SFG2695

KINGDOM OF CAMBODIA
Nation Religion King

SECONDARY EDUCATION IMPROVEMENT PROJECT (SEIP) IN CAMBODIA

Project Number: P157858
November 2016

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Prepared for:

THE WORLD BANK GROUP
1818 H STREET NW
WASHINGTON, DC, USA 20433

Prepared by:

PROJECT MANAGEMENT COMMITTEE
MINISTRY OF EDUCATION, YOUTH AND SPORTS, CAMBODIA

Table of Contents

Abbreviations

ACM	:	Asbestos Containing Materials
DoE	:	District Office of Education
CSEIP	:	Cambodia Secondary Education Improvement Project
ECOPs	:	Environmental Codes of Practices
EMP	:	Environmental Management Plan
EPA	:	Environmental Protection Agency
ER	:	Environmental Review
ILO	:	International Labor Organization
MAFF	:	Ministry of Agriculture, Fishery and Forest
MCFA	:	Ministry of Culture and Fine Arts
MoE	:	Ministry of Environment
MoEYS	:	Ministry of Education, Youth and Sport
NGO	:	Non-Governmental Organization
PoE	:	Provincial Office of Education
PPE	:	Personal Protective Equipment
RGC	:	Royal Government of Cambodia
WB	:	World Bank

ENVIRONMENTAL MANAGEMENT PLAN (EMP)
CAMBODIA SECONDARY EDUCATION IMPROVEMENT PROJECT (SEIP)

1. Project Background

The International Development Association (IDA) is going to finance Secondary Education Improvement Project in Cambodia. The project is to expand lower secondary education in target area to be determined by the Ministry of Education, Youth and Sport of Royal Government of Cambodia.

The project activities involve expansion of secondary schools and construction of teacher and student accommodation in remote and rural areas.

The project will have two components. Sub-components 1.1 and 1.2 will use results-based financing to support the achievement of MoEYS secondary school standards through three interlinked dimensions: (i) strengthening school-based management and (ii) upgrading teachers. For each sub-component, there will be one or two Disbursement-Linked Indicators (DLI) with time-bond targets. These three components will make up the package (or packages) that will be sent to MEF for special arrangement approval. Investment Project Financing will be used for Sub-component 1.3, improving school facilities and Component 2: (i) project management and monitoring and evaluation (M&E) and (ii) Program for International Student Assessment (PISA) for Development.

1. **Component 1: Improving Lower Secondary Education to Meet Standards (US$32.6 million equivalent).** This component aims to support the goals of the ESP and the TPAP through the establishment of 100 effective lower secondary schools (i.e., schools that meet LSSES) that can provide lessons to MoEYS as it increases expenditures in the sub-sector. This component targets approximately 8 percent of total lower secondary schools nationwide. This component will be implemented using a holistic approach, targeting national, sub-national and school levels. This will be achieved through three sub-components: (i) strengthening school based management through the provision of the School Improvement Fund (SIF) at the POE, DOE and school levels; (ii) upgrading qualification of lower secondary school teachers (especially in math, physics, biology, chemistry, Khmer, and History subjects)[1] and school directors to bachelor's degrees; and (iii) improving school facilities through construction and rehabilitation of 100 existing schools and construction of 30 new schools to provide enabling conditions for effective teaching and learning. The selection of the 100 existing schools and 30 new schools were: (a) need-based and drawn upon an extensive school mapping exercise; (b) based on schools that exhibit a strong community commitment to the project concept and willingness to meet the project's preconditions for selection; and (c) located in rural and remote areas. Component 1.1 targets only 100 existing schools and Component 1.3 targets both 100 existing schools and 30 new schools, while Component 1.2 targets teachers nation-wide with preference given to teachers and school directors/deputy directors from the 130 target schools. Each of these overlapping subcomponents are detailed below.

[1] The teacher upgrading in math and science connects to the *Cambodia Industrial Development Policy, 2015-2025*, specifically as it relates to the areas of STEM.

Sub-component 1.1: Strengthening School-Based Management (approximately US$14.7 million equivalent through DLI approach). This subcomponent aims to support capacity development of POEs, DOEs and the 100 targeted Lower Secondary Schools to strengthen service delivery in efforts to: (i) strengthen school management through school development planning, monitoring/assessment of teachers and student performance, and community participation; and (ii) support teachers in improving teaching and classroom management practices, including lessons plan, workbooks, test items, and student assessment/feedback. To achieve the goals of this sub-component, the project will finance (1) SIFs[2] at the POE, DOE and School-levels as well as (2) activities that capacity build staff members at each of these levels.

Sub-component 1.2: Upgrading Teachers (US$7.3 million equivalent through DLI approach). Working through the national structure of TPAP, this subcomponent aims to upgrade the qualifications of 2,000 teachers and 310 school directors and deputy directors to bachelor's degrees. The first cohort to be upgraded will be the teachers and directors from the 100 target schools (see sub-component 1.3). The remaining teachers will be upgraded based on national needs identified by TPAP, thus creating a spillover effect. The proposed sub-component activities will focus on demand side scholarships, coving tuition costs and stipends (i.e., transportation and accommodation costs).

Sub-component 1.3: Improving School Facilities (approximately US$10.6 million through IPF traditional approach). To complement the two above sub-components, this sub-component will support the physical improvement of 130 target Lower Secondary schools to expand access. This will include: (i) construction and rehabilitation of 100 existing schools[3] and (ii) construction of 30 new schools in the communes lacking a lower secondary school. The schools will cover all 25 provinces in 78 districts. The construction plan of the 130 selected schools will include teacher accommodations where needed and will be carried out through community participation construction method. The selection of the schools will be need-based and draw upon the school mapping exercise undertaken by MoEYS.

The project will also support to strengthen the Ministry's Education Management Information System (EMIS) so that achievement of the project development objective and results indicators will be properly assessed.

2. Objective of the Partial Environmental Assessment (EA)

The implementation of the project will involve construction of secondary schools, extension of classrooms and facilities for students and teachers. Some concerns need to take into account for these activities such as site safety (especially among pupils during class hours), dust, noise, construction waste management and disposal, climate change and disaster risk, etc. Even though the impact is minor, site specific, and reversible in nature but mitigation measures have to be designed.

Thus the main objectives of the environmental assessment for the project are to:

- Assess the potential environmental adverse impacts/issues related to school construction activities

[2] The operational guidelines will describe: (i) the process of school self-assessment, planning and budgeting, monitoring and review; (ii) procurement of goods, services; and works; (iii) financial management; (iv) transparency and public reporting; (v) and teacher allowance procedures.

[3] The selection of the 100 existing schools will be based on: (i) schools that exhibit a strong commitment to the project concept and are willing to meet the project preconditions for selection; and (ii) schools with high drop-out rates, low enrollment rates and high student/teacher ratios. The selection of the 100 existing schools excludes the more affluent and/or well-endowed schools (e.g. schools with sufficient teachers, flagship schools in the provincial center, etc.) or schools that receive supports from other donor programs.

- Update an Environmental and Social Management Framework for subprojects (as site specific locations are not yet known)
- Update an Environmental Management Plan for subprojects which will be include in the general conditions of contract (bidding documents)

3. Environmental Assessment Overview

Considering the nature of the proposed construction of 100 Lower Secondary schools and construction of teacher training facilities, a formal environmental assessment report was not considered necessary because the impacts are deemed to be site specific, minor and reversible. The project is classified as environment category B[4] since the impacts are known and likely to be minimal. MoEYS has experience in implementing the safeguard tools in the previous education related projects such as FTI and ESSSUAP.

The civil works for the school constructions will be designed to be aligned with the MoEYS's developed-Education Facilities Plan/engineering specifications. The activities consist of the construction of 100 Lower Secondary school buildings, upgrading of teacher facilities and construction of teacher/student facilities for lower secondary school. This school construction and facilities should have open space for students, protection wall or fence from falling into lake waters and will include appropriate ventilation, lighting, waste separation bins (especially encouraging in teacher/student facility) and environmental friendly sanitation facilities.

The potential risks from or to project activities which could directly or indirectly affect the environment, the health and the safety of the communities are the following:

- **Project pre-construction stage**: from the assessment the land for school construction and teacher/student facilities, the construction activities will not involve land acquisition and/or destruction of cultural heritages or to be built on area with presence of UXOs. As for a precaution measure, a screening checklist is provided and attached in the Appendix 1 . From discussion with school principle, teachers and school construction committee, an understanding of EMP remains to be improved among site engineers (and workers) and school committee/teachers.. As a measure, a brief explanation session (pre-construction stage) will have to be provided by MoYES to relevant stakeholders.

- **During construction**: Some general concerns are related to safety of workers, teachers and students and the management of construction waste in worker camp area. In the EMP, these issues are discussed and measures are taken into account: safety, air quality and dust, noise, solid waste, improper disposal of toxic and hazardous waste.

- **During operation**: Solid waste still remain concern in both urban and rural areas. An understanding of solid waste management practices will be delivered to school children especially on waste packing and discharging. In addition malfunction of sanitation facilities is still concern for lower secondary school student. Most of schools in rural area have enough sanitation facility but no water to flush and to clean. However, in urban areas, where there are high enrollment, have no enough toilet.

[4] Category B: A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases migratory measures can be designed more readily than for Category A projects (WB OP 4.01). The scope of EA (Environmental Assessment) for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance

The risks and corresponding mitigation measures are described in further detail in chapters 6 and 7 of this document.

The lessons learned from development and operation of existing visited schools funded and implemented by other agencies echo the risks anticipated during operation:

1. General lack of environmental knowledge and absence of training on quality supervision and environmental and social safeguards to construction support committee;
2. Solid waste management in school;
3. Lack of sanitary facility in school building (for urban area);
4. No water to flush toilet (mostly in rural area).

Mitigation measures to the above environmental problems have to be addressed and minimized or prevented from happening. The EMP offers preventive and mitigation measures incorporated into standard practices and the contracts for civil works.

Contractor specifications to address environmental issues relevant for the project, including construction dust and noise control, waste management, site management, safety controls, provision of clean water and sanitation facilities, and asbestos containing material have been adequately addressed and described in the EMP Matrix.

Appropriate supervision provisions throughout the construction cycle will be built into the contract documents to include engineers and consultants as well as the involvement of stakeholders at school level. Some training programs for school personnel, students and communities will be conducted throughout the life of the proposed Project to foster sanitary awareness, promote environmentally friendly schools, maintain the newly installed sanitation facilities, prevent the spread of diseases and reduce maintenance costs.

4. Public Consultation / Community Participation process

Nine schools in four provinces are visited to refine the project understanding of specific social and environmental issues in the circumstances of each individual location. Below is the name of visited school and provinces.

Name of Visited School

No.	Province	Commune/District	Name of School
1	Kampong Speu	Char Morn	Kampong Speu High School
		Oral	Chha'in Lower High School
		Tuol Sala	Ang Say Lower High School
2	Banteay Meanchey	Serey Sophoan	O Ambel High School
		Preah Neth Preah	Preah Neth Preah Lower High School
3	Ratanakiri	Bor Keo	Bor Keo Lower High School
		Kon Mom	Trapeang Chres Lower High School
4	Kampot	Krong Kampot	Preah Reach Samphear High School
		Angkor Chey	Hun Sen Angkor Chey Lower High School

The assessment will provide an understanding of actual and perceived risks by all stakeholders in regards to social and environmental impacts, including local awareness of issues involved and what should be the responsibilities with regards to implementation of environmental mitigation

measures. MoYES will involves in all stages of the project from design stage, planning and implementation, and evaluation.

5. Environmental Management Plan – Bid Specifications

Contractor bid technical specifications for school buildings and teacher/student facilities will include environmental provisions for construction techniques, noise and dust, site and waste management, asbestos containing material management, cultural and historic resources such as nearby pagodas, and provision of clean water and sanitation facilities.

5.1 Display of Good Construction Management Practices at the Construction Site

The Contractor shall put the notice of the EMP (includes in the bidding document) at the construction site and it should be visible by all visitors as well as teachers and school construction support committee. The School Construction Committee, MoYES staff and all other entities involved in the construction monitoring should be briefed by the MoYES Department of Monitoring and Evaluation on safety rules, EMP implementation and regulations at the Construction Site.

"Safety First" is very common in all construction sites. The construction site shall be protected by safety fence to discourage people around the work area. Children, teachers and visitors are not allowed to enter the site during construction if permit is not granted.

5.2 Environmental Code of Practices

The Environmental Code of Practices (ECOPs) is updated for this project. It is trusted to be simpler and practical for safeguarding the construction of facilities (see Appendix 2). The Contractor shall be aware of the ECOPs and implement it as part of their professional practice. While school committee, site engineers, and other relevant stakeholders will need to check construction site before starting civil works and appropriately advise the contractor if there is any wrong doing (please see checklist on construction site in Appendix 1). It is the contractor's responsibility to implement ECOPs and this EMP provisions.

5.3 Environmental Management during Construction - environmental impacts and mitigation measures

Dust: The schools and facilities construction may take place near village or in town. The windows of residences as well as classrooms (in existing school) are typically open during clement weather. The open windows would make student/residents liable to airborne dust exposure from construction activities. Exposure to airborne dust has the potential to exacerbate and/or cause several health conditions, including asthma.

Should activities begin to generate visible airborne dust, the contractor(s) will cease the activity(s) which generate the dust: (i) until the dust is controlled with means such as water spray or (ii) another technique which prevent generation of airborne dust.

Noise is another concern near residential areas, health centers and in urban settings. The contractor shall limit: (i) hours of work when noise generation activity could take place to regular daytime hours, and (ii) sound levels during work to 60 dBA[5].

[5] Maximum permitted noise level in public and residential area, Sub-decree on Air Pollution and Noise Disturbance Control, July 2000.

Waste Generation during Construction: Construction activities will generate domestic waste. The Contractor, in this case, shall manage to install waste bins at the construction site to keep the site clean at all times. All wastes from the site including plastic and construction materials (plastic, wood and concrete) shall be properly handled and dumped in a license area nearby the site as permitted by the local authority.

5.4 Practices for Asbestos Cement Roofing Material

Asbestos is the name given to a group of minerals that occur naturally in the environment as bundles of fibers that can be separated into thin, durable threads. These fibers are resistant to heat, fire, and chemicals and do not conduct electricity. For these reasons, asbestos has been used widely in many industries.

Asbestos has been widely used worldwide as a construction material and insulator because of its strength, durability and heat resistance characteristics. The United Nations trade statistics have revealed that the import of asbestos cement for use in Cambodia's construction industry nearly tripled in recent years from 1.3 million in 2009 to 4 million in 2013[6]. In recent years, evidence on the adverse health effects of exposure to asbestos has been mounting globally leading to urgent calls to cease production of the most-harmful asbestos types, limit the use of less-harmful asbestos (e.g. discontinued spraying of asbestos), and to impose strict exposure standards for workers handing raw asbestos and asbestos- containing products. Occupational exposure to asbestos by inhalation can cause asbestosis (scarring of the lung tissue), lung cancer, and mesothelioma (cancer of the lung's lining). In Cambodia, however, many construction companies and workers are unaware of the toxic substance and its potential health hazards. In addition, it is likely that no government data exists on asbestos-related diseases.

Fiber cement roofing material is still present in some of the older school buildings in rural areas in Cambodia. And the new school visited use "cement roof tile" which is made from imported Portland asbestos cement imported. This roofing material typically contains asbestos fibers as reinforcement. By its nature, the present project is unlikely to directly involve any demolition or rehabilitation and will hardly avoid asbestos for new construction. The recommendations below, as well as the *Good Practice Note: Asbestos by the World Bank Group May 2009* will be imposed on and closely followed by the contractors in the cases where asbestos may be encountered in the project.

5.5 Water Quality

All existing stream courses and drains within, and adjacent to, the site will be kept safe and free from any debris and any excavated materials arising from the construction project. Chemicals, sanitary wastewater, spoil, waste oil and concrete agitator washings will not be deposited in the lake.

In the event of any spoil or debris from construction works being deposited on land or any silt washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land and areas restored to their natural state by the Contractor to the satisfaction of the Supervising Engineer.

5.6 Protection of Historic and Cultural Resources- on land site

To avoid potential adverse in the case of impacts to historical, cultural resources and mortuary site, the Contractor shall:

[6] Ministry of Labour Workshop: Construction Sector Unaware of Asbestos Risks, Phnom Penh Post, Wed 26 August 2015

Protect sites of known antiquities, historic and cultural resources by the placement of suitable fencing and barriers.

Adhere to accepted international practice and all applicable historic and cultural preservation requirements of the RGC (Royal Government of Cambodia).

In the event of unanticipated discoveries of cultural or historic artifacts (movable or immovable), or human remains in the course of the work, the Contractor shall take all necessary measures to protect the findings and shall notify the Construction Supervisor and concerned provincial-level and government representatives of the Department of Fine Arts, Ministry of Education, Youth and Sports [#80 Norodom Blvd, Phnom Penh, 023-210-134]. If continuation of the work would endanger the finding, work shall be suspended until a solution for preservation of the artifacts is agreed upon.

5.7 Clean Water and Sanitation Facilities for Construction Workers

The contractor shall provide at the site potable (safe from a health standpoint) drinking water at a minimum rate of 4.5 liters per day per worker.

The Contractor shall provide a temporary privy facility if there are no existing facilities available at the construction site for the workers. The facility will be dismantled, pit filled and site cleaned to pass inspection of the Construction Supervisor when permanent toilet facilities available for the construction workers are constructed and operational at the site. The toilet shall be located more than 30 meters of an existing water supply well or surface water body, unless a lack of available site area or other extenuating circumstance prevents such a safety distance. Alternatives shall be approved by the Construction Supervisor/Site Engineer (to be assigned by Department of Construction, DoC).

5.8 An Updated Environmental Management Plan and Mitigation Measures

The intent of an EMP and Mitigation Measures is to recommend feasible and cost-effective measures to prevent or reduce significant adverse impacts to acceptable levels as well as relevant monitoring actions.

For purposes of the proposed Project for which environmental impacts are expected to be limited, particular attention is given to outlining best management practices and design measures which should be put in place to ensure that environmental impacts are minimized during civil works activity and that human health and environmental concerns are fully addressed on an ongoing basis during project implementation. Best management practices and mitigation measures are detailed by activity in the following matrix.

Secondary Education Improvement Project (SEIP)
Environmental Management Plan for SEIP Construction (A-H), and Operation (I-K)

ACTIVITY	PARAMETER	MITIGATION MEASURES	RESPONSIBILITY	
			IMPLEMENTATION	MONITORING
A. General Conditions	Notification and Worker Safety	(a) The local construction and environment inspectorates and communities have been notified of upcoming activities. (b) The public has been notified of the works through appropriate notification in the media and/or at publicly accessible sites (including the site of the works) (c) All legally required permits have been acquired for SEIP construction. (d) All work will be carried out in a safe and disciplined manner designed to minimize impacts on neighboring residents and environment. (e) Workers' PPE will comply with international good practice (always hardhats, as needed masks and safety glasses, harnesses and safety boots). (f) Appropriate signposting of the sites will inform workers of key rules and regulations to follow. (g) EMP notice in Khmer shall display near the construction site and should be visible to all. The notice shall be well protected against water - put in a waterproofing transparent plastic bag.	Contractor	MoYES site Engineer/ Safeguards Consultant / School Construction Committee
B. General Construction Activities	Air Quality/ Dust	(a) Suppress dust during pneumatic drilling/ by ongoing water spraying and/or installing dust screen enclosures at site. (b) Keep surrounding environment (roads, paths) free of debris to minimize dust. (c) There will be no open burning of	Contractor	MoYES site Engineer/ Safeguards Consultant / School Construction Committee

ACTIVITY	PARAMETER	MITIGATION MEASURES	RESPONSIBILITY	
			IMPLEMENTATION	MONITORING
		construction / waste material at the site. (d) There will be no excessive idling of construction vehicles at sites. (e) In the case of floating sites, construction of floating units will take place away from immediate house and community structures to minimize disturbance, and will be floated onto final location only upon completion.		
	Noise	(a) Construction noise will be limited to restricted times agreed to in the permit. (b) During operations the engine covers of generators, air compressors and other powered mechanical equipment should be closed, and equipment placed as far away from residential areas as possible. (c) In the case of floating sites, construction of floating units will take place away from immediate house and community structures to minimize disturbance, and will be floated onto final location only upon completion	Contractor	MoYES site Engineer/ Safeguards Consultant / School Construction Committee
	Water Quality	(a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in the lake.	Contractor	MoYES site Engineer/ Safeguards Consultant / School Construction Committee
	Sanitation facility during construction	(a) The construction site needs to be equipped with latrine/toilet for workers. (b) Location of temporary toilet/latrine shall at least 30m from the existing well or water drinking source. (c) After handing over of construction, the latrine shall be dismantled, pit filled,	Contractor	MoYES site Engineer/ Safeguards Consultant / School Construction Committee

ACTIVITY	PARAMETER	MITIGATION MEASURES	RESPONSIBILITY	
			IMPLEMENTATION	MONITORING
		site cleaned.		
	Waste management during construction	(a) Mineral construction wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (b) Contractor shall minimize the waste if there is possibility. (c) Construction waste will be collected and disposed properly by licensed collectors. (d) The records of waste disposal will be maintained as proof for proper management as designed. (e) Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos).	Contractor	MoYES site Engineer/ Safeguards Consultant / School Construction Committee
C. Climate change adaptation	Flooding Free Level	(a) Make sure that no water stagnant around the constructed building (b) The floor of classroom and teacher/student facilities should be raised to flood free level	Contractor	MoYES site Engineer/ Safeguards Consultant / School Construction Committee
	Orientation of the building	(a) The building should be laid in East-West (if land available) direction in order to minimize wall exposure to sun light (b) Plant more tree, especially, in West direction to provide more shade to building	Contractor	MoYES site Engineer/ Safeguards Consultant / School Construction Committee
D. Individual wastewater treatment system	Water Quality from construction	(a) The approach to handling sanitary waste and wastewater from building sites (installation or reconstruction) must be approved by the local authorities. (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality	Contractor	MoYES site Engineer/ Safeguards Consultant / School Construction Committee

ACTIVITY	PARAMETER	MITIGATION MEASURES	RESPONSIBILITY	
			IMPLEMENTATION	MONITORING
		criteria set out by national guidelines on effluent quality and wastewater treatment. When mobilizing to the construction site, the contractor will put in place a temporary latrine and septic tank to be used by the workers during construction until the final CSEIP latrine is built.		
E. Historic building(s)	Cultural Heritage	(a) If the building is a designated historic structure, very close to such a structure, or located in a designated historic district, notify and obtain approval/permits from local authorities and relevant Ministries and address all construction activities in line with local and national legislation. (b) Ensure that provisions are put in place so that artifacts or other possible "chance finds" encountered in excavation or construction are noted, officials contacted, and works activities delayed or modified to account for such finds. (c) Based on Environmental Assessment site visits, there is no important landmark, monument, grave or any other conservation that need be avoided or mitigate the impact for. For all sites, the SEIP will be built in the compound of existing primary schools.	Contractor/ School Support Committee	MoYES site Engineer/ Safeguards Consultant / School Construction Committee/ Representative from Ministry of Culture and Fine Arts (MCFA)
F. Toxic Materials	Asbestos management	By its nature, the present project is unlikely to directly involve any demolition or rehabilitation and will avoid asbestos for new construction. However, the recommendations below, as well as the Good Practice Note: Asbestos by the World Bank Group May 2009 will be imposed on and closely followed by the	Contractor	MoYES site Engineer/ Safeguards Consultant / School Construction Committee

ACTIVITY	PARAMETER	MITIGATION MEASURES	RESPONSIBILITY	
			IMPLEMENTATION	MONITORING
		contractors in the cases where asbestos may be encountered in the project. (a) If asbestos is located on the project site, mark clearly as hazardous material (b) When possible the asbestos will be appropriately contained and sealed to minimize exposure (c) The asbestos prior to removal (if removal is necessary) will be treated with a wetting agent to minimize asbestos dust (d) Asbestos will be handled and disposed by skilled & experienced professionals (e) If asbestos material is be stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately (f) The removed asbestos will not be reused		
	Toxic / hazardous waste management	(a) Temporarily storage on site of all hazardous or toxic substances will be in safe containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances should be placed in an leak-proof container to prevent spillage and leaching (c) The wastes are transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be used	Contractor	MoYES site Engineer/ Safeguards Consultant / School Construction Committee
G. Affects forest and/or	Protection	No protected areas have actually been	Contractor	MoYES site Engineer/

ACTIVITY	PARAMETER	MITIGATION MEASURES	RESPONSIBILITY	
			IMPLEMENTATION	MONITORING
protected areas		identified in the immediate vicinity of the project villages. The following measures apply. (a) All recognized natural habitats and protected areas in the immediate vicinity of the activity will not be damaged or exploited, all staff will be strictly prohibited from hunting, foraging, logging or other damaging activities. (b) For large trees in the vicinity of the activity, mark and cordon off with a fence large tress and protect root system and avoid any damage to the trees (c) Adjacent wetlands and streams will be protected from construction site run-off, with appropriate erosion and sediment control feature to include by not limited to hay bales, silt fences. (d) There will be no unlicensed borrow pits, quarries or waste dumps in adjacent areas, especially not in protected areas.		Safeguards Consultant / School Construction Committee
H. Traffic and Pedestrian Safety-	Direct or indirect hazards to public traffic and pedestrians by construction activities	The SEIP construction is located in the existing school compound. By the fact, there is no traffic concern and thus traffic congestion is not seen as a major risk. However, in compliance with national regulations (Road Law) the Contractor will ensure that the construction site is properly secured and construction related traffic regulated. This includes but is not limited to: ▪ Sign posting, warning signs, barriers and traffic diversions: site will be clearly visible and the	Contractor	MoYES site Engineer/ Safeguards Consultant / School Construction Committee

ACTIVITY	PARAMETER	MITIGATION MEASURES	RESPONSIBILITY	
			IMPLEMENTATION	MONITORING
		public warned of all potential hazards ▪ Traffic management system and staff training, especially for site access and near-site heavy traffic. Provision of safe passages and crossings for pedestrians where construction traffic interferes. ▪ Organize suitable parking, or docking and landing areas around the construction sites and schools to facilitate access during construction. ▪ Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during school time and rush hours or times of livestock movement ▪ Active traffic management by trained and visible staff at the site, if required for safe and convenient passage for the student and public. ▪ Ensuring safe and continuous access to school buildings, office facilities, shops and residences if the buildings stay open for the public.		
I. Unexploded ordnances	Removal	▪ Arrange any necessary clearance of UXO's from the construction site ▪ Prior the start of the work, the employer will coordinate any required mine-clearing with mine clearing agencies or with police/military. ▪ The contractors will not start the civil works until all sites are	Mine-clearing agencies	MoYES site Engineer/ Safeguards Consultant / School Construction Committee

ACTIVITY	PARAMETER	MITIGATION MEASURES	RESPONSIBILITY	
			IMPLEMENTATION	MONITORING
		confirmed to be cleared all UXO's. ▪ If UXO's are discovered during construction, contractors must stop the civil works until UXO;s are removed.		
Operation Stage				
I. Water supply during operations	Health of SEIP users	(a) Maximize supply (capture of rain water, use rainwater collection tanks for latrines); (b) Maximize storage (tanks or cisterns), (c) Prevent contaminated surface water from contaminating wells in land sites by elevating systems when possible, and identifying well sterilization (chlorination) techniques	Community/ School Committee	PoE & DoE
J. Solid Waste during operation	Environment, Water Quality, Health	(a) Conduct Environmental Awareness program (b) Waste segregation (c) Waste bins	Community/ School Committee	PoE & DoE
K. Sanitation during operation	Environment, Water Quality, Health	(a) Conduct Environmental Awareness program (b) Provide enough water for flashing and cleaning (c) Pumping machine should be installed to pump water to the water storage tank (d) If fund available elevated water storage tank should be built for water supply in the school	Community/ School Committee	PoE & DoE

6. School Sanitation Options

6.1 The Need for Water Supply and Sanitation Facilities

Every year in Cambodia, diarrheal diseases that result from inadequate sanitation and poor hygiene practices account for approximately 10,000 deaths of children under five years[7]. As would be expected, the prevalence of diarrhoea among children under-five in rural areas is about twice the prevalence in urban areas[8].

The importance of access to clean water and sanitation is emphasized by a recent World Bank study on the poverty/ environmental nexus in Cambodia:

> "[The study mapped] total cases of childhood diarrhea, population without access to clean water, and population without access to toilets in Cambodia. [This mapping] suggests a close spatial correlation between poverty and lack of access to clean water. Regression analysis … also indicates that poor households have much less access to safe water than higher-income households in Cambodia. The implications for child mortality are suggested by [mapping], which displays the regional distribution of childhood deaths in Cambodia. Again, the spatial correlation with the poverty population is evident. We conclude that safe water is a poverty/environment nexus issue of great importance in Cambodia."
>
> "… we should note the difference between the spatial distributions of poverty and mortality *rates*, and the spatial distributions of total poverty and mortality. The latter provide the basis for our welfare analysis, because they reflect the total number of people affected. By this criterion, the central population axis of Cambodia is the high-priority area for addressing both poverty and mortality from lack of clean water and sanitation. Poverty and mortality *rates*, by contrast, are generally higher in the northern and eastern parts of the country. The proportion of households affected by poverty and waterborne disease … is higher in these areas, but the total number of affected households is much lower than in the central population axis.[9]"

6.2 Overview School Water Supply and Sanitation Problems

The SEIP project shares problems with schools in developing countries worldwide:

- water supply is either non-existent or inadequate for the number of school children;
- toilets and latrines do not function properly due, for example, to poor design and/or lack of water for flushing;
- smell from the small cubicle with tin roof which is very hot under the sun;
- children, specifically girls, do not attend school because appropriate and private sanitation facilities are lacking (WHO, 1997).

The provision of safe water and sanitation facilities combined with good hygiene education inevitably improves the health and attendance of children and may potentially result in a lower drop

[7] Cambodia Water Supply and Sanitation Sector Review (2012)
[8] National Institute of Statistics, Directorate General for Health, and ICF Macro. (2011)
[9] The Poverty/Environment Nexus in Cambodia and Lao People's Democratic Republic by Susmita Dasgupta, Uwe Deichmann, Craig Meisner, David Wheeler, DECRG World Bank Policy Research Working Paper 2960, January 2003.

out, especially of girls. In essence, it is the combination of hard and software components that prevent water and sanitation-related diseases (UNICEF and IRC, 1998).

6.3 Background – the Cambodia Context

Three main problems of rural schools are:

1. **Clean Water Supply**: Generally the community use water from the river, lake, well for their daily living includes bath, washing, cooking and drinking except for those living in urban area. Some people boil water before drinking and some household do not boil at all. This habit may cause health risk in long term.

2. **Solid Waste Management**: Solid waste especially plastic waste can be seen everywhere in the school compound. It is collected and burn at normal temperature. Burning activities create potential adverse effects to the surrounding environment; employees; local area residents; and children playing outdoors.

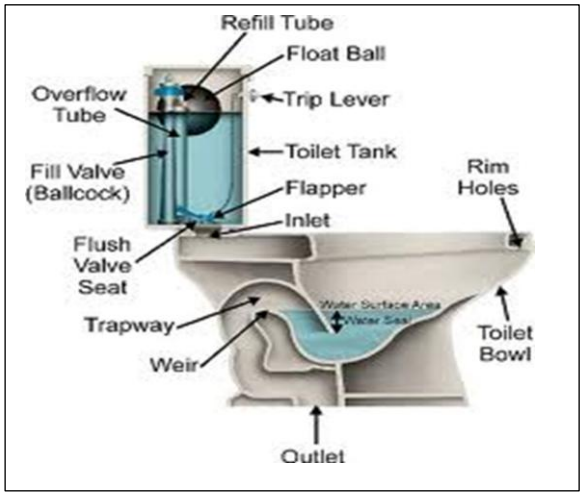
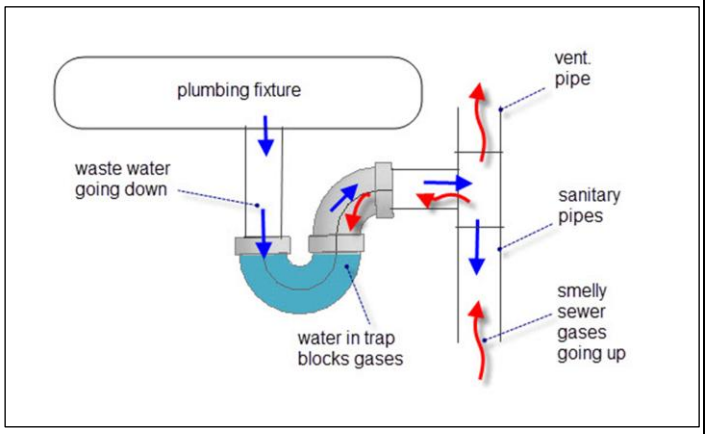
   Worldwide scientific research has conclusively demonstrated that burning of waste produces air toxins. Typically, burning occurs at low temperatures (250 ºC to 700 ºC) in oxygen starved conditions. Hydrocarbons, chlorinated materials and pesticide compounds under these conditions produce a wide range toxic gases harmful to the environment and public health. These gases contain dioxins/furans, volatile organic compounds, particulate matter (PM), hydrogen chloride (HCl), carbon monoxide (CO) and oxides of sulfur and nitrogen and liberate metals including antimony, arsenic, barium, beryllium, cadmium, chromium, lead, manganese, mercury, phosphorus and titanium.

3. **Sanitation**: Lack of water for flashing and cleaning toilet in almost all visited school. Learning from field visit the school sanitary design does not yet reach appropriate level for student since wall, floor and water tank is built from cement which is difficult to clean. The current design should be improved with better quality sanitation.

Further detail and Recommendations and Mitigation Measures for Water Supply, Solid Waste and Sanitation during operation

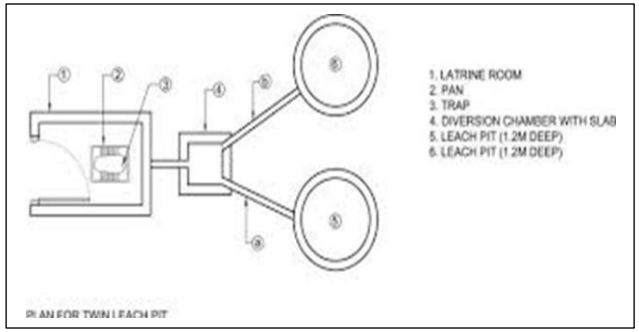
Environmental Problem	Recommendation and Mitigation Measures
Clean Water Supply Only schools in urban area (two visited schools: Preah Reach Samphear in Kampot and Name of school in Kampong Speu high school have access to clean water) where other school do not have clean water supply and they use water from well if rain water is not enough. Children bring their own drinking water to school from their homes.	Options for Improved Clean Water Supplies: • maximize supply (capture of rain water); • maximize storage (tanks or cisterns); • consider use of well pumps that can pump well water up into a storage tank; Water Supply Systems in Seasonally Flooded Areas: Surface water entering wells is the main source of pollution. Flood water is likely to be contaminated, and could contaminate wells via inundation of the pump. The following are options for design changes and specifications to maintain safe water supplies: • Consider elevation of the water supply well pump and apron in areas of flooding; to avoid contamination by flood water and allow user access during floods; • Identify vendors of low cost bacteriological screening kits, and; • Identify a well sterilization (chlorination) technique and recommended frequency, to restore wells that have become contaminated and/or use rainwater collection tanks for latrines.
Solid Waste Common habit and practice in all community. During the construction solid waste is created	Environmental Awareness Program The Ministry of Environment with support and other NGOs working on environment (Live and Learn Environmental Education) should design/establish an environmental awareness program specifically for community and students to contribute to Cambodia's poverty reduction strategy. Waste segregation Dividing waste into dry and wet. Dry waste includes wood and related products, metals and glass. Wet waste, typically refers to organic waste usually generated by eating establishments and are heavy in weight due to dampness. Waste can also be segregated on basis of biodegradable or non-biodegradable waste. The most rational way to cope with all this is to collect it at its source in each area and to separate it immediately where possible. The way that waste is sorted must reflect local disposal systems. The following categories are common:

	• Paper • Cardboard (including packaging for return to suppliers) • Glass (clear, tinted – no light bulbs or window panes, which belong with residual waste) • Plastics • Battery • Compost • Special/hazardous waste • Residual waste Organic waste should also be segregated for disposal. The following categories are recommended: • Leftover food which has had any contact with meat should be collected separately to prevent the spread of bacteria. • Meat and bone should be retrieved by bodies responsible for animal waste • If other leftovers are sent, for example, to local farmers, they should be sterilized before being fed to the animals • Peel and scrapings from fruit and vegetables can be composted along with other degradable matter. Other waste can be included for composting, too, such as cut flowers, corks, coffee grindings, fruit, tea bags, egg- and nutshells, paper towels etc. <u>Waste Bin</u> This can be achieved by providing bins in communal areas for segregated waste. It is important to involve the students in the recycling policy. It is important to make sure that recycling information is prominently displayed, with clear instructions about what you would like the children or the community members to do. At the Constructions sites the Contractor shall install waste bins to keep the site clean at all times. All wastes from the site, including plastics and construction materials shall be properly handled and dumped in a license area nearby the site as permitted by the local authority.
Sanitation	From current practice in both rural and urban areas, site septic tank is the better option since there

Lessons learned concerning sanitation systems (pour flush toilet) currently in use include poor operation of the school latrines, resulting in requirements for maintenance. During the wet season percolation is poor, preventing flushing, and during the dry season, with little or no flush water, solids build up and have to be removed.	is no water during dry season. But the sanitary system must address minor issue which not much attention is paid to during construction of the latrine. <u>Basic Design: Plumbing</u> Design flaws in the plumbing of the water carriage latrine designs currently in use for construction of schools in Cambodia is probably the major source of dissatisfaction with these sanitation systems. The plumbing becomes clogged and the latrine becomes unusable. <u>Plumbing Improvements</u>: For water carriage systems, there should be a trap either within the toilet fixture or in the plumbing directly connected to the toilet fixture. This trap holds water and prevents sewer gas from escaping into the latrine room. The toilet plumbing should be vented to avoid siphoning the water out of the traps.  Toilet Fixture With Built-in Trap  "P" Type Trap and Vent A standard cleanout, which consists of the same four-inch diameter PVC pipe with a threaded cleanout port in the top, can be located directly downstream of the toilet fixture, to enable bypassing

the trap in order to auger the rest of the drain pipe to the septic tank. Additional cleanouts can be added where needed, with access through a covered manhole, but these should all be standard PVC cleanout fittings that do not alter the flow in the drain line. There should be no "cleanout" boxes in the plumbing prior to the outlet into the septic tank, as these will slow flow, collect solids and clog the plumbing.

- Eliminate the box located directly under the toilet fixture, this box slows flush water flow and will collect solids and prevent complete flushing of wastes into the septic tank, if available;
- Eliminate the cleanout box that interrupts the pipe run to the septic tank, as this will slow flow, collect solids and clog. Use standard PVC cleanout fittings where required for convenient auguring of the drain pipe instead;
- Waste pipe diameter should be 4 inches, with slope of at least 1/4 inch per lineal foot, the greater the slope the better;
- Built-in and encased plumbing should not be approved;
- The most sanitary seats, particularly for children, are the U-shaped type made of nonabsorbent material;
- At least one washbowl should be placed near the toilets. The number of washbowls should at least be equal to the number of classrooms in the building;
- Toilet paper, towels, and liquid soap are necessities in toilet and washrooms.



Twin Pits Pour Flush Toilet

On Stilt Toilet with Elevated Pits

6.4 Environmental Management Plan execution: responsibilities, capacity building and funding

The contractor will be the primary implementer of recommendations during construction stage and the community and school staff will be the primary implementer of recommendations during operations.

During construction, MoYES, Department of Monitoring and Evaluation will assign responsible the expert/staff to monitor the implementation of the EMP throughout the life of the project. He/she will collaborate closely with the safeguard Technical Advisor (TA), and liaise with relevant Ministry representatives (MoE, MCFA) as necessary. He/she will be responsible for producing a brief monthly EMP Monitoring report which will be attached to the project's regular progress reports.

The safeguards TA will provide support to the work of the Engineer. The TA provide capacity building and training programs for MoEYS officials at national, provincial and district level on topics such as solid waste management. It is expected that the Engineer and, training to the extent possible, other relevant project stakeholders will participate in those training.

Throughout the process, MoEYS will be the responsible institution for environmental management and should be assisted by an environment safeguards. In addition, the staff in the construction team or school construction committee will work to not only ensure the quality of construction, but also to minimize the environmental, archaeological and paleontological impacts of all construction activities.

During construction, all interventions that will take place as a result of the execution of the EMP will be built into the budget of the project itself and factored into the agreement with the contractor. During operations, the expenditures linked with the maintenance of the center (latrine, solid waste, security barriers etc.) will be forecasted and budgeted for under the schools' standard operating and maintenance costs, and funded by the MoEYS and/or the Commune Investment Budget as applies.

6.5 Recommendations

- Consultations with local community who directly benefit from the project should continue to be carried out during construction.
- The MoEYS needs to ensure that plumbing mistakes in current sanitation designs should be rectified in the new schools and facilities construction.
- A better quality of sanitation should be built instead of concrete floor and plastered wall with painting to ease cleaning and prevent from bacteria.
- Sanitation should response to gender and well enclosed and separate from male toilet.
- Septic tank should be well design protecting in flooded area (to prevent faeces from floating into water surface) and non-flooded area.
- Maximum use should be made of water supply storage
- Catchment and storage of rain water is encouraged for all school location
- Solid waste management and environmental awareness program should be a priority. "Clean environment starts from kids"
- Waste segregation awareness, in cooperation with other NGOs working in the area/commune/province, should be regularly introduced
- A site screening process to determine the best system for school building direction against the standard size of DoC, land availability, and environmental conditions should be initiated

for all proposed project sites. The appropriate technology should be matched to the specific project and site.

- Open waste burning should be avoided. If possible, the collected waste should be burned in a simple and low cost incinerator.

7. Grievance Redress Mechanism

In connection with school and teacher/student facilities construction, all grievances will be handled through negotiation with the aim of achieving consensus. It is recommended that complaints will pass through three stages (1-School support committee; 2-Commune Council; and 3- District local authority).

References

1. Asbestos Containing Materials (ACMs) in Workplaces, Practical Guidelines on ACM Management and Abatement, Health and Safety Authority, UK
2. Good Practice Note: Asbestos: Occupational and Community Health Issues, World Bang Group, May 2009
3. http://articles.timesofindia.indiatimes.com/2012-05-21/chennai/31800290_1_dump-yards-source-segregation-corporation-council
4. http://forum.susana.org/forum/categories/105-processing-technologies-for-excreta-or-faecal-sludge/4057-floating-treatment-pods-for-lake-communities-in-asia-wetland-works-ltd-phnom-penh-cambodia
5. Health and Environmental Effects of Burning Municipal Solid Waste (http://www.environment.gov.sk.ca/)
6. Buildings and Climate Change, Summary for Decision Makers, Sustainable United Nations, UNEP, 2009
7. Government Eyes Ban on Asbestos, National, Phnom Penh Post, 20 August 2015
8. Asbestos Imports Increasing, Phnom Penh Post, 28 July 2010
9. Construction Sector Unaware of Asbestos Risks, Phnom Penh Post, 26 August 2015

APPENDIX 1: Environmental and Social Safeguards Checklist

ENVIRONMENTAL SCREENING

School and Teacher/Student facilities Construction

Instructions: This form has to be filled by local authorities or school committee						
I. General Information	1. Name of village, commune and province					
	2. Name of proposed project					
	3. Type of project	New construction	☐	Reconstruction	☐	
		Rehabilitation	☐	Other (please specify)	☐	
	4. Objective of the proposed project and brief description					
			Please check (√)			
			Yes	No	N/A	
	5. Does the proposed project involve all types and classes of the people in the locality?		☐	☐	☐	
II. Environmental Checklist (please check the box where appropriate)	1. Does the project located in the land mine or UXO area?		☐	☐	☐	
	2. Is there any cultural heritage area nearby the propose project?		☐	☐	☐	
	3. Is there any mortuary site in or near the proposed project area?		☐	☐	☐	
	4. Does the project's implementation interrupt the natural flow of river, canal or any stream?		☐	☐	☐	
	5. Does the project's implementation increase the possibility of ground water pollution?		☐	☐	☐	
	6. Does the project's implementation increase the possibility of surface water pollution?		☐	☐	☐	
	7. Does the project generate any waste?		☐	☐	☐	
	8. Is there any waste management plan for the project if it generates waste?		☐	☐	☐	

	9. Is there any chance of increased public health problem by throwing waste into open water bodies?	☐	☐	☐

Instructions: This form has to be filled by local authorities or school committee				
	10. For construction of school buildings, is there any chance of creating problems to water bodies that are used for irrigation or other community purposes?	☐	☐	☐
	11. Does the scheme generate air and dust pollution?	☐	☐	☐
	12. Does the school construction generate noise or disturbance?	☐	☐	☐
	13. For the sanitary latrine construction, is there any drinking water source within 30m distance of the latrine?	☐	☐	☐
	14. Is there any chance of trees to be cut down by the implementation of the proposed scheme? (If yes, then please specify the number of trees to be cut down)	☐	☐	☐
	15. Is there any chance of destruction of biodiversity (fish, birds, and animals) habitat by the implementation of the scheme?	☐	☐	☐
	16. Mitigation measures:			
III. Other Information (if any)		Yes	No	N/A
	17. Does the land owned by the school?	☐	☐	☐
	18. Is there any land acquisition for school construction?	☐	☐	☐
	19. What is the direction of the proposed school building?	East-West ☐	North-South ☐	Other direction ☐
	20. Is there any flood in the school? If yes, what is the flood level? …….. m from ground level. Describe: …… ……..	☐	☐	☐
	21. How many meter from road center line to proposed school construction?	15m ☐	20m ☐	Greater than 20m ☐

	22. Other related information for to consider for school design and construction: …… …… ……			
IV. Evaluation by Environmental Safeguards Specialist				
Is the form filled correctly?			**Yes** ☐	**No** ☐
Are the proposed mitigation measures satisfactory?			**Yes** ☐	**No** ☐
If the mitigation measures are not satisfactory, why? Any recommendations for improvement? (where necessary):				
Name of Environmental Safeguards Specialist		**Signature**	**Date**	

APPENDIX 2: Environmental Code of Practices - ECOPs

ENVIRONMENTAL CODE OF PRACTICES FOR SCHOOL AND TEACHER/STUDENT FACILITIES CONSTRUCTION

Introduction

The environmental codes of practice (ECOPs) of the proposed Secondary Education Improvement Project (CSEIP) is prepared for SEIP construction sites to enable developers and contractors working in Cambodia to understand what standards should normally be adopted when undertaking the following building works:

a. Site safety
b. Site clearance and preparation
c. Construction
d. Maintenance and repair

It is the responsibility of the main contractor to ensure that all sub-contractors and site personnel are aware of and comply with the requirements of the codes.

1. Legal Framework

Whilst compliance with the code of practice is voluntary it should avoid the need for enforcement action using statutory notices. Where, however, the code of practice has been incorporated into a bidding document as part of the contract agreement, failure to comply with its requirements could result in enforcement action under Cambodia law.

2. Community Relations

Based on experience of construction works within community/village area clearly demonstrated the benefit of warning residents and commercial operators in advance of the disruption that may arise. It is to ensure that contractors who are intending to undertake construction works:

1. Establish a local point of contact for any inquiries and/or complaints relating to the construction works,
2. Nominate a member of staff (from contractor side) who will liaise (as necessary) with MoEYS, residents and commercial operators,

In addition the main contractor should display at the prominent position on the site boundary details of his name, address and telephone number, together with an indication of the likely duration of works.

3. Working Hours

It is important that the following working hours should apply when there are sensitive receptors (e.g. school, hospital, pagoda, residential property) adjacent to the construction site.

08:00 – 18:00 hours Monday-Friday
08:00 – 12:00 hours Saturday-Sunday

Unless agreed in advance with MoEYS, no working should be undertaken on Public Holiday. MoEYS also acknowledges that some activities may be undertaken on site without causing disturbance to neighbors (e.g. electrical rewiring, painting) and therefore may be scheduled outside the normal working hours. Prior warning of such works should be given to the Environmental Safeguards Specialist of the project.

4. Child Labor Is Not Accepted
(Refer to ILO Conventions 138 and 182 and to the UN Convention on the Rights of the Child)

According to the UN Convention on the Rights of the Child, a person is a child until the age of 18. Child labor is not allow in the construction site. No person shall be employed at an age younger than 15 or younger than the legal age for employment. The contractors must take the necessary preventive measures to ensure that they do not employ anyone below the legal age of employment.

5. Security and Safety Fence
Construction sites should be fully enclosed to protect the general public, student, and pupil and deter unauthorized entry. The safety temporary fence should have appropriate high above pavement level.

Temporary safety fence should not be used for advertising. However, it may be used to display details of the site including project name and duration, name, address and telephone number of the main contractor and/or site agent.

6. Access Gates and Scaffolding
Access to and from the site should be organized to allow vehicles to enter and leave the site in a forward gear. When necessary a gate marshal should be employed to ensure the safety of pedestrians using adjacent public footpaths.

7. Lighting
Though SEIP site is in the village but the contractors should ensure that any lighting of the site and its perimeter is sufficient to ensure the safety of workers and other pedestrians. In addition the lighting should be located and orientated so that it does not cause intrusion to adjacent residential property or distract passing motorists.

8. Access Road Management
Where reasonably practicable all loading and unloading of contractors' vehicles should be within the site boundary. Deliveries and collections should be scheduled to coincide with the normal working hours.

9. Environmental Control
9.1 Dust
The CSEIP will be located on land where it is easy to access to construction materials and other supply to the construction. Though the construction is not in the target village but other community whose do not benefit from the project shall not be affected by construction activity, for instance, dust.

1. Bulk storage of potentially dusty materials should be located away from the site boundary.
2. Mixing large quantities of concrete on site should be undertaken using enclosed plant.
3. Cutting and grinding operations should be undertaken using appropriate dust suppression techniques.
4. Potentially dusty spoil and other waste materials should be damped down regularly when handled and transported in sheeted vehicles.
5. Rubble-chutes should be used with care and drop heights kept to a minimum.

9.2 Air Pollution
Smoke, fumes and particulate emissions can be minimized by ensuring that:

1. No on-site bonfires are used for the disposal of any waste.

2. All plants are properly maintained and throttled down or switched off when not in use.
3. Fuel storage tanks are located away from the site boundary and vented at a point remote from sensitive receptors (e.g. school, hospital, pagoda or residential property).

9.3 Land Contamination

In some cases the remediation of known or suspected land contamination may require the excavation and disposal of soils and other waste materials. Such materials should be adequately segregated and removed to a suitably licensed facility in accordance with article 13 and article 16 of Sub-decree on Solid Waste Management (No. 36 ANRK.BK, April 1999). If there is likely to be an offensive odour or vapour associated with the excavation and disposal operation the local authorities should be advised in advance.

9.4 Asbestos

Works involving the treatment of asbestos products should be undertaken by carefully and handled in accordance with hazardous waste management of Solid Waste Management Sub-decree, 1999, of the Ministry of Environment.

9.5 Noise and Vibration

The contractors shall take necessary measures to minimize noise and vibration impacts to nearby community. Noise from the proposed construction works should comply with article 7 of Sub-decree of Air Pollution Control and Noise Disturbance (July 2000) of Ministry of Environment. See table below.

Maximum Permitted noise level in public and residential area (dB(A))

Remark: This standard is applied to control of noise level of any source of activity that emitted noise into the public and residential areas.

No	Area	Period of Time		
		From 6:00 - 18:00	From 18:00 - 22:00	From 22:00 - 6:00
1	Quiet areas - Hospitals - Libraries - School - Kindergarten	45	40	35
2	Residential area: - Hotels - Administration offices - House	60	50	45
3	Commercial and service areas and mix	70	65	50
4	Small industrial industries intermingling in residential areas	75	70	50

The contractors have to use the best practicable means to minimize noise for example:

1. All equipment should be selected having regard to its published sound power level.
2. If an activity is inherently noisy (e.g. driven piling) then an alternative technique should be investigated.
3. Effective silencers and acoustic covers should be provided and maintained in good working order.
4. Temporary structures and buildings may provide useful noise screening.

5. Fixed items of plant (e.g. generators) should be electrically powered rather than diesel or petrol driven.
6. Sufficient time should be allocated for large concrete pours.
7. Anti-social behaviors involving swearing, shouting and loud radios should be avoided.

9.6 Water and Effluent

Water and effluent generated from on-site activities should be treated and disposed of in accordance with the provisions on waste and hazardous discharge of the Sub-decree on Water Pollution Control, April 1999 of Ministry of Environment.

Adequate pollution prevention techniques should be adopted to ensure that any potentially hazardous substances do not come into contact with vulnerable water (e.g. via surface water drainage systems). Recycling water should be encouraged.

9.7 Pest Control

Preventive measures should be adopted to control any rodent activity on site and test baiting may be necessary to confirm the existence or otherwise of an infestation. All redundant drainage and sewerage infrastructure should be improved or stopped up and accumulations of putrescible waste should be avoided.