintentional interruption of services. -Obtain from the PIU the list of affected utilities that need to be shifted.	Contingency plan for services disruption.	During detailed design phase, contractor to prepare list and operators of utilities and contingency plan		
Resources mobilization and allocation of space	Allocation of space for storage yard for construction material, labour camp, project office requires addition amount of space. Use of additional land for resource mobilization during construction may lead to conflicts.	Adequate provision should be made on site to mobilize the construction equipment. Selection of land for construction material storage should be done carefully avoiding conflict with Kelaniya Pradeshiya Saba approval. Selection of lands such purposes should be undertaken by the contractors carefully Sitting of the construction camp shall be as per the guidelines below and details of layout to be approved by PMU.	Check for approval letter on release of land for the purpose from respective authorities Observe the location of construction camp site, sanitary facilities etc	Contactor (I) PIU Project site Engineer (M)	Contactor	At the time of establishment of the construction camp and finalizing the storage areas.

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		Potential sites, within the FCT plot, for the labor camp will be lined up to be visited by the environmental expert of PMU. The one having least impacts on the environment will be approved by the PMU and Safeguards Cell. The intention of establishing construction camp within FCT plot is avoid impacts on surrounding land The storage location of construction materials shall be at the any building close to the FCT site. Construction camp sanitation facilities shall be adequately planned. Selection of local un-skilled and skilled workers for the proposed construction activities can reduce the requirement of land for labour camps. Use local materials as much as possible to reduce the need for storage space.				
Disaster management	Extreme climate events such as intense rainfall (flooding), cyclone etc. and fire may cause damages to lives and property.	Adoption of appropriate disaster risk reduction strategy, emergency preparedness and recovery, training/orientation program for lecturers and students and construction worker, etc. Identify an emergency evacuation point in the building.	Disaster Management Plan in place for the FCT. Scheduled operation and	PIU (M) Contactor (I) Maintenance engineer of the FCT at UOK	Project cost	Before construction

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		An emergency alarm system has to be in place in all the buildings. Schedule the maintenance and cleaning of the canal system associated with the project. Develop a flood risk management plan for FCT.	maintenance table for the canal system associated with project site in place Observation of adjacent canal.			
Safety of students and academic staff	Lack of safety measures within the design will lead to fire and increase occupational safety hazards	Plan for fire extinguishers fire alarms and a stair case for emergency evacuations. Fire safety management and mock drill	Review of design plans for fire safety	PIU (M) Site Engineer (I)		At design stage and during construction.
Occupational Health and Safety	Unless worker safety is complied with, it can lead to injury and other health risks.	Contactor to comply with ADB Environmental, Health, and Safety Guidelines, Labour Organization (ILO) convention No. 62, and Factory Ordinance to the extent that are applicable to his contract First aid treatment will be made available for all injuries likely to be sustained during work. Develop and implement comprehensive site-specific health and safety plan on Occupational Health and Safety A management strategy and applying practices to eliminate, or minimize, fatalities injuries, and illnesses for workers	Health and safety plan in place First aid available onsite (appropriately equipped). Observations on safety attire of workers. Regular jobsite safety inspections being conducted.	PIU (M) Contactor (I)	Contractor fee	Regularly during the construction phase.

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		performing activities and tasks associated with the project. Include in the health and safety plan measures such as (i) type of hazards in the construction of the FCT buildings, (ii) corresponding personal protective equipment for each identified hazard, (iii) health and safety training for the site personnel, (iv) procedures to be followed for all site activities, and (v) documentation of work-related accidents. Provide medical insurance coverage and indemnity for workers. (a) The contractor will conform to all anti dengue instructions given to him by the PHI and the PIU (b) Workers employed on mixing cement, lime mortars, concrete, etc., will be provided with protective footwear and protective goggles (c) Workers engaged in welding works will be provided with welder's protective eye shields (d) The use of any toxic chemical will be strictly in accordance with the manufacturer's instructions. The PIU will be given at least 6 working days'	Data on available personal protective equipment.			

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		notice of the proposed use of any chemical. A register of all toxic chemicals delivered to the site will be kept and maintained up to date by the contractor (e) Use of licensed and trained vehicle operators, workers should adopt necessary safety measures as stated in the contract including using of hard hats, boots, gloves and appropriate clothing. (f) Workers employed on mixing cement, lime mortars, concrete, etc., will be provided with protective footwear and protective goggles (g) Workers engaged in welding works will be provided with welder's protective eye shields (h) The use of any toxic chemical will be strictly (i) First aid provisions available on site and personnel trained on use. (j) Keep the workplace free from hazards. (k) Provide suitable communication and information on safety				

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		The construction site will be properly barricaded through Mild Steel sheets of adequate height to avoid noise impacts in the surroundings.				
Public consultations		Continue information dissemination, consultations, and involvement or participation of stakeholders during project implementation.	Disclosure records; consultations	PIU (M & I) TMS (I)	Project cost	During Preparation of IEE report. Prior to starting construction During construction

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CONSTRUCTION PHASE						
Site Clarence and cut and fill operations	Construction activities such as cut and fill operation etc. may lead soil erosion, sedimentation and siltation. Decrease of infiltration of rain water, acceleration of surface runoff, are the main impacts.	Only ground cover or shrubs and trees that directly affect the permanent works or necessary temporary works shall be removed with prior approval from the environmental expert of the PIU (a) Permanent and temporary work should be undertaken to control soil erosion, sedimentation and water pollution (b) Top soil generated from construction sites should be stored properly (c) Use of silt traps and erosion control measures close to water bodies is also necessary. (a) Construction activities including earth work and construction of cross drainages should be conducted during the dry season	Site observation and reporting	PMU(M) Contractor (I) Project site Engineer from the Building Department (I)	Project cost	Weekly during construction

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Land preparation	Activities such as site clearing, construction of culverts, removal of trees and green cover vegetation and etc., will potentially impact the ecological resources. Noise generated from construction vehicles, equipment, and vehicle traffic has the potential to	(a) Awareness programs should be organized for the workforce about the importance of flora, fauna and ecology of the wetland. (b) Contractor shall adhere to the guidelines and recommendation made by CEA and DS regarding removal of trees (c) Contractor should especially be aware not to introduce any alien species during construction related activities (d) Saplings for tree planting program	Site observation and reporting Check for the CEA, recommendation letters	PIU(M) Contractor (I) Project site Engineer (I)	Project cost	During construction
Soil erosion and water ponding on account of excavation	Incidence of vector born disease	Slope protection measures will be undertaken as per design to control soil erosion especially on side slopes of access and internal roads The excavation works will be avoided during monsoon months to avoid soil erosion, stagnation of water, and vector – borne diseases.	Location of slope protection Observations and water sample checks for mosquito larvae.	PIU (M) Contactor (I)	Contactor fee	During construction. Monthly PHI checks especially during rainy season.
Drinking water availability at construction camp and construction site	No availability of drinking water for labours will result in dehydration and health risk.	Sufficient supply of potable water to be provided and maintained at the site for the workers. The drinking water will be obtained from the market or any alternative source. The drinking water	Water supply source and availability of water identified.	PIU (I) Contractor (M)	Contractor Fee	Regularly during construction phase

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	Lack of usable Ground water may lead to water constraints at the construction site. Water quality shows that it is acidic with a pH value of 6.66 (refer geotechnical repot).	will be stored in a suitable size storage tank to ensure uninterrupted availability. In the event Pipe borne water supply which is to be obtained before construction is not sufficient for construction purpose then water bowsers will have to be brought in and storage tanks set up.. An adequate water tank should be setup before the commencement of activities, for drinking and if needed for construction. Contractor will submit his plan on ensuring water availability at the site for drinking sanitation and construction. The original source of the water supplied by the tankers will be recorded.	Water availability plan.			
Arrangement for construction water in the event water requirement is large for construction	Delayed and interruption water supply leads to economic cost	The contractor shall provide a list of locations and type of sources from where water for construction shall be acquired. To avoid disruption or disturbance to other water users, the contractor shall arrange water from the market through authorized	Source of water used by the tanker	PIU (M) Contactor (I)	Contractor fee	Regularly during the construction phase

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and cannot be supported by the pipe water supply.		tanker suppliers or from the local municipality and consult PIU before finalizing the source.				
Use and transport of natural resources	Impact on the natural ecosystem by means of exploitation. Extraction, transportation and storage of construction materials may give negative impact such as noise, air, water, soil pollution, reduction of scenic beauty	a) Extraction of construction materials should be undertaken only from mines and quarries approved by GS&MB b) Environmental requirements and guidelines issued by the CEA, and LAs should be followed with respect of locating material extraction sites c) Transport, loading and unloading of construction materials should not cause nuisance, noise, vibration and dust d) Sand, rubble, metal bitumen and cement should be covered to ensure protection from dust to avoid emissions.	Availability of permits at the raw material extraction sites Observation and reporting	PIU (M) Contactor (I)	Contactor	During construction period
Transport of construction material	Transportation of construction materials on road network can cause damages to the access roads.	(a) The Contractor should obtain permits from LAs to use local roads prior to transportation of construction materials, machineries etc.	a) Check for contractors permits from LAs to use local roads	PIU (M) Contactor (I)	Contractor fee	During construction

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		(b) Construction materials shall not exceed the carrying capacity of the local road network. (c) If it is likely to cause damage to public roads, provision should be made for their repair as part of the contract.	b) Check and observe whether construction materials are carried beyond the carrying capacity			
	Transportation of construction material may block the access roads. Loading and unloading shuttering and metal poles and handling of heavy objects may increase the risk and injury to workers.	(a) Construction materials and machinery should not be placed in a manner that blocks any roads, paths or local accesses; (b) Accidents while transporting of materials should be avoided by transporting material in fully covered method. (a) Loading and unloading of material should be done according to proper safety guidelines.	Observation and field check	PIU (M) Contractor (I)	Contractor fee	Weekly and whenever construction material is being brought to the site.
On Site housekeeping	Lack of solid waste and sanitation management on site can lead to lack of general cleanliness and impact on ecology, public health and scenic beauty.	(a) Pre-identified waste disposal site by the contractor should exclude areas which are close to public and sensitive environment. This is part of the comprehensive waste disposal plan. (b) A solid waste management plan will be prepared by the contractor in	• Waste disposal sites, waste management plan in place • Contractor has an agreement for disposal of waste with the	PIU (M) PHI (M) Contactor (I)	Contactor fee	Regularly during the construction phase (Weekly)

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		consultation with local civic authorities (c) Make arrangements with the local authority on disposal of solid waste generated during construction a) Proper solid waste disposal, sanitation and sewerage facilities (drinking water, urinals, toilets and wash rooms in working condition should be provided to the site of labour camps b) The environmental specialist of PIU shall approve these disposal sites after conducting a joint inspection on the site with the contractor c) Contractor shall ensure that waste shall not be disposed of near storm water natural drain in the surrounding of the site and along the access path d) Practice cleanliness and good housekeeping practices on site. There should be a demarcated waste storage area on site. Provision of proper drainage facilities to minimize water stagnation around worker-based camps e) Under no circumstances should the solid waste be burned on site.	Kelaniya Pradeshiya Saba in place. • Observation on cleanliness at the construction site. • Solid waste storage area demarcated and in operation • All construction solid waste removed at end of construction			

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		Additionally, under no circumstances will any construction waste will be disposed of around the project site Garbage bins should be provided to all workers-based camps, and construction sites f) Contractor shall ensure that waste shall not be disposed of near storm water natural drain in the surrounding of the site and along the access path				
Stockpiling of construction materials	Pollution of water ways	-Stockpiling of construction materials will be done in such a way that it does not impact and obstruct the drainage. -Stockpiles will be covered to protect from duct and erosion	Observe the stockpile site .	PIU (I) Contractor (M)	Contactor fee	Weekly
Air pollution	Impact from dust generation leads to Poor air quality release of Volatile Organic Compound (VOC) from storage sites and transfer of vehicle/equipment fuels, emission of small amounts of Carbon monoxide, Nitrogen dioxide and particulates from construction activities and	(a) Wet down and spray water at construction site, quarries if required. Dust emissions during (b) transportation of construction materials should be controlled by enforcing speed limits on the vehicles close to site (c) Take steps to avoid dust emissions during loading and unloading of construction material. Tarpaulin covering is mandatory on	Observations – controlled dust emissions. Air quality monitoring results and the water spray records available	PIU(M) Contractor (I)	Contactor	Regularly during the construction phase

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	vehicles may compromise health of the workers and surrounding community.	trucks/lorries which are used for transporting materials. (d) All filling works are to be protected or covered in a manner to minimize dust generation (e) The air quality monitoring will be conducted as per the plan (f) All vehicles, equipment, and machinery used for construction shall conform to the Sri Lankan government vehicle emission test. For equipment emission norms as specified in air emission gazette under NEA (g) The Contractor shall maintain a record of pollution under control for all vehicles and machinery used during the contract period, which shall be produced for verification whenever required	Dust screens in place. Construction material stored properly. Record of vehicle emission tests according to the standards issues under CEA			

Noise pollution	Construction noise can disturb surroundings	(a) All machinery, equipment and vehicles should be maintained in a good condition by engaging skilled mechanics and regularly maintained. National Emission Standards (1994). Noise control regulations stipulated by the CEA in 1996 (Gazette Extra Ordinance, no 924/12) should strictly be implemented for crushers, construction vehicles and equipment. (b) Contractor must ensure that all vehicles and equipment used in construction shall be fitted with exhaust silencers. (c) Construction work should be limited to daytime. (d) At the construction sites, noisy construction work such as crushing, operation of diesel generator sets, use of high noise generation equipment shall be stopped during the night time between 10:00 p.m. to 6:00 a.m. (e) Adhere to noise levels stipulated under NEA. Construction noise level should be maintained at 75 dB(A) during day time (6:00 a.m. to 9:00 p.m.). (f) Noise level monitoring will be carried out as per monitoring plan.	Observation	PIU(M) Contractor (I)		Weekly by Engineer

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Onsite emergency plan for minor accidents and mishaps	Absence of plan will lead to death to the worker and economic cost to the project	Onsite emergency management plan will be prepared by the contactor with the consultation of the PIU.	Onsite emergency plan for minor accidents and mishaps in place	PIU (M) Contactor (I)	Contractor fee	Mock drills to be carried out on a quarterly basis.
Disaster Management Plan for flooding	Life and property damage. Economic cost for the project	For natural calamities, disaster management plan prepared by the PIU under the provisions of Disaster Management Act. Refer disaster management under "planning	Onsite disaster management plan documented and available with the PIU	PIU (M) Contactor (I)	Contractor fee	Mock drills every quarter
Clearing of construction of camp and restoration	It will not be visually pleasing and would lead to health risk	Contractor to prepare site restoration plans for approval by the engineer (PIU). The plan is to be implemented by the contractor prior to demobilization. On completion of the works, all temporary structures will be cleared away, all rubbish removed, excreta or other disposal pits or trenches filled in and	Restoration plan and records of preconstruction of temporary sites	PIU (M) Contactor (I)	Contractor fee	End of construction phase

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		effectively sealed off, and the site left clean and tidy, at the contractor's expense, to the entire satisfaction of PIU.				
Landscaping	In the absence of proper landscape will not be aesthetically pleasing. Landscaping should blend in with the wetland ecosystem. Recommendations of the Rapid Bio Diversity Assessment should be considered.	(a) Project landscape activities have to be done as per either detailed design or typical design guidelines. The landscaping works will be taken up in XXXXm^2 area ear marked in the drawing. (b) Plant floral species that are recommended in the IEE	Site observation and reporting. Note trees and shrubs planted by the project	PIU(M) Contractor (I)	Contractor fee	Towards end of construction
OPERATIONAL PHASE						
Environmental conditions and parameters	Unless regular monitoring is conducted, it may lead to environmental pollution issues during the operation of the Campus.	Periodic monitoring of the ambient air quality, noise level, surface water quality, soil quality in the subproject area as suggested in the monitoring ng plan through an approved monitoring authority.	Monitoring results and relevant standards	CEA/ Kelaniya Pradeshiya saba(M) FCT of UOK Selected authority for monitoring (I)	UOK	As per the monitoring plan

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Drainage Congestions	Stagnation or blocking the water flows may occur due to sediments, improper disposal of debris during maintenance activities or ignorance. This will provide suitable habitats for vectors like mosquitoes etc In the absence of a proper storm water drainage system there will be a risk of water logged conditions around the site.	(a) University needs to undertake regular maintenance of the drainage system to avoid drainage congestions that may cause local flooding	Site observation of congested drains and reporting	Kelaniya Pradeshiya saba PHI (M) Maintenance engineer at UOK (I)		Once in 4 months

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Solid waste management	Irregular collection of solid waste will increasing the , risk of solid waste piling up on FCT premises and would be unhygienic condition for the student population. It can also lead to an increase in vector population and increase health risks.	(a) Management plan. Ensure demarcated solid waste storage area with source separation for organic waste and other domestic non-organic waste. (b) Encourage composting programs (c) Place color coded bins at necessary places to dispose waste.	Design plan waste stage area designated Cleanliness and good housekeeping practices observed. Waste management plan in place. Review solid waste management plan.	Kelaniya Pradeshiya saba PHI(M) Maintenance engineer at UOK (I)	UOK	Once in 3 months
Domestic liquid waste disposal	Poor maintenance of sanitary facilities and improper disposal of domestic waste water will result in environmental pollution.	a) Properly designed waste water treatment plant is in place b) Ensure that the domestic waste water is directed to waste water treatment plant in conformity with the CEA, Local Authority guidelines and should not be discharged to the environment prior to the treatment. c) In instance of overflow, leaks, immediate repairs should be carried. Establish and collaborate with the	Check the design plans for cesspits and soakage pits. Review wastewater treatment plant maintenance. Carry out water quality tests of the treatment plant effluent.	Kelaniya Pradeshiya saba PHI(M) Maintenance engineer at UOK (I)	FCT at UOK operation cost	At the design phase and thereafter once in 6 months or when need arises.

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		Local Authority under such circumstances.				
Sanitary facilities	Discharge of untreated or insufficiently treated sewage, and lack of maintenance of sanitary facilities may lead to: • Contamination of drinking water (ground and surface) • Spreading of diseases among the student population and surrounding community	(a) Ensure proper maintenance of the sanitary facilities (flushable and clean) (b) Train maintenance and operation staff to monitor and repair leaks from cracked containment structures, broken pipes, faulty valves and similar structures. (c) Septic tanks will be regularly emptied and maintained (d) Provide a suitable sump/ overhead tank, taking into account the daily requirement of water to ensure uninterrupted water supply for the sanitary faculties. (e) Maintain a required ratio of male/female toilets with in the faculty.	Observation on cleanliness and maintenance of sanitary facilities. Maintenance schedule in place No leaks observed. Water supply is available in the toilets. The disposed waste water will conform to the waste water discharge standard stipulated under the NEA		FCT at UOK operation cost	Bi-annually

Health and Safety of students:	In practical sessions on laboratories students may be faced with accidents. Risk of accidental deaths due to negligence	Train the students on occupational risk involved in handling the equipment. Train the students and teachers on managing risk and emergencies. - Provision of first aid kit and train the teachers on it - Emergency switches should be properly covered. - Fire extinguishers must be placed adequately and they should be working at all times. - Proper segregation, collection and disposal of domestic solid wastes - Ensure the road safety of the trainees on the A1 road Place a traffic light for the already existing pedestrian crossing on the Kandy Colombo highway for students to cross the road	Observations and safety reports Traffic lights in place	RDA for traffic light installation the(I) FCT at UOK on the traffic light installation (M)	FCT at UOK operation cost or RDA cost for placement of traffic lights	Annually

Issue for concern	Environmental Impact	Mitigation measure(s)	Monitoring indicator(s)	Responsible party (ies) I-Implement M-Monitoring	Fund Sources for Implementing Mitigation Measure	Time Frame
Waste generated on account of operation and maintenance		(a) The solar thermal panels and water will be operated by the supplier. Any waste that is generated will be taken by the supplier for possible reuse and recycle. For this necessary agreement will be made with the supply at the time of the agreement is drawn	Waste generation of operation and maintenance of solar PV cells and panels	Kelaniya Pradeshiya Saba (M) UOK and the suppliers of the renewable energy systems (I)	FCT at UOK operation cost	During the entire operational phase
Onsite emergency plan for minor accidents mishaps and disaster management plan. For natural disaster such as flooding		(a) The dean of the FCT of UOK should prepare an onsite emergency plan for possible minor accidents. During the operation phase. For natural disaster the disaster management plan prepared by UOK will be followed	On site emergency plan and disaster management plan documented and in place	Dean of the FCT of UOK (I) Disaster management center or the Pradeshiya Saba Kelaniya (M)	FCT at UOK operation cost	Mock drills carried out every quarter. During the entire operational phase

Issue for concern	Environmental Impact	Mitigation measure(s)	Monitoring indicator(s)	Responsible party (ies) I-Implement M-Monitoring	Fund Sources for Implementing Mitigation Measure	Time Frame
Maintenance of plantation and landscaped area in the FCT project site	In the absence of maintained landscape FCT grounds will not be pleasing to the eye	(a) The faculty head with the appropriate support staff allocated for the purpose will be responsible for the maintenance of shrubs, tree and land scape of the area. Minimum of 90% survival of plans will be maintained. Any short fall of tis amount will be replaced during the monsoonal period	Survival of plans, trees and shrubs in the landscape area	PIU or UGC (M) Faculty head and associated staff (I)	FCT at UOK operational cost	Every year before the onset of the monsoon period
Adopt food safety guidelines	If student don't maintain personal hygiene, it could be issue for the students and lecturers	(a) Include the under mentioned conditions in the contractual arrangement with the canteen operator (b) Health checks of the canteen should be done annually (c) Prepare set of rules on personal hygiene	PHI Reports, observations.	Faculty head and the supporting staff at the university (I)	Canteen operator cost	Bi-annual spot checks

Issue for concern	Environmental Impact	Mitigation measure(s)	Monitoring indicator(s)	Responsible party (ies) I-Implement M-Monitoring	Fund Sources for Implementing Mitigation Measure	Time Frame
		(d) Adopt food safety regulation imposed by the Ministry of health. Encourage the following among the student (e) Encourage regular hand washing during working hours (f) Strike rules for canteen operators Scalp hair should be fully covered		Praeshiya saba Kelaniya PHI (M)		

P.S. Note: PIU: project implementation unit, PHI: public health inspector allocated to the area from the pradeshiya saba kelaniya, UOK, university of Kelaniya, NEA; National Environmental Act