Initial Environmental Examination

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India: Supporting Human Capital Development in Meghalaya (Phase II)

Construction of Additional Facilities at Public Schools (Shillong Public School, Pine Mount School, and Jowai Public School)

Prepared by the Government of Meghalaya for the Asian Development Bank.

CURRENCY EQUIVALENTS
(As of 2 September 2024)

Currency unit – Indian rupee (₹)
₹1.00 = US $0.0119
US $1.00 = ₹ 83.87

ABBREVIATIONS

ADB	–	Asian Development Bank
ASI	–	Archaeological Survey of India
BUA	–	built-up area
CPCB	–	Central Pollution Control Board
CTE	–	consent to establish
CTO	–	consent to operate
EA	–	executing agency
EARF	–	environmental assessment and review framework
EIA	–	environmental impact assessment
EMP	–	environmental monitoring program
ESZs	–	eco-sensitive zones
IEE	–	initial environmental examination
MoEFCC	–	Ministry of Environment, Forest and Climate Change
PUC	–	pollution under control certificate
REA	–	rapid environmental assessment
SDP	–	sector development program
SPCB	–	State Pollution Control Board

TABLE OF CONTENTS

List of Tables

List of Figures

EXECUTIVE SUMMARY

1. The Project, “Supporting Human Capital Development in Meghalaya (Phase 2) (SHCDM-II)” aims to enhance the employability of Meghalaya’s youth by (a) improving the quality and delivery of school education with an emphasis on secondary and higher secondary levels, and (b) facilitating market-relevant technical and vocational education and skills training. The project’s interventions aim to contribute to enhancing the economic competitiveness of Meghalaya’s youth. The expected outcome will be improved quality and effectiveness of schooling and skills development systems in the state. This will be achieved through the following outputs:

(i) Output 1: Learning environments in government secondary and higher secondary schools enhanced.
(ii) Output 2: Quality of teaching and learning in government schools improved.
(iii) Output 3: Access to and relevance of skilling system enhanced.
(iv) Output 4: Institutional capacity to deliver effective schooling and skills training strengthened.

2. **Environmental Categorization.** The Project is categorized as 'B' for environment in accordance with ADB’s Safeguard Policy Statement (SPS), 2009. The interventions support (i) upgradation of need-based infrastructure in selected government schools (under output 1); (ii) upgrading training infrastructure in 3 District Institutes of Education and Training (DIETs) and equipping them with adequate and modern training facilities (under output 2); (iii) establishing multi-story Meghalaya Skills and Innovation Hub (MSIH) in Shillong with residential facilities (under output 3); and (iv) upgrading infrastructure in selected industrial training institute (ITIs) pertaining to new or upgraded residential facilities, redesigning workshops, workshops and classrooms for new trades (under output 3). Any component that qualifies as category “A” for environment safeguards will not be financed under the project. The environmental impacts caused by the proposed building construction, expansion, or modernization works are expected to be less significant, minor, and reversible. They will also be site-specific and temporary in nature and can be easily mitigated with environmental management measures. All infrastructure will integrate climate and disaster-resilient and disability-friendly features.

3. **Component Description.** The proposed facilities for Shillong Public School include a new building with provisions for classrooms (6), digital classroom (1), science Laboratory (3 – 1 each for Physics, Chemistry, Biology), separate toilet for boys and girls- (1 of each), multipurpose hall (1), staff Room (1). Renovation of existing rooms will be undertaken; these include computer classroom (1) and library (1). Solar panels shall be installed. The existing structures will not be demolished. The proposed facilities for Pine Mount School include a new building with provisions for science laboratory (3 – 1 each for Physics, Chemistry, Biology), digital classrooms (2), library (1), multipurpose hall (1 with capacity of 150 persons), art & craft room (1), toilet for girls (1) and school office (1). The existing staff/office room (1) will be dismantled, and a new one will be constructed. Solar panels shall be installed. The proposed facilities for Jowai Public School include a new building with provisions for classrooms (4), digital classroom (1), science laboratory (1), library (1), separate toilets for boys and girls (1 for each), girls activity room (1), multipurpose hall (1) and a staff room with toilet (1). Some existing rooms will be renovated and converted to serve new functions as follows: (i) old computer room to physics laboratory, (ii) renovation and conversion of old library to girls’ common room, and (iii) old staff room to chemistry laboratory. Solar panels shall be installed. The proposed schools are expected to provide a better learning environment for students and teachers.

4. Civil works for the proposed components include earth work, site clearance, site levelling, RCC frame structure, plastering works, flooring fall celling, brick masonry work, and insulated metal sheet proofing with a supporting structural steel framework and access and internal road construction works.

5. **Description of Environment**. The schools are in Shillong, in the East Khasi Hills District and Jowai, in West Jaintia Hills District of Meghalaya State. The land ownership of the schools is free from any dispute, and the campus is being used by school functionaries.

6. There are no archaeologically important places, no protected forests, and no national parks or wildlife sanctuary in or near the project site. The project sites are in the East Khasi Hills District and West Jaintia Hills District in Meghalaya, which falls in Zone V.

7. There are three ambient air quality monitoring stations at Shillong in East Khasi Hills District and one station at Dawki in West Jaintia Hills District near the selected sites. The PM10 values at all locations in Shillong are within the National Ambient Air Quality Standards. Similarly, PM2.5 values are within the National Ambient Air Quality Standards at all locations. SO2 and NO2 values are within the limits at all locations. The values at Dawki monitoring station are within the National Ambient Air Quality limits.

8. **Potential Environmental Impacts and Mitigation Measures.** Potential negative environmental impacts during the pre-construction, construction, and operation phases of the components were identified. Design measures including following relevant seismic codes in structural design to mitigate risks from natural disasters such as earthquakes and landslides will be adopted and are incorporated in the environmental management plan (EMP). The proposed buildings will not cover a large area and are unlikely to cause any significant impact. Usual construction-related impacts such as noise, dust generation, silt generation, soil contamination from chemicals spills and leaks, construction waste generation, and occupational and community health and safety risks, among others, will be localized, temporary, and avoidable with the implementation of mitigation measures as per the EMP. The construction/renovation works will be within existing schools, hence, strict implementation of health and safety measures, including construction site fencing, prevention of unauthorized entry into construction sites, noise attenuation devices, prior coordination and scheduling of works will be implemented to ensure health and safety of school workers/staff and students. Operation impacts including wastewater and fecal sludge generation, solid waste generation, etc., can be addressed through mitigation measures specified in the EMP. The clean rainwater runoff can be reused for horticultural purposes and recharging the ground water. Any contaminated rainwater (such as from parking area) will not be diverted to ground water recharge pit without appropriate treatment (such as passing it through oil water separator cum sedimentation tank). Materials containing asbestos will not be used. Any waste generated on account of operation and maintenance of solar PV cell will be collected and disposed of responsibly (re-use and/or recycle) by the supplier, who will also be maintaining the PV cell.

9. **Environmental Management Plan (EMP).** An EMP has been developed and included as part of this initial environmental examination (IEE), which outlines the following: mitigation measures for environmental impacts during implementation; environmental monitoring program, cost estimates, and the institutional arrangements for implementation, monitoring and reporting. In accordance with this EMP, the Contractor will be required to prepare a site-specific environmental management plan (SEMP). Contractor will submit its SEMP for approval to the project implementation unit (PIU) or regional project management unit. The EMP and SEMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the component; (iv) detail specific actions deemed necessary to assist in mitigating the

environmental impact of the component; and (v) ensure that safety recommendations are complied with. Copies of the EMP and SEMP shall be kept on-site during the construction phase. The contractor will be responsible for the organization, direction, and execution of environmental management related activities during construction of the proposed component. The contractor will also undertake all activities in accordance with the relevant environmental requirements, including consent documentation and other regulatory and/or statutory and contractual requirements. The component specific budget for implementation of EMP is also estimated as part of the EMP. The budget for this component is approximately INR 16 Lakhs per site. This IEE including the EMP, and budget will need to be updated based on detailed design of Pine Mount School, stipulations of statutory or other competent authorities, change in scope, identification of unanticipated impacts, if required. Both the draft and updated EMP and budget will be included in the bid and contract documents of contractor and PMC as applicable after these are reviewed and cleared by ADB.

10. **Grievance Redress Mechanism**. A four-tier GRM will be established for the Project. The GRM will provide an accessible platform for receiving and facilitating resolution of affected persons' grievances related to the social and environmental issues of the project.

11. **Information Disclosure and Consultation.** Stakeholders' consultations and community consultations have been conducted during preparation of this IEE report. The discussions with different stakeholders and community members focused on obtaining information about the ownership of land, presence of ecologically important areas in the vicinity, information on floral/faunal pattern, prevailing usage of land concerned and nearby area, infrastructure availability with respect to waste/effluent management, water availability – supply, presence of heritage/archaeological site, current environmental conditions, potential pollution generating sources, stakeholders general perception and expectation about the component etc.

12. The stakeholder consultations were conducted with various departments, including Department of Planning, Investment Promotion & Sustainable Development, Forest and Environment Department, Meghalaya State Pollution Control Board, Department of Urban Affairs, Survey of India, Department of Water Resources, Directorate of Agriculture, Directorate of Horticulture, Meghalaya Fire & Emergency Service, Public Health Engineering Department, Shillong Public School, Pine Mount School, and Jowai Public School.

13. The IEE will be made available at public locations in the town such as the Department of Education office, district administration office, etc. It will be disclosed to a wider audience via the ADB and Department of Education websites.

14. **Implementation Arrangement.** The Department of Planning, Investment Promotion and Sustainable Development (DPIPSD) as the executing agency (EA) will have a Project Management Unit (PMU), and the Department of Education as the implementing agency (IA) will have a Project Implementation Unit (PIU-1), who will be responsible for overall planning and implementation of the civil works for this component. The project director, through the project implementation unit (PIU-1), will be responsible for addressing all environment and safeguards issues and will ensure that the IEE and EMP are implemented during the component implementation. He will be assisted by environmental specialists who will be engaged under the loan as part of the project management consultants (PMC) team and the design and supervision consultants (DSC) team to be supported by the state government's counterpart funding. The environmental specialists of both the PMC and DSC teams will be shortlisted as per qualifications and experience specified in the request for proposal documents for these consultancies. They will also assist the Department of Education in (a) preparing the IEE and EMP in line with the environmental assessment and review framework (EARF - for future components) and ADB's SPS, 2009; and (b) supervising civil works and ensuring the EMP implementation as per the IEE report cleared by ADB. The PMC will also

help the project management unit (PMU) and MSSDS in preparing semi-annual safeguards monitoring reports as required by ADB. PMU (environmental safeguards focal person), with the assistance of PMC environmental specialist, will consolidate the semi-annual reports from monthly reports submitted by the DSC and contractor(s), and submit them to ADB through PMU (the project director's office). ADB will review the semi-annual environmental monitoring reports and disclose them on its website upon acceptance. The PMU will submit these semi-annual environmental monitoring reports until project completion.

15. **Environmental clearance requirement.** All three school components have less than 20,000 sq. m. built-up area and the requisite environmental clearance (EC) is not applicable as per Environmental Impact Assessment (EIA) notification 2006 and its amendment thereof. No further special study or EIA needs to be undertaken to comply with Government of India EIA Notification, 2006.

16. This draft IEE with EMP has been prepared according to the ADB SPS 2009 requirements, based on detailed designs of Shillong Public School and Jowai Public School and preliminary design of Pine Mount School and shall be included in the bidding and contract documents. The required budget for EMP implementation will be included in the contract amount. This IEE will need to be updated based on the final design of Pine Mount School, and in case of changes in design or location of components during project implementation and submitted to ADB for review and disclosure. No work can commence until the final IEE is approved by ADB and provided to the Contractor, and the SEMP is approved by the PMU/PIU. The draft and updated IEE reports including EMPs will be disclosed on ADB website as per ADB's SPS, 2009 requirements.

I. INTRODUCTION

A. Overview

17. To support the government of Meghalaya in strengthening its human capital base, the proposed Supporting Human Capital Development in Meghalaya (Phase 2) (SHCDM II) project will tackle underlying issues at critical junctures in the education and skills development process. The project will support transformative solutions to steer skills trainings in the state towards better outcomes while encouraging innovation among youth and will enhance the quality of education to build a competent and steady student pipeline for further training and/or employment. The project is aligned with the following impacts: (i) opportunities for aspirational skills development and innovation expanded (National Policy for Skill Development and Entrepreneurship, 2015), and (ii) competitiveness of Meghalaya's youth improved (Meghalaya Youth Policy, 2021). The project will have the following outcome: quality and effectiveness of schooling and skills development systems in Meghalaya improved.

18. **Output 1: Learning environments in government secondary and higher secondary schools enhanced.** This output will support the upgrade of safe, climate-resilient, gender responsive and inclusive infrastructure in over 50% of government schools at the SHS levels. These include separate toilets for girls and boys, water, sanitation and hygiene facilities, and separate activity rooms for girls.[1] To promote interactive learning and enable the building of digital competencies among students and teachers alike, this output will also help establish digital classrooms in the selected schools. To enable better teaching and learning in science, technology, engineering, and mathematics (STEM) subjects, this output will construct integrated science labs for secondary grades and separate science subject labs to expand the provision of the Science stream at the higher secondary level in selected government schools. This output will also support targeted outreach activities in the project school catchment areas

[1] Girls' activity rooms refer to separate spaces for girls which also serve as sick rooms that girl students can use during menstruation.

to ensure enrollment and retention of children in school.[2] To alleviate the impacts of climate and disaster-related disruptions, this output will develop and orient project schools on emergency response plans.

19. **Output 2: Quality of teaching and learning in government schools improved.** This output will improve education quality at upper primary level and above through interventions focused on (i) strengthening the state's system for teacher professional development, (ii) boosting learning via measures such as provision of supplementary teaching materials and remedial lessons for STEM subjects, and (iii) enhancing systems for assessing learning outcomes.[3] To improve the regularity, quality and relevance of in-service teacher training, the project will (i) develop a system for regular teacher needs assessment that maps teachers to training needs and informs training design; (ii) upgrade training infrastructure with gender responsive facilities[4] and hostels in three DIETs; and (iii) design and implement training for government school teachers on content knowledge as well as pedagogy (including using digital tools) with an emphasis on cultivating conceptual mastery, reasoning, and analytical skills in students. Furthermore, the training will include modules on understanding children's well-being, socio-emotional learning and gender-responsive teaching. Supplementary teaching and learning materials will comprise a mix of physical and digital learning content and will be aligned with teacher training. The project will build on the state government's efforts to develop the system for learning assessments for STEM subjects in selected grades from developing item banks to training teachers and education functionaries in utilizing them.[5]

20. **Output 3: Access to and relevance of skilling system enhanced.** This output will expand provision of skills training that target a mix of wage employment in-state, higher skills training that can lead to higher paying out-of-state jobs, and entrepreneurship training to encourage self-employment.[6] The project will establish a residential Meghalaya Skills and Innovation Hub (MSIH) focusing on two key pillars (i) training for relatively higher skill levels such as IT/ITes sectors and niche sector-specific skills[7] as well as soft skills that are anchored on industry demand and employment opportunities; and (ii) incubation, acceleration and open innovation support to promote entrepreneurship in the state especially among women.[8] The MSIH will promote green skills and development of sustainable products and services, contributing to climate change mitigation.[9] To strengthen the relevance of skills training, this output will introduce new NCVT-aligned trades in select ITIs, including those that promote clean energy,[10] upgrade selected ITI trades to NCVT standards, and enhance trainer capacity by training instructors from ITIs as well as selected private TSPs on content, pedagogy, and

[2] Village education committees and school management committees will be leveraged to implement the outreach activities.

[3] The teaching and learning interventions cover upper primary level and above as key concepts are introduced in the upper primary grades.

[4] The project will establish space and facility for childcare in the DIETs to encourage female teachers to participate in training. There are 7 DIETs serving 11 districts in the state. DIETs that serve multiple districts will be selected for upgrading infrastructure and facilities.

[5] Paper setters of the Meghalaya Board of School Education examinations will also be trained on using item banks; this is expected to steer state examinations toward measuring learning outcomes effectively.

[6] These include, but are not limited to, technical trades, agro-based sectors, health professionals, tourism and hospitality, gig economy-related jobs, IT and IT enabled services.

[7] Niche skills training, in this context, will cover courses across sectors that are relevant to the state but are not currently offered. These include but are not limited to training on cyber security, augmented reality and virtual reality, food fortification, sustainable tourism, intellectual property rights and others.

[8] The state government will leverage existing central and state-level funding schemes for start-ups to provide financing support for beneficiaries of the incubation and acceleration support program. These may include the Startup India Seed Fund Scheme, Meghalaya Entrepreneurship Promotion Scheme, CM ELEVATE and Atal Innovation Mission.

[9] Completing construction of MSIH is estimated to take 36 months. MSSDS will implement some training activities envisioned under MSIH at an interim facility while phase-wise construction of MSIH is ongoing. The interim facility is expected to be ready during the first year of project implementation period.

[10] These include mechanic electric vehicle (E-MMV) trade and drone technician trade in ITI Shillong and ITI Tura, and other trades that are in high demand.

preparing lesson plans. To ensure inclusive access to training opportunities across the state, the project will (i) establish hostels in selected ITIs and in the MSIH; (ii) undertake targeted outreach and mobilization of trainees to ensure inclusion of women and girls, and youth from socioeconomically disadvantaged groups;[11] and (iii) support customization of training modules, including translating content into regional languages.

21. **Output 4: Institutional capacity to deliver effective schooling and skills training strengthened.** This output aims to fill crucial gaps to make education and skills development more effective. It will (i) enhance the school education management information system (SEMIS) with a learning and development module for teachers, (ii) form district-level resource groups (DRGs)[12] to facilitate quality enhancement interventions in schools, (iii) develop and implement a school performance assessment framework to strengthen monitoring,[13] and (iv) enhance the capacity of principals and education functionaries in thematic and leadership areas. To strengthen the skills development ecosystem, the output will (i) establish two regional placements cum counselling cells, (ii) set up and/or strengthen institute management committees in selected ITIs to enhance industry linkage, [14] (iii) facilitate partnerships with private TSPs or external institutes to enhance training relevance and quality as well as employment outcomes, and (iv) develop an MIS with data disaggregated by sex and social group to enhance ITIs' management. This output will also support an interim skills gap analysis to identify new training opportunities during implementation, including in green skills. To strengthen pathways from schooling to further skilling, this output will (i) develop mechanisms for improving relevance of vocational education in project schools based on a detailed assessment of school-level vocational education, and (ii) enhance exposure of SHS students to skills training or entrepreneurship development opportunities.[15]

22. The Department of Planning, Investment Promotion and Sustainable Development (hereafter, referred to as "the Planning Department") will serve as the executing agency for the proposed project. A project management unit (PMU) established within the Planning Department will be responsible for overall project implementation. There will be three project implementing agencies comprising Department of Education (DOE), Meghalaya State Skills Development Society (MSSDS), and Directorate of Employment and Craftsmen Training (DECT). Each implementing agency will establish a project implementation unit (PIU). In addition, the State Sports Council of Meghalaya (SSCM)[16] will be engaged as a technical support agency to support the procurement and implementation activities related to civil works components under MSSDS and DECT. A project steering committee led by the Chief Secretary; Government of Meghalaya will provide strategic guidance for overall project implementation.

23. The proposed investment project is conceived with 4 sub-components that include physical infrastructure, namely, (i) upgrade of school facilities in 34 government secondary and higher secondary schools; (ii) strengthening training and hostel facilities in Industrial Training Institutes (ITIs); (iii) upgrading training facilities in three District Institutes for

[11] Mobilization activities will include print and digital media campaigns and physical outreach, including in schools.
[12] The DRGs will be formed as a sub-committee under the existing district level education committees.
[13] The school performance framework will build on the existing frameworks from the National University of Educational Planning and Administration and/or the Quality Council of India and be tailored to Meghalaya context.
[14] Institute management committees (IMCs) are governing bodies responsible for the overall management and strategic direction of the ITI. Their primary role is to ensure the institution meets its training objectives, maintains high education standards, and aligns its training programs with industry needs. A prominent industry leader chairs the IMC and has members from other industries and educational institutions. At present, IMCs are not functional in several ITIs in Meghalaya.
[15] For example, this could entail school-level orientation or field visits to nearby ITI, TSPs or MSIH.
[16] The State Sports Council of Meghalaya will implement civil works under Output 3 related to MSSDS and Directorate of Employment, Craftsmen and Training (DECT). The council is equipped with an engineering team that has experience in implementing civil works for MSSDS and DECT.

Education and Training (DIETs); and (iv) constructing Meghalaya Skills and Innovation Hub (MSIH).

B. Purpose of the IEE Report

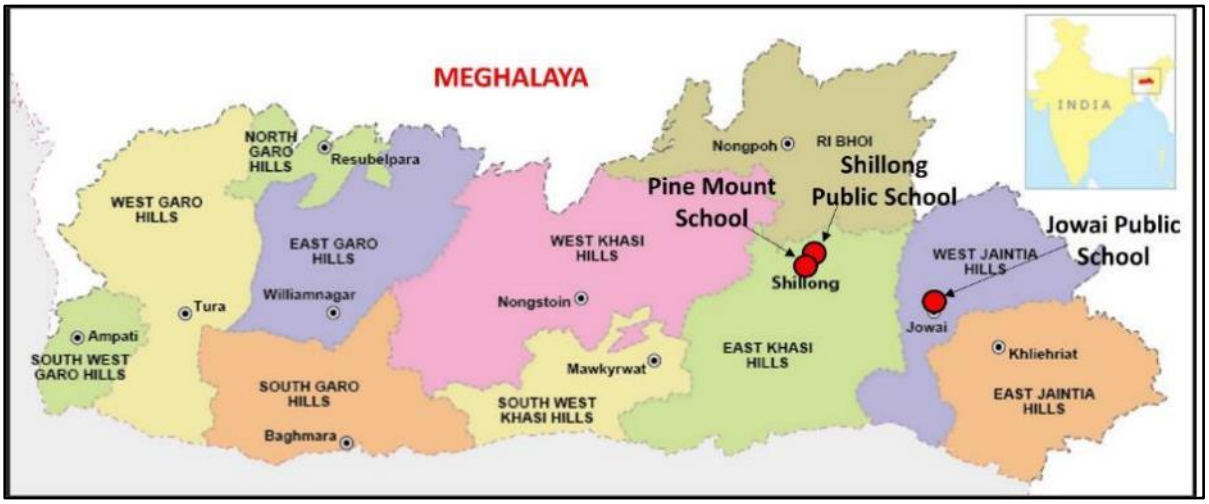
24. This draft IEE has been prepared for the proposed construction and renovation of school buildings in Shillong Public School, Pine Mount School and Government Public School in Jowai.

Table 1: Indicative Project Components

S. No	Name of School/Institute	Block	District	Cluster	Estimated Budget in USD	Proposed Civil Work component
1.	Shillong Public School	Shillong Municipal and Cantt.	East Khasi Hills	Khasi Region	800,598	New Building (LG + G + 1) (Built up area - 1607.80 Sq.m)
2.	Pine Mount School				1,063,196	New Building (Built up area – 834.40 Sq.m) Office Building (G), Laboratory building (LG + G)
3.	Government Public School, Jowai	Thadlaskein	West Jaintia Hills	Jaintia Region	1,176,541	New Building (Built up area – 1947.60 Sq.m) Academic Block (G + 2), multi-purpose hall (LG + G)

LG = lower ground, G + 1 = ground floor plus one floor above, sq.m = square meter
Source: STUP Consultant (DSC = design and supervision consultants)

Figure 1 Location of Shillong Public School, Pine Mount School and Government Public School in Jowai



Source: Desktop Analysis and https://www.mapsofindia.com/maps/meghalaya/meghalaya.htm

25. This IEE identifies potential environmental impacts due to component implementation together and corresponding mitigation measures to ensure that negative impacts are avoided or minimized, and positive impacts are enhanced.

26. **Method.** This IEE report was prepared following the requirements of the ADB SPS, 2009. Rapid Environmental Assessment (REA) checklists were prepared and used to guide the preparation of the draft IEE (**Appendix 1**). Site visits, stakeholder consultations, and secondary data collection were conducted to assess the existing environmental conditions of the project site and the potential environmental impacts that may occur during project implementation. Primary baseline environmental monitoring for air quality, noise level, surface water quality and groundwater quality will be conducted before the start of construction activities.

27. **Report Structure.** This report contains the following sections: executive summary, (i) introduction; (ii) policy, legal and administrative framework; (iii) description of components; (iv) baseline environmental description; (v) public consultation and disclosure; (vi) anticipated environmental impact and mitigation measures; (vii) analysis of alternatives; (viii) grievance redress mechanism; (ix) environmental management plan; (x) conclusion and recommendations.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. National Regulatory Framework

28. The Government of India's environmental rules and regulations, as relevant for the component, are shown in **Table 2**.

Table 2: National Laws, regulations, and policies relevant under the Project

Environmental Laws/Guidelines/Policies	Applicability
Environment (Protection) Act, 1986 and Environmental Protection Rules 1986 and subsequent amendments thereon.	This is an umbrella act under which several applicable statutes/regulations have been framed. This Act provides general guidelines for the prevention of pollution. Under this Act, rules have been specified for discharge/ emission of effluents and different standards for environmental quality. These include ambient noise standard, general effluent standards, emission standards **Applicable.**
The EIA notification, 2006 (and its subsequent amendments till date) provides for categorization of projects into category 'A' and 'B', based on extent of impacts.	The component is not covered in the ambit of the EIA notification (amended till date), either as a Category 'A' or Category' B' project. As per the MoEFCC Notification S.O. 5736(E) dated November 15, 2018, building or construction projects, educational institutes with less than 20,000 m^2 built up area are exempted from prior environmental clearance. However, these projects must follow environmental management guidelines (during project implementation) specified in the above-mentioned notification. As a result, the categorization, and the subsequent environmental assessment and clearance requirements, either from the state or the GOI, are not triggered. **Not Applicable**
Water (Prevention and control of pollution) Act, 1974 and Air (prevention and control of pollution) Act, 1981	Consent To Establish (CTE) and Consent to Operate (CTO) from the State Pollution Control Board will be required during construction for installation of diesel generator set, hot mix plant, concrete batching plant and Sewage Treatment Plant, etc. if installed by the contractor. For the operation phase, CTO will be required for diesel generator sets installed for power back up. **Applicable**
The Motor Vehicle Act, 1988 and Motor Vehicles Rules, 1989 and subsequent amendments	The Act regulates all aspects of road transport vehicles. It details legislative provisions regarding licensing of drivers/conductors, registration of motor vehicles, control of motor vehicles through permits, traffic regulation, insurance, liability, offences and penalties, etc. This Act will be applicable for all machinery including vehicles/machineries deployed/used by contractor and/or facility authority. The law mandates the requirement of valid pollution under control certificate (PUC) of vehicles. **Applicable**

Environmental Laws/Guidelines/Policies	Applicability
Noise Pollution (Regulation and Control) Rules, 2000	These rules prescribe ambient noise levels for various land uses. This act will be applicable during construction. The noise levels during the construction period will be attenuated to meet the levels stipulated for the land uses adjacent (within 100 m) to the components under the Project. **Applicable**
Guidelines to regulate and control ground water extraction in India – Central Ground Water Authority Notification, 24 September 2020	Guidelines have been issued to regulate and control ground water extraction in the country. These guidelines will be applicable if ground water is to be extracted during the construction and operation phases. According to these guidelines, a 'No Objection Certificate' is required to be obtained by the infrastructure projects (current projects will fall in this category) for water extraction. At present, no ground water extraction during the construction and operation phases is planned. **Not Applicable**
The Wildlife (Protection) Act, 1972, amended in 2003 and 2006, provides for protection and management of Protected Areas.	An Act to protect wild animals and birds through the creation of National Parks and Sanctuaries. There are no areas such as National parks, Wildlife sanctuaries, biosphere reserves, tiger reserves, reserved and protected forests, wetlands under Ramsar and protected monuments near or within the Project site. **Not Applicable**
Forest (Conservation) Act, 1980	This act provides guidelines for conservation of forests and diversion of forest land for non-forest use. It describes the penalties for contravention of the provisions of the Act. If forest land must be acquired for the project, clearance is required from the Forest Department. No forest land is required for the schools. Hence, this is not applicable **Not Applicable**
The Meghalaya Forest Regulation (Application and Amendment) Act, 1973	School sites are not located within forest area. The nearest forest is Laitkor Reserved Forest, located at an aerial distance of 0.27 km in the SE direction of Pine Mount School. **Not Applicable**
Meghalaya Tree (Preservation) Act, 1976	An Act to make provisions for regulating the felling of trees for purpose of protection of catchment areas and soil from erosion and to preserve the special characteristics of the hilly areas as regard landscape, vegetal cover and climate and to provide for matters connected there with and incidental thereto. It shall extend to the Municipality and Cantonment areas of Shillong, provided that the State Government may, by notification, extend the Act to other areas of Meghalaya. Permission from concerned authority prior to tree felling to be secured. Compensatory plantation activities to be taken up as stipulated by the State Forest department or rules. **Applicable**
The National Green Tribunal (NGT) Act, 2010	NGT provides an effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith.

Environmental Laws/Guidelines/Policies	Applicability
	Stakeholders/affected persons may approach NGT to resolve component/s induced environmental issues
The Ancient Monuments and Archaeological Sites and Remains (Amendments and validation) Act, 2010, and the rules provide guidance for carrying out activities including conservation, construction, and reuse in and around the protected monuments.	The National Monument Authority (NMA) under the Ministry of Culture, GOI provides protection and preservation of monuments and sites. The Archaeological Survey of India (ASI) is responsible for conducting archaeological surveys, explorations, and excavations in the country. None of the sites is within 300 m of any monument/site/ buffer/control area protected by the ASI or State of Meghalaya. Hence, no clearance/permission is needed from ASI. **Not Applicable**
Coastal Regulation Zone (CRZ) Notification, 2019 and subsequent amendments	This notification for the purpose of conserving and protecting the coastal areas and marine waters, the CRZ area has been classified as CRZ I (further classified as IA and IB), CRZ II, CRZ III (further classified as IIIA and IIIB) and CRZ IV (further classified as IVA and IVB) based on ecological sensitivity and zonation. Section 4 and 5 of the Act clarifies prohibited activities and Regulation of permissible activities within CRZ limit. Section 6 of the Act defines the procedure of securing CRZ clearance for permissible and regulated activities. Projects falling in CRZ needs prior clearance from the State or National Coastal Zone Management Authority as per applicability. The project location is away from CRZ. **Not Applicable**
Wetlands (Conservation and Management) Rules, 2017 and subsequent amendments	These rules are enacted for the protection of wetlands and restriction of certain activities within wetlands by providing a regulatory mechanism. These rules apply to protected wetlands notified under the rules (which include Ramsar sites; wetlands in eco-sensitive zones (ESZs)/United Nations Educational, Scientific and Cultural Organization (UNESCO) sites, high altitudes, etc.). Section 4 of the rule elaborates Restrictions of activities in wetlands. Permission from the concerned authority to be taken if any impact is envisaged on any such feature. There are no wetlands within the core zones of any of the three schools. **Not applicable.**
Notification of Eco Sensitive Zones (ESZs) and subsequent amendments	ESZs are areas of significant ecological importance. The ESZs notification are to conserve and protect the natural resources and living beings. Several zones are declared in the country as eco sensitive zones by notifications. Any project activity located in ESZs will require prior permission from ESZ monitoring committee. There are no ESZs within the core zones of any of the three schools. **Not Applicable.**
Solid Waste (Management) Rules, 2016	These rules have been notified by the MoEFCC for collection, transportation and disposal of municipal waste. These rules will be applicable both during construction and operation. **Applicable**

Environmental Laws/Guidelines/Policies	Applicability
Hazardous Wastes (Management, Handling and Trans-boundary Movements) Rules 2016	These rules are for safe handling, storage, transportation and disposal of hazardous waste. The hazardous waste discarded fuel and lubricants on account of vehicle, equipment and machinery maintenance during construction. Hence these rules will be applicable during the construction phase and requisite permission shall be obtained by the contractor. **Applicable**
Battery Waste Management Rules, 2020	These rules have been promulgated for safe recycling of lead acid batteries. These will be applicable both during construction and operation phases. The requisite permission shall be obtained. **Applicable**
Plastic Waste Management Rules, 2016 and amendments	The Act regulates the responsibilities of producers and generators, for effective segregation, management and recycling of plastic waste. The facility authority is required to engage a licensed recycler to collect and handle the recyclable plastic waste generated from facility. **Applicable**
E- Waste (Management) Rules, 2016	These rules have been formulated to channelize the E-waste to authorized dismantlers for re-use and recycle of waste. As per the provision of these rules, the disposal of e-wastes must be done through specified collection centers and needs to be reported annually. **Applicable**
Bio-Medical Waste Management Rules 2016	There will be no generation of any biomedical waste during construction and operation phases of the component so these will not be applicable. However, if any medical center and /or first aid center is planned in operation phase, then these rules will be applicable if there is bio-medical waste generation. **Not Applicable**
Construction and Demolition Waste Management Rules 2016	The rules have been formulated for safe storage, transportation, and disposal of construction and demolition waste. There will be generation of construction waste during the construction phase. Hence these rules will be applicable during the construction phase. **Applicable**
Regulation of Polychlorinated Biphenyls Order, 2016	Use of polychlorinated biphenyls (PCBs) by project will be prohibited as per the provisions of the order, old transformers, if any, will be handled as per the provisions of the Act, and all existing transformers to be PCB free by 2025. Disposal of PCB containing equipment must be done as per Hazardous and Other Wastes (management and trans-boundary movement) Rules. Applicable in case of transformers/substations to be installed for power supply
Ozone Depleting Substances (Regulation) Rules, 2000 as amended in 2005	Use of ozone depleting substances by project will be prohibited as per the provisions of the Act. Any equipment using such substances will be hermetically sealed. Applicable refrigerators, air conditioners, fire extinguishers may be used. It needs to be ensured that no ozone depleting substances are used such appliances

Environmental Laws/Guidelines/Policies	Applicability
Workers and Labor Welfare	
Building and Other Construction Workers (Regulations of Employment and Conditions of Service) Act, 1996	The rules have been formulated and notified under this Act in 1998 for the regulation of employment and safe working conditions for the construction workers. The workers will be employed by the contractor(s) for the construction and these rules will be applicable during construction phase for proper occupational, health and safety measures at site. **Applicable**
Workmen's Compensation Act, 1923 and amendments thereof.	This act is for the payment of compensation in accordance with the Act's provisions for any injury to workers on site during construction activities. **Applicable**
The Child Labor (Prohibition and Regulation) Act, 1986 and amendments thereof.	This act is to protect child labor in the country for the safety of children from exploitation and provide the children opportunities for education and other developments. **Applicable**
The Bonded Labour (Abolition) Act 1976	The bonded labour means any labour or service rendered under the bonded labour system. The act states that all forms of bonded labour stand abolished, and every bonded laborer stands freed and discharged from any obligations to render any bonded labor. The contractor and project authorities need to ensure that no bonded labour is practiced at site for construction or operation works either directly or by the contractors/sub-contractors. **Applicable**
The E.P.F. and Miscellaneous Provisions act, 1952	This act aims to provide a kind of social security for the employees and workers. The Act provides retirement or old age benefits, such as Provident Fund, Superannuation Pension, Invalidation Pension, Family Pension and Deposit-Linked Insurance. This norm secures well-being of the employees and will be followed as per applicability **Applicable**
Minimum Wages Act, 1948	The Act empowers the Government to fix minimum wages for employees working in specified employments. The Act requires the Government to fix minimum rates of wages and review the rates every 5 years. These are the minimum wages that are to be paid to employees (for construction workers). The project authority needs to ensure the display of wage notices and issue wage slips to workers as prescribed by the regulatory body. **Applicable**
Equal Remuneration Act 1976	As per the Equal Remuneration Act 1976, it is the duty of an employer to pay equal remuneration to men and women workers for same work or work of a similar nature. The contractor and project authority need to ensure the adherence to the provision with the Act. **Applicable**

Environmental Laws/Guidelines/Policies	Applicability
The inter-state migrant workmen (Regulation of employment and conditions of service) Act, 1979 and amendments thereof	There is a possibility of engaging inter-state migrant workers for the specialized jobs during the construction. This act is for regulation of employment of inter-state labor. Accordingly, contractors will obtain labor licenses from the Department of Labor, GoM. **Applicable**
Meghalaya Identification, Registration (Safety & Security) of Migrant Workers Act, 2020	Provides the rules for identification and registration of migrant workers in the State of Meghalaya. Applicable in case migrant workers from other Indian states are recruited. **Applicable.**
The Contract Labor (Regulation & Abolition) Act, 1970 and Rules and amendments thereof	This act is for the regulation of local labor and to ensure the welfare of workers. The contractor will obtain labor license from the Department of Labor if workers are more than 20 in which twenty or more workmen, are employed or were employed on any day of the preceding twelve months as contract labor. **Applicable**
Public liability insurance act, 1991	An Act to provide for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling any hazardous substance and for matters connected therewith or incidental thereto. The contractor/subcontractor needs to obtain insurance policies to cover liabilities from accidents that cause harm or injury to the affected person. **Applicable**
Building Safety	
National Building Code (NBC), 2016	The primary requirement of the Code is the Safety of the Occupants, the safe exit of Occupants, restricting fire to a part of the building and the suppression of fire through automatic or manual means. The proposed project will have to comply with fire and life safety considerations (as applicable to) under the NBC. **Applicable**
National Disaster Management Act 2005	Provides for the timely and effective response to disaster. It lays down guidelines to be followed by the State Authorities in drawing up the State Plans. Applicable in case any disaster situation arises. The project will have both onsite and offsite emergency response plan prepared for the construction and operations period.
The Meghalaya Building By-laws 2021	Under the Meghalaya Building by-laws 2021, every new building after completion is required to obtain an 'occupancy certificate' from the authority. The schools will also require a building occupancy certificate after the building's completion. **Applicable**
The Meghalaya Fire and Emergency Services, Act, 2012	Under the Meghalaya Fire and Emergency Services Act, 2012 every building needs to obtain No Objection Certificate (NOC) from the Fire Department. The school buildings will also need to obtain NOC from the Fire Department. **Applicable**

EIA = environmental impact assessment, E.P.F. = Employees' Provident Fund, GOI = Government of India, GOM = Government of Meghalaya, m^2 = square meter, MoEFCC = Ministry of Environment, Forest, and Climate Change, S.O. = statutory order.

Note: All relevant statutes/ regulations and their amendments of the country/state/local body related to environmental safeguards and labour standards will be applicable.
Source: Secondary research - latest official notifications of Indian National Laws, Regulations, and Policies

B. International Environmental Agreements

29. The list of majors Multilateral Environmental Agreements (MEAs), to which India is a signatory, which are applicable to the components are listed below:

Atmospheric emissions

Table 3: International Treaties, Conventions, and Declarations for Atmospheric Emissions

S. No	Atmospheric emissions	Applicability
1	UNFCCC (United Nations Framework Convention on Climate Change): The ultimate objective of all three agreements under the UNFCCC is to stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system, in a time frame which allows ecosystems to adapt naturally and enables sustainable development. Source: https://unfccc.int/	Yes, Likelihood of greenhouse gases (GHG) emissions by vehicular movement during construction phase and operation of diesel generator sets (only on standby during power failure) during operation phase. These will be minimized through optimum usage of vehicles and machinery during construction and operation phases.
2	Kyoto Protocol: Kyoto Protocol operationalizes the UNFCC by committing industrialized countries and economies in transition to limit and reduce GHG emissions in accordance with agreed individual targets. The Convention itself only asks those countries to adopt policies and measures on mitigation and to report periodically. Source: https://unfccc.int/kyoto_protocol	

Source: Secondary research - latest official documents of international treaties, conventions and declarations for nature conservation.

Occupational Health and Safety

Table 4: International Treaties, Convention for Labour, Health and Safety

S. No	Labor Health and Safety	Applicability
1	India is a signatory to the International Labour Organization (ILO) Core Labor Standards with 47 conventions and 1 protocol ratified, this relates to ensuring core labor standards are upheld for construction workers. https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::p11200_country_id:102691	Yes, Ensuring core labor standards during construction phase will be mandatory.

Source: Secondary research - latest official documents of international treaties, conventions and declarations for nature conservation.

C. ADB Environmental Safeguards

30. ADB SPS 2009[17] provides for the environmental requirements and review procedures of ADB and applies to all projects/program and grants ADB finances. SPS 2009 comprises three key safeguard areas: environment, involuntary resettlement, and indigenous peoples; and aims to avoid adverse project/ program impacts to both the environment and the affected people; minimize, mitigate and/or compensate for adverse project impacts; and help Borrowers to strengthen their safeguard systems and to develop their capacity in managing the environmental and social risks. At the project identification phase, ADB uses a categorization system to indicate the significance of potential environmental impacts and is determined by the category of its most environmentally sensitive component, including direct, indirect, cumulative, and induced impacts within the project's area of influence. The project categorization system is described below.

- **Category A.** A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required.
- **Category B.** A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination is required.
- **Category C.** A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.
- **Category FI.** The proposed project involves the investment of ADB funds to, or through, a financial intermediary.

31. Depending on the significance of project impacts and risks, a full-scale environmental impact assessment (EIA) will be required for category A projects. An initial environmental examination (IEE) will be required for category B projects. A desk review is required for Category C projects. EIA will be a comprehensive assessment while an IEE, with its narrower scope, is conducted for projects with limited impacts that are few, generally site-specific, largely reversible, and readily addressed through mitigation measures. An EMP, which addresses the potential impacts and risks identified by the environmental assessment, shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the project's impact and risks.

32. The components are category B for environment based on the screening conducted through the rapid environmental assessment checklist.

33. **Safeguard Policy Statement (SPS): Environmental Safeguard**: The objective of this Policy Statement is to ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process. Environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts. Safeguard Requirements 1: Environment of SPS 2009 is provided as **Appendix 2.**

34. **Information Disclosure and Meaningful Consultation.** SPS 2009 requires information about environmental safeguard issues to be made available in a timely manner, in an accessible

[17] https://www.adb.org/sites/default/files/institutional-document/32056/safeguard-policy-statement-june2009.pdf

place, and in a form and language(s) understandable to affected people and to other stakeholders, including the public, so they can provide meaningful inputs into component/s design and implementation. For illiterate people, suitable communication methods like broadcast media, public service announcements etc. will be used. This IEE will be disclosed on ADB's website and executing agency and implementing agencies' website as well as the hard copies at site offices. During project implementation, consistent with SPS 2009, the disclosure of documents submitted by the executing agency for this project will be:

(i) new or updated IEEs, and a corrective action plan, if any, prepared during project implementation, upon receipt by ADB; and,
(ii) the environmental monitoring reports, upon receipt by ADB.

35. ADB's Safeguard Policy Statement (2009) requires communities, groups, or people affected by components, and civil society to be engaged by Executing Agency through information disclosure, consultation, and informed participation in a manner commensurate with the risks to and impacts on affected communities. Meaningful consultation processes are defined as those that, (i) beginning early in the project preparation stage and being carried out on an ongoing basis throughout the project cycle, (ii) providing timely disclosure of relevant and adequate information that is accessible to affected people, (iii) being free of intimidation and coercion, (iv) being gender inclusive and responsive, and (v) enabling the incorporation of all relevant views of affected people and other stakeholders in decision-making. The consultation process and its results are to be documented and reflected in an IEE report for category B components.

36. **Grievance Redress Mechanism.** ADB's SPS 2009 also requires Executing Agency to set up and maintain a grievance redress mechanism (GRM) to receive and facilitate resolution of affected peoples' concerns and grievances about their environmental performance at project level. It should address affected people's concerns and complaints promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the affected people. Affected people can also take complaints to ADB's Accountability Mechanism although they should approach the local GRM in the first instance; but the GRM should not impede access to the country's judicial or administrative remedies.

37. **Pollution Prevention:** ADB's SPS 2009 refers borrowers to the IFC's General Environment, Health, and Safety (EHS) Guidelines, 2007 which set out international good practice related to environment, health, and safety which the project should follow regarding assessment of potential impacts and applicable standards and management measures, performance indicators, and monitoring guidelines. Following requirements of ADB SPS, the component shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in EHS Guidelines. When the government regulations differ from these levels and measures, the component shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific component circumstances, full and detailed justification for any proposed alternatives consistent with the requirements presented in ADB SPS 2009 shall be provided.

III. DESCRIPTION OF THE PROJECT SITES

A. Description of the Project Sites:

38. The proposed project sites, i.e. Shillong Public School, Pine Mount School, and Jowai Public School have been chosen to be upgraded under the Project, Supporting Human Capital Development in Meghalaya-II. Table 5 summarizes the description of the proposed components.

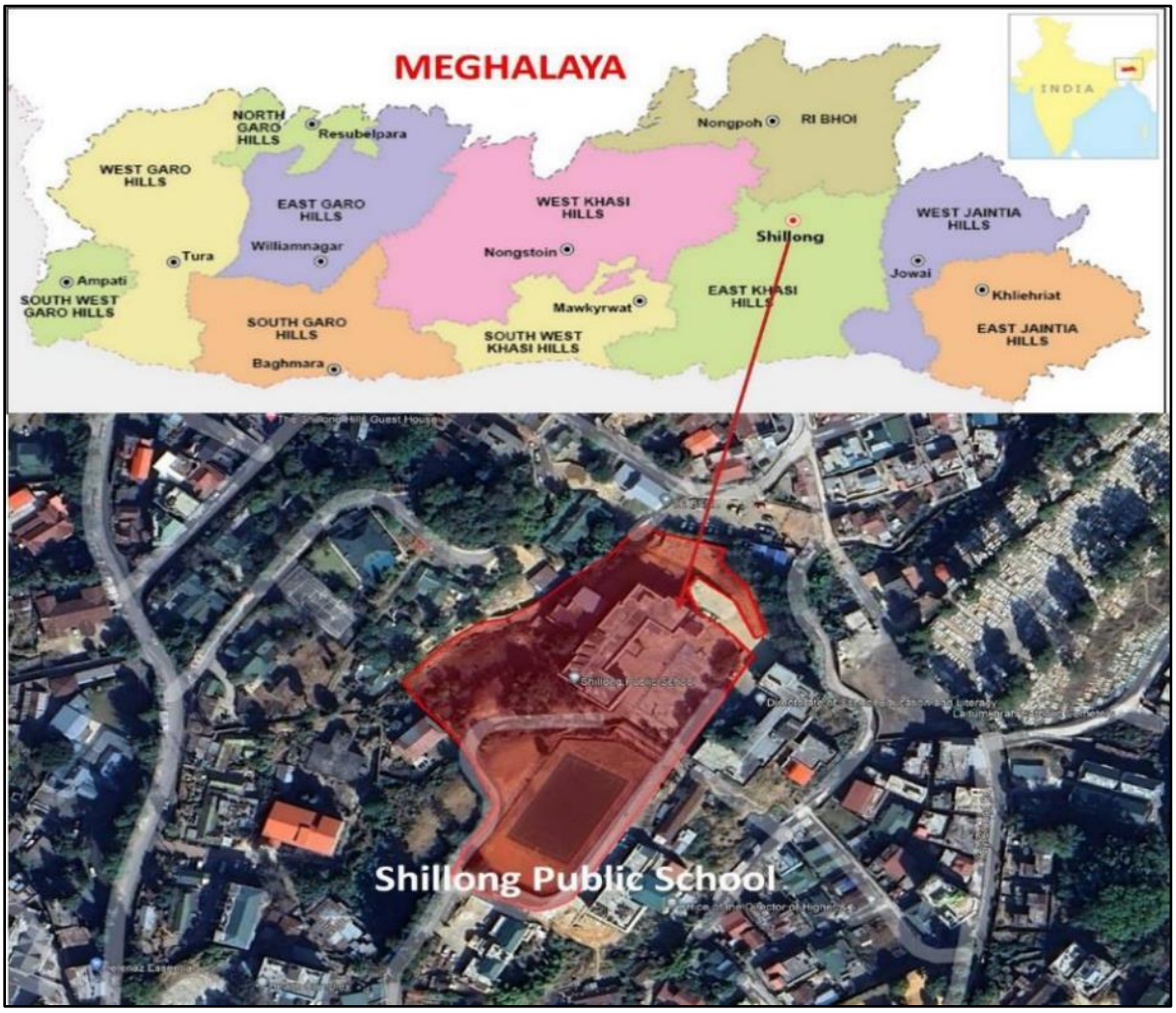
Table 5: Description of Project Sites

S.No.	Parameters	Shillong Public School	Pine Mount School	Jowai Public School
1.	Location	Shillong Public School is in Shillong, in the East Khasi Hills district of Meghalaya State. The school was established in the year 1994. Geographically, the school is located at 25°34'29.17"N and 91°53'55.78"E and at an altitude of 1548 m above mean sea level (MSL).	Pine Mount School is in Shillong, in the East Khasi Hills district of Meghalaya State. The school was established in the year 1881, but due to an earthquake on June 12, 1897, all records were destroyed. The oldest school register found in the school office records admissions starting from the year 1900, marking a new phase in the school's history.[18] Geographically, the school is located at 25°33''54.40"N and 91°52''49.66"E and at an altitude of 1551 m above Mean Sea Level (MSL).	Jowai Public School is in Jowai, in the West Jaintia Hills District of Meghalaya State. The school was established in 1985. Geographically, the school is located at 25°27''18.87"N and 92°12''25.33"E and at an altitude of 1408 m above mean sea level (MSL).
2.	Curriculum	The school is affiliated with the Council of Indian School Certificate Examinations (CISCE), New Delhi. It prepares the students for the ICSE examinations.	Pine Mount School is affiliated with the Council for the Indian School Certificate Examinations (ICSE) and Indian School Certificate (ISC), which is recognized by all universities in the commonwealth countries.	Jowai Public School is affiliated with the Council for the Indian School Certificate Examinations (ICSE).
3.	Land Ownership	As per the land record of the municipal corporation, the land belongs to the school and is free from any dispute regarding its ownership. The campus is being used by school functionaries.	As per the land record of the municipal corporation, the land belongs to the school and is free from any dispute regarding its ownership. The campus is being used by school functionaries.	As per the land record of the municipal corporation, the land belongs to the school and is free from any dispute regarding its ownership. The campus is being used by school functionaries.

E = east, N = north.
Source: DSC.

[18] https://pinemountschool.in/school-history/

Figure 2: Location of Shillong Public School Component

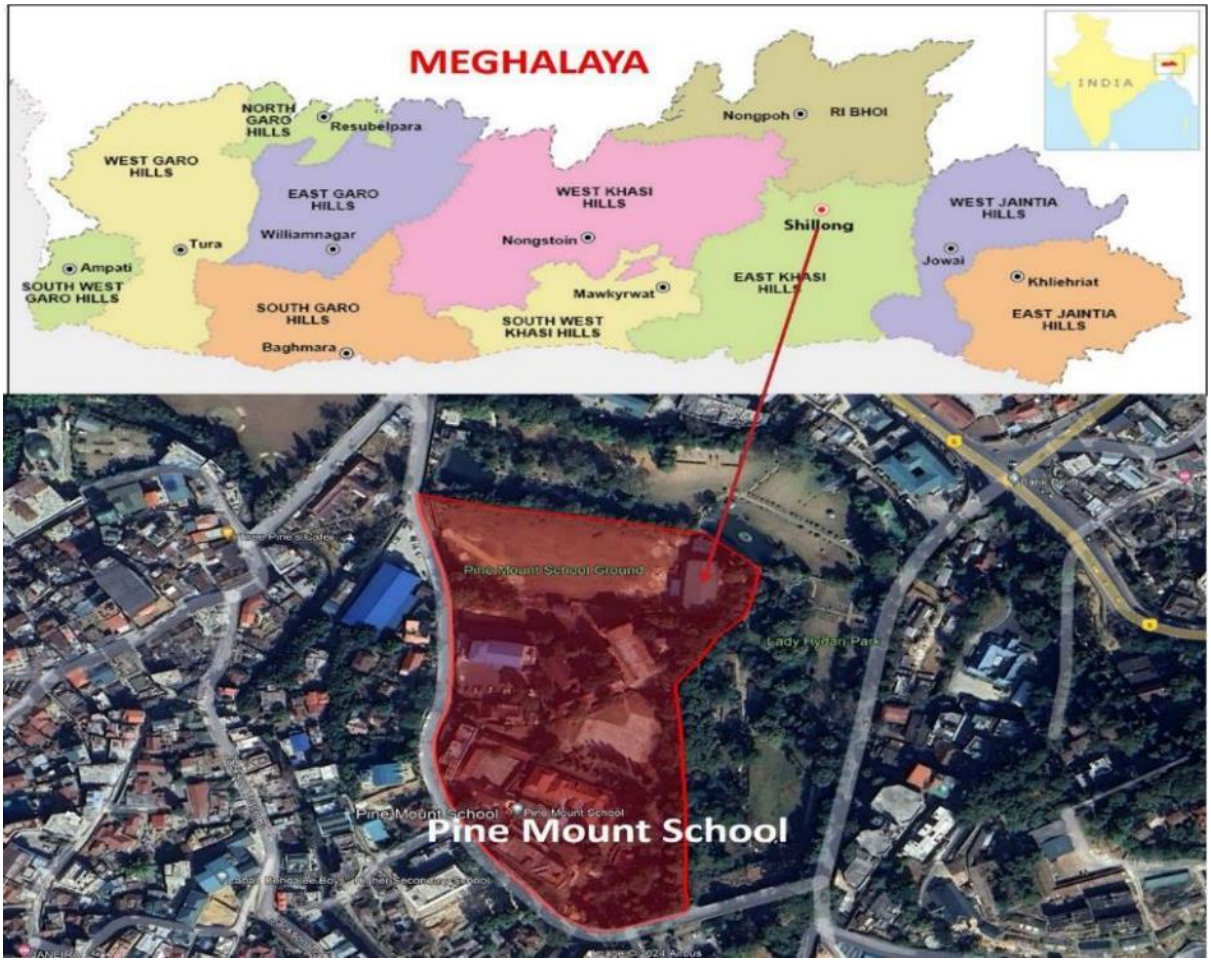


Proposed Site Area

Path leading to existing school building

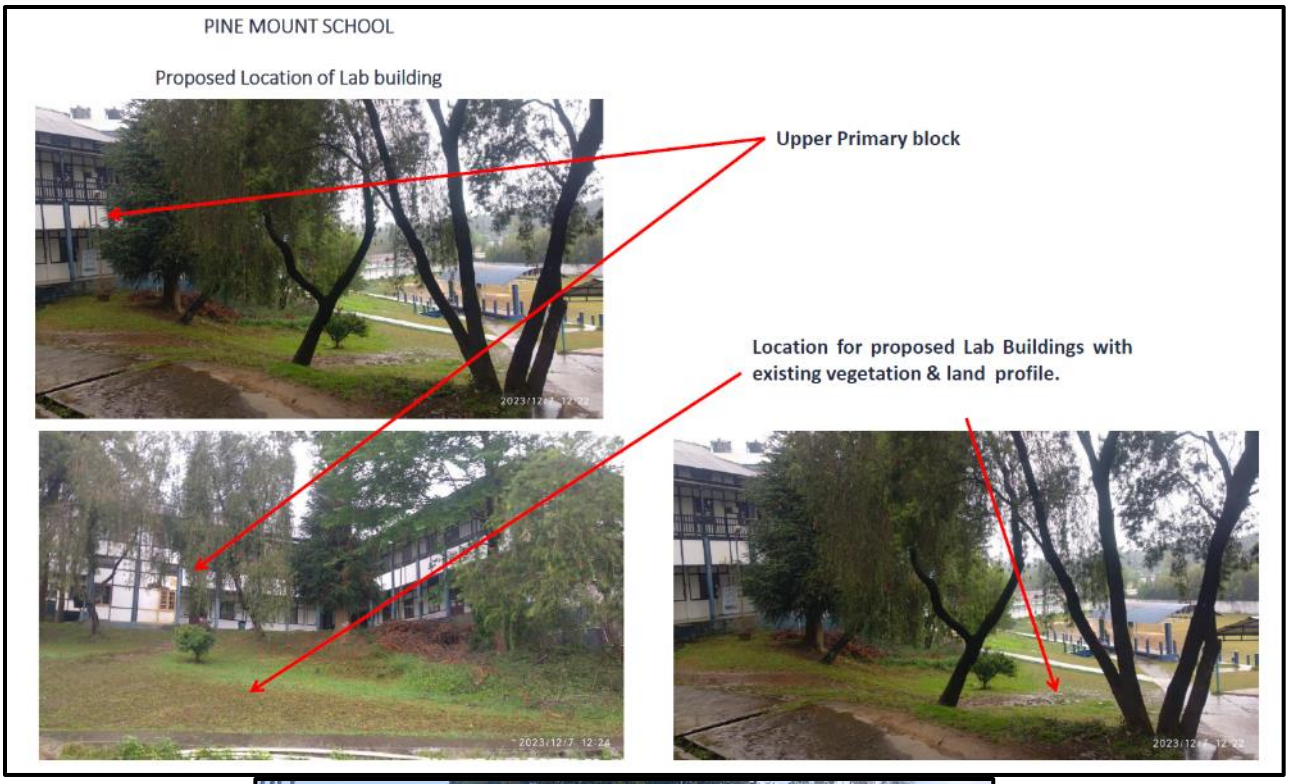
Source: Desktop Analysis, Google Earth (2024) & Maps of India; Site Visit – 11 March 2024.

Figure 3: Location of Pine Mount School Component



Existing buildings at Pine Mount School

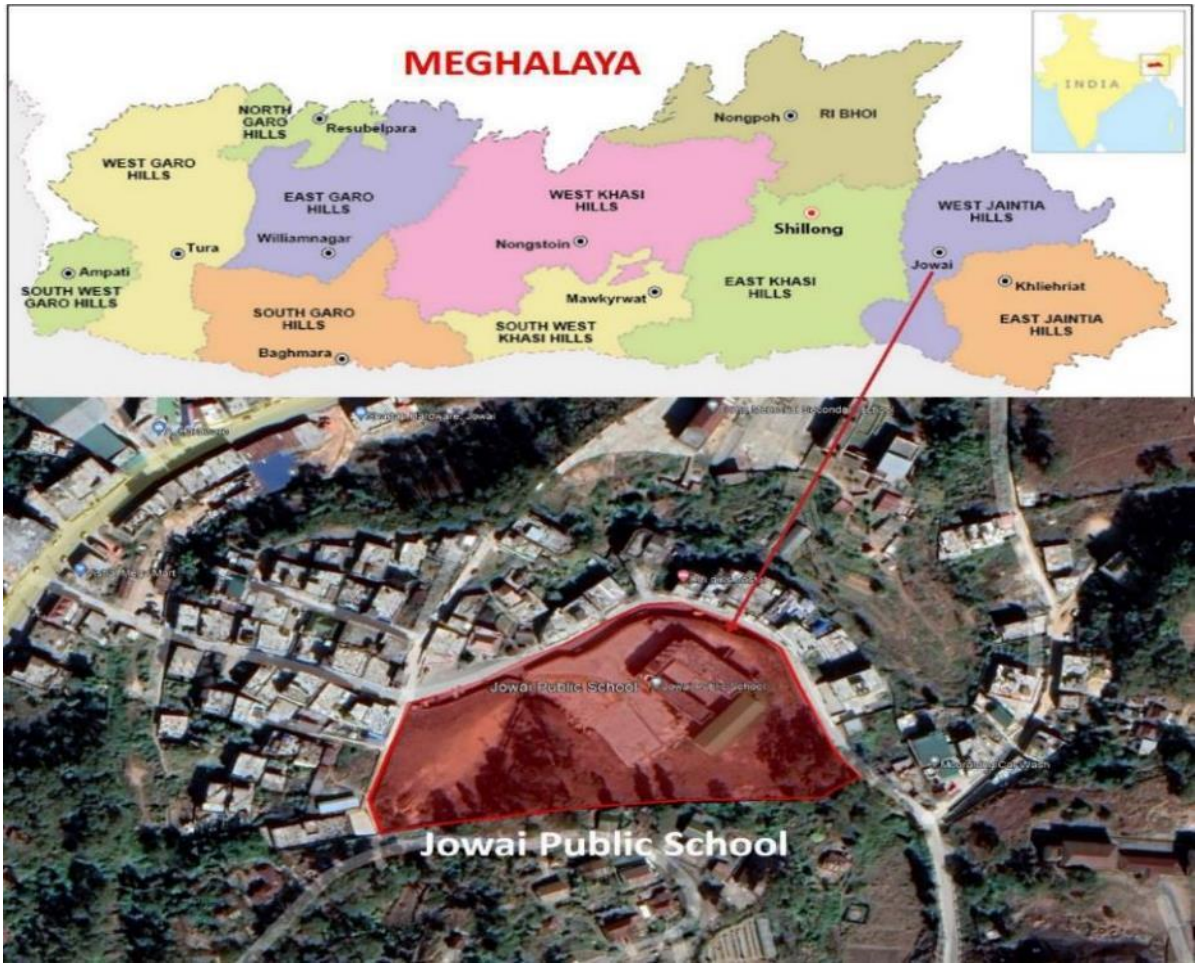
Source: Desktop Analysis, Google Earth (2024) & Maps of India; Date of Visit – 11 March 2024



Office building at Pine Mount School which will be dismantled, and a new building (G) will be constructed at the same place

Source: Desktop Analysis, Google Earth (2024) & Maps of India; Date of Visit – 11 March 2024

Figure 4: Location of Jowai Public School Component



Proposed site area for Multi-purpose Hall at Jowai Public School

Proposed site for academic block at Jowai Public School

Source: Desktop Analysis, Google Earth (2024) & Maps of India; Date of Visit – 11 March 2024

39. **Site Connectivity:** The connectivity of the three project sites is given in the Table 6 below.

Table 6: Site Connectivity of Project Sites

Particulars	Shillong Public School	Pine Mount School	Jowai Public School
Road Connectivity	The nearest road connectivity is National Highway 6, which is approximately 1 km arial distance from Shillong Public School.	The nearest road connectivity is National Highway 6, which is approximately 0.3 km from Pine Mount School.	The nearest road connectivity is National Highway-6, which is approximately 2.3 km away, and NH-206, which is 1.64 km from Pine Mount School.
Rail Connectivity	There is no direct rail connectivity to Shillong. The nearest railway station to Shillong is Guwahati Railway Station (GHY). The distance between Shillong and Guwahati railway station is 105 km.	There is no direct rail connectivity to Shillong. The nearest railway station to Shillong is Guwahati Railway Station (GHY). The distance between Shillong and Guwahati railway station is 105 km.	There is no direct rail connectivity to Jowai. The nearest railway station to Jowai is Guwahati Railway Station (GHY). The distance between Jowai and Guwahati railway station is 156 km.
Air Connectivity	The nearest airport is Shillong Airport at an approximate distance of 33 km.	The nearest airport is Shillong Airport at an approximate distance of 33 km.	The nearest airport is Shillong Airport at an approximate distance of 70 km.

km = kilometer, NH = national highway.
Source: DSC.

40. **Existing Facilities:** The list of existing facilities present in the project sites are given in the Table 7 below. Environmental audit findings are also included with recommendations included.

Table 7: Existing Facilities and Environmental Audit Findings

Shillong Public School	Pine Mount School	Jowai Public School
The school has 12 classrooms: 1 digital room, 1 computer classroom, 2 arts and craft rooms, 1 girls' common room, and 1 library. The school has PHE and municipal pipeline water supply, which is used for drinking purposes and a bore well is used for non-potable uses. The school is well connected to the road network. The school also uses advanced RFID technology for taking attendance of the students so that parents can be informed through SMS facilities and notifications about their children's absence.	The existing school building has Existing classroom – 50 (40 students/classroom) with some on depleted stage and one staff/office room. The school has a PHE and municipal pipeline for water supply, which is used for drinking purposes. And two borewells are used for non-potable uses. There is an existing playground in the school's vicinity.	The existing school building has 14 classrooms, 1 computer room, 1 library, and 1 arts and craft room. The school has a PHE and municipal pipeline for water supply, which is used for drinking purposes. There is an existing playground in the school's vicinity.

Shillong Public School	Pine Mount School	Jowai Public School
There is an existing playground in the school's vicinity.		
Environmental clearance, forest clearance, and CTO are not applicable.	Environmental clearance, forest clearance, and CTO are not applicable.	Environmental clearance, forest clearance, and CTO are not applicable.
Wastewater from WC (water closet) is disposed in the septic tank and septic tank is cleaned periodically through the services provided by the ULB.	Wastewater from WC (water closet) is disposed in the septic tank and septic tank is cleaned periodically through the services provided by the ULB.	Wastewater from WC (water closet) is disposed in the septic tank and septic tank is cleaned periodically through the services provided by the ULB.
Existing laboratories are not in use.	Existing laboratories are not in use.	Existing laboratories are not in use.
There are two existing rainwater harvesting pits, however, one is not operational and needs to be cleaned up for optimum use.	Building safety needs to be established and ensured during detailed design for the proposed construction of additional floor.	

PHE = Public Health Engineering, RFID = radio frequency identification, SMS = short message service.
Source: DSC.

41. **Comparison between existing and proposed facilities:** The list of existing and proposed facilities in all three project sites are given in Table 8 and the list of facilities to be demolished are given in Table 9.

Table 8: Comparison between Existing and Proposed Facilities of Project Sites

Particulars	Shillong Public School	Pine Mount School	Jowai Public School
Existing Facilities	Existing school has classrooms (12 no.), arts and crafts room (01 no.) and girls' common room (01 no.).	The existing school building has 50 classroom (40 students/classroom) with some on dilapidated stage and 01 no of staff/office room.	The existing school building has 14 classrooms, 1 computer room and 1 library and 1 arts and craft room.
Proposed Facilities	A new building is proposed to be constructed. The new building shall have provision for classroom (06 no), digital classroom (01 no), science Laboratory (03 no. for physics, chemistry, biology), separate toilet for boys and girls- (01 of each), multipurpose Hall (01 no), staff room (01 No). Renovate some existing rooms i.e., Computer classroom (01 no), Library (01 no). Solar panels shall be installed. Expansion of the approach road to the school is proposed.	One existing building (G+1) will be added with one more floor. This is proposed to have the following facilities: includes digital classroom (02 no.), library (01no.), multipurpose hall (01 no. of 150 capacities), arts and crafts room (01 no.), separate toilet for both boys and girls (01 no. each) and school office (01 no.). An old staff/office building (ground floor only; number of rooms: 01) needs to be dismantled and construct a new one (ground floor only). A new building (LG + G) will be constructed for science laboratory (03 nos. separate	New academic block (G + 2) includes Classroom (Proposed-8), Digital classroom (01 no.), science laboratories (01 no.), library (01 no.), toilet for boys and girls (01 nos. of each), girls activity room (01 no.), multipurpose hall (01 no.), staff room with toilet (01 no.). Renovation of old computer room to physics laboratory, old library to girls' common room, old staff room to chemistry laboratory.

	Detailed floor plans of proposed components are given in Appendix 3.3.	laboratory for physics, chemistry, and biology), Solar panels shall be installed. Preliminary designs of proposed components are given in Appendix 3.3.	A new multipurpose hall (LG + G) will be constructed. Solar panels shall be installed. Detailed floor plans of proposed components are given in Appendix 3.3.

G+1 = ground floor plus one floor above.
Source: DSC.

Table 9: Facilities to be Demolished

Shillong Public School	Pine Mount School	Jowai Public School
No demolition of the existing structure will be carried out. However, renovation of some existing rooms i.e., Computer classroom (01 no), Library (01 no).	Demolition of one staff/office room (01 no) is required for the construction of a new one.	No demolition activity will be carried out. However, renovation of old computer room to physics laboratory, old library to girls' common room, old staff room to chemistry laboratory.

Source: DSC.

42. **Salient Features of proposed facility:** The salient features of proposed facilities are furnished in Table 10 below.

Table 10: Salient Features of the Proposed Facilities

S. No	Particulars	Shillong Public School	Pine Mount School	Jowai Public School
1.	Project Cost (estimated by Meghalaya government)	$800,598	$1,063,196	$1,176,541
2.	Total plot Area	10204.06 sq.m	35456.18 sq.m	1947.60 sq.m
3.	Total built up Area	1607.80 sq.m (Details in Appendix-3.1)	834.40 sq.m (Details in Appendix-3.1)	1947.60 sq.m (Details in Appendix-3.1)
4.	By law considered for building layout	The Meghalaya Building By Laws 2021	The Meghalaya Building By Laws 2021	The Meghalaya Building By Laws 2021
5.	Total Nos. of Car Parking	16 Nos.	No new parking proposed. There are open car parking spaces along internal roads inside school premises.	12 nos. of car parking near multipurpose hall and remaining car may park in open area.
6.	Total water requirements for School	10.8 KLD (Details in Appendix 3.2)	5.4 KLD (Details in Appendix 3.2)	7.2 KLD (Details in Appendix 3.2)
7.	Source of water supply	Water supply from PHE department	Water supply from PHE department	Water supply from Municipal Corporation
8.	Water Treatment	Septic tank capacity of 33 cu.m is proposed	Septic tank capacity of 10.40 cu.m is Proposed	Septic tank capacity of 33 cu.m is proposed

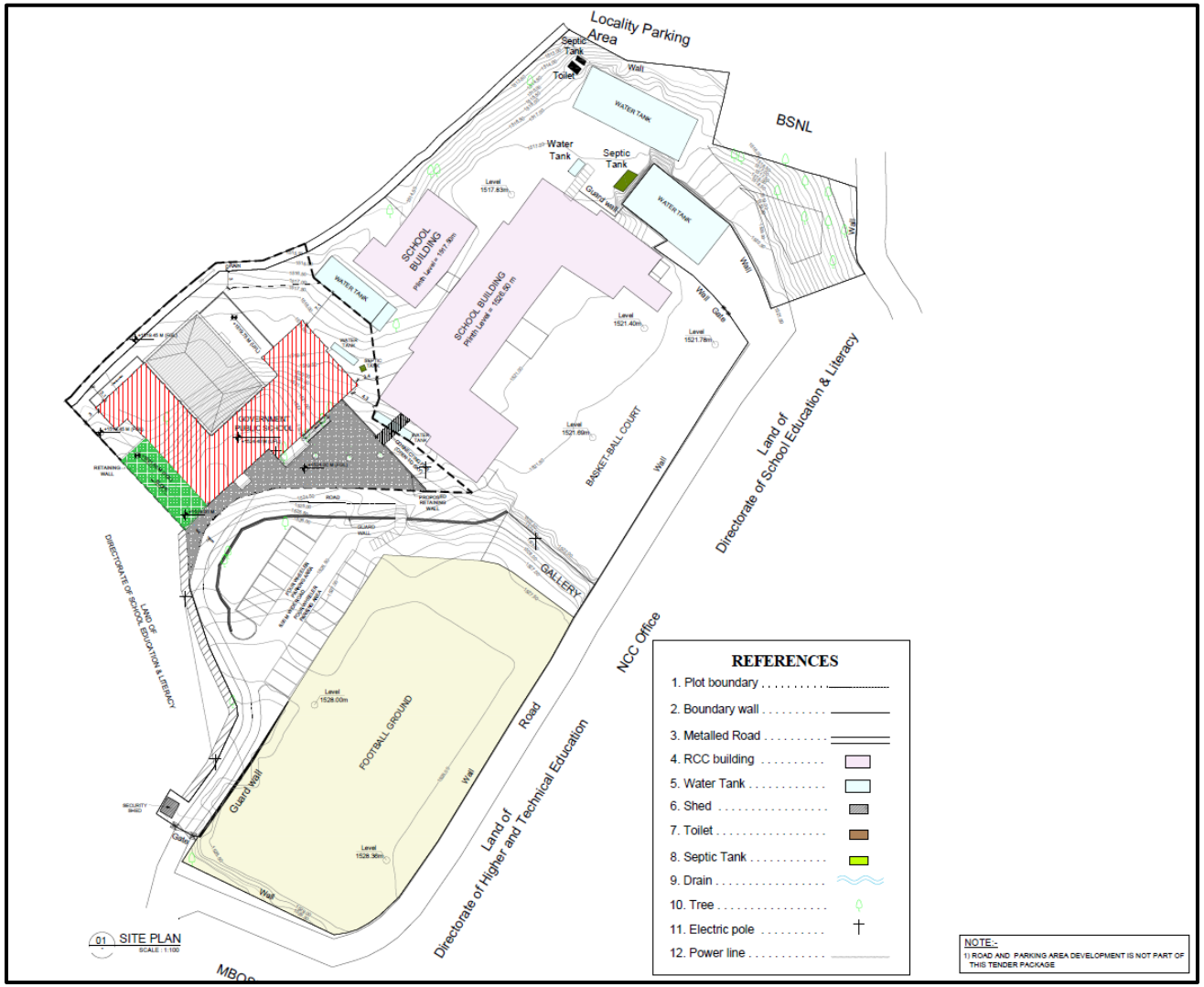
S. No	Particulars	Shillong Public School	Pine Mount School	Jowai Public School
9.	Total sewage generation	8.6 KLD	4.3 KLD	5.7 KLD
10.	Management of wastewater from laboratories	Wastewater likely to be generated from laboratories will be stored in neutralization tank and then disposed to authorized hazardous waste disposal vendor in consultation with Shillong Municipal Board. No chemical wastewater shall be directly disposed into the septic tank.	Wastewater likely to be generated from laboratories will be stored in neutralization tank & then disposed to authorized hazardous waste disposal vendor in consultation with Shillong Municipal Board. No chemical wastewater shall be directly disposed into the septic tank.	Wastewater likely to be generated from laboratories will be stored in neutralization tank & then disposed to authorized hazardous waste disposal vendor in consultation with Jowai Municipal Board. No chemical wastewater shall be directly disposed into the septic tank.
11.	Fecal sludge disposal	Wastewater shall be stored in a septic tank of capacity 33 33 cu.m and through regular interval it shall be cleaned. Fecal sludge collection shall be through the ULB or authorized service provider.	Wastewater shall be stored in a septic tank of capacity 10.40 cu.m and through regular interval it shall be cleaned. Fecal sludge collection shall be through the ULB or authorized service provider.	Wastewater shall be stored in a septic tank of capacity 33 cu.m and through regular interval it shall be cleaned. Fecal sludge collection shall be through the ULB or authorized service provider.
12.	Solid waste Management	Segregation by school and handover to Shillong Municipal Board	Segregation by school and handover to Shillong Municipal Board	Segregation by school and handover to Jowai municipal board
13.	Rainwater harvesting/ ground water recharge	Rainwater from the roof top is being collected in rainwater harvesting pits for reuse and a 20 cubic meters rainwater harvesting pit is proposed.	Not proposed	Rainwater from the roof top is being collected in rainwater harvesting pits for reuse and a 20 cubic meters rainwater harvesting pit is proposed.
14.	Electrical Power Requirement:	27 KW (Details in Appendix 3.4)	11 KW (Details in Appendix 3.4)	43 KW (Details in Appendix 3.4)
15.	DG Set for Backup Supply	15KVA (10.8 KW)	No DG Set proposed	25 KVA (16 KW)
16.	Fire Detection and Alarm System	Not required per NBC (Appendix 3.5) Adequate provisions will be in place to deal with situation in case of emergency like proper exit path, assembly area, area for water storage for fire emergency, public address system, alarm bells, etc.	Not required per NBC (Appendix 3.5) Adequate provisions will be in place to deal with situations in case of emergency like proper exit path, assembly area, area for water storage for fire emergency, public address system, alarm bells, etc.	Not required per NBC (Appendix 3.5) Adequate provisions will be in place to deal with situation in case of emergency like proper exit path, assembly area, area for water storage for fire emergency, public address system, alarm bells, etc.

S. No	Particulars	Shillong Public School	Pine Mount School	Jowai Public School
17.	Closed-circuit television (CCTV)system	Yes, CCTV is proposed for this project. (dome camera-21 nos. and bullet camera-06 nos.)	Yes, CCTV is proposed for this project (Dome camera – 05 nos)	Yes, CCTV is proposed for this project (18 no of dome camera will be provided)
18.	Reverse Osmosis (RO) water supply system	R.O. water supply system is available at the school. No proposal for new R.O.	N/A	N/A
19.	Firefighting system	Yes, Firefighting with water sprinkler system, hydrant and enough portable fire extinguishers shall be provided.	04 no. of fire extinguisher will be provided.	Yes, Firefighting system will be provided.

cu.m = cubic meter, DG = diesel generator, KLD = kiloliter per day, KVA = kilo volt ampere, KW = kilowatt, NBC = National Building Code, N/A = not available, PHE = public health engineering, sq.m = square meter, ULB = urban local body.
Source: Design Supervision Consultant (DSC)

Figure 5: Proposed Site Plan of Shillong Public School

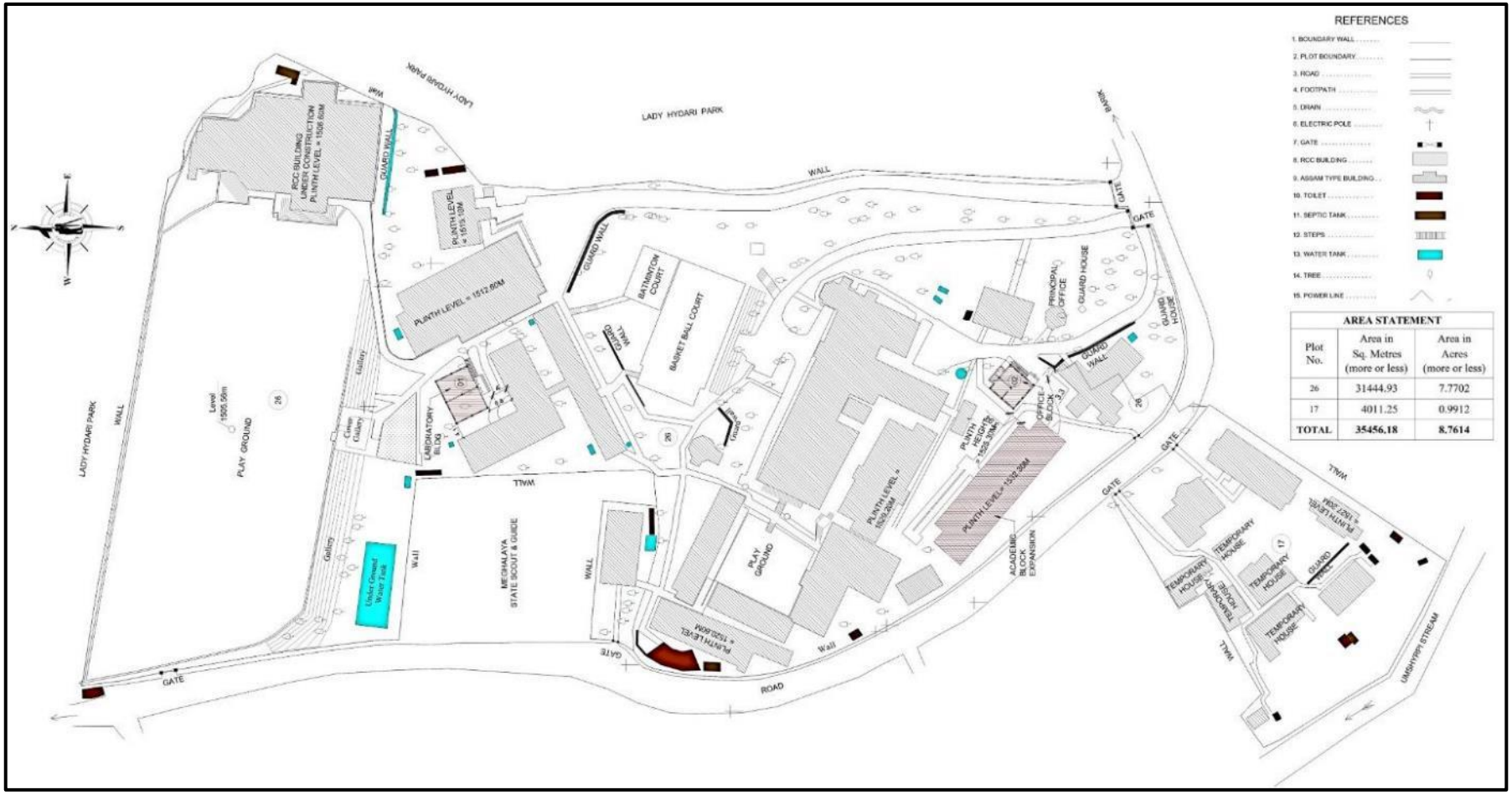
The red hatch indicates the proposed renovation and construction of new structures.



Source: DSC.

Figure 6: Proposed Site Plan of Pine Mount School

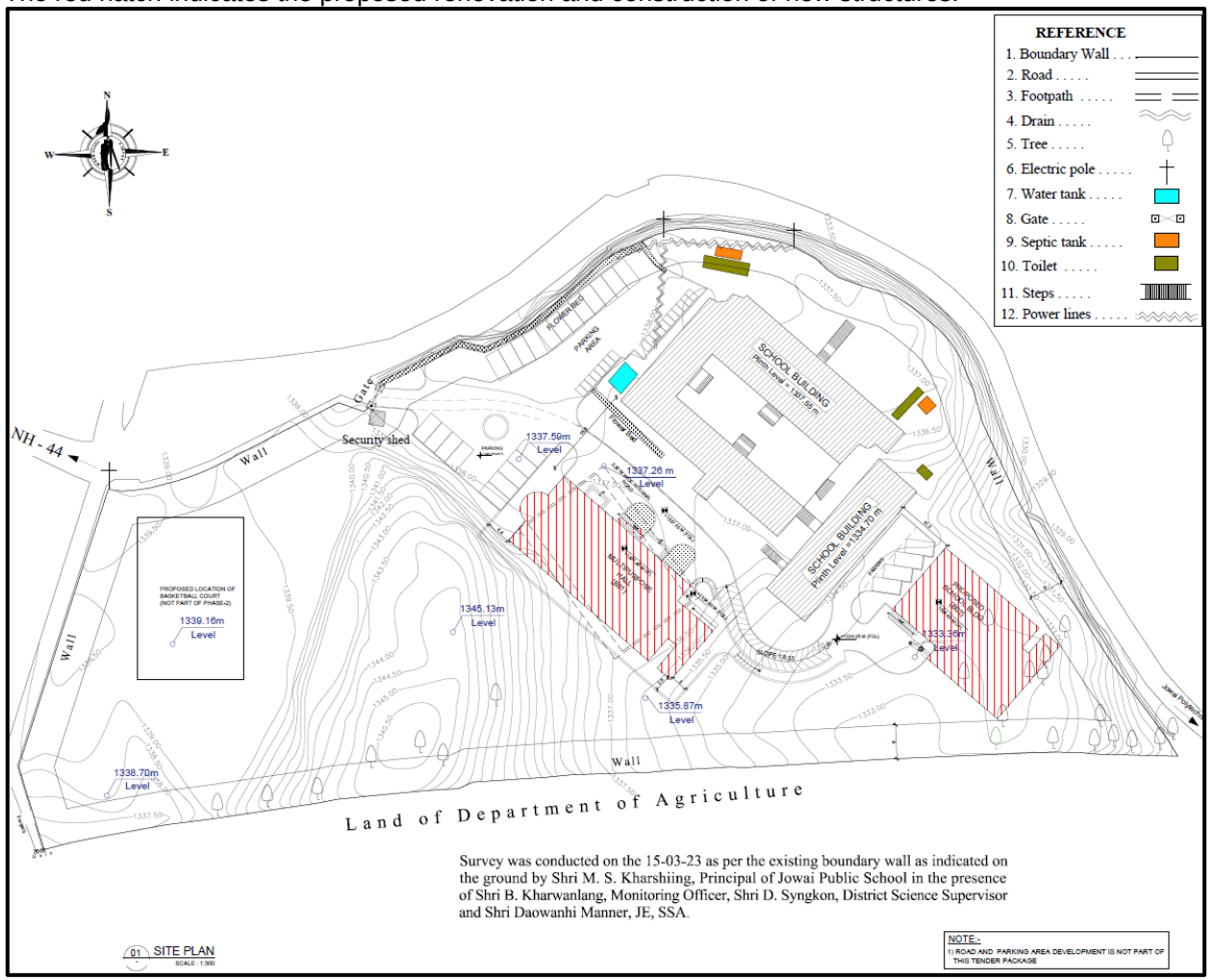
The red hatch indicates the proposed renovation and construction of new structures.



Source: DSC.

Figure 7: Proposed Site plan of Jowai Public School

The red hatch indicates the proposed renovation and construction of new structures.



Source: DSC.

43. **Civil Works for the proposed components:** The civil works for proposed components include earth work, site clearance, site levelling, and road construction works.

44. **Proposed Facilities:** The proposed facilities (Appendix 3.3) for all three components include the following:

Shillong Public School:

a. New Classroom: 6 rooms
b. Digital Classroom: 1 new and 1 old room for renovation
c. Computer room: 1 old digital classroom will be renovated at existing room.
d. Science Laboratory: 3 new (Physics, Chemistry, Biology) for higher secondary
e. Arts and crafts room: 1 will be renovated at old science laboratory
f. Girls common room: 1 will be renovated at old science laboratory
g. Library: 1 for renovation
h. Separate Toilet for Boys and Girls - 1 each
i. Multipurpose Hall -1
j. Staff Room-1

The approximate quantum of earthwork involved at Shillong public school is:

- Excavation quantity (soils, soft and hard rock etc.) - 3651 m3
- Filling quantity - 1984 m3

Pine Mount School:

a. Science Laboratory - 3 (Physics, Chemistry, Biology – 1 each)
b. School office - 1
c. Digital Classroom – 2
d. Toilet – 1 (Girls)
e. Library - 1
f. Arts and Crafts - 1
g. Multipurpose Hall – 1 (150 capacity)
h. Existing classroom – 50 (40 students/classroom) with some on depleted stage – 5 new classroom
i. Staff/office room – Existing 1 (Assam type), but the structure is too old – requires a 1 new staff room – dismantle the old one and construct a new one.

The approximate quantum of earthwork involved at Pine Mount school is:

- Excavation quantity (soils, soft and hard rock etc.) - 450 m3
- Filling quantity - 550 m3

Jowai Public School

a. Classroom - 4
b. Digital Classroom – 1
c. Computer room – 1 and 1 for renovation of old computer laboratory to physics laboratory
d. Science Laboratory – 1 (Physics, Chemistry, Biology) and 2 laboratory renovation at staff room and computer laboratory
e. Library - 1
f. Arts and crafts room – renovation at library room
g. Girls' activity room – 1

h. Separate Toilet - 1 each (Boys & Girls)
i. Multipurpose Hall – 1 (200 capacity)
j. Staffroom – 1 new and 1 for renovation to chemistry laboratory

The approximate quantum of earthwork involved at Jowai public school is:

- Excavation quantity (soils, soft and hard rock, etc.) - 4973 m3
- Filling quantity - 3750 m3

Table 11: Key Environmental Setting of Proposed Components

Particulars	Shillong Public School	Pine Mount School	Jowai Public School
Latitude	25°34'29.17"N	25°33'54.40"N	25°27'18.87"N
Longitude	91°53'55.78"E	91°52'49.66"E	92°12'25.33"E
Ownership of the land parcel	Shillong Public School	Pine Mount School	Jowai Public School
Present Land use of the site	Land with vegetation (27 no. of trees) Tree felling is envisaged for 6 number of trees in Shillong. The total number of trees to be felled will be finalised based on the contractor's final design, the necessary permission will be obtained from forest department, and compensatory plantation activity will be undertaken.	Land with vegetation (130 no. of trees) Tree felling is envisaged for 5 number of trees in Pine Mount School. The total number of trees to be felled will be finalised based on the contractor's final design, the necessary permission will be obtained from forest department, and compensatory plantation activity will be undertaken.	Land with vegetation (19 no. of trees) Tree felling is envisaged for 7 number of trees in Jowai Public School. The total number of trees to be felled will be finalised based on the contractor's final design, the necessary permission will be obtained from forest department, and compensatory plantation activity will be undertaken.
Archaeologically Important Places	No archaeologically important places within the immediate vicinity of the project site (i.e. 300m).	No archaeologically important places within the immediate vicinity of the project site (i.e. 300m).	No archaeologically important places within the immediate vicinity of the project site (i.e. 300m).
Reserved/Protected Forests	Shyrwat Reserve Forest located in an arial distance 3.15 km Laitkor Protected Forest located at an arial distance of 1.28 km in the SSW direction, and Short Round Protected Forest located at an arial distance of 1.55 km in the NNE direction from Shillong Public School.	The nearest forest patches are Laitkor Protected Forest, located at an aerial distance of 0.27 km in the SE direction, and Riat Laban Reserved Forest, located at an arial distance of 0.96 km in the SW direction from Pine Mount School.	No reserved/protected forests located near Jowai Public School
National Parks/Wildlife Sanctuaries	No national park/sanctuary is located within the	No national park/sanctuary is located within the	No national park/sanctuary is located within the

Particulars	Shillong Public School	Pine Mount School	Jowai Public School
	immediate vicinity of the project site. The Nongkhyllem Wildlife Sanctuary is located approximately 25.5 Km arial distance from project site. The project site is not falling within the ESZ boundary of the sanctuary.	immediate vicinity of the project site. The Nongkhyllem Wildlife Sanctuary is located approximately 31 Km arial distance from project site. The project site is not falling within the ESZ boundary of the sanctuary.	immediate vicinity of the project site. The Narpuh Wildlife Sanctuary is located approximately 38 Km arial distance from project site. The project site is not falling within the ESZ boundary of the sanctuary.
Seismicity	East Khasi Hills district in the state of Meghalaya fall in Zone V.	East Khasi Hills district in the state of Meghalaya fall in Zone V	West Jaintia hills district in the state of Meghalaya fall in Zone V

E = east, ESZ = eco-sensitive zone, m = meter, N = north, NNE = north-north east, SW = southwest.
Source (Seismicity Information): (https://westjaintiahills.gov.in/disaster-management/#:~:text=The%20State%20of%20Meghalaya%20being,of%20human%20lives%20and%20properties.)

Table 12: Construction Materials

Shillong Public School	Pine Mount School	Jowai Public School
The proposed project has been designed as per the guideline of the Meghalaya Building by Laws 2021. RCC frame structure, plastering works flooring, false celling, Brick masonry work and insulated metal sheet proofing with supporting structural steel framework for multipurpose hall is proposed. The following climate resilient materials are proposed: 1. High albedo (solar heat reflective) paint over concrete roof slab have been considered. 2. Acoustical insulation for metal roofing system in multi-purpose halls 3. Perforated (acoustical) gypsum false ceiling in multi-purpose halls 4. Elastomeric membrane water proofing for concrete *chajjas* and canopies 5. Low VOC acrylic emulsion paint for interior walls and ceilings 6. Laminated wooden flooring in multi-purpose hall stage portion	The proposed project has been designed as per the guideline of the Meghalaya Building by Laws 2021. RCC frame structure, plastering works flooring, false celling, Brick masonry work and insulated metal sheet proofing with supporting structural steel framework for multipurpose hall is proposed. The following climate resilient materials are proposed: 1. High albedo (solar heat reflective) paint over concrete roof slab have been considered. 2. Acoustical insulation for metal roofing system in multi-purpose halls 3. Perforated (acoustical) gypsum false ceiling in multi-purpose halls 4. Elastomeric membrane water proofing for concrete *chajjas* and canopies 5. Low VOC acrylic emulsion paint for interior walls and ceilings 6. Laminated wooden flooring in multi-purpose hall stage portion	The proposed project has been designed as per the guideline of the Meghalaya Building by Laws 2021. RCC frame structure, plastering works flooring, false celling, Brick masonry work and insulated metal sheet proofing with supporting structural steel framework for multipurpose hall is proposed. The following climate resilient materials are proposed: 1. High albedo (solar heat reflective) paint over concrete roof slab have been considered. 2. Acoustical insulation for metal roofing system in multi-purpose halls 3. Perforated (acoustical) gypsum false ceiling in multi-purpose halls 4. Elastomeric membrane water proofing for concrete *chajjas* and canopies 5. Low VOC acrylic emulsion paint for interior walls and ceilings 6. Laminated wooden flooring in multi-purpose hall stage portion

Shillong Public School	Pine Mount School	Jowai Public School
7. High pressure laminate sheets (1.5mm thick) for door shutters 8. Epoxy resin-based flooring for laboratory rooms	7. High pressure laminate sheets (1.5mm thick) for door shutters 8. Epoxy resin-based flooring for laboratory rooms	7. High pressure laminate sheets (1.5mm thick) for door shutters 8. Epoxy resin-based flooring for laboratory rooms

mm = millimeter, RCC = reinforced cement concrete, VOC = volatile organic compound.
Source: DSC.

Table 13: Water Requirement

Shillong Public School	Pine Mount School	Jowai Public School
During construction phase, water will be required for construction of structures, sprinkling for dust suppression, domestic and non-domestic uses of the construction workers/camps etc. The approximate water requirement during construction stage is 4019.5 KL. This will be sourced from private tankers. During the operation phase, water will be required for domestic and other operational (washing, cleaning etc.) purposes. A total water requirement is estimated to be around 10.8 KLD for the operation of School. For continuous water supply at adequate pressure, complete water supply system is designed.	During construction phase, water will be required for construction of structures, sprinkling for dust suppression, domestic and non-domestic uses of the construction workers/camps etc. The approximate water requirement during construction stage is 796 KL. This will be sourced from private tankers. During the operation phase water will be required for domestic and other operational (washing, cleaning etc.) purposes. The total water requirement is estimated to be around 5.4 KLD for the operation of the school. For continuous water supply at adequate pressure, a complete water supply system is designed.	During construction phase, water will be required for construction of structures, sprinkling for dust suppression, domestic and non-domestic uses of the construction workers/camps etc. The approximate water requirement during the construction stage is 3651.05 KL. This will be sourced from private tankers. During the operation phase water will be required for domestic and other operational (washing, cleaning etc.) purposes. A total water requirement is estimated to be around 7.2 KLD for the operation of School. For continuous water supply at adequate pressure, complete water supply system is designed.

KL = kiloliter, KLD = kiloliter per day.
Source: DSC.

Table 14: Sewage and Effluent Treatment

Shillong Public School	Pine Mount School	Jowai Public School
The septic tank proposed with 33 cubic meters for 1 year. The septic tank shall be cleaned on a regular basis. The waste from the chemical laboratory may include minimal quantities of sodium hydroxide, potassium hydroxide, chemical reagents for identifying salts, and indicator substances, etc. A Chemical holding and neutralization tanks (30 gallon) have been proposed for storage and neutralization of chemical wastewater from laboratory and this waste shall be disposed of to an authorized hazardous waste	The septic tank is proposed with 10.40 cubic meters for 1 year. The septic tank shall be cleaned on a regular basis. The waste from the chemical laboratory may include minimal quantities of sodium hydroxide, potassium hydroxide, chemical reagents for identifying salts, and indicator substances, etc. A Chemical holding and neutralization tanks (30 gallon) have been proposed for storage and neutralization of chemical wastewater from laboratory and this waste shall be disposed of to an authorized hazardous waste	The septic tank proposed with 33 cubic meters for 1 year. The septic tank shall be cleaned on a regular basis. The waste from the chemical laboratory may include minimal quantities of sodium hydroxide, potassium hydroxide, chemical reagents for identifying salts, and indicator substances, etc. A Chemical holding and neutralization tanks (30 Gallon) have been proposed for storage and neutralization of chemical wastewater from laboratory and this waste shall be disposed of to an authorized hazardous waste

Shillong Public School	Pine Mount School	Jowai Public School
disposal vendor in consultation with Shillong Municipal Board. No chemical wastewater shall be directly disposed into the septic tank.	disposal vendor in consultation with Shillong Municipal Board. No chemical wastewater shall be directly disposed into the septic tank.	disposal vendor in consultation with Jowai Municipal Board. No chemical wastewater shall be directly disposed into the septic tank.

Source: DSC.

Table 15: Power Demand and Source

Shillong Public School	Pine Mount School	Jowai Public School
Electrical Load for the proposed project will be 27 KW. The power will be sourced from Meghalaya Energy Corporation Limited (MeECL). Diesel Generator set with a capacity of 15 KVA (10.8 KW) with inbuilt fuel storage capacity of 45 liters is proposed to be provided for back up supply in case of electricity failure. Solar power contribution will be 3 KW.	Electrical Load for the proposed project will be 11 KW. The power will be sourced from Meghalaya Energy Corporation Limited (MeECL). Diesel generators are not proposed for the project, because there is no lift proposed at the school and DG sets are proposed only to the facilities for lift power backup. Solar power contribution will be 3 KW.	Electrical Load for the proposed project will be 43 KW. The power will be sourced from Meghalaya Energy Corporation Limited (MeECL). Diesel Generator set with a capacity of 25 KVA (16 KW) with inbuilt fuel storage capacity of 65 liters is proposed to be provided for back up supply in case of electricity failure. Solar power contribution will be 3 KW.

KVA = kilo volt ampere, KW = kilowatt.
Source: DSC.

Table 16: DG Set Details

Shillong Public School		Pine Mount School		Jowai Public School	
DG Capacity in KVA	**No. of DG Set**	**DG Capacity in KVA**	**No. of DG Set**	**DG Capacity in KVA**	**No. of DG Set**
15 KVA (10.8 KW)	1	N/A	N/A	25 KVA (16 KW)	01

DG = diesel generator, KVA = kilo volt ampere, KW = kilowatt, N/A = not available.
Source: DSC.

Table 17: Traffic Circulation and Parking Details

Shillong Public School	Pine Mount School	Jowai Public School
Traffic circulation during construction by diverting vehicular and pedestrian traffic by the contractor in consultation with approval of traffic authority. Surface parking area has been demarcated on Site Plan. To facilitate user provision for parking spaces of 16 cars has been planned.	Traffic circulation during construction by diverting vehicular and pedestrian traffic by the contractor in consultation with approval of traffic authority. No car parking has been proposed.	Traffic circulation during construction by diverting vehicular and pedestrian traffic by the contractor in consultation with approval of traffic authority. Surface parking area has been demarcated on Site Plan. To facilitate user provision for parking spaces of 12 cars near multipurpose hall has been planned.

Source: DSC.

Table 18: Landscaping

Shillong Public School	Pine Mount School	Jowai Public School
The aim of the landscape theme is to create an enabling healing environment for the students. The overall visual of the space is intended to increase green density with native and local plantation based on the climatic conditions of the site. The area proposed for landscaping is 90 sq.m (area on site is provided in Appendix 3.6). Total number of trees to be planted are 60 (considering 1:10 ratio plantation), the final number will be decided by the forest department at the time of taking permission for tree felling.	The aim of the landscape theme is to create an enabling healing environment for the students. The overall visual of the space is intended to increase green density with native and local plantation based on the climatic conditions of the site. The area proposed for landscaping is 230 sq.m (area on site is provided in Appendix 3.6). Total number of trees to be planted are 50 (considering 1:10 ratio plantation), the final number will be decided by the forest department at the time of taking permission for tree felling.	The aim of the landscape theme is to create an enabling healing environment for the students. The overall visual of the space is intended to increase green density with native and local plantation based on the climatic conditions of the site. The area proposed for landscaping is 320 sq.m (area on site is provided in Appendix 3.6). Total number of trees to be planted are 70 (considering 1:10 ratio plantation), the final number will be decided by the forest department at the time of taking permission for tree felling.

sq.m = square meter.
Source: DSC.

Table 19: Boundary Wall

Shillong Public School	Pine Mount School	Jowai Public School
School is compounded with boundary wall.	School is compounded with boundary wall. Some portion of boundary wall need to renovate.	School is compounded with boundary wall.

Source: DSC.

Table 20: Signage

Shillong Public School	Pine Mount School	Jowai Public School
Signages are proposed at the main entrance locations of the school, at the parking area and emergency exit. Different types of signages provided are entrance signages, directional signages, safety signages, informational signages, evacuation diagrams, parking signages, hazard warnings etc. The details of signages, project information boards, and GRM are provided in Appendix 3.7. Evacuation plans are provided in Appendix 3.8.	Signages are proposed at the main entrance locations of the school, at the parking area and emergency exit. Different types of signages provided are entrance signages, directional signages, safety signages, informational signages, evacuation diagrams, parking signages, hazard warnings etc. The details of signages, project information boards, and GRM are provided in Appendix 3.7. Evacuation plans are provided in Appendix 3.8.	Signages are proposed at the main entrance locations of the school, at the parking area and emergency exit. Different types of signages provided are entrance signages, directional signages, safety signages, informational signages, evacuation diagrams, parking signages, hazard warnings etc. The details of signages, project information boards, and GRM are provided in Appendix 3.7. Evacuation plans are provided in Appendix 3.8.

GRM = grievance redress mechanism.
Source: DSC.

B. Implementation Schedule:

45. The implementation period for all three components is 36 months. The drawings for all three components have been prepared by the Design and Supervision Consultant (DSC) and these are in approval process. This draft IEE will be updated based on final designs before contract award or before the start of construction. The construction is expected to start by the 2nd quarter of 2025. The components construction is expected to be completed by 1st quarter of 2028.

IV. BASELINE ENVIRONMENTAL DESCRIPTION

46. This chapter describes the existing environmental settings of the project area and its surroundings. This includes physical environment (comprising air, water and noise components etc.), biological environment and socio-economic environment.

47. **Study Area.** The proposed project sites are located as follows: a) Shillong Public School is located in Shillong Municipality and the cantonment block of East Khasi Hills district; b) Pine Mount School is located in Shillong Municipality and the cantonment block of East Khasi Hills district; and c) Jowai Public School is located in the Thadlaskein block of West Jaintia Hills district in Meghalaya. A 10 km radius from the proposed project site boundary and 500 m (primary survey) around the proposed component areas have been considered as study areas for environmental baseline conditions. District-level secondary information was also collected for various environmental and social components, irrespective of any demarcated limit. Baseline data for all environmental parameters will be updated prior to commencement of works. The maps used in the Chapter are not up to the scale and indicative in nature (used for general referencing only).

A. Physical Environment

48. **Location of Shillong Public School:** Shillong Public School is in Shillong, in the East Khasi Hills district of Meghalaya State. The school is located at 25°34'29.17"N and 91°53'55.78"E. The East Khasi Hills district is bounded by Ri-Bhoi district on the north, Karbi Anglong district on the northeast, Jaintia Hills district on the east, Bangladesh on the south, and West Khasi Hills district on the west.

49. Shillong is the district headquarters of East Khasi Hills district as well as the state capital. It is a hill station with unique natural scenic beauty, which makes it an ideal resort throughout the year. The district is well connected with motorable roads throughout its length and breadth.

50. The major environmentally sensitive features present within a 10-kilometer radius of the project site is shown in Figure 8. The project site is clear of any environment-sensitive features like protected areas, coastal regulatory zones, national parks, wildlife sanctuaries, biosphere reserves, tiger reserves, reserved and protected forests, wetlands under Ramsar and protected monuments etc.

51. **Location of Pine Mount School:** Pine Mount School is in Shillong, in the East Khasi Hills district of Meghalaya State. The school is located at 25°33'54.40"N and 91°52'49.66"E. The East Khasi Hills district is bounded by Ri-Bhoi district on the north, Karbi Anglong district on the northeast, Jaintia Hills district on the east, Bangladesh on the south, and West Khasi Hills district on the west.

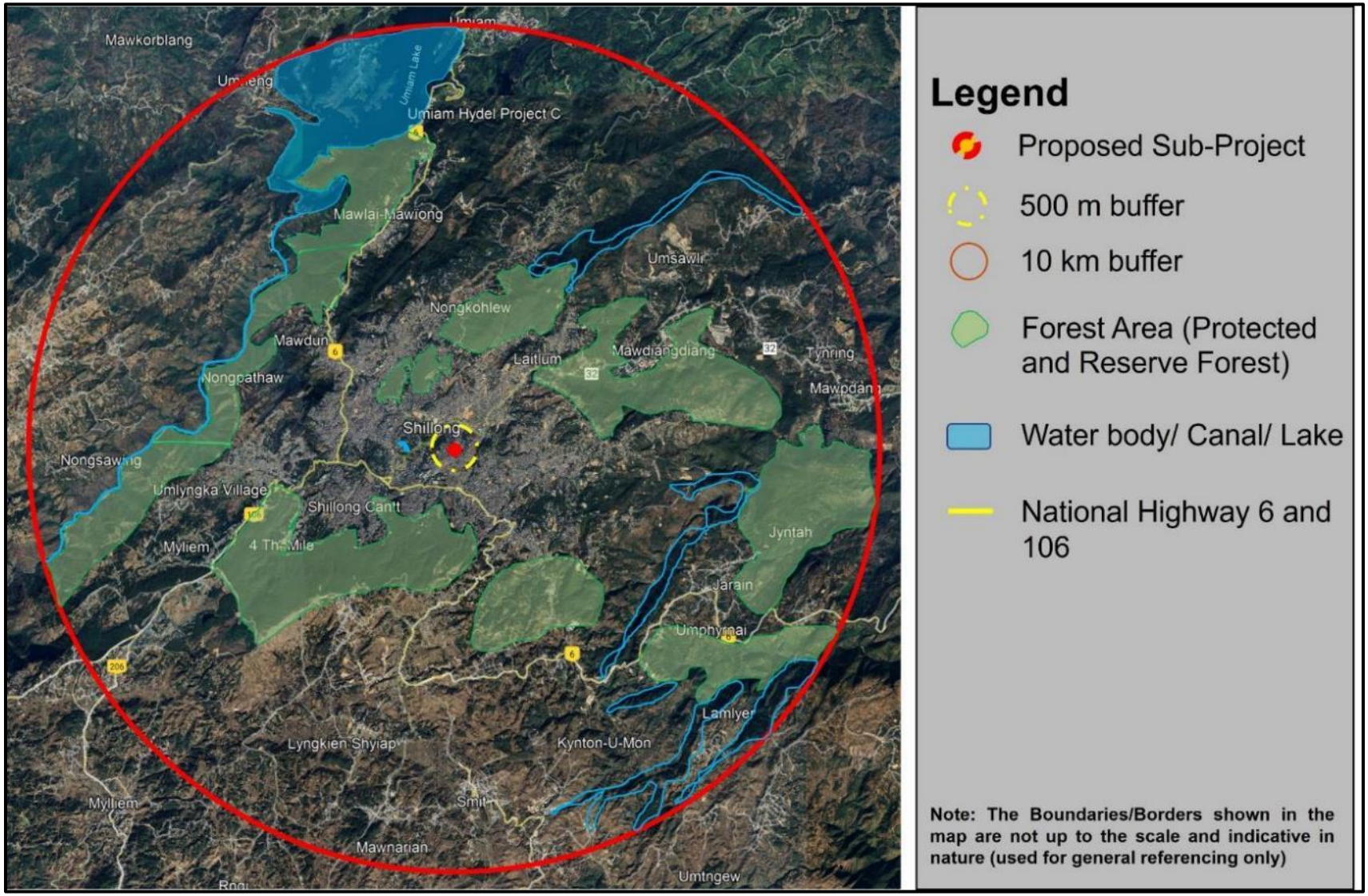
52. Shillong is the district headquarters of East Khasi Hills district as well as the state capital. It is a hill station with unique natural scenic beauty, which makes it an ideal resort throughout the year. The district is well connected with motorable roads throughout its length and breadth.

53. The major environmentally sensitive features present within a 10-kilometer radius of the project site are shown in Figure 9. The project site is clear of any environment-sensitive features like protected areas, coastal regulatory zones, national parks, wildlife sanctuaries, biosphere reserves, tiger reserves, reserved and protected forests, wetlands under Ramsar and protected monuments etc. The nearest forest patches are Laitkor Protected Forest, located at an aerial distance of 0.27 km in the SE direction, and Riat Laban Reserved Forest, located at an arial distance of 0.96 km in the SW direction from Pine Mount School.

54. **Location of Jowai Public School:** Jowai Public School is in the West Jaintia district of Meghalaya State. The school is located at 25°34'29.17"N and 91°53'55.78"E. The West Jaintia Hills district is bounded by Assam on the north, Bangladesh and East Jaintia Hills district on the south, Assam on the east, and East Khasi Hills district on the west. Jowai is the district headquarters of West Jantia Hills.

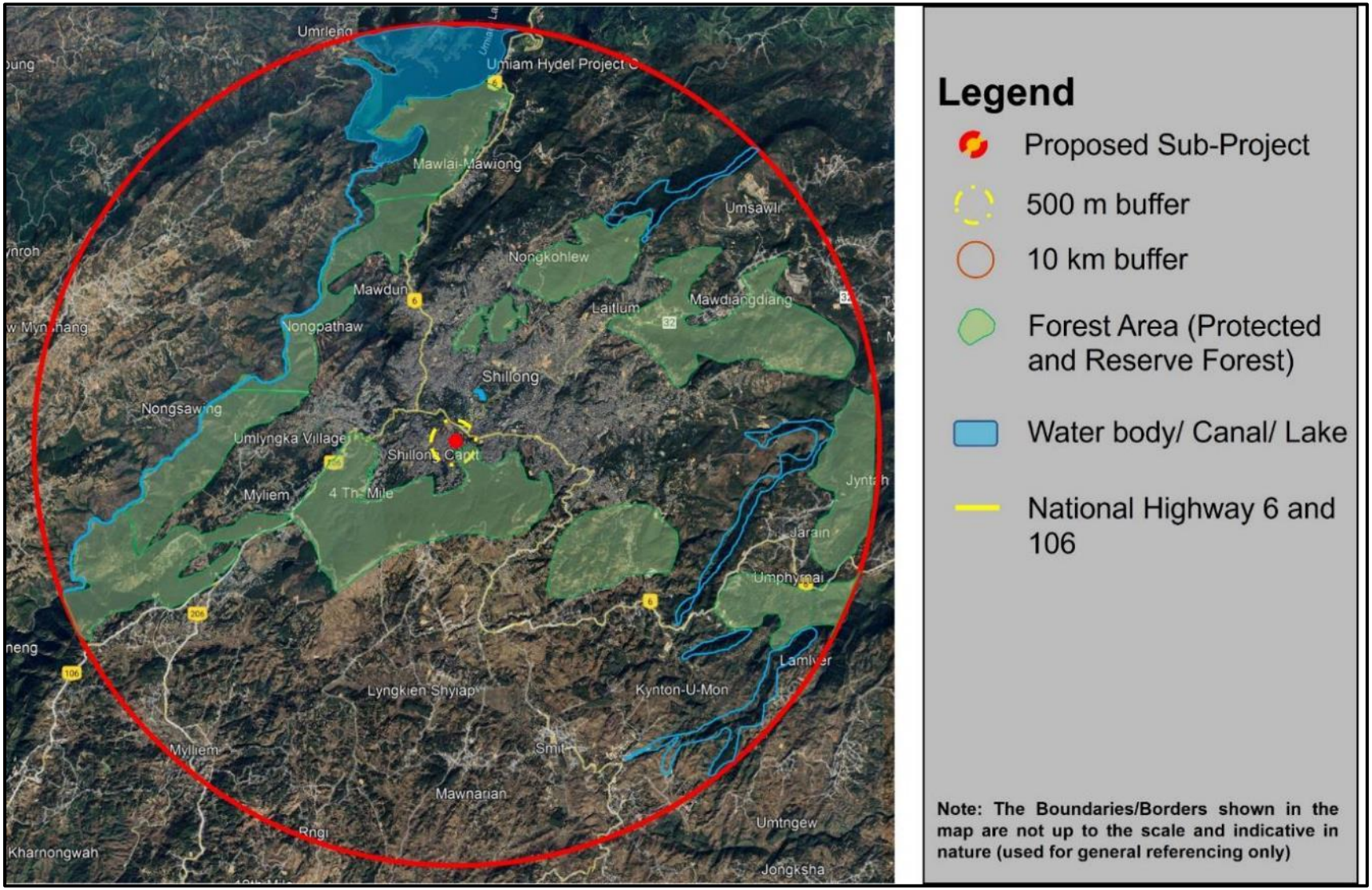
55. The major environmentally sensitive features present within a 10-kilometer radius of the project site is shown in Figure 10. The project site is clear of any environment-sensitive features like protected areas, coastal regulatory zones, national parks, wildlife sanctuaries, biosphere reserves, tiger reserves, reserved and protected forests, wetlands under Ramsar and protected monuments etc.

Figure 8: Map Showing Environmental Sensitive Features in the Study Area (10 km) around Shillong Public School



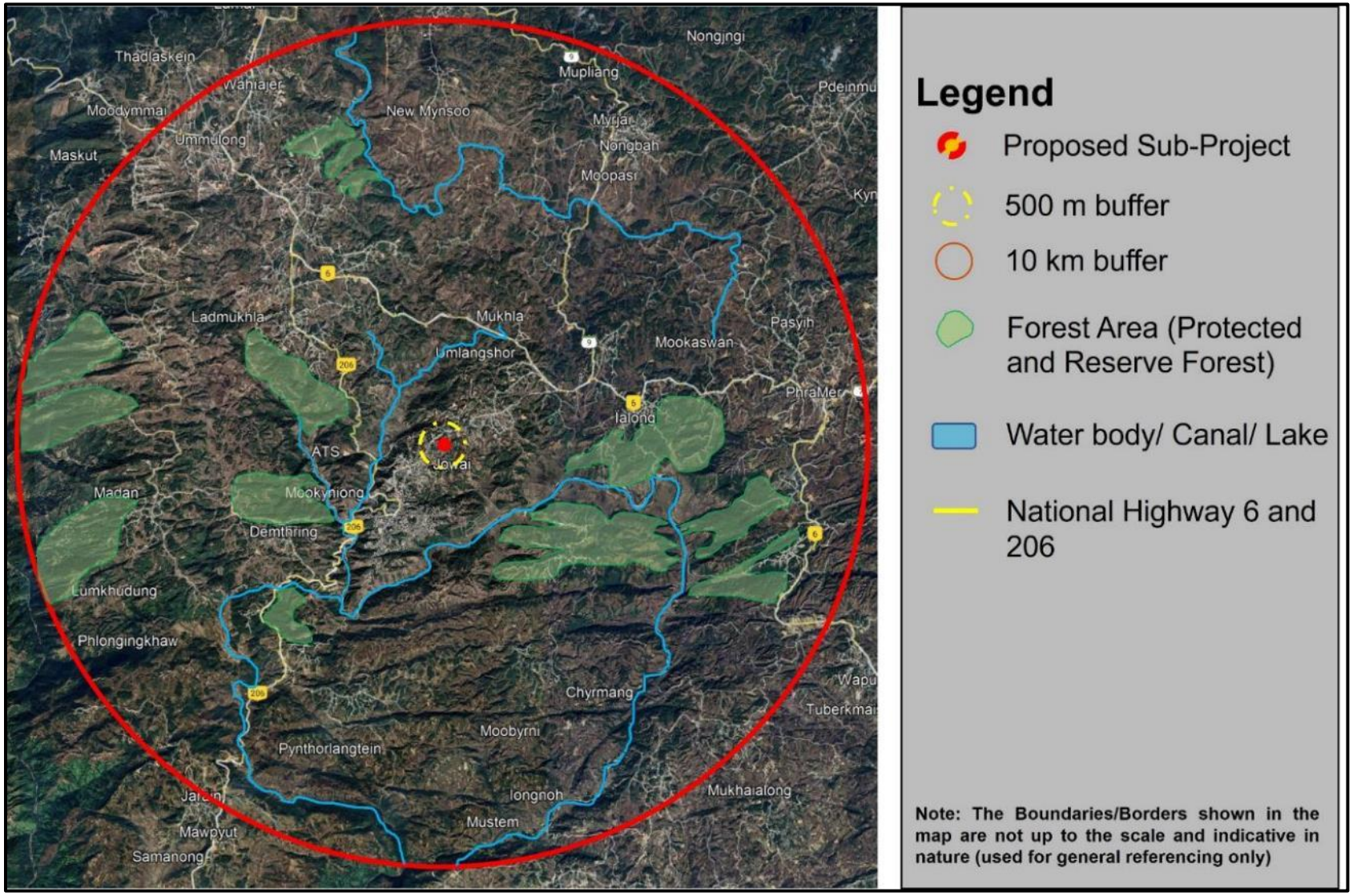
Source: *Primary Survey, Desktop Analysis and Google Earth*

Figure 9: Map Showing Environmental Sensitive Features in the Study Area (10 km) around Pine Mount School



Source: *Primary Survey, Desktop Analysis and Google Earth*

Figure 10: Map Showing Environmental Sensitive Features in the Study Area (10 km) around Jowai Public School



Source: *Primary Survey, Desktop Analysis and Google Earth*

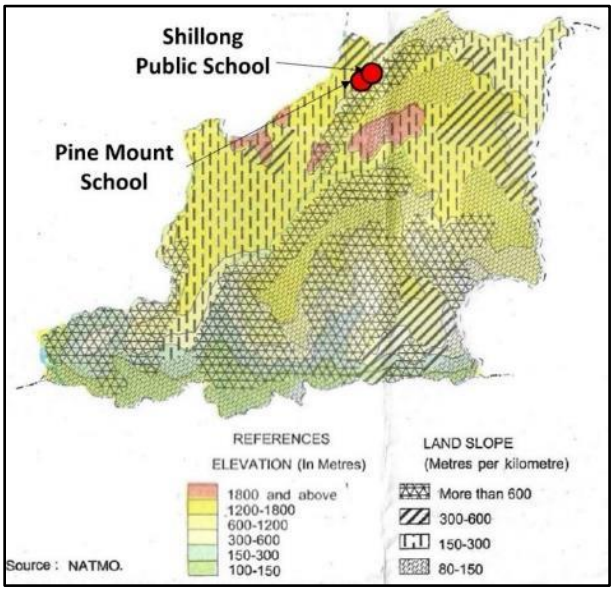
56. **Topography and Physiography of East Khasi Hills District covering Shillong Public School and Pine Mount School:** The East Khasi Hills district is mostly hilly, with deep gorges and ravines on the southern portion. The most important physiographic features of the district are the Shillong Plateau, which is interspersed with a river valley and then falls sharply in the southern portion, forming deep gorges and ravines in Mawsynram and Shella-Bholaganj, bordering Bangladesh. Shillong Peak, lying 10 km from the city, offers a panoramic view of the scenic countryside and is also the highest point in the district as well as in the state.[19]

57. **Topography and Physiography of West Jaintia Hills District covering Jowai Public School:** Topographically, the West Jaintia Hills district is an undulatory one (it varies from a gently rolling type to a highly undulating type). The area is irregular in shape. The Hills ranges rise to a maximum altitude of 1400 m above mean sea level (msl). The lowest point in the area is situated above the bank of the Umngot River at an elevation of 190 m above msl. The general topography of the area is undulating, often covered with grassy blanks of enormous size, dotted with pine trees individually or in small groups. The ground is generally gentle sloping, with slopes varying between 10 percent and 280 percent. It is only near the tributaries of rivers that the ground becomes comparatively steeper based on the elevation. The land can be divided into three physiographic units. (i) Intermediate plateau with gradient above 33 percent slope; (ii) Lower plateau with gradient ranges from 15 to 33 percent slope; (iii) Valley rolling, undulating almost flat gradient ranging from 1 to 15 percent slope. The area is mainly drained by the Umngot River. The overall drainage patterns vary from normal to a naturally high system.[20]

58. The elevation of the site Shillong Public School is ranging from 1540.7 m to 1555.6 m (5055 ft to 5104 ft) above msl, elevation of the site Pine Mount School is ranging from 1536.8 m to 1552 m (5042 ft to 5092 ft) above msl, and the elevation of the site Jowai Public School is ranging from 1402.6 m to 1412.7 m (4602 ft to 4635 ft) above msl.

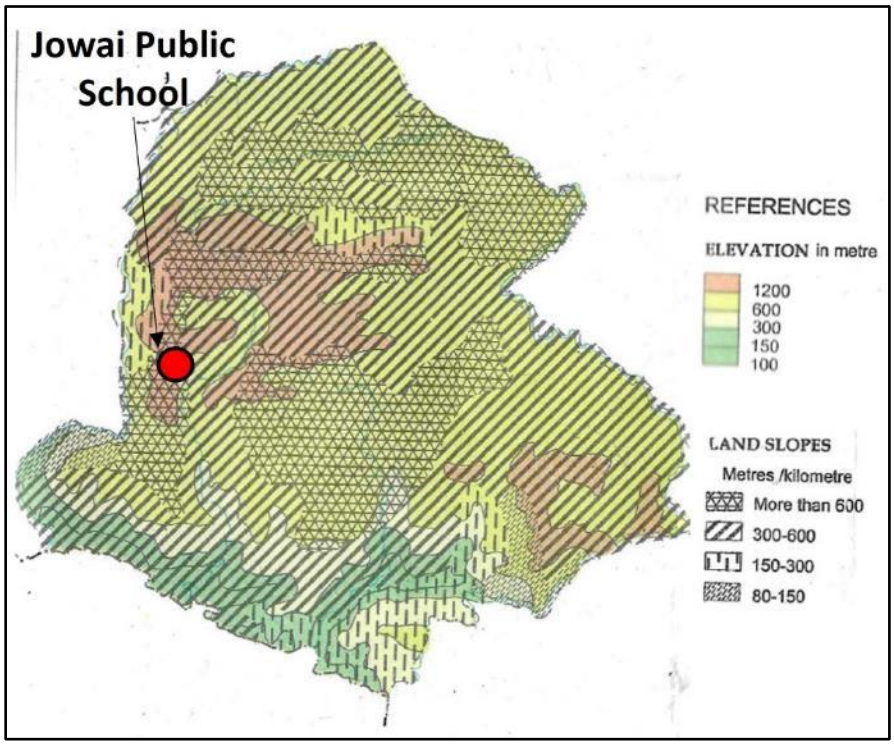
[19] Brief Industrial Profile of East Khasi Hills District by MSME - https://dcmsme.gov.in/old/dips/DIPEastKashiHills.pdf
[20] Detailed Project Report of Integrated Watershed Management - https://megsoil.gov.in/iwmp/2013-14/DPR%20WJH%20IWMP%20X.pdf

Figure 11: Slope and Elevation Map of East Khasi Hills District



Source: National Atlas and Thematic Mapping Organization (1991)

Figure 12: Slope and Elevation Map of West Jaintia Hills District



Source: National Atlas and Thematic Mapping Organization (1991)

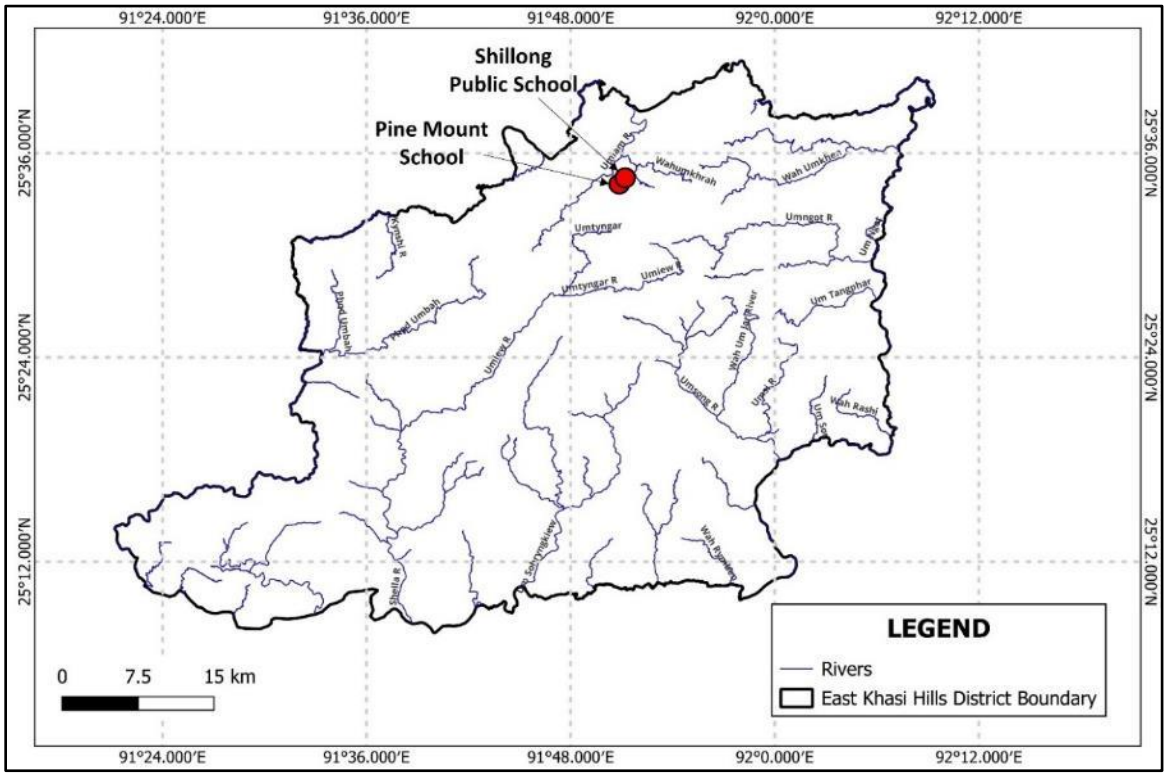
59. Inferring from the above maps, the sites Shillong Public School, Pine Mount School and Jowai Public School fall under the slope range of more than 600 meters/kilometers. The proposed sites are not steep.

60. **Drainage of East Khasi Hills District covering Shillong Public School & Pine Mount School:** The topography controls the drainage system as it divides the state into two watersheds, namely the Brahmaputra system in the north and the Meghna/Surma system in the south. The drainage of the district in the north flows toward the Brahmaputra River, and in the south, the rivers flow towards the Bangladesh plains into the Surma River. The important rivers in the northern part are Umtrew, Umiam, and Umkhen. The Umtrew (or Digaru) River originates from the west of the Sohpetbneng range in East Khasi Hills district, near Lum Raitong. It flows towards the west until it meets the waters of the Umiam River, which is being diverted by the Umiam Hydel Project. In the southern part, rivers Umiew (or Shella, also known as Bagra), Umngot, Umngi (Balat), etc., all tributaries of the Surma, originating from the southern slopes of Khasi Hills, drain one of the world's heaviest rainfall areas and flow southwards into Bangladesh.[21] The Umiam Hydel Project is at 8.42 km and 10 km from Shillong Public School and Pine Mount School respectively.

61. Map showing the drainage of the East Khasi Hills district with the components Shillong Public School and Pine Mount School is shown in the Figure 13. A seasonal drain is passing through the boundary of the site Shillong Public School (about 3 meters from the proposed school building which is acceptable according to the Meghalaya Building Bye Law (Section B-B2 of C), the setback shall be 2.4m) and no waterbody is passing through the site Pine Mount School components (nearest surface water is Umpsyrpi River at 500 meters). During community consultation, it was informed that there will be an issue of waterlogging at the low-lying areas near the Shillong Public School during monsoon season.

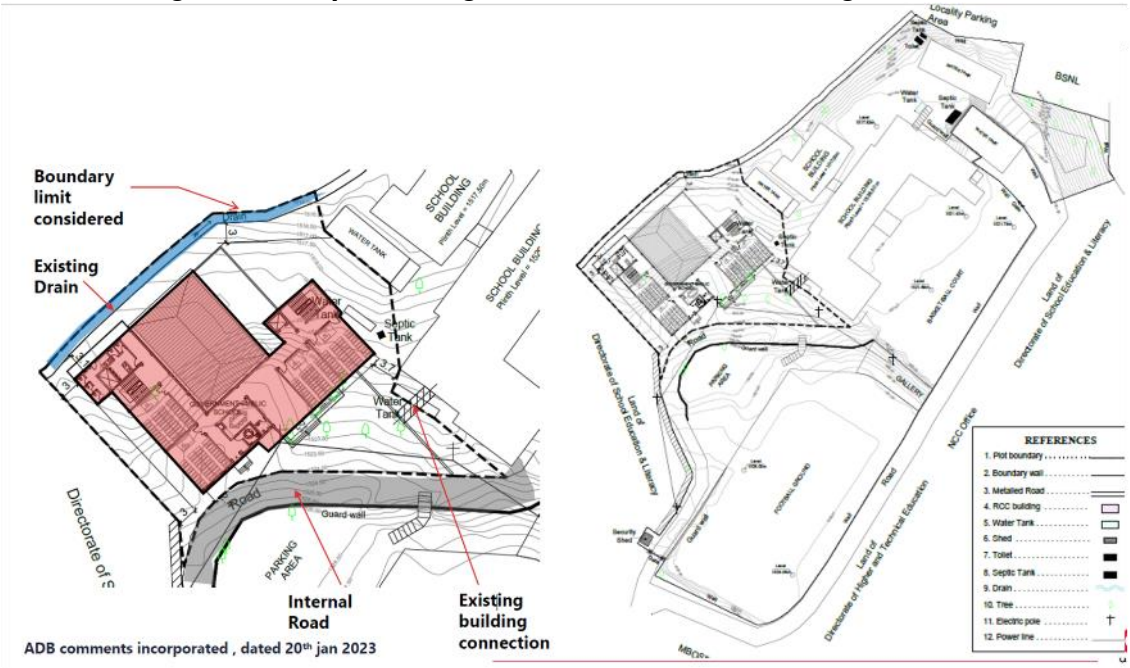
[21] Aquifer Mapping and Management of Ground Water Resources East Khasi Hills District, Meghalaya - https://www.cgwb.gov.in/cgwbpnm/public/uploads/documents/16843861411116154445file.pdf

Figure 13: Drainage Map of East Khasi Hills District



Source: Water Resource Department, Shillong (Primary Data)

Figure 14. Map Showing Seasonal Drain in Shillong Public School



Source: DSC.

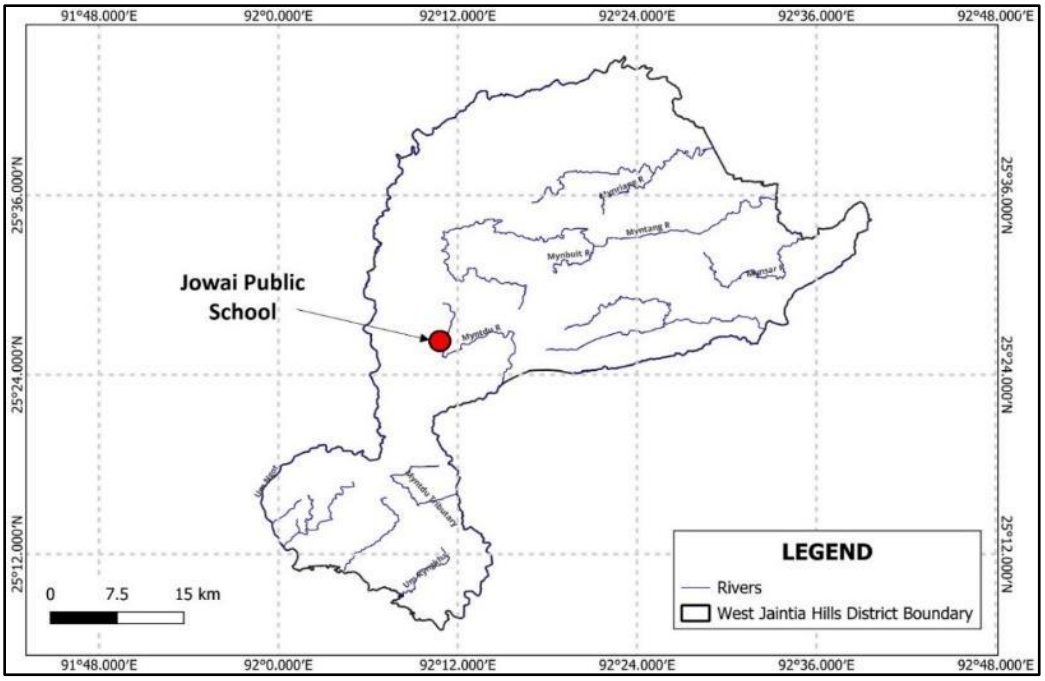
62. **Drainage of West Jaintia Hills District covering Jowai Public School:** The drainage system of the district is controlled by topography. The drainage pattern of dendritic, rectangular types is found in the area, which indicates both topographic and structural control. Broadly, there are mainly two watersheds in the district, one flowing in the northern direction toward the Brahmaputra and the other in the south, towards the Surma valley in Bangladesh. The important rivers flowing to the Brahmaputra are Kopili, Myntang, and Mynriang, and the main rivers flowing to the Surma valley are Myngngot (Umngot), Myntdu, and Wah Prang. The drainage pattern is sub-parallel to parallel. It is being controlled by joints and faults, as indicated by the straight courses of the rivers and streams with deep gorges. The drainage map of the West Jaintia Hills district is given in Figure 15. However, rivers within a 10-kilometer radius of the proposed project are depicted in Table 21. No waterbody is passing through the project site.

Table 21: Rivers in the Study Area

S. No.	Name of the River	Distance from Jowai Public School
1.	Myntdu River	2.36 km, S
2.	Umngot (Beyond 10km)	10.44, W

km = kilometer, S= south, W = west.
Source: Desktop Analysis.

Figure 15: Drainage Map of West Jaintia Hills District



Source: Water Resource Department, Shillong (Primary Data)

63. **Geology of Meghalaya:** Geologically, the Meghalaya plateau comprises rocks from the oldest Precambrian gneissic complex to the recent alluvium formations. The stratigraphic sequence is as follows:

- Cretaceous-Tertiary sediments
- The Sylhet trap

- Lower Gondwana rocks
- Shillong Group of Rocks
- Precambrian gneissic complex (basement gneiss)

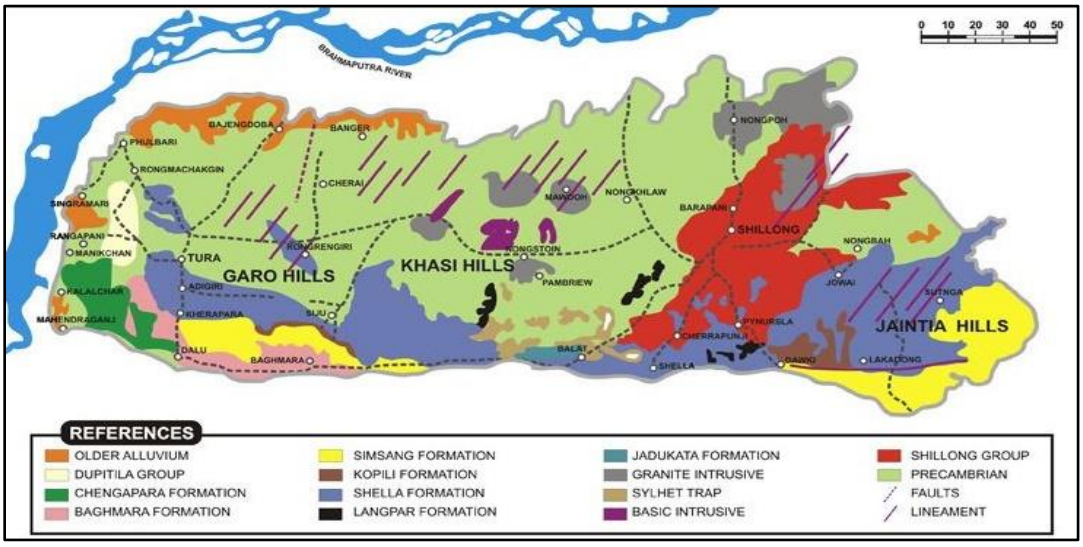
64. The Precambrian gneissic complex, comprising para and orthogneisses, migmatites, and the Shillong Group of rocks, comprising mainly quartzytes, is exposed in the central, eastern, and northern parts of the Meghalaya plateau. They are intruded by basic and ultrabasic intrusives and late-tectonic granite plutons.

65. The Sylhet trap of the middle Jurassic age, comprising mainly basalt, rhyolites, and acid tuffs, is exposed in a narrow E-W strip along the southern border of Khasi Hills.

66. The Cretaceous-tertiary sediments occupying the southern part of the Meghalaya plateau comprise the Khasi Group (arenaceous facies), the Jaintia Group (calcareous facies), and the youngest formation, the Garo Group, which is represented as the Simsang, Bagmara, and Chengapara formations.

67. Besides these, the Dupi Tilla group of mid-Pliocene age occurs in the western part of Garo Hills and towards the south of Khasi Hills. Isolated patches of older alluvium overlie the Tertiary rocks along the southern and western borders of the state. The recent alluvium formation is mostly found in the river valleys of Garo and Khasi Hills districts.

Figure 16. Geological and Tectonic Map of Meghalaya

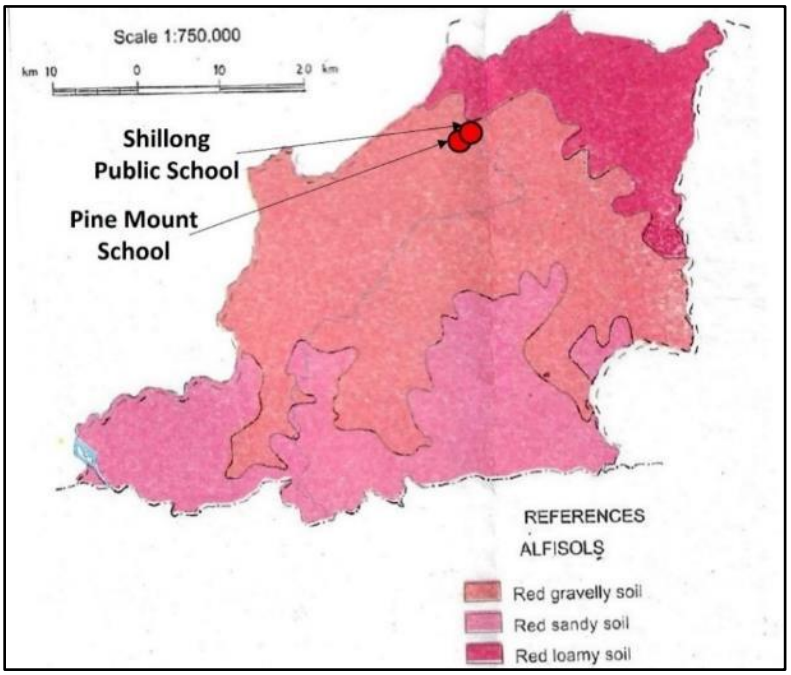


Source: Department of Mining & Geology.

68. The location of Shillong Public School and Pine Mount School falls under the category of red gravelly soils as shown in the Figure 17. Red gravelly soils typically have a coarse texture and low organic matter content, which can lead to increased susceptibility to erosion. Red gravelly soils may pose challenges for construction due to their stability and load-bearing capacity.

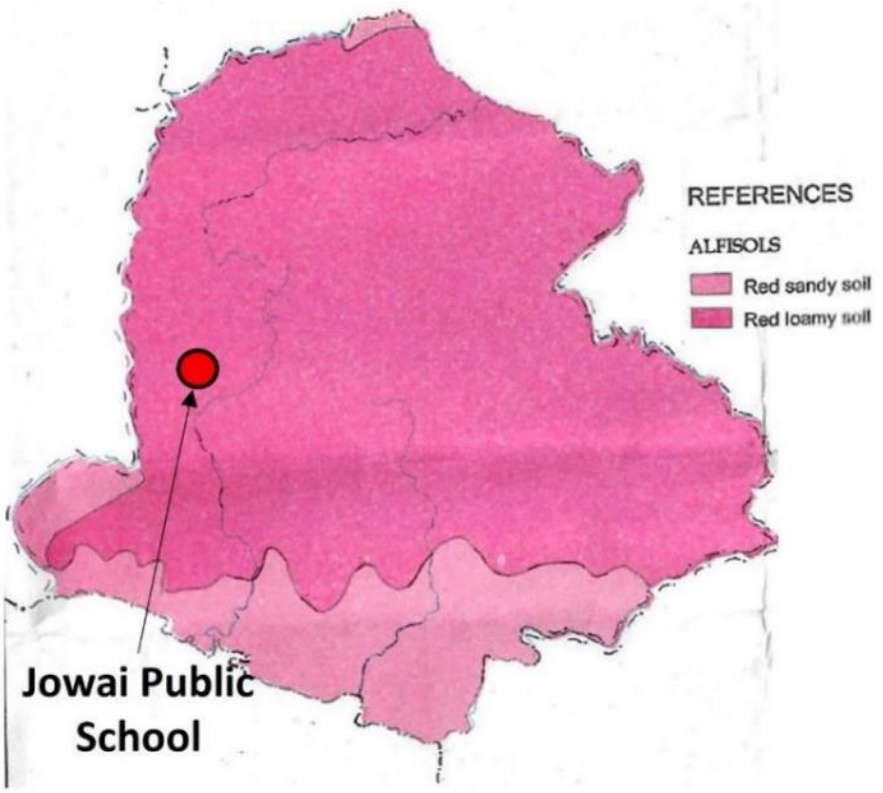
69. The location of Jowai Public School falls under the category of red loamy soil as shown in the Figure 18. Red loamy soils, while generally more stable than gravelly soils, can still be prone to erosion. Red loamy soils typically have good water retention capacity due to their clay content.

Figure 17. Soil types of East Khasi Hills District



Source: National Atlas and Thematic Mapping Organization (1991)

Figure 18: Soil types of West Jaintia Hills District



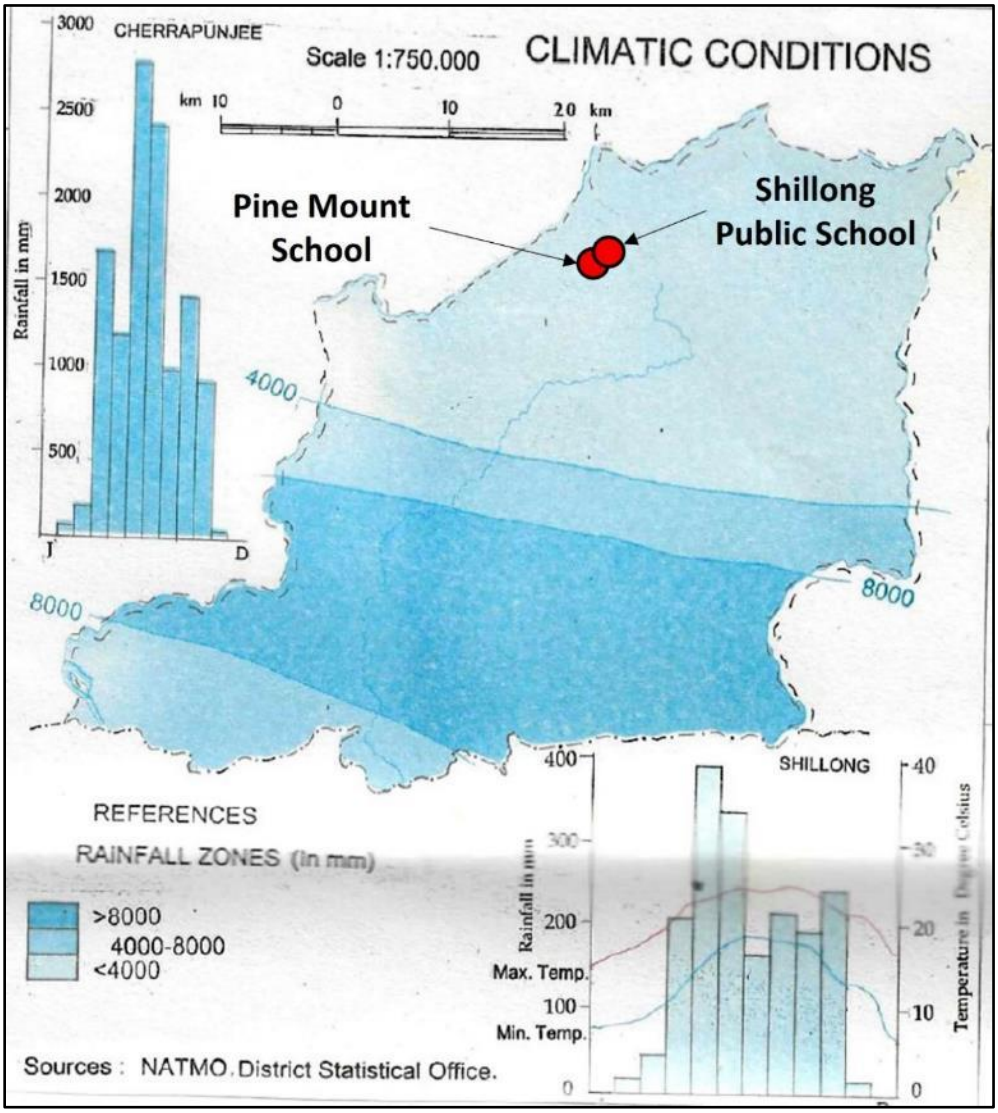
Source: National Atlas and Thematic Mapping Organization (1991).

70. **Climate and Rainfall of East Khasi Hills District covering Shillong Public School & Pine Mount School:** The district has the unique distinction of having the wettest place on earth, i.e., Mawsynram, with an average annual rainfall of about 12,270mm. This is followed by the second-wettest place, called Cherrapunjee, with an average annual rainfall of 11,600 mm. Southwest monsoons originating from the Bay of Bengal and the Arabian Sea directly relate to the high rainfall received by the region. The high-altitude areas of the district experience a temperate humid climate, and the low-altitude areas experience a tropical to sub-tropical humid climate. The whole year can be divided into four seasons: summer, rainy, autumn, and winter. The temperature varies from 1.7°C to 24°C.[22]

71. The location of Shillong Public School and Pine Mount School falls under the rainfall zone of < 4000 mm as shown in the Figure 19.

[22] Aquifer Mapping and Management Plan of East Khasi Hills District, Meghalaya" by the Central Ground Water Board: https://www.cgwb.gov.in/cgwbpnm/public/uploads/documents/16843861411116154445file.pdf

Figure 19: Climatic Conditions of East Khasi Hills District



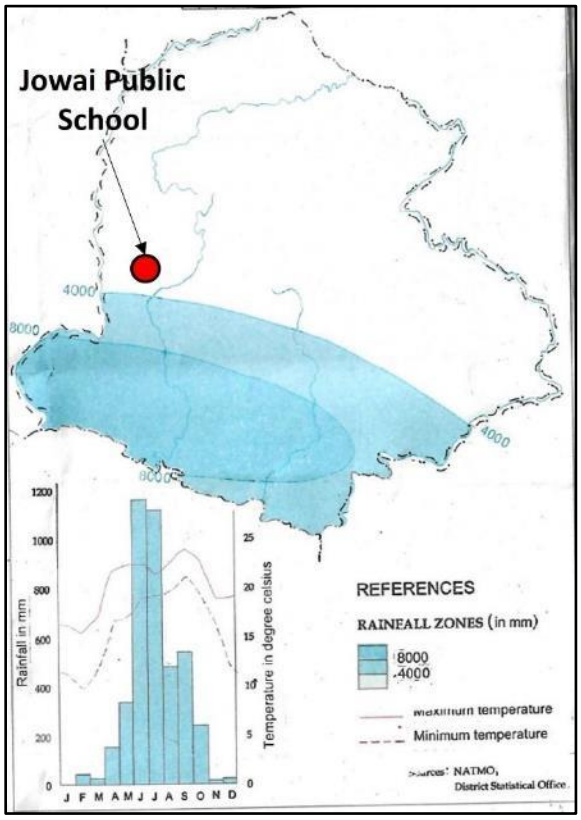
Source: National Atlas and Thematic Mapping Organization (1991)

72. **Climate and Rainfall of West Jaintia Hills District covering Jowai Public School.** The climate shows a variation from the warm, humid tropical in the plains in the eastern and southern parts, and a temperate climate is experienced in the western part around the district headquarter, Jowai. The climatic conditions vary substantially from place to place due to wide differences in altitude. Therefore, according to the prevailing weather conditions over the years, the district can be grouped into four conspicuous seasons: the winter season, the pre-monsoon season, the monsoon season, and the retreating season. The rainfall profile is very high during the south-west monsoon, which usually starts in the middle of May and declines towards the last part of September. The intensity of rainfall in the district during the last few years has registered a rising trend due to the untimely vagaries of the monsoon coupled with the existence of fogs, mists, and nimbus clouds that loom large during the rainy season. The average relative humidity is highest

during the month of July, while December records the lowest relative humidity. The total annual rainfall in the district during the year 2015 was recorded at 9793.8mm at Jowai. The district receives high rainfall throughout the year. Most of the precipitation occurs between April and September. The monthly maximum rainfall of 2864.4mm was recorded in June 2015 at the same rain gauge station. The average temperature in the district (at Jowai) varies from a minimum of 13 °C (Jan) to a maximum of 25 °C (Sep-Oct). During 2015, relative humidity in the district (at Jowai) varied from a minimum of 45% (Dec) to a maximum of 95% (June).

73. Jowai Public School falls under the rainfall zone of < 4000 mm as shown in the Figure 20.

Figure 20: Climatic Conditions of West Jaintia Hills District

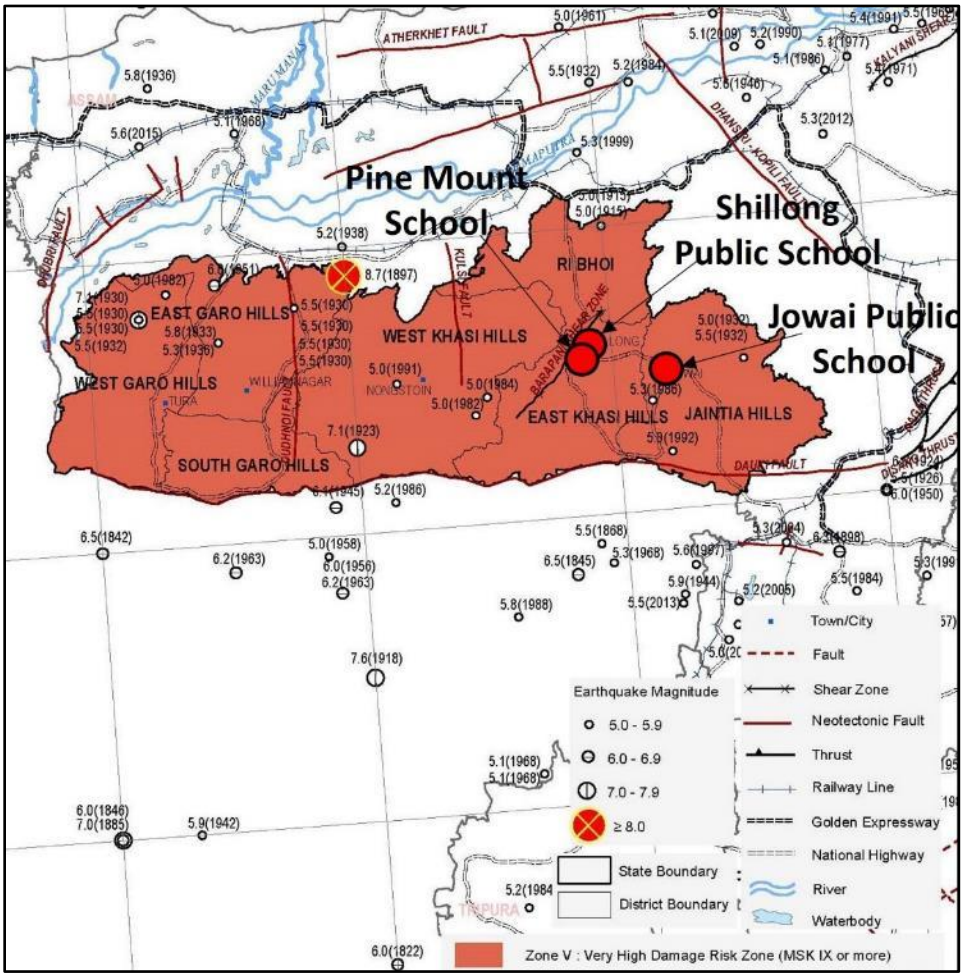


Source: National Atlas and Thematic Mapping Organization (1991).

74. **Natural Hazards and Climatic Disasters of Meghalaya: Seismicity:** The State of Meghalaya, being situated in Seismic Zone V, is highly vulnerable to earthquakes. During 1897, the state was severely affected by an 8.7-magnitude earthquake, which resulted in untold misery. The earthquake of 8.5 magnitudes that occurred in 1950 also caused the loss of human lives and properties. The state experiences several low- to medium-intensity earthquakes regularly. The recent earthquake in Shillong occurred in 1897 with a magnitude of 8.7. Apart from earthquakes,

it is affected by a few landslides, storms, flash floods, fire accidents, road accidents, and other kinds of hazards.[23] The seismic map of Meghalaya is depicted in the Figure 21.

Figure 21: Earthquake Hazard Map of Meghalaya



Source: BMTPC Vulnerability Atlas of India.

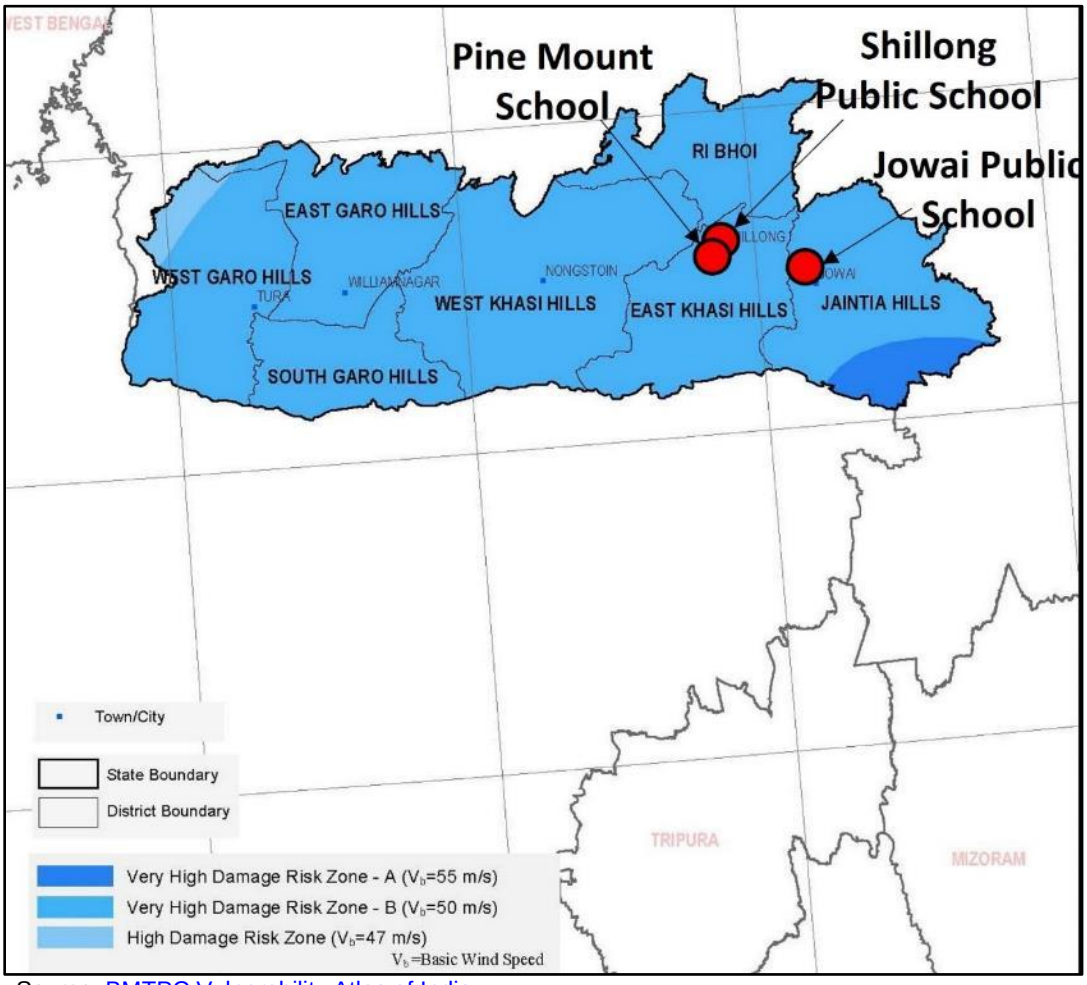
75. The complete state of Meghalaya falls under seismic zone V, a very high damage risk zone (MSK IX or more). Shillong Public School and Pine Mount Scholl are near the Barapani Shear Zone, and Jowai Public School is in the magnitude zone of 5.0–5.9. The last earthquake in Jowai occurred in 1986 with a magnitude of 5.3.

76. **Cyclones:** The districts of West Jaintia Hills and East Jaintia Hills may experience a wind speed of up to 55 m/s. Occasional cyclones do occur in western Meghalaya their severity being more during monsoon season. The districts Southwest Garo Hills, South Garo Hills, Southwest Khasi Hills, and West Khasi Hills, fall in a very high cyclonic zone due to their proximity to the Bay of Bengal (which is a cyclone basin). In this zone, wind speeds can reach up to 50 m/s, which can

[23] Disaster Management Plan West Jaintia Hills District - https://cdn.s3waas.gov.in/s384f7e69969dea92a925508f7c1f9579a/uploads/2018/12/2018120584.pdf

cause large-scale damage. The recent cyclone occurred in East Jaintia Hills, Meghalaya on 28th May 2024 with a wind speed of 60 km per hour. The Bay of Bengal accounts for seven percent of the annual tropical cyclone activity worldwide; the recorded frequency of cyclones per year along the Bay of Bengal is four, and inevitably one of the four transforms into a severe cyclone, causing human and property losses.[24]

Figure 22: Wind Hazard Map of Meghalaya



Source: BMTPC Vulnerability Atlas of India.

77. The locations of Shillong Public School, Pine Mount School and Jowai Public School fall under the wind hazard category of very high damage risk zone B (V_b = 50 m/s)

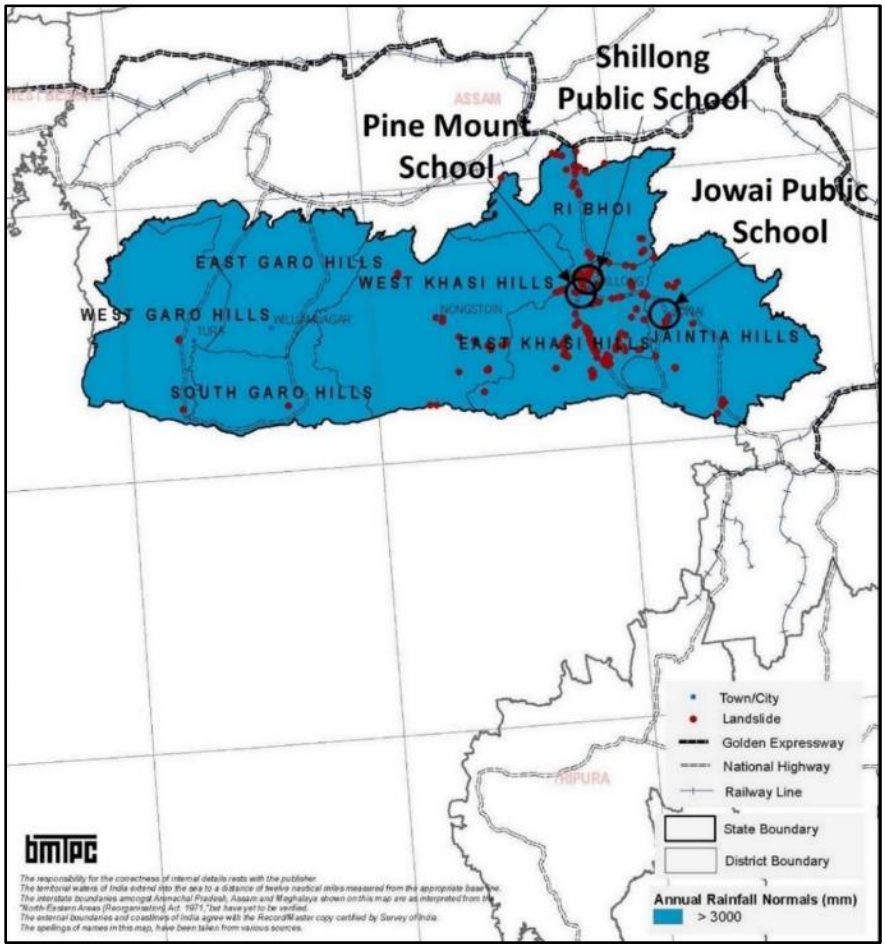
78. **Floods:** The state with hilly terrain does not suffer from major problem from floods. However, due to heavy rain, flash floods may be caused, resulting in riverbank erosion and some local damage. In Meghalaya, floods occur in river valleys when flow exceeds the capacity of the river channel, particularly at bends or meanders. The plain areas of Meghalaya adjoining Assam

[24] Report of Meghalaya State Disaster Management Plan, 2016 - https://megrevenuedm.gov.in/reports/Meghalaya_State_Disaster_Management_Plan_Volume2.pdf

are affected by floods due to the backflow of water from the River Brahmaputra during the flood season between June and October. The tributaries like Krishnai, Jinari, Jingjiram, Rongai, Dudhnoi, Ringgi, Gohai, Dilni, etc. cause flooding in the plain areas of the state. Water logging is a common problem in many low-lying areas of Shillong during monsoon.

79. **Landsides:** Meghalaya, being a hilly terrain, is prone to landslides. Every year, a few landslides have been reported from various localities. Landslides are primarily attributed to high slopes, immature geology, neo-tectonic activity, heavy rainfall, and unplanned and improper land use practices in the state. Landslides generally occur during heavy rains, that is, during the months of June to October in Meghalaya.

Figure 23: Landslide incidence map of Meghalaya



Source: BMTPC Vulnerability Atlas of India - https://vai.bmtpc.org/ls-mg.html

80. The southern part of Meghalaya is more susceptible to landslides than the northern part. National Highways like Bajengdoba-Tura-Dalu, Damra-Siju-Baghmara, Guwahati-Shillong-Tamabil, and Shillong-Jowai-Badarpur are prone to landslides. Landslides occurred frequently at Sonapur on Shillong-Jowai-Badarpur Road, but now the problem has been mitigated by constructing a tunnel for vehicular traffic. The urban areas of Shillong, Tura, and Jowai are also prone to landslides due to the faulty construction of houses and rapid urbanization. During the

stakeholder consultation meeting, it was informed that no major landslides have occurred near the project site in the last two decades. Shillong and Jowai regions are prone to landslides, [25] but based on the information gathered from the consultation with school representatives, there is no occurrence of landslide in the three project sites, Shillong Public School, Pine Mount School, and Jowai Public School.

81. **Land use (Shillong Public School & Pine Mount School):** Development in the Shillong Planning Area (SPA) has been constrained by terrain suitability and forest area. While 18.2% of the total area is already developed (52.63 km2) out of the total planning area (288.5 km2), the abundance of hills, wetlands, water bodies, eco-sensitive areas, and forest areas has limited the developable area to only 16.2%.

82. Around 2.71 km2 of the total planning area is unsuitable for any developmental activity with a slope of 45 degrees or above and is attributed to around 0.9% of the available land. Inherently, certain parcels of land have been positioned as developable pertaining to tree-clad areas where canopy cover is less than 70% and clusters of vegetation have area coverage less than 50 hectares.

Table 22: Land Utilization of SPA (2022)

SNo	Land Utilization	Area (Sq km)	Percentage
1	Agriculture	47.46	16.4
2	Developable Area	46.63	16.2
3	Developed Area	52.63	18.2
4	Forest Area	19.11	6.6
5	Tree Clad Area	34.45	11.9
6	Dense Area	74.66	25.9
7	Unclassified	7.57	2.6
8	Water Sheet	3.29	1.1
9	Slope>45	2.71	0.9
TOTAL PLANNING AREA		**288.51**	**100**

sq.km = square kilometer.
Source: Department of Planning, Investment promotion and sustainable development, Govt. of Meghalaya (Primary Data – March 2024).

83. The land use distribution in Shillong indicates its administrative and educational standpoint, as well as the presence of a defence establishment in the city. While residential areas take up nearly 29.7% of the total developed land, mixed land use comprises 2.5% of the developed area. Areas under administrative, institutional, and public and semi-public use account for 8.2% of land. 14.3% of the area comes under circulation (transportation and traffic-related), which is indicative of the hilly terrain of Shillong Planning Area.

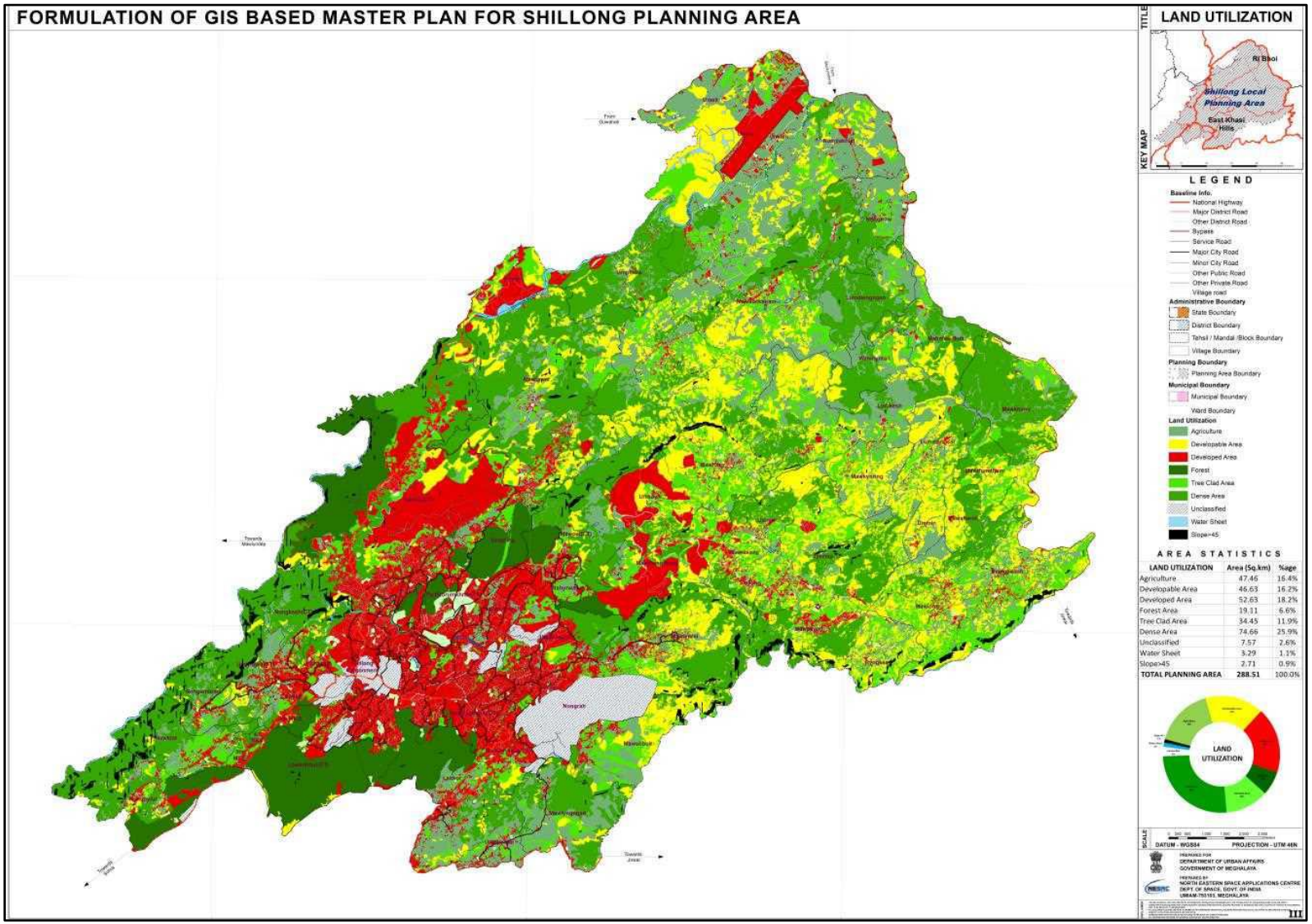
[25] Report of Meghalaya State Disaster Management Plan, 2016 - https://megrevenuedm.gov.in/reports/Meghalaya_State_Disaster_Management_Plan_Volume2.pdf

Table 23: Existing Urban Land Use (2022) of SPA

SNo	Categories	Area (Sq. km)	Percentage of Developed area
1	Residential	15.66	29.75
2	Commercial	1.31	2.48
3	Industrial	1.21	2.3
4	Mixed	1.32	2.5
5	Educational	6.52	12.38
6	Health Services	1.61	3.07
7	Central Govt. Property	0.55	1.05
8	State Govt. Property	1.94	3.68
10	Public and Semi-public	1.84	3.49
11	Religious	0.48	0.91
12	Recreational	1.53	2.91
13	Public Utilities	0.18	0.34
14	Solid Waste Management	0.07	0.13
15	Communication	0.02	0.04
16	Heritage	0	0
17	Slum	0.03	0.05
18	Vacant Land	5.8	11.02
19	Transportation	7.45	14.16
20	Traffic related	0.07	0.14
21	Rural	2.97	5.63
22	Misc.	2.09	3.97
Total Developed Area		**52.6**	**100**

sq.km = square kilometer, SPA = Shillong Planning Area.
Source: Department of Planning, Investment promotion and sustainable development, Govt. of Meghalaya (Primary Data)

Figure 24: Land Utilization Map of SPA



SPA = Shillong Planning Area.

Source: Department of Planning, Investment promotion and sustainable development, Govt. of Meghalaya (Primary data)

84. **Air and Noise Quality (Shillong and Pine Mount School):** The Meghalaya State Pollution Control Board is monitoring the ambient air quality (PM_{10}, $PM_{2.5}$, sulfur dioxide (SO_2), and oxides of nitrogen (NOx)). The outcome of the monitoring for Shillong is presented in Table 24.

Table 24: Ambient Air Quality at Shillong

Month and Year	Parameters	PM_{10} (µg/m3)	$PM_{2.5}$ (µg/m3)	SO_2 (µg/m3)	NO_2 (µg/m3)
November 2023	Board Office Premises, Lumpyngngad, Shillong	43.7	15.7	2.0	4.5
	O/o EE (PHE), Hills Division, Barik, Shillong (nearest to Pine Mount School, 0.22 km)	56.3	28.8	9.3	18.6
	Forest Rest House, Polo Hills, Shillong (nearest to Shillong Public School, 0.12 km)	51.4	21.7	5.1	16.2
	Myllem Range Office, Social Forestry, 4 ½ Mile, Upper Shillong	48.9	18.4	4.5	11.8
December 2023	Board Office Premises, Lumpyngngad, Shillong	42.6	18.1	2.0	4.5
	O/o EE (PHE), Hills Division, Barik, Shillong	52.4	24.6	9.6	19.8
	Forest Rest House, Polo Hills, Shillong	48.3	20.3	5.1	15.1
	Myllem Range Office, Social Forestry, 4 ½ Mile, Upper Shillong	46.4	18.9	4.6	13.2
January 2024	Board Office Premises, Lumpyngngad, Shillong	52.4	20.96	4.2	9.2
	O/o EE (PHE), Hills Division, Barik, Shillong	69.2	34.1	12.9	23.0
	Forest Rest House, Polo Hills, Shillong	57.0	25.6	5.2	16.3
	Myllem Range Office, Social Forestry, 4 ½ Mile, Upper Shillong	55.3	23.2	4.9	15.2
February 2024	Board Office Premises, Lumpyngngad, Shillong	52.1	23.2	4.1	9.3
	O/o EE (PHE), Hills Division, Barik, Shillong	69.5	42.9	13.9	24.0
	Forest Rest House, Polo Hills, Shillong	59.3	32.7	5.4	17.6
	Myllem Range Office, Social Forestry, 4 ½ Mile, Upper Shillong	56.5	27.7	5.5	14.5
NAAQS 2009 (24 hours)		100	60	80	80
WHO Global Air Quality Guidelines (2021), 24 hours		45	15	40	25

km = kilometer, NAAQS = National Ambient Air Quality Standards, NO_2 = nitrogen dioxide, PHE = Public Health Engineering, PM = particulate matter, SO = sulfur dioxide, ug/m = microgram per cubic meter, WHO = World Health Organization.
Source: Meghalaya Pollution Control Board.

85. The PM_{10} values at all locations is within the National Ambient Air Quality Standards. $PM_{2.5}$ values are within the National Ambient Air Quality Standards. SO_2 and NO_2 values are within the limits at all locations.

86. The nearest station to the Shillong Public School is Forest Rest House, Polo Hills, Shillong, which is approximately at 0.12 km and the nearest station to Pine Mount School is O/o EE (PHE), Hills Division, Barik, Shillong, which is approximately at 0.22 km.

87. **Ambient Air Quality (Jowai Public School):** The Meghalaya State Pollution Control Board is monitoring the ambient air quality (PM_{10}, sulfur dioxide (SO_2), and oxides of nitrogen (NOx)). The outcome of the monitoring for West Jaintia Hills district is presented in Table 25.

Table 25: Ambient Air Quality at Dawki, West Jaintia Hills District

Months of year 2019	Parameters		
	PM_{10} (µg/m3)	SO_2 (µg/m3)	NO_2 (µg/m3)
NAAQS (2009)	100	80	80
WHO (2021)	45	40	25
January	26.6	4.2	12.5
February	27.6	3.9	12.8
March	28.2	4.1	13.2
April	25.1	2.0	13.1
May	24.8	2.0	12.6
June	22.4	2.0	13.7
July	22.5	2.0	14.3
August	28.1	2.0	16.2
September	27.9	2.0	14.7
October	28.2	2.0	15.2
November	30.9	4.0	16
December	29.6	2.0	15.9
Annual Average	26.8	2.0	14.2

NAAQS = National Ambient Air Quality Standards, NO_2 = nitrogen dioxide, PM = particulate matter, SO = sulfur dioxide, ug/m = microgram per cubic meter, WHO = World Health Organization.
Source: Meghalaya State Pollution Control Board - Annual Report- 2019-2020.

88. All values of PM_{10}, SO_2 and NO_2 are within the National Ambient Air Quality Standards. The monitoring location is at an approximate distance of 35 km from the Jowai public school.

89. Baseline ambient air quality will be established at the school sites before the start of construction.

90. **Ambient Noise Monitoring (Shillong and Pine Mount School):** As per the Meghalaya Pollution Control Board Annual Report of 2019–2020, the board conducted noise level monitoring in different places during 2019–2020 and found the following result.

Table 26: Noise Level Monitoring of Shillong

Name of Industry/Firm/ Institution/ Residential	Sampling Location	Date of Sampling	Category	Observed Value {dB(A) Leq}		Prescribed Standard {dB(A) Leq (India National Noise Level Standards)}	Remarks
Smti. A. Kharbuli, Mawlai Mawdatbaki, NEHU Road, Shillong, (EKHD)	House Premises	21-05-19 to 25-05-19	Residential	Day-	47.9	55	W
				Night	-	-	-
St. John Whitehall, Dum Dum, Nongthymmai, Shillong, (EKHD)	School Premises	11-06-19 to 13-06-19	Residential	Day-	59.8	55	A
				Night	-	-	-
Marten Mawlai Shillong, Mawiong (EKHD)	Near Dumping Site	25-06-19	Industrial	Day	62.4	75.0	A
				Night	54.7	70.0	W
Shillong Express Pvt. Ltd. Shillong Bypass, Mawkhan (EKHD)	Front of the Office	14-10-19	Residential	Day	72.5	55.0	A
				Night	68.9	45.0	A

A = above the prescribed standards, EKHD = East Khasi Hills district, Pvt. = Private, W = within the prescribed standards.
Source: Meghalaya State Pollution Control Board - Annual Report- 2019-2020

91. The nearest ambient noise level monitoring station to both Shillong Public School and Pine Mount School is St. John Whitehall, Dum Dum, Nongthymmai, Shillong, (EKHD), which is at 1.5 km distance from Shillong public school and 2.9 km distance from Pine mount school.

92. **Ambient Noise Monitoring (Jowai Public School):** As per the Meghalaya Pollution Control Board Annual Report of 2019-2020, the board conducted noise level monitoring of the Jowai municipal dumping site during 2019-2020 and found that the result was within the prescribed standard. The location of the dumping site is at an approximate distance of 1.6 km from Jowai public school.

Table 27: Noise Level Monitoring during 2019-2020

Name of Industry/Firm/ Institution/ Residential	Sampling Location	Date of Sampling	Category	Observed Value {dB(A) Leq}		Prescribed Standard {dB(A) Leq}
Jowai Municipal Dumping Site (WJHD)	Near Dumping Site	07-06-19	Industrial	Day	58.1	75.0
				Night	-	-

dB = decibel, Leq = equivalent continuous sound level, WJHD = West Jaintia Hills district.
Source: Meghalaya State Pollution Control Board - Annual Report- 2019-2020.

Table 28: Ambient Noise Level during Idol Immersion 2019 at River Myntdu Immersion Site, SyntuKsair, in Jowai

Time Duration	Leq dB(A)	Ambient Noise Level Standard (Day time) [Residential Area] Leq dB(A)
12:45 Hrs. to 12:55 Hrs.	62.4	55.0
12:55 Hrs. to 13:05 Hrs.	61.9	
13:05 Hrs. to 13:15 Hrs.	57.8	

dB = decibel, Leq = equivalent continuous sound level, Hr = hour.
Source: Meghalaya State Pollution Control Board - Annual Report- 2019-2020

93. The above Table 28 reveals that the ambient noise level at the immersion ghat along the river Myntdu at Lynter Archaka, Syntu Ksiar, Jowai, exceeded the daytime limit. This location is situated at 2.2 km from Jowai public school.

94. Baseline ambient noise will be established at the school sites before the start of construction.

95. **Groundwater (Shillong, Pine Mount, and Jowai Public School):** In Meghalaya, groundwater occurs under unconfined to semi-confined conditions. In unconsolidated formation, the pre- and post-monsoon water levels generally vary from 2 to 10 mbgl and 2 to 5 mbgl, respectively. The water levels in consolidated and semi consolidated formations rest in the range of 2–45 mbgl both during the pre- and post-monsoon periods. Water level trends for the period of the last 10 years show that there is no significant decline anywhere in the state. Maximum stations show a rise or fall in water level in the range of 0 to 10 cm/yr.

96. As per the study conducted by the Central Groundwater Board (CGWB), the net annual groundwater availability of the district works out to be 20210.66 ham. The annual allocation for domestic uses has been estimated at 673.59 ham based on the population data, which has been projected up to 2025. The overall stage of groundwater development in the East Khasi Hills district is 2.84%.

97. **Ground Water Quality:** Ground water in the state ranges from acidic to alkaline, with pH values ranging from 4.42 to 10.51. The electrical conductivity values for ground water in a phreatic aquifer in Meghalaya range from 14.1 to 662 µs/cm at 25ºC, indicating the quality of the ground water to be of low salinity and that the water is potable. Total hardness (Ca+Mg) expressed as CaCO3 in ppm is small, indicating that the water is soft in quality. The other chemical constituents of ground water, namely HCO3, Cl, Ca, Mg, Fe, etc., are all within the permissible limit according to the Bureau of Indian Standard (IS: 10500–91). The chemical analysis of groundwater samples from phreatic aquifers reveals that the groundwater of Meghalaya is generally suitable for drinking purposes. Almost all the chemical constituents are within the permissible limits of drinking water standards except for iron and fluoride, which are high in some pockets. Higher concentrations of iron above the permissible limit in phreatic aquifers and semi-confined aquifers were found in some pockets of 7 districts. High fluoride concentrations beyond the permissible limit were found in some deeper aquifers in two districts, viz., East Jaintia Hills district at Mynthlu and at four locations (Chasingre, Rongram, Jengjal, and Dadenggre) in West Garo Hills district. The ranges of water quality data from dug wells, borewells, and springs are shown in the Table 29 below.

Table 29: Ground Water Quality of Meghalaya (March 2023)

Sl. No.	Chemical Constituents (Concentrations in mg/l except pH and EC)	Dug well	Borewell	Spring
1	pH	4.79 to 8.58	4.42 to 10.51	4.60 to 8.8
2	EC µS/cm at 25°C	14.1 to 662	20 to 545.2	13.03 to 405
3	Turbidity (NTU)	BDL to 29	BDL to 4.9	BDL to 1.2
4	TDS	BDL to 385	BDL to 283.2	BDL to 236
5	CO3	BDL to 172.3	BDL to 240.6	BDL to 89.79
6	HCO3	BDL to 220	BDL to 176	BDL to 195.16
7	TH as CaCO3	10.01 to 95.1	10 to 135.13	10 to 195.16
8	Cl	7.09 to 63.12	7.09 to 165.13	14.18 to 67.35
9	SO4	BDL to 87.1	BDL to 67.35	BDL to 46.49
10	NO3	BDL to 29.3	BDL to 79.81	BDL to 9.88
11	F -	BDL to 0.54	BDL to 3.47	BDL to 1.7
12	Ca	1.7 to 70	0.22 to 41.6	1.7 to 93.6
13	Mg	0 to 26.69	1.2 to 32	0.5 to 16.5
14	TH	15 to 180	1.2 to 136	15 to 276.5
15	Na	0.6 to 74	BDL to 100	0.13 to 37.1
16	K	0.12 to 45.1	BDL to 86.26	0.04 to 27.88
17	Fe	BDL to 4.43	BDL to 39.65	BDL to 2.4

°C = celsius, µS/cm = micro siemens per centimeter, BDL = below detection limit, Ca = calcium, $CaCO_3$ = calcium carbonate, Cl = chlorine, CO_3 = carbonate, EC = electrical conductivity, F = fluorine, Fe = iron, HCO_3 = sodium bicarbonate, K = potassium, Mg = magnesium, Na = sodium, NO3 = nitrate, NTU = nephelometric turbidity unit, pH = potential of hydrogen, SO4 = sulfate, TDS = total dissolved solids, TH = total hardness.
Source: Meghalaya State Pollution Control Board - Annual Report- 2019-2020.

98. **Surface Water (Shillong Public School and Pine Mount School):** Umtrew, Umiam, UmKhen, Myntang, and Umgnot, as well as a good number of other turbulent streams that drain out all over the district, exhibit gentle gradients with sinuosity in the plain areas. The river drainage system generally exhibits eight patterns: (i) radial, (ii) centrifugal, (iii) parallel, (iv) dendritic, (v) deranged, (vi) trellised, (vii) annual, and (viii) rectangular. These two patterns, i.e., parallel and dendritic, can be witnessed in the catchment areas of the rivers in this district.

Table 30: Surface Water Quality data during December 2023

Name of the monitoring station	Umkhrah River at Demthring	Umkhrah River at Umkaliar	Umkhrah at Mawlai Slaugter	Umkhrah River at Mawpdang, Mawlai	Umshyrpi River at Risa Colony	Umshyrpi at Law College	Umshyrpi River at Umshyrpi Bridge
Aerial distance from Shillong Public School (Approximately)	2.17 km	01 km	2.6 km	2.65 km	1.62 km	1.5 km	3.1 km
Aerial distance from Pine Mount School (Approximately)	2.8 km	2.9 km	3.4 km	3.4 km	1.2 km	**0.7 km**	1.2 km
Arial distance from Jowai Public School (Approximately)	31.9 km	33 km	35.6 km	35.6 km	33.5 km	34 km	36.2 km
State	Meghalaya	Meghalaya	Meghalaya	Meghalaya	Meghalaya	Meghalaya	Meghalaya
Sampling date	1.12.23	1.12.23	1.12.23	1.12.23	1.12.23	1.12.23	1.12.23
Sampling time	1:35	2:38	3:30	2:20	2:45	4:35	2:45
Sampling code	3359	3360	3361	3362	3363	3364	3365
Type of water body	River	River	River	River	River	River	River

Name of the monitoring station	Umkhrah River at Demthring	Umkhrah River at Umkaliar	Umkhrah at Mawlai Slaugter	Umkhrah River at Mawpdang, Mawlai	Umshyrpi River at Risa Colony	Umshyrpi at Law College	Umshyrpi River at Umshyrpi Bridge
Weather	Clear	Clear	Clear	Clear	Clear	Clear	Clear
Colour	Greyish	Clear	Light-Brown	Light-Brown	Clear	Black	Light-Brown
Odour	Septic	Septic	Septic	Septic	None	Septic	Septic
Water Temperature (°C)	16.4	16.2	15.4	16	15.4	16.2	15.7
Dissolved Oxygen (mg/L)	2.3	5.7	1.6	2.1	7.4	1.8	5.2
pH	7.7	7.2	7	7.1	6.7	6.9	6.9
Conductivity (µmho/cm)	390	275	326	390	32	278	174
BOD (mg/L)	18	4.2	24	21	1.5	25	8.3
Nitrate-N (mg/L)	6.8	2.5	3.5	1.3	0.52	0.45	1.1
Nitrite-N (mg/L)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Total Coliform (MPN/100ml)	36000	7900	94000	79000	70	93000	22000
Fecal Coliform (MPN/100ml)	6300	2700	27000	24000	4	31000	4100
Fecal Streptococci (MPN/100ml)	2700	840	8400	6300	2	8400	1700
Turbidity (NTU)	21	6.4	14.2	17.2	1.8	21.7	7.8
P-Alkalinity (mg/L)	Nil	Nil	Nil	Nil	Nil	Nil	Nil
T-Alkalinity (mg/L)	132	74	98	126	14	98	49
Chlorides (mg/L)	60	42	49	49	8	39	28
COD (mg/L)	52	17	48	58	6	56	22
Total Kjeldahl Nitrogen (mg/L)	38	10	20	22	1.5	18	27
Ammonical-N (mg/L)	19.3	5.2	10.7	11.2	0.64	8.8	13.3
Total Hardness as CaCO3 (mg/L)	112	70	136	132	20	70	64
Ca as CaCo3 (mg/L)	78	50	96	92	14	50	44
Mg as CaCo3 (mg/L)	34	20	40	40	6	20	20
Sulphate (mg/L)	19.6	11	11.2	17.6	5.7	19.3	9.5
Ca++ (mg/L)	30	20	38	36.8	5.6	20	17.6
Mg++ (mg/L)	8.2	4.8	10	10	1.5	5	5
Sodium (mg/L)	32	20	25	25	4.3	20	14.4
Total Dissolved Solids (mg/L)	256	194	220	260	20	182	120
Total Suspended Solids (mg/L)	28	15	17	13	6	18	12
Ortho Phosphate (mg/L)	0.85	0.2	0.68	1.6	0.03	0.52	0.23
Potassium (mg/L)	15.6	10.2	12.6	12.5	2.1	10	7.2

Name of the monitoring station	Umkhrah River at Demthring	Umkhrah River at Umkaliar	Umkhrah at Mawlai Slaugter	Umkhrah River at Mawpdang, Mawlai	Umshyrpi River at Risa Colony	Umshyrpi at Law College	Umshyrpi River at Umshyrpi Bridge
Fluoride (mg/L)	0.1	0.06	0.09	0.05	0.07	0.09	0.1
% Sodium	1.4	0.8	1.08	1.08	0.18	0.87	0.62
SAR	1.32	1.03	0.92	0.93	0.41	1.02	0.77

°C = celsius, % = percent, BOD = biochemical oxygen demand, Ca = calcium, $CaCO_3$ = calcium carbonate, COD = chemical oxygen demand, km = kilometer, mg/L = milligrams per liter, P-Alkalinity = phenolphthalein alkalinity, pH = potential of hydrogen, NTU = nephelometric turbidity unit, pH = potential of hydrogen, SAR = sodium adsorption ratio, SO4 = sulfate, T-Alkalinity = total alkalinity.
Source: Meghalaya Pollution Control Board

99. **Surface Water (Jowai Public School):** The Lukha and Myntdu Rivers are the major surface water sources of the West Jaintia Hills. The Lukha River, which originates from the Nongkhlieh Elaka and flows along the Narpoh reserve forest of Jaintia Hills, Meghalaya, is one of the main rivers that run through the district and drains itself into the Surma valley in Bangladesh. Umtrew, Umiam, UmKhen, Myntang, and Umgnot, as well as a good number of other turbulent streams that drain out all over the district, exhibit gentle gradients with sinuosity in the plain areas. The river drainage system generally exhibits eight patterns: (i) radial, (ii) centrifugal, (iii) parallel, (iv) dendritic, (v) deranged, (vi) trellised, (vii) annual, and (viii) rectangular. Of these two patterns (i.e., parallel and dendritic), both can be witnessed in the catchment areas of the rivers in this district.

100. The Myntdu River originates at a place called Mihmyntdu, adjacent to Jowai town. The river flows across Jowai and then through Leshka (where a Hydro Project Dam is being constructed) to reach a village called Borghat, within the Jaintia Hills, before finally entering Bangladesh, where it is locally called 'Shari'. Its abundant water is used to irrigate the Myntdu Valley, located on the outskirts of Jowai town.

Table 30: Surface Water Quality data during December 2023

Name of the monitoring station	Myntdu at Jowai
State	Meghalaya
Sampling date	8.12.23
Sampling time	10:30
Sampling code	1631
Type of water body	River
Depth of Water Body (Meter)	
Weather	Cloudy
Colour	Clear
Odour	None
Water Temperature (°C)	15
Dissolved Oxygen (mg/L)	7.2
pH	6.7
Conductivity (µmho/cm)	48
BOD (mg/L)	1.7

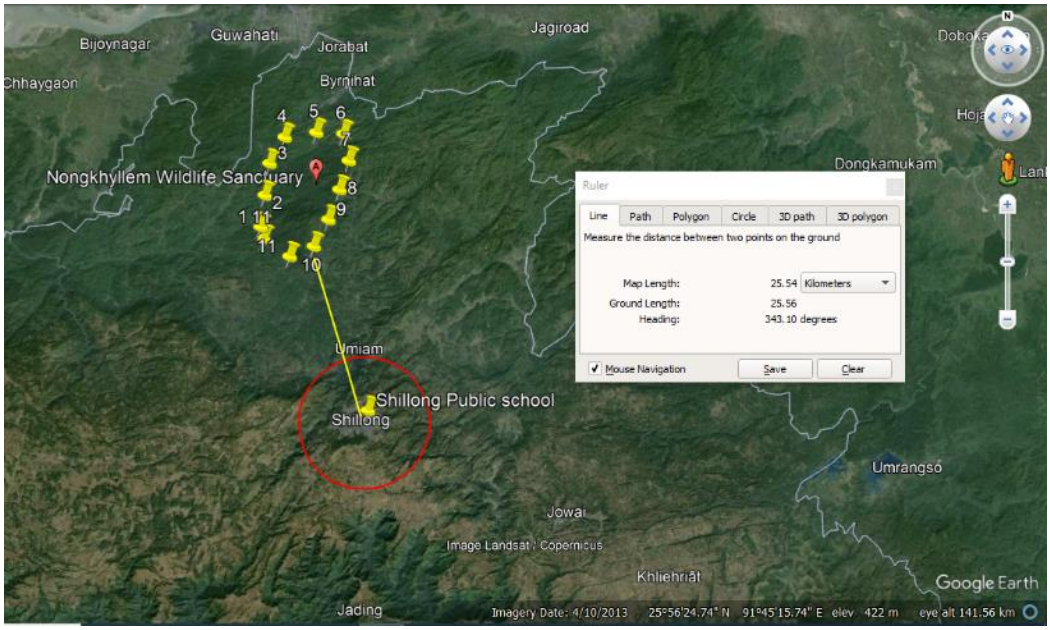
Name of the monitoring station	Myntdu at Jowai
Nitrate-N (mg/L)	0.3
Nitrite-N (mg/L)	Nil
Total Coliform (MPN/100ml)	2400
Fecal Coliform (MPN/100ml)	240
Fecal Streptococci (MPN/100ml)	150
Turbidity (NTU)	4.2
P-Alkalinity (mg/L)	Nil
T-Alkalinity (mg/L)	20
Chlorides (mg/L)	8
COD (mg/L)	8
Total Kjeldahl Nitrogen (mg/L)	0.38
Ammonical-N (mg/L)	0.2
Total Hardness as CaCO3 (mg/L)	20
Ca as CaCo3 (mg/L)	14.4
Mg as CaCo3 (mg/L)	6
Sulphate (mg/L)	7
Ca++ (mg/L)	6
Mg++ (mg/L)	1.5
Sodium (mg/L)	4.2
Total Dissolved Solids (mg/L)	30
Total Suspended Solids (mg/L)	11
Ortho Phosphate (mg/L)	0.03
Potassium (mg/L)	2
Fluoride (mg/L)	0.06
% Sodium	0.18
SAR	0.39

°C = celsius, % = percent, mg/L = milligrams per liter, BOD = biochemical oxygen demand, Ca = calcium, $CaCO_3$ = calcium carbonate, Mg = magnesium, MPN = most probable number, NTU = nephelometric turbidity unit, P-Alkalinity = phenolphthalein alkalinity, pH = potential of hydrogen, SAR = sodium adsorption ratio, T-Alkalinity = total alkalinity.
Source: Meghalaya Pollution Control Board (Primary Data)

B. Biological Environment

101. **Protected area (Shillong Public School)**: There are no environmentally sensitive areas such as National parks, Wildlife sanctuaries, biosphere reserves, tiger reserves, wetlands under Ramsar and protected monuments within 10 km radius of the Shillong Public School. The aerial distance of the school from the Nongkhyllem WLS (Ri-Bhoi District) is 25.5 km (approximately), and the site is outside the corridor of impact of the eco-sensitive zone of the WLS. None of the protected and reserved forests fall under the project area.

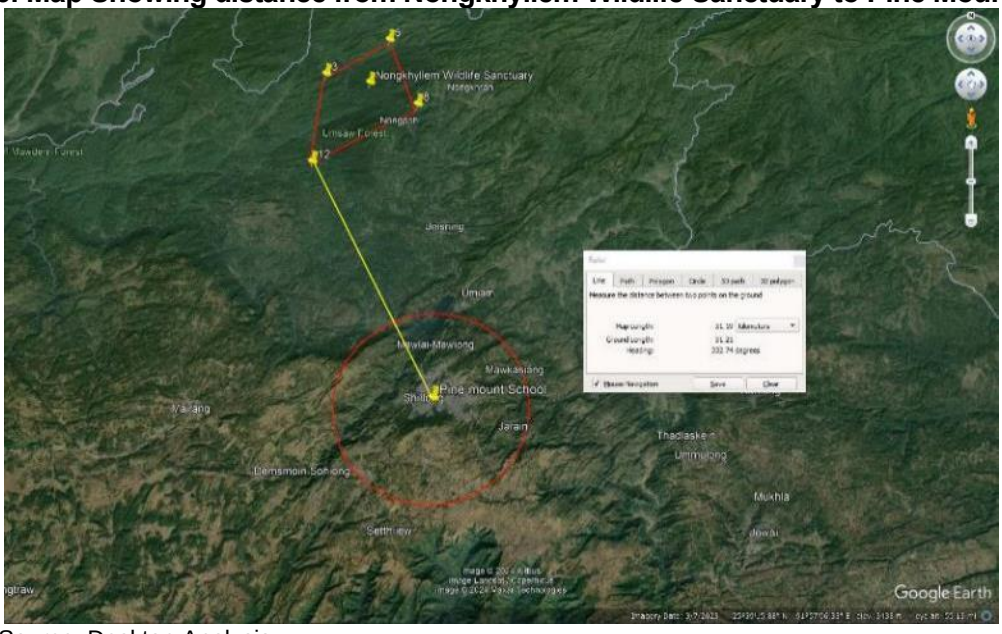
Figure 25: Map Showing distance from Nongkhyllem Wildlife Sanctuary to Shillong Public School



Source: Desktop Analysis.

102. **Protected area (Pine Mount School):** The aerial distance of Pine Mount School from the Nongkhyllem WLS (Ri-Bhoi District) is approximately 31 km, and the project is outside the corridor of impact of the eco-sensitive zone of the WLS.

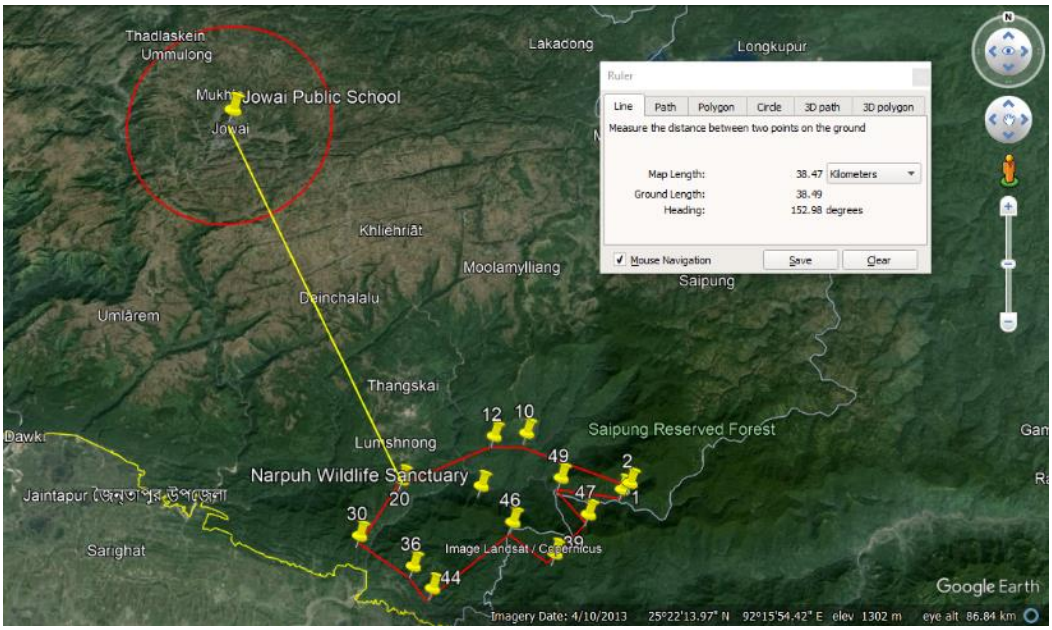
Figure 26: Map Showing distance from Nongkhyllem Wildlife Sanctuary to Pine Mount School



Source: Desktop Analysis

103. **Protected Area (Jowai Public School):** The project site falls in the West Jaintia Hills District. There are no environmentally sensitive areas such as National parks, Wildlife sanctuaries, biosphere reserves, tiger reserves, wetlands under Ramsar and protected monuments within 10 km radius from Jowai Public School. However, the nearest protected area is Narpuh Wildlife Sanctuary, which is in East Jaintia District and is at approximately 38 km from the project site.

Figure 27: Map Showing distance from Narpuh Wildlife Sanctuay to Jowai Public School



Source: Desktop Analysis.

104. **Forest areas in East Khasi Hills District:** As per the Forest & Environment Department, Government of Meghalaya, there are five protected forests and three reserved forests in the East Khasi Hills district. The list of these forests is shown in Table 32.

Table 31: Forest areas of East Khasi Hills District

Sl.No.	Protected Forest (PF)	Area (sq.km)
1.	Upper Shillong P.F.	7.66
2.	Short Round P.F.	1.13
3.	Laitkor P.F.	3.25
4.	Green Block No. 2	0.21
5.	Umkhuti P.F.	0.14
	Total P.F. area	**12.39**
	Reserved Forest (RF)	**Area (sq.km)**
1.	Riatkhwan R.F.	3.91
2.	Shyrwat R.F.	0.44

3.	Riat Laban R.F.	2.05
	Total R.F. area	**6.4**
	Total Forest Area (P.F. + R.F.)	**18.79**

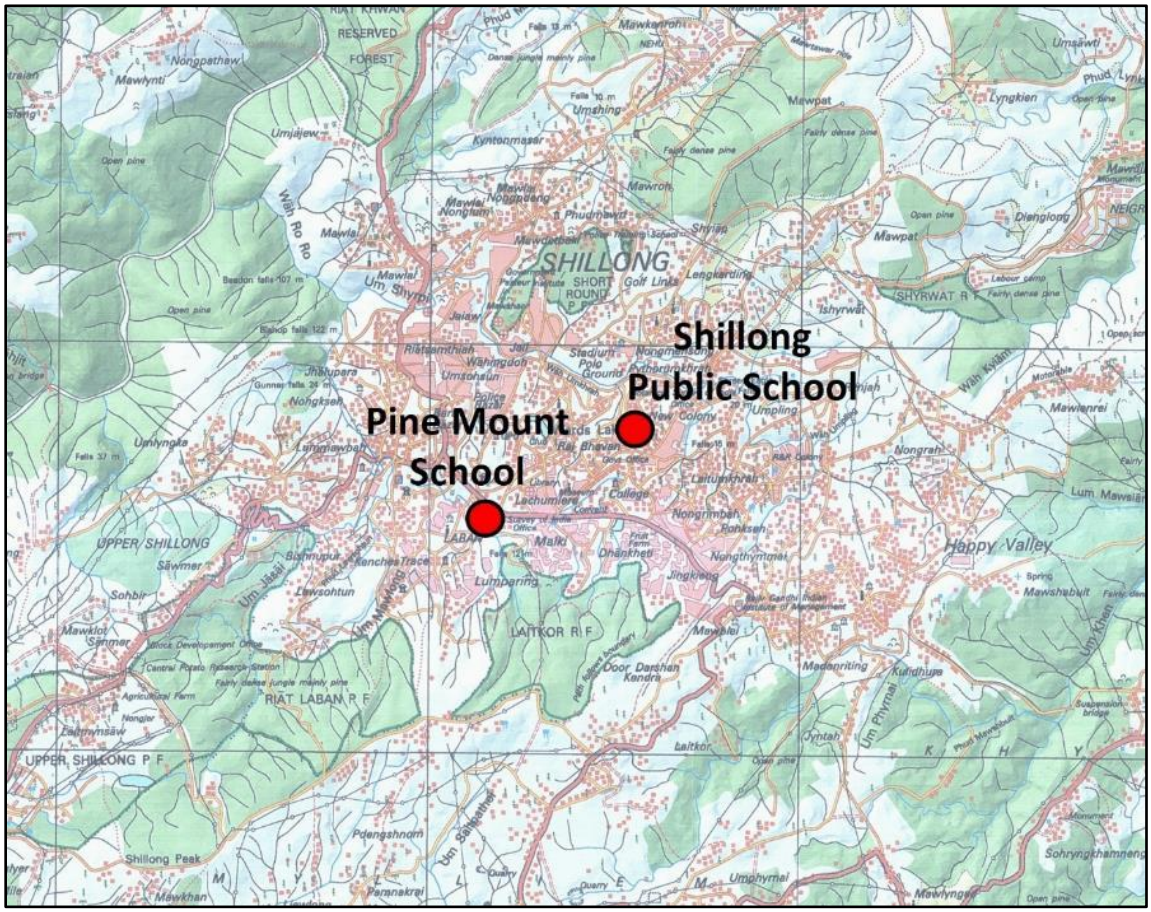
sq.k = square kilometer.
Source: Meghalaya Forest & Environment Department.

105. **Forest (Shillong Public School):** The proposed project site does not fall within any forest area. The nearest forest patches are Shirwat Reserved Forest located at an arial distance of 3.15 km in the NE direction, Laitkor Protected Forest located at an arial distance of 1.28 km in the SSW direction, and Short Round Protected Forest located at an arial distance of 1.55 km in the NNE direction from Shilong Public School.

106. **Forest (Pine Mount School):** The proposed project site does not fall on any forest land. The nearest forest patches are Laitkor Reserved Forest, located at an arial distance of 0.27 km in the SE direction, and Riat Laban Reserved Forest, located at an arial distance of 0.96 km in the SW direction from Pine Mount School.

107. A map showing the forest areas and the Shillong Public School and Pine Mount School is given in Figure 28.

Figure 28: Map Showing Forest Areas and Components Shillong Public School and Pine Mount School



Source: Survey of India Toposheet.

108. **Forest (Jowai Public School):** The proposed project site does not fall within any forest area. There are no protected or reserved forests in the West Jaintia Hills District.

109. A map showing the forest areas, and the component Jowai Public School is given in Figure 29.

Figure 29: Map Showing Forest Areas (open jungle mainly pine) and Component Jowai Public School

Source: Survey of India Toposheet.

110. **Flora and Fauna of the region:** The flora and fauna found in and around the Shillong Reserved and Protected Forests are as follows:

111. **Flora:** Trees such as *Terminalia arjuna*, *Terminalia bellerica*, *Terminalia myriocarps*, *Alstoniascholaris*, *Ficusglomerata*, *Gmelinaarborea*, *Bauhinia acuminata*, *Ailanthus grandis*, *Duabanga grandiflora*, and *Sterculiavillosa* are very frequent in this area. The dominant shrubs of this area are *Eupatorium odonatum*, *Zizyphus muritinum*, *Clerodendron infortunatum*, *Saccharum spontaneum*, and *Thysanolaena maxima*, which are abundant in exposed places. There are quite a number of herbs in exposed areas. The dominant forms are *Sidacordifolia*, *Sidaacuta*, *Urenalobata*, *Amaranthus viridis*, *Ageratum conyzoides*, and *Bidenspillosa*. Climbers are abundant. The most predominant forms are *Mikeniascandense* and *Combretumroxburghii*. Wild Musa sapiantum occurs at lower elevations. However, no endangered or threatened plant species were found in the project area. A comprehensive list of flora found in the region is given in Table 33.

Table 32: List of Flora in the Shillong Reserved and Protected Forests

Forest	Flora of the area
Laitkor Reserved Forest	*Pinus Kesiya*
	Castanopsis species
	Mynica esculenta
	Quercus spp
	Cinnamomum cecidodaphne
	Eurya japonica
	Rhus succedanea
Riat Khwan	*Pinus kesiya*
	Castanopsis species
	Schima wallichii
	Albizzia lebbek
	Callicarpa arborea
	Betula alnoides
	Toona ciliate
	Albizzia procera
	Prunus cerasoides
	Bauhinia purpurea
	Albizia stipulate
Upper Shillong	*Pinus kesiya*
	Castanopsis species
	Schima wallichii
	Myrica esculenta
	Wendlandia grandis
	Castanopsis india
	Castanopsis species
	Cinnamomum cecidodaphne
	Prunus cerasoides
Riat Laban	*Pinus kesiya*
	Castanopsis species
	Schima wallichii
	Myrica esculenta
	Quercus species
	Wendlandia grandis
Short Round	*Pinus kesiya*
	Castanopsis species
	Schima wallichii
	Albizzia lebbek
	Alnus nepalensis
	Albizzia species
Shyrwat	*Pinus kesiya*
	Castanopsis species
	Schima wallichii
	Albizzia lebbeck
	Eurya japonica
	Albizzia procera
	Prunus cerasoides

Source: Forest Department (14 March 2024).

112. **Fauna:** As per the consultation held at project sites and the forest department, the fauna commonly seen in the project area are domestic animals. A comprehensive list of fauna found in the region is given in Table 34, and a comprehensive list of birds and reptiles is given in Tables 35 and 36.

Table 33: List of Mammals in the Shillong Reserved and Protected Forests

Sl. No.	Common Name	Scientific Name	Local Name
1.	Barking Deer	*Muntiacus Muntjak*	Skei
2.	Leopard Cat	*Felis Bengalensis*	Khlabamsim
3.	Jungle Cat	*Felis Chaus*	Ksar
4.	Golden Cat	*Felis Kimmineki*	
5.	Large Indian Civet	*Viverra Zibetha*	Kuiheh
6.	Small Indian Civet	*Veverricula Indica*	Kuirit
7.	Malayan Giant Squirrel	*Ratufa Bicolour*	
8.	Common Giant Flying Squirrel	*Petaurista*	Syllit
9.	Chinese Pangolin	*Mains Pentadactyla*	Kyrbeirit
10.	Himalayan Palm Civet	*Paguma Lavata*	Bshadheh
11.	Toddy Cat	*Paradoxurus Hermaphroditus*	
12.	Jackal	*Canis Aureus*	Myrsiang
13.	Spotted Linsang	*Prionnodon Paradicolour*	
14.	Indian Giant Squirrel	*Ratufa Indica*	Risang
15.	Hollock or White Brown Gibbon	*Hylobates Hoolock*	Huleng
16.	Rhesus Macaque	*Macaca Mulatto*	Shriehsaw
17.	Slow loris	*Nycticebus Coucang*	
18	Indian Porcupine	*Hystrix Indica*	Diengkhied
19.	Hodgson's Porcupine	*Hystrix Hodgsoni*	Brai
20.	Binturong	*Arctictis Binturong*	
21.	Hispid Hare	*Caprolagus Hispispidus*	
22.	Mongoose	*Herpestes Species*	Bsong
23.	Smooth Indian Otter	*Lutra Perspicillita*	Ksih

Source: Forest Department (as of 14 Mar 2024).

Table 34: List of Birds in the Shillong Reserved and Protected Forests

Sl. No.	Common Name	Scientific Name
1.	Common Teal	*Anas Crecca*
2.	Crested Serpent Eagle	*Spilorins Cheela*
3.	Common Hill Partridge	*Arborophilla Torquela*
4.	Kaleej Pheasant	*Lophura Leucomelana*
5.	Dove	
6.	Pigeon	*Theron Phoenicoptera*
7.	Owl	*Othene Brama*
8.	Bee Eater	*Merops Orientails*
9.	Kingfisher	*Ceryle Lugubris*
10.	Yellow wagtail	*Montacilla Citreola*
11.	Grey Wagtail	*Montacilla Cinerea*
12.	White Wagtail	*Montacilla Alba*
13.	Common Mejna	*Acridotheres Tristis*
14.	Jungle Mejna	*Acridotheres Fuscus*
15.	Hill Myna	*Gracula Religoisa*
16.	Spotted Munia	*Lonchura Punctualata*

Sl. No.	Common Name	Scientific Name
17.	Bay Backed Shrike	*Lanius Vittatus*
18	Rufous backed Shrike	*Ianius Sachach*
19.	Woodpecker	*Dinopim Bengalensis*
20.	Red Start (River Chatt)	
21.	Indian Roller	*Caraecias Bengalensis*
22.	Magpie Robin	*Copsychus Sanlaris*
23.	Indian Tree Pie	*Dendrocitta*
24.	Red billed Blue Magpie	*Vagabunda*
25.	Indian Jungle Crow	*Cissa Erythrorhynchia*
26.	Hoopoe	*Corvus Macrorynchos*
27.	Scarlet Minivet	*Upupa Epo*
28.	Tailor Bird	*Pericrocotus Flammeus*
29.	Drongo	*Orthomus Sutorius*
30.	Flycatcher	*Dierurus Sutorius*
31	Bulbul	*Rhipidura Albicollis*

Source: Forest Department on 14 March 2024

Table 35: List of Reptiles in the Shillong Reserved and Protected Forests

Sl. No.	Common Name	Scientific Name
1.	Python	*Python Molurs*
2.	Water Lizard	*Varanus Salvator*
3.	Indian Cobra	*Naja Jaja*
4.	Banded Krait	*Bunjarus Fasciatus*
5.	Common Krait	*Bunjarus Careuleus*
6.	Monitor Lizard	*Varanus Bengalensis*
7.	Green Vipers	*Trimeresurus Gramineus*

Source: Forest Department on 14 March 2024.

113. The list of fauna which are either vulnerable, endangered, or critically endangered according to the IUCN threatened category present in the Shillong Protected and Reserved forests includes the following:

Mammals:

- Chinese Pangolin - Critically Endangered
- Hollock or White Brown Gibbon - Endangered
- Binturong - Vulnerable
- Hispid Hare - Endangered
- Smooth Indian Otter - Vulnerable

C. Social Environment

114. **East Khasi Hills: Demographic Profile:** As per the 2011 census, the East Khasi Hills district had a population of 825,922, of which males and females were 410,749 and 415,173, respectively, and it constitutes about 27.84% of the total Meghalayan population. In comparison with the 2001 census, the district achieved an increase of 24.96% in population growth. The population density of the district is 301 people per sq. km. The average literacy rate is 84.15% (male and female literacy were 84.51 and 83.81, respectively), compared to 76.07% in 2001. With regards to the sex ratio, it stood at 1011 per 1000 males, compared to the 2001 census figure of 981.

115. **Socio Economic Features:** Agriculture is the mainstay of the rural population of the district. In urban areas, less than 1.0 percent of the total workers are engaged as cultivators and less than 1.0 percent as agricultural laborers. The principal crops cultivated in the district are cereals (rice, maize, small millets, etc.), pulses, potatoes, tapioca, fruits (pineapples, citrus fruits, bananas, papayas), areca nuts, ginger, turmeric, chillies, etc. As per Census 2011, the district has 3,26,786 people (2,04,303 males and 1,22,483 females) engaged in economic activities. Out of which, persons engaged in cultivation, agriculture, household industry, and other categories are 23.49%, 12.51%, 0.91%, and 63.09%, respectively. The highest percentage distribution of persons engaged in cultivation, agriculture, and household industry, as well as the other categories, is noticed in Mawphlang (71.64%), Pynursla (39.53%), Khatarshnong-Laitkroh (2.03%), and Mylliem (88.16%), respectively (Census 2011).

116. **West Jaintia Hills: Demographic Profile:** Most of the population of the district is based in rural areas. The district economy is basically agrarian as it is rural based, with agriculture contributing significantly to state GDP. Agriculture thus plays a great role in the overall economic development of the district and the state. The gross cropped area in 2008–2009 was 3,373,94 hectares, and the net cropped area was 2,841,49 hectares. The development of animal husbandry, which includes livestock and poultry, is an important indicator that shows the pace of growth and contribution to the rural economic scenario at the district and state levels. In the case of self-employment in livestock and diary-based farming and food processing, livestock and poultry are the only alternative vocations available to the villagers for a subsidiary living.

117. **Socio Economic Features:** As per Census 2011, the district has 1,54,180 persons (88,839 males and 65,341 females) engaged in economic activities. Persons engaged in cultivation, agriculture, household industry, and other categories are 32.98%, 23.20%, 1.30%, and 42.53%, respectively. The female population outnumbered the male population, whereas it is vice versa in the case of persons engaged in economic activities. The work participation rate of females is found to be higher than that of males, except in the field of cultivation. The work participation rate of females is found to be higher than that of males in all categories except in other categories of activities. The highest percentage distribution of persons engaged in cultivation, agriculture, household industry, and other categories is noticed in Thadlaskein, Laskein, Saipung, and the Khliehriat sub-districts, respectively.

V. PUBLIC CONSULTATION AND DISCLOSURE

A. Overview

118. ADB's SPS (2009) requires projects to carry out meaningful public consultation on an ongoing basis. All components will need to be community involved, and as such consultation should be built into and central to the component design process from initiation onwards. However, meaningful consultation per ADB SPS 2009 requirements is also mandatory for those components which are Category 'B' and will need to be documented in the IEE report. Public consultation for these components will: (i) begin early and carry on throughout the project cycle; (ii) provide timely disclosure of relevant information, understandable and accessible to people; (iii) ensure a free and un-intimidated atmosphere without coercion; (iv) ensure gender inclusiveness tailored to the needs of disadvantaged and vulnerable groups; and (v) enable the incorporation of all relevant views of affected people, and stakeholders into project decision making, mitigation measures, the sharing of development benefits and opportunities and implementation issues. It will then need to continue throughout the project implementation. Department of Planning, Investment Promotion and Sustainable Development, Government of Meghalaya (PIU) will ensure that the communications strategies and consultations plan will refer to the requirements of ADB's SPS 2009:

I. Disclosure of relevant information that is understandable and accessible to affected people.
II. Consultation undertaken in an atmosphere free of intimidation or coercion.
III. Process of consultation that is gender inclusive and responsive, fit to the needs of disadvantaged and vulnerability groups.

119. For Category 'B' components consultations at different stages may take place in the form of public meetings in villages, focus groups e.g., for women, or one-on-one consultations with landowners, adjacent residents etc. Consultations for each component must ensure a representative percentage of the local community are consulted, as well as gender balance and representation of vulnerable groups. If that is not possible at a public consultation a separate gender focus group must be held to ensure the concerns of women and other identified vulnerable groups (e.g., below poverty line) are heard. Meaningful consultations will inform participants of details of the component and the possible environmental and social impacts, collect views and opinions from affected persons, and ensure the component responds to them. The dates, attendees (gender details, details of any participants' vulnerabilities, topics covered, and views and opinions raised should be recorded and included in the Environment Monitoring Reports (EMR) report, along with details of how PIU /the component has responded to them throughout the pre-construction, construction and operation stages.

120. Key potential stakeholders as identified during preparation of the IEE are listed in Table 37. Any others stakeholder if identified during implementation of component should be brought into the process in the future.

Table 36: Potential Stakeholders with Influence-interest Matrix

S.I. No	Stakeholder	Phase	Interest	Potential impact of this project on stakeholder (negligible, minor, moderate, high) Interest	Level of influence of stakeholder on this project (negligible, minor, moderate, high) Power
Local Government					
i.	Department of Planning, Investment Promotion and Sustainable Development (DPIP&SD)	Project preparatory phase, pre-construction phase, construction phase, operation phase, (defined in this table as "all phases")	As the Executing agency, all the components development and operation are of a direct concern for DPIP&SD.	High	High
ii.	Department of Education	All phases	As one of the Implementing agencies, all the Components development and operation are of a direct concern for Department of Education	High	High
iii.	Meghalaya State Skills Development Society (MSSDS)	All phases	As one of the Implementing agencies, all the Components development and operation are of a direct concern for MSSDS	High	High
iv.	Directorate of Employment, Craftsmen and Training (DECT)	All phases	As one of the Implementing agencies, all the Components development and operation are of a direct concern for DECT	High	High
v.	State Sports Council of Meghalaya (SSCM)	All phases	As one of the Implementing agencies, all the Components development and operation are of a direct concern for SSCM	High	High

S.I. No	Stakeholder	Phase	Interest	Potential impact of this project on stakeholder (negligible, minor, moderate, high) Interest	Level of influence of stakeholder on this project (negligible, minor, moderate, high) Power
vi.	Pollution Control Board	All phases	Regulator for green permits for establishing the project, pollution prevention, safeguard implementation, hazardous waste management, pollution control etc.	Moderate	High
vii.	Department of Forest	Preconstruction and Construction Phase	Permission for felling of trees Selection of species for green area development	Minor	High
viii.	Urban Local Bodies (Shillong Municipality and Municipal Board Jowai)	All Phases	Such entities will be potentially responsible for the supply of water resources for the proposed project, drainage connectivity, permits for the building layout and safety plans, municipal waste management etc.	Moderate	High
ix.	Groundwater authority/ Water resource department	Construction and operations	Water supply and permits for abstraction of water for construction works as well as during operations.	High	High
x.	Meghalaya Energy Corporation Limited (MeECL) or other entity supplying electricity	All Phases	Supply of electricity	Moderate	High
xi.	State fire department/Fire brigade	Operations phase	Responsible for firefighting and fire prevention in the building and issuing inspection certificate after conducting fire audits.	High	High
xii.	Department of labor welfare	Construction Phase	Fair compensation, working hours, prohibition of child/forced labor	High	High

S.I. No	Stakeholder	Phase	Interest	Potential impact of this project on stakeholder (negligible, minor, moderate, high) Interest	Level of influence of stakeholder on this project (negligible, minor, moderate, high) Power
xiii.	Revenue Department	Preconstruction and Construction Phase	Facilitating discussion with affected Potential Project Affected Peoples; dissemination of information about the project at local level; fixation of entitlement for compensation	Moderate	High
Private sector					
xiv.	Equipment suppliers	Operation	On-time payment for equipment installation, maintenance of equipment	High	Minor
xv.	Construction contractors	Construction	Fair wage, safe and healthy working environment	High	High
xvi.	Contracted Workers (Cleaning staff, security, maintenance, etc.)	Operations Phase	Fair wage, safe and healthy working environment	High	Minor
Employee					
xvii.	School Employees	Operations	Fair compensation, work-life balance, social security/benefits, adequate provisions for mitigation of Occupational Hazards	High	High
xviii.	Construction workers	Construction	Fair compensation, temporary facilities to reside, acceptable hygiene in workplace, access to basic amenities during construction phase	High	High
Community					
xix.	Students, Project Affected Person (if applicable) Residential areas near proposed facility	Construction, Operation phase	Loss of assets/livelihood, Nuisance from pollution (Air pollution, traffic congestion, noise pollution, threat from improper management of waste and effluent)	Moderate	Moderate

S.I. No	Stakeholder	Phase	Interest	Potential impact of this project on stakeholder (negligible, minor, moderate, high) Interest	Level of influence of stakeholder on this project (negligible, minor, moderate, high) Power
xx.	Press/social media and Civil Society Organizations/ Worker's Unions	All phases	Identify interest, express and share opinions	Moderate	Moderate

Source: Site Visit Findings, Stakeholder Consultation, Desktop Analysis.

121. The stakeholder engagement and communication about the proposed components should ensure continuous communication and coordination with the government departments, utility service providers, workers, community etc. throughout the project lifecycle. Stakeholder engagement is an ongoing process and to be scaled to the project risk and phase. It also includes disclosure and dissemination of information and participation of those interested or/and affected by the project, grievance redress mechanism, and ongoing reporting to concerned public and communities.

122. In case of situations like pandemics, in undertaking any face to face consultations it will need to be ensured that national requirements and WHO meeting and hygiene guidelines are followed, including awareness raising activities for those undertaking consultations, minimizing travel requirements, undertaking screening health checks to confirm those going in the field are not symptomatic, providing them with adequate supplies of personal hand sanitizer and masks, ensuring social distancing of at least 1m, that masks are worn at all times during consultations, and that a register of all contacts is maintained. If public meetings are not possible to convene due to restrictions, then the same representation should be achieved through door-to-door consultations within communities. Consultations should also convey how DPIP&SD will ensure community health and safety during construction.

123. Aside from ADB's SPS 2009, DPIP&SD will also ensure that the relevant national requirements in the Right to Information Act 2005 will be complied with. DPIP&SD will ensure to make a list of the participants of the consultation process including the summary of the concerns/ issues they raised and suggestions on project design, mitigation measures and monitoring, employment opportunities, and other relevant issues on implementation. Participation of women, if any, will be highlighted as well as the date and location of the consultations.

B. Outcome of Stakeholder Consultation carried out during preparation of IEE

124. The outcome of the stakeholder consultations carried out during the preparation of this IEE Report are presented in Table 38. The photographs captured during the consultation are provided in Figure 30.

Table 37: Outcome of Stakeholder Consultations Carried Out during Preparation of IEE

S. No.	Department	Person Contacted and Designation	Date of Consultation	Outcome of the discussion
1.	Planning, Investment Promotion & Sustainable Development Department, Government of Meghalaya and PMU, SHCDM (Phase - II)	Additional Project Director, SHCDM-II and concerned officials from PIUs	15 Mar 2024	• Discussion regarding findings of the environmental safeguards team of PWC and the way forward. • Potential proposed Institutional hierarchy for environmental safeguard management was discussed. • Facilitated consultation with different stakeholders and accompanied during site visit
2.	Forest and Environment Department (Territorial Division), Shillong, Government of Meghalaya	Mr. Arul, DFO, Shillong Territorial Division	14 Mar 2024	• Shared forest map and information with respect to forest land of the area surrounding the site. • Opined no such non notified important ecological habitat is present in the project surrounding area • Shared information on flora-fauna; requirement of Tree felling permission.
3.	Meghalaya State Pollution Control Board	Mr. S. Syiem Environmental Engineer	13 Mar 2024	• Provided information on analytical data on Air and Water Quality of the area. • Elaborated about requirements of permits (CTO under water and air act and authorization under Hazardous waste management rules etc.) and consents for the components during construction and operation phases • Information on availability of vendor for collection of hazardous waste • Requirement of solid waste and sewage management during component implementation

S. No.	Department	Person Contacted and Designation	Date of Consultation	Outcome of the discussion
4.	Shillong Municipal Board	Mr. C. Chyne Executive Engineer	13 Mar 2024	• Confirmed availability of solid waste collection mechanism at component level in Shillong • Confirmed availability of inhouse sewage collection mechanism (24 Sewage collection vehicles) from facility premise i.e., septic tanks and further treatment at centralized septage treatment plants in Shillong • Provided information on status of coverage of stormwater network in the area. • Information on Solid waste management by board.
5.	Survey of India	Mr. Felix, Map Sales Officer	13 Mar 2024	• Provided district planning maps of East Khasi Hills and West Jaintia Hills districts • Provided toposheets (Scale 1:50000) of Component areas
6.	Department of Water Resources, Government of Meghalaya	Ms. JF Lyngdoli Sup. Engineer: Hydrology Planning and Design	14 Mar 2024	• Provided information with respect to drainage pattern in the area • Provided information with respect to ground water scenario
7.	Directorate of Agriculture	B Kharshandi, Deputy Director of Agriculture	14 Mar 2024	• Provided information on cropping patter, soil type, soil quality and land use of the districts.
8.	Directorate of Horticulture	Smt. D. C. Sohtun. Director of Horticulture,	14 Mar 2024	• Provided information on cropping pattern/ system of horticulture crops in Meghalaya
9.	Meghalaya Fire & Emergency Service	Mr. M Rymba AFPO	14 Mar 2024	• Provided information on applicability of NoCs/permits from the department for the components/ facilities and compliance requirements • The facilities may invite the department for providing awareness training on handling emergency

S. No.	Department	Person Contacted and Designation	Date of Consultation	Outcome of the discussion
10.	Public Health Engineering Department – Rural Water Supply Division and Electrical Division, Jowai, Government of Meghalaya	Executive Engineer	12 Mar 2024	• Provided information / data on Surface water quality in Jowai. • Challenges associated with surface water management in the component area. • Water quality management and water supply network details.
11.	Shillong Public School	Mr. Aaron Warjri (Principal) and Robert Diemgdoh (Vice Principal)	11 Mar 2024	• Provided information about the current practices of water and waste management. • Water is sourced from PHE and treated with R.O. for drinking purpose. Rainwater harvesting is done. • Wastewater from WC is disposed in the septic tank and the other wastewater is disposed in the public drains. • Solid waste is disposed of to the municipal waste collection trucks. • Provided details of the existing capacity of the building and the proposed structures.
12.	Pine Mount School	Mrs. Werti Mon Dkhar (Vice Principal) and Senior Staff	11 Mar 2024	• Provided information about the current practices of water and waste management. • Water for drinking purpose is sourced from PHE (then treated in aqua guard) and utility purpose is sourced from the borewells present in the campus. • Wastewater from WC is disposed in the septic tank and the other wastewater is disposed in the public drains. • Solid waste is disposed of to the municipal waste collection trucks. • Provided details of the existing capacity of the building and the proposed structures.
13.	Jowai Public School	Mr. M.S. Kharshiing (Principal) and Vice Principal	12 Mar 2024	• Provided information about the current practices of water and waste management. • Water for drinking purpose is sourced from private tankers (then treated in aqua guard) and utility purpose is sourced from PHE. Rainwater harvesting is done.

S. No.	Department	Person Contacted and Designation	Date of Consultation	Outcome of the discussion
				• Wastewater from WC is disposed in the septic tank and the other wastewater is disposed in the public drains. • Solid waste is disposed of to the municipal waste collection trucks. • Provided details of the existing capacity of the building and the proposed structures.

AFPO = assistant fire prevention officer, CTO = consent to operate, DFO = district/divisional forest officer. NoC = no objection certificate, PHE = public health engineering, PIU = project implementation unit, PMU = project management unit, PWC = PricewaterhouseCoopers International, R.O. = reverse osmosis, SHCDM = Supporting Human Capital Development in Meghalaya, WC = water closet/toilet.
Source: Stakeholder Consultation.

Table 38: Outcome of Community Consultations Carried Out during Preparation of IEE

S. No.	Department	Person Contacted and Designation	Date of Consultation	Outcome of the discussion
1.	Community Consultation at Shillong Public School	Community Representatives (Participants List attached as Appendix 4.1.)	15 Mar 2024	• Main source of water for household consumption is provided by PHE. Some also source from borewell (water table at 15 ft). • Segregation of dry and wet waste is being done at household level. • Wastewater from WC is disposed in the septic tank and the other wastewater is disposed in the public drains. But the drain blocks and overflows during monsoon. • Solid waste is disposed of to the municipal waste collection trucks. Waste disposed on roadside by outsides is an issue. • The approach road to school is narrow so proper planning and timing of construction materials to be done.
2.	Community Consultation at Pine Mount School	Community Representatives (Participants List attached as Appendix 4.1.)	15 Mar 2024	• Main source of water for household consumption is provided by PHE and PWD. • No segregation of dry and wet waste is done at household level. • Wastewater from WC is disposed in the septic tank and the other wastewater is disposed in the public drains. • Solid waste is disposed of to the municipal waste collection trucks.
3.	Community Consultation at Jowai Public School	Community Representatives	12 Mar 2024	• Main source of water for household consumption is provided by PHE. Some also source from borewell (water table at 10 to 20 ft). • Segregation of dry and wet waste is being done at household level.

S. No.	Department	Person Contacted and Designation	Date of Consultation	Outcome of the discussion
		(Participants List attached as Appendix 4.1.)		• Wastewater from WC is disposed in the septic tank and the other wastewater is disposed in the public drains. • Solid waste is disposed of to the municipal waste collection trucks. • The fencing of the school boundary needs to be strengthened and capacity of the school rooms needs to be increased as this is the only school with ICSE curriculum in the district. • Vocational training centre can be included with courses on mechanical and electrical works and running a small business-like bakery and salon etc. • During school hours, there is a traffic congestion in the nearby area as many come from different places of the district every day.

ft = foot, ICSE = Indian School Certificate Examinations, IEE = initial environmental examination, PHE = public health engineering, PWD = Public Works Department, WC = water closet/toilet.
Source: Community Consultation.

Figure 30: Stakeholder and Community Consultation carried out during the preparation of IEE

Consultation with Executive Engineer, PHE Jowai

Consultation with Shillong Public School

Consultation with Shillong Municipal Board

Community consultation at Jowai Public School

Community consultation at Pine Mount School

Community consultation at Shillong Public School

IEE = initial environmental examination, PHE = public health engineering.
Source: Stakeholder Consultation and Community Consultation

Meeting with Additional Project Director, SHCDM-II and concerned officials from PIUs

Source: Stakeholder Consultation and Community Consultation.

Future Consultation and Information Disclosure

125. To ensure continued public and stakeholder participation in the component life cycle, periodic consultations and focus group discussion shall be continued. A grievance redress mechanism will be established to register grievances of the people regarding technical, social, and environmental issues. Further, to ensure an effective disclosure of the component proposals to the stakeholders and the communities in the vicinity of the individual component location, meaningful consultations shall be carried out throughout the project duration.

Information disclosure

126. The electronic version of the IEE will be placed on the official website of the Department of Education, and Planning, Investment Promotion and Sustainable Development Department and the website of ADB after approval of the documents by the GoM and ADB. On demand, any person seeking information can refer to a hard copy of the complete IEE document from the office of the PMU and PIU on a written request and can also get the report photocopied by paying the cost, if required. The Executive Summary of IEE report and EMP will also be disclosed in English and local language (Khasi, Garo) at PIU/PMU website.

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

127. The proposed components will be developed on brownfield sites. In consideration of prevailing environmental condition, this chapter assesses the nature, type and magnitude of the potential impacts on the various environmental components i.e., physical, biological and social environment likely associated with proposed development. In commensurate with nature and type of impact on various environmental component the chapter suggests mitigation measures to avoid, reduce or alleviate potential negative impacts and enhance positive ones throughout various component phases.

128. The impacts on the environment can include potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic factors (such as impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), as well as physical cultural resources within the project's area of influence. Direct impacts are those that are directly attributable to the component, whereas Indirect impacts are those that are indirectly generated as well as altered patterns of social and economic development.

129. Considering the siting, type and scale of the component, it can be fairly stated that the key potential impacts during construction as well operation phase of the component are likely to be primarily limited within component footfall area. The component's area of influence for direct impact has been considered as 500m around the project location, while a 10 km radius around the site location is considered for indirect impact assessment towards framing up of corresponding mitigation measure. In addition, there will also be an impact due to transportation of construction materials through trucks during construction phase, and increased traffic during schools' operation. The cumulative impacts during construction phase include a strain on local infrastructure and resources due to influx of people. No other cumulative impacts are anticipated in operation phase as all three projects are brownfield. Induced impacts can manifest as secondary consequences, such as the construction phase may induce increased traffic and noise pollution in surrounding areas. No other induced impacts are anticipated in operation phase as all three projects are brownfield.

130. The impacts on the various environmental and social components were assessed considering following stages of the component planning and implementation:

- Design phase
- Pre-construction phase
- Construction phase
- Operating phase

131. The proposed mitigation measures should be implemented alongside sound management practices and well-conceived engineering designs, construction techniques, and operational procedures. It is imperative that personnel are adequately trained and equipped to manage environmental issues at the site and effectively execute and monitor these protective measures.

A. Design Phase Impacts and Mitigation Measures

132. **Compliance with Component Selection Criteria.** Compliance with Environmental Guidelines and Criteria for Component Selection as defined in the EARF is provided below:

Table 39: Compliance with Environmental Guidelines and Criteria for Component Selection as Defined in the EARF

S. No	Environmental Guidelines and Criteria for Component Selection under the project	Whether complied with stipulated requirements		
		Shillong Public School	Pine Mount School	Jowai Public School
a)	Design and selection of components will consider the input from public consultations, if any	Yes	Yes	Yes
b)	All components involving activities included in the ADB Prohibited Investment Activities List must be excluded from the Project.	Yes	Yes	Yes

S. No	Environmental Guidelines and Criteria for Component Selection under the project	Whether complied with stipulated requirements		
		Shillong Public School	Pine Mount School	Jowai Public School
c)	All components/activities that trigger environment category A (e.g. components/activities with significant adverse environmental impacts that are irreversible, diverse, or unprecedented) must be excluded from the Project.	Yes	Yes	Yes
d)	Components/activities that result in the significant conversion or degradation of natural habitat or which are within a critical habitat[26] must be excluded from the Project.	Yes	Yes	Yes
e)	no component will be in or encroach upon legally protected areas including national parks, wildlife sanctuaries, conservation/elephant/tiger reserves, forest land (reserved and protected forest), ecologically sensitive areas, ecologically sensitive zones, Coastal Regulation Zones, and Ramsar sites etc;	Yes	Yes	Yes
f)	component components will not be in forest land (other than reserved and protected forest) if a significant number of trees are required to be cut or any damage is envisaged to any rare or endangered species present in the land parcel.	Yes	Yes	Yes
g)	no component will be located in or encroach upon areas that have been identified by MoEFCC or State Government or expert institutions under the GoI/GoM like Wildlife Institute of India (WII) as potential or priority habitats/clusters for critically endangered species such as Great Indian Bustard, Lesser Florican etc. unless it has been clearly demonstrated to ADB through an ecological assessment undertaken by an external expert, in consultation with relevant biodiversity stakeholders, that the project activity	Yes	Yes	Yes

[26] As described in ADB's Safeguard Policy Statement (2009), critical habitat is a subset of both natural and modified habitat that deserves particular attention. Critical habitat includes areas with high biodiversity value, including habitat required for the survival of critically endangered or endangered species; areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or that are associated with key evolutionary processes or provide key ecosystem services; and areas having biodiversity of significant social, economic, or cultural importance to local communities. Critical habitats include those areas either legally protected or officially proposed for protection, such as areas that meet the criteria of the World Conservation Union classification, the Ramsar List of Wetlands of International Importance, and the United Nations Educational, Scientific, and Cultural Organization's world natural heritage sites.

S. No	Environmental Guidelines and Criteria for Component Selection under the project	Whether complied with stipulated requirements		
		Shillong Public School	Pine Mount School	Jowai Public School
	will not have significant adverse impacts on the ecology of the area.			
h)	no component will be in or encroach upon other internationally or nationally recognized biodiversity sites including key biodiversity areas, important bird areas, wildlife corridors.	Yes	Yes	Yes
i)	no component will result in significant damage to physical cultural resources or require any physical cultural resources to be removed from their current location	Yes	Yes	Yes
j)	no component will be in or encroach upon internationally or nationally recognized cultural, archaeological or heritage sites including ASI and state protected monuments and their prohibited, regulated or controlled areas as are defined by the relevant statutes.	Yes	Yes	Yes
k)	environmental screening of the components will be done using the applicable rapid environmental assessment (REA) checklist	Yes	Yes	Yes
l)	components which have been categorized as 'B' for environment based on SPS 2009 will not be taken up unless assessed in accordance with Safeguards Requirements 1 and confirmed by ADB following review and clearance of the IEE report; and	Yes	Yes	Yes
m)	All necessary national and local government approvals and/or clearances (if required) will be /have been obtained for the component and shared with ADB prior to implementation.	CTE and CTO and other statutory clearances will be obtained as applicable prior to commencement of construction works.	CTE and CTO and other statutory clearances will be obtained as applicable prior to commencement of construction works.	CTE and CTO and other statutory clearances will be obtained as applicable prior to commencement of construction works.
n)	No components will be located on flood plains or reclaimed water bodies or wetlands. The components will be located above the high flood level of that region.	Yes	Yes	Yes
o)	Components will not be in areas of social conflicts.	Yes	Yes	Yes
p)	avoidance of asbestos containing products and assessment of presence of asbestos containing products to be ensured	Yes, if there is any presence of asbestos containing products then asbestos	Yes, if there is any presence of asbestos containing products then asbestos	Yes, if there is any presence of asbestos containing products then asbestos

S. No	Environmental Guidelines and Criteria for Component Selection under the project	Whether complied with stipulated requirements		
		Shillong Public School	Pine Mount School	Jowai Public School
		management plan to be included	management plan to be included	management plan to be included

ADB = Asian Development Bank, ASI = Archaeological Survey of India, CTE = consent to establish, CTO = consent to operate, EARF = environmental assessment and review framework, GOI = Government of India, GOM = Government of Meghalaya, MoEFCC = Ministry of Environment, Forest, and Climate Change, SPS = Safeguard Policy Statement.
Source: Site Visit Findings, Stakeholder Consultation and Desktop Analysis.

133. **Building Location and Layout Impacts.** Potential concerns which may arise due to the location and layout of the school buildings include the following: lack of proper planning which may lead to energy inefficiency, unnecessary cutting of trees, decreased rainwater infiltration, waterlogging, nuisance/ disturbance to community, students due to noise from diesel generator, odor from septic tanks and waste storage areas, traffic congestion management etc.

134. According to the rapid environmental assessment, all three project sites are not located in any legally protected area, wetland, cultural heritage site, CRZ/Mangrove, Estuarine, important biodiversity habitat etc. As a result, no adverse effects on rare, endangered, or threatened species or habitats are expected. Furthermore, there are no archaeological sites of significance in the vicinity of all three component facilities. The components will be within existing school sites, and there will be no encroachment of any private properties. The sites are accessible via pre-existing road networks, eliminating the necessity for constructing major new access roads.

135. The facilities will be situated within the predefined zones designated for the school buildings. Minor effects on the landscape and visual aspects are expected because of the construction of new structures. Tree felling is envisaged for 6 number of trees in Shillong public school, 5 number of trees in pine mount school and 7 number of trees in Jowai public school. The total number of trees to be felled will be finalised based on the contractor's final design, the necessary permission will be obtained from forest department, and compensatory plantation activity will be undertaken. Based on the consultation taken up with the forest department during due diligence and IEE, it is understood that there are no endangered or rare or threatened species in the vicinity of all three components.

Mitigation Measure:

(i) The layout of the facilities will be such that the classrooms and administrative buildings are away from the noise generating sources such as road traffic, pumps, DG sets.
(ii) Building layout will be superimposed on the site features to avoid clearing trees from the zones that are not going to be constructed. Minimization of tree cutting by identifying the areas to be retained as green or open areas.
(iii) Acoustic building materials for walls, windows, doors will be proposed based on the assessment of noise levels, if they are anticipated to be beyond the standards.
(iv) Acoustic enclosures will be provided to noise generating sources like DG sets.
(v) Drainage layout will be well planned and ensured that it does lead to waterlogging
(vi) Proper traffic circulation plan along with adequate parking will be ensured.
(vii) In case of open parking areas, possible usage of grasscrete may be explored.
(viii) Adequate provisions will be in place to deal with situation in case of emergency like proper exit path, assembly area, area for water storage for fire emergency, public address system, alarm bells, etc.

136. **Climate change Design Considerations.** Failure in considering climate change parameters during design stage of the project can have several significant impacts, including:

(i) **Increased Energy Costs**: Buildings designed without accounting for future climate conditions may require more energy for heating or cooling. This can lead to higher utility bills for occupants, making the building less cost-effective to operate.

(ii) **Decreased Comfort:** Inadequate insulation and ventilation can result in uncomfortable indoor temperatures, making it less pleasant for occupants. This can impact productivity and overall well-being.

(iii) **Structural Vulnerability:** Extreme weather events like storms, floods or heatwaves and natural disasters like earthquake, landslides, and cyclones are becoming more frequent and severe due to climate change. Buildings that aren't designed to withstand these conditions may be structurally vulnerable, leading to damage or safety risks. And can also lead to reduced longevity, the buildings may deteriorate more quickly.

(iv) **Environmental Impact:** Energy-inefficient buildings contribute to higher greenhouse gas emissions.

(v) **Health Concerns:** Poorly designed buildings can have indoor air quality issues, leading to health problems for occupants. This can include mould growth due to moisture infiltration or inadequate ventilation.

137. **Mitigation Measures include:**

(i) Integrate adaptation measures such as green building and sustainability provisions

Table 40: Green Building and Sustainability Provisions per Meghalaya Building by Laws 2021

Plot Category	Plot Area (Sq feet)	Provision for Commercial Institutions, Hospitals, Public Buildings, Hostels, Guest Houses
I	<5000	1. Rainwater harvesting. 2. Segregation of waste. 3. Soft cover provision of minimum 10% plot area. 4. Wastewater management as per recommendations of the MSPCB
II	5001 – 25000	1. Rainwater harvesting. 2. Wastewater above recycle and re-use (for covered area more than 5000 sq. ft). 3. Installation of solar assisted water heating system. (optional) 4. Reduction of hardscape (minimum of 20% should be soft cover). 5. Segregation of waste. 6. Lighting of common areas (for covered area more than 5000 sq. ft) by SPVP/LED devices.
III	Above 25000 sq. ft.	1. Rainwater Harvesting. 2. Wastewaters recycle and reuse. 3. Installation of SPVP/LED devices. 4. Installation of solar assisted water heating system. (optional). 5. Low Water consumption plumbing fixtures. 6. Low energy consumption lighting fixtures. 7. Energy efficiency and HVAC system. 8. Lighting of common areas by solar energy/LED devices. 9. Reduction of hardscape. 10. Segregation of wastes. 11. Organic Wastes Management.

sq. ft = square foot, HVAC = heating, ventilation, and air conditioning, LED = light-emitting diode, MSPCB = Meghalaya State Pollution Control Board, SPVP = solar photovoltaic power.
Source: The Meghalaya Building By laws, 2021.

(ii) The plot area for the proposed structures in Shillong Public school falls above 25000 sqft. and that of the Pine mount school and Jowai public school falls between the range of 5001 to 25000 sqft. Hence, the above-mentioned green building and sustainable provisions shall be followed accordingly, apart from the above-mentioned provisions the following climate resilient materials are also proposed at all three sites:
   - High Albedo (solar heat reflective) paint over concrete roof slab have been considered.
   - Acoustical Insulation for Metal Roofing system in Multi-Purpose Halls
   - Perforated (Acoustical) Gypsum false ceiling in Multi-Purpose Halls
   - Elastomeric membrane water proofing for concrete *chajjas* and canopies
   - Low VOC Acrylic Emulsion paint for interior walls and ceilings
   - Laminated wooden Flooring in Multi-Purpose Hall stage portion
   - High pressure laminate sheets (1.5mm thick) for door shutters
   - Epoxy resin-based flooring for laboratory rooms

(iii) To mitigate the adverse effects of climate change, it is imperative to select construction materials with lower carbon footprint. An effective approach involves favouring alternative materials over conventional ones, with a particular emphasis on those that possess a significantly lower carbon footprint. This approach substantially reduces greenhouse gas emissions associated with construction activities. It is imperative to consider building design considerations tailored specifically for hilly areas.
   - Usage of recyclable materials like wood substitutes.
   - Installation of BEE certified equipment
   - Usage of energy efficient lighting fixtures (LED)
   - Provision of PV cells on roof for solar power for solar light.
   - Opting for materials sourced near the construction site serves a dual purpose. It not only minimizes fuel consumption linked to transportation but also mitigates the associated greenhouse gas emissions. By favouring local sourcing, a project can significantly curtail its carbon footprint while concurrently fostering regional economic sustainability.
   - Roof top and in other suitable locations rainwater harvesting structures will be proposed.
   - In case of open parking areas, possible usage of grasscrete may be explored.

138. **Seismic hazards, Emergency Response Design Considerations**

(i) Adequate provisions will be in place to deal with situation in case of emergency like proper exit path, assembly area, area for water storage for fire emergency, public address system, alarm bells, etc.

(ii) Considering appropriate Bureau of Indian Standards Codes (BIS) for design, Seismic Zone V coefficient (IS: 1893 (Part I)-2002: Indian Standard Criteria for Earthquake Resistance Design of Structures (5th Revision) and IS:4326-1993: Indian Standard Code of Practice for Earthquake Resistance Design and Construction of Buildings (2nd Revision)), appropriate wind load factor (corresponding to the prevalent wind speed), and detailed design after carrying geotechnical investigations and topographic survey as required.

(iii) When designing structures in areas susceptible to landslides, a comprehensive assessment is critical to mitigate both direct and indirect impacts. Here are the key details to be considered during the design phase:
   1. Site Investigation and Assessment

a. Geological Survey: Detailed mapping of the geological features, soil types, and rock formations.
b. Topographical Survey: Analysis of slope angles, elevation changes, and terrain features. Identification of natural drainage patterns and potential water accumulation areas.

2. Risk Assessment
   a. Landslide Hazard Analysis: Identification and mapping of potential landslide zones.
   b. Vulnerability Assessment: Determining the potential impact on structures, infrastructure, and human lives.
3. Design Considerations
   a. Slope Stabilization Measures
   Retaining Structures: Design of retaining walls, crib walls, and soil nailing to stabilize slopes.
   Reinforcement: Use of geotextiles, geogrids, and soil reinforcement techniques to enhance slope stability.
   Vegetation: Planting deep-rooted vegetation to stabilize the soil and reduce erosion.
   b. Drainage Control
   Surface Drainage: Designing proper surface drainage systems to direct water away from vulnerable slopes.
   Subsurface Drainage: Installation of sub-drainage systems to reduce groundwater pressure and prevent water accumulation.
   c. Grading and Excavation
   Grading: Re-contouring of the landscape to reduce slope angles and improve stability.
   Terracing: Creating terraces on steep slopes to reduce the risk of soil movement.

(iv) Cut and Fill: Proper management of cut and fill operations to maintain slope stability during construction.

139. **Securing Necessary Permits**: The permits or certificates from concerned authorities (i.e., Consent to Establish, tree felling permissions, water abstraction etc.) as applicable prior to construction to be obtained prior to the start of the construction activity.

B. Pre- Construction Phase Impacts and Mitigation Measures

140. **Contractor's Environment, Health and Safety Experts:** There could be a possibility that there will be Inadequate Safeguard Performance during project implementation.

141. **Mitigation Measures:**

(i) The Contractor to appoint One Environment Expert and one H&S Expert (Instead of One Environment Expert and one H&S Expert, an expert with Environment - Health-Safety expertise may also be considered if the person is qualified enough in terms of qualification and professional experience), having relevant qualification and adequate experience in implementation of Environmental safeguards in the project till the engagement period of contractor.
(ii) The expert/s to prepare construction EMP (CEMP) including Health and safety (H&S) plan based on ADB cleared EMP if required to include the site-specific conditions pertaining to construction and associated activities.
(iii) The occupational health and safety plan for construction site and nearby community will also be prepared in detail by the Contractor.
(iv) The contractor to conduct baseline monitoring for all environmental parameters before start of the construction.

142. **Securing Necessary Permits:** The permits or certificates from concerned authorities (i.e., Consent to Establish, tree felling permissions, water abstraction etc.) as applicable prior to construction to be obtained prior to the start of the construction activity.

143. **Mitigation Measures:**

- Consent to Establish and Consent to Operate (for facilities such as crusher, batching plant etc.) should be obtained as appropriate and terms/conditions mentioned in the consent must be complied with.
- Prior Permission for ground water extraction shall be obtained from the central ground water board (CGWB) or other concerned authority for proposed borewells/abstraction of groundwater.
- Registration and license to be obtained as per Contract Labour (regulation and abolition) Act 1970 or state act and rules.
- Registration and license under Inter State Migrant Worker Act (in case migrant workers are engaged).
- Conduct Environmental monitoring for parameters like Air Quality, Water Quality, Noise Quality and Soil Quality as per monitoring plan. This monitoring is to establish baseline environmental monitoring.

144. **Alteration of land contour and drainage pattern:** Changed storm water runoff from alterations of the site's natural drainage patterns due to excavation works in the sites, construction. Affect the existing seasonal drain present along the boundary of the site. Affect the slope stability of the site.

145. **Mitigation Measures:**

- Design of proposed facility components should enable efficient drainage of the sites and maintain natural drainage patterns to the extent possible.
- Plan should be in place so that the drainage pattern of surrounding area is unaffected.
- Since the existing seasonal drain is passing along the boundary of the project site, no realignment or shifting of drain is anticipated.
- Slope protection measures shall be followed for maintaining slope stability.

146. **Utility Shifting.** Several types of utilities serving local and regional needs may be placed on the proposed component's premises and may need to be relocated/shifted from their current location due to the proposed component's activities. These features may primarily consist of electric wires, water supply/sewerage pipelines, and telephone cables. These may create service disruptions and inconvenience to residents. Exposure to asbestos containing materials during utility shifting can pose serious health risks to workers and anyone in the vicinity.

147. **Mitigation Measures:**

(i) Prior to the start of construction, all utilities should be restored. The necessary mitigation measures should be to instruct the relevant owners of these utilities to relocate them before construction begins to avoid disruption of local services.

(ii) If there are temporary service delays, the community shall be notified as soon as possible, and alternate supply facilities, such as water tanks or equivalent, must be provided if unavoidable.

(iii) Before beginning construction, the contractor would inspect existing underground utilities such as water supplies, gas pipelines, sewerage lines, and cables to ensure that underground utilities (if any) are not disrupted during construction/excavation operations. If any subsurface utilities are anticipated to be impacted because of the construction activity, the contractor shall request authorization from the relevant authority before initiating construction works.

(iv) Underground and/or aboveground utilities such as power lines, water lines, gas lines, oil pipelines (if any) and any communal property resources such as temples,

mosques, and so on shall be protected. The concerned authorities shall be notified right away if any utilities are damaged.

(v) If it is found that AC structures are present during the survey, then the Contractor will prepare a detailed SOP for asbestos handling and management prior to disposal/ handling of the AC structure and shall be approved by the PMC.

(vi) All AC pipes/ structures will be left in situ and untouched, if possible

(vii) In the event, that the asbestos fibres from AC structures were accidentally disturbed/exposed, the contractor should follow Safe disposal provisions as per the USEPA.[27]

(viii) Use of AC materials will be strictly prohibited at site.

148. **Tree felling.** All three proposed project sites lack dense vegetation cover, with only sporadic bushes, shrubs, and a small number of trees. Tree felling is envisaged for 6 number of trees in Shillong public school, 5 number of trees in pine mount school and 7 number of trees in Jowai public school. The total number of trees to be felled will be finalised based on the contractor's final design, the necessary permission will be obtained from forest department, and compensatory plantation activity will be undertaken. Based on the consultation taken up with the forest department during due diligence and IEE, it is understood that there are no endangered or rare or threatened species in the vicinity of all three components.

149. **Mitigation Measures:**

(i) All efforts must be taken to conserve trees and avoid felling to the greatest extent practicable.

(ii) Disturbance and removal of vegetation must be confined solely to the designated component area where construction of building is sited in the layout (this shall be identified in the design stage itself by superimposing the approved layout on the existing features map of site). Before proceeding with any vegetation clearance or construction work, it is essential to conduct a survey to identify mature, older trees, and to actively consider alternative measures including transplantation to avoid their removal.

(iii) In the case of any tree felling, prior approval from the competent department should be acquired.

(iv) Compensatory plantation may be carried out in the ratio of 1:10 or as specified by the competent authority along the area available within component premises or any other designated places.

150. **Chance finds procedure:** Accidental discovery of historical and archaeological resource/artefacts.

151. **Mitigation Measures:** A rapid response procedure to protect chance finds while minimizing disruption to project activities should be in place. It will include the provisions to:

(i) consultation with the State Archaeology Department,

(ii) demarcation of the discovery site,

(iii) chance finds report,

(iv) arrival and actions of cultural authority, and

(v) suspension/non- suspension/further suspension of work

(vi) If archaeological artifacts are unexpectedly found during construction, work will be immediately halted, and the Implementing Agency (IA) and the local cultural relics/heritage department will be informed of the discovery.

[27] https://www.govinfo.gov/content/pkg/USCODE-2011-title15/pdf/USCODE-2011-title15-chap53-subchapII.pdf

152. **Site Induction Training:** Lack of understanding of potential safeguard concerns and corresponding mitigation measures.

153. **Mitigation Measures:**

(i) No works will be initiated by the contractor until the site induction training is carried out

(ii) Site induction training includes but not limited to i) discussion and review of EMP detailing specific environmental risks associated with their Scope of work; how to manage, requirement of legal compliances ii) Health and Safety Awareness

154. **Labour Camp/Accommodation:** Poor siting and layout of workers camp (if located outside of proposed area premise) may result in loss of agricultural produce if sited on cultivable land, health hazards to workers and nearby community due to poor hygiene conditions, contamination of surface and ground water bodies if sited near water bodies, local drainage problems, fire, electrical, and other safety risks, and so on.

155. **Mitigation Measure:** Prior to the establishment of a worker's camp, the site, layout, and basic facility provision should be carefully prepared by the contractor and approved by the component authority (PMC/implementing agency). The location of worker camps should be determined by considering the proximity of residential and sensitive facilities like schools, existing healthcare centres, religious institutions, forests and waterbodies to the construction site. The minimum distance requirement should be determined based on site-specific factors. The camps should be planned about 500 m (or at a distance as suggested by concerned authority like gram panchayat, forest department, etc.) away from water bodies, residential areas, forest area or any environmentally sensitive areas etc. If the camps are located on the premises of a component, they should be suitably barricaded. Contractors should produce a solid waste (including hazardous waste) and wastewater management plan that includes collection, storage, and disposal, subject to the component Authority's (PMC/implementing agency's) evaluation and approval. Air polluting construction sources such as batching plant, crusher etc. shall be in the downwind direction of residential or environmentally sensitive areas. Prior to site preparation or construction, necessary consent/permission such as labour licenses from Labour Department and labour insurance, etc.) as applicable to the component must be secured. No temporary or permanent constructions to be done on the locations of water bodies (including seasonal) identified within site even if there is no water and these water bodies shall be barricaded.

C. Construction Phase Impacts and Mitigation Measures

156. Potential impacts during the construction phase are related to soil erosion, increased noise and dust levels, the generation of liquid and solid waste from the construction site and labour camp, and safety risks to both workers and the local community. There will be no major adverse effects on flora and fauna, as the project sites are brownfield and mostly consists of open barren land with very few mature trees or vegetation. There are also no known reports of physical cultural resources in the vicinity of the proposed site; however, a procedure for the chance find will be established as a precautionary measure.

157. The environmental impacts associated with the construction phase are expected to be localized and of short term. These impacts can be effectively mitigated through the implementation of sound construction site management practices. The primary impacts during construction are elaborated below.

158. **Sources of construction materials:** Sourcing construction materials from unauthorised mining/ quarry sites can cause environmental impacts like habitat destruction, air & water pollution, resource depletion, soil erosion and degradation.

159. **Mitigation Measures:**

(i) Obtain construction materials only from government-approved quarries/vendors that are compliance to the environmental regulations. Verify suitability of all material sources and obtain approvals from PIU and DSC.
(ii) Creation of new borrow areas, quarries, etc., for the project should be avoided; if unavoidable, contractor to obtain all necessary clearances and permissions in prior

160. **Land use, Drainage and Topography:** Potential Impact on natural land Use/ contours, vegetation clearance, disturbance to natural drainage patterns, water logging, and water pollution. As the proposed project sites are brownfield and there is no water body present inside the project sites except for a seasonal drain passing through the boundary of the Shillong public school site which is 3 m away from the proposed building. There is a possibility of vector nuisance from the existing seasonal drain present at site. There will be no change in land use. Nevertheless, due to site preparation activities like land levelling, cutting, and filling, the topography and drainage patterns in the project area may be influenced. However, these impacts are predicted to be confined to specific areas. Therefore, it is advisable to incorporate measures for maintaining proper drainage conditions in the project design to prevent potential issues like localized waterlogging that could create unhygienic conditions or flooding that might affect the surrounding environment.

161. **Mitigation Measures:**
(i) Site levelling should be done with minimum alteration in contour level as possible while not disturbing the natural drainage system.
(ii) It should be ensured the natural flow of water in the drain is retained to mitigate and vector nuisance in future due to stagnation of water.
(iii) Install adequate protection measures to prevent filling of existing drainage with spoils or construction materials/wastes.
(iv) Strip the topsoil and store properly (so that it maintains the organic/ inorganic properties of the soil) for reuse later.
(v) Maximize the re-use of earth-cut materials, spoils, and construction debris/wastes.

162. **Generation of Construction and Demolition Waste and disposal of the same (as applicable):** Contamination of surrounding environment, risk to community health and safety, poor aesthetics.

163. **Mitigation Measures:**
(i) The contractor to ensure regular collection and disposal of construction waste generated debris, concrete, metal cuttings waste, waste/used oil etc. through authorized vendor or by any other means in compliance with regulatory requirement.
(ii) Collection, storage, handling and disposal of Asbestos (if any) containing waste/material from the site should be managed in accordance with rules and guidelines on environmental management of construction & demolition (C& D) wastes by Central Pollution Control board (CPCB) and MoEFCC. Contractor should submit a demolition plan for the existing structures/ sheds (if any) within the premises that are likely to demolished for the proposed development works.

164. **Asbestos Materials:** No asbestos containing materials were found in the schools. However, measures are recommended in case ACM are found at the sites to avoid health risks due to exposure to asbestos materials.

165. **Mitigation Measures:**
(i) Obtain details from PHED/Local body on location of underground AC pipes/ structures.
(ii) Contractor should conduct a survey with the assistance of PHED and / or NP on the presence of existing AC pipes/ structures at site (if any).

(iii) If it is found that AC structures are present during the survey, then the Contractor will prepare a detailed SOP for asbestos handling and management. ADB's Good Practice Guidance for the Management and Control of Asbestos: Protecting Workplaces and Communities from Asbestos Exposure Risks | Asian Development Bank (adb.org) will be followed along with other international guidelines in preparing the SOPs.
(iv) All AC pipes/ structures will be left in situ and untouched, if possible
(v) In the event, that the asbestos fibers from AC structures were accidentally disturbed/exposed, the contractor should follow Safe disposal provisions as per the USEPA https://www.epa.gov/asbestos/safe-work-practices
(vi) Use of AC materials will be strictly prohibited at site

166. **Air Quality.** During the construction phase of the project, moderate, temporary impacts on air quality are foreseen, primarily stemming from fugitive dust generation in the vicinity of the project site. Significant fugitive emissions during the construction phase primarily originated from activities such as vehicular movements, excavation, and levelling operations. Minor elevations in the levels of $PM_{10,}$ $PM_{2.5}$, nitrogen oxides (NOx), hydrocarbons (HC), carbon monoxide (CO) and sulfur dioxide (SO_2) are expected due to construction activities and the operation of construction equipment and machinery. It's important to note that these impacts during the construction phase will be confined to specific areas and of a short-term nature. Nevertheless, they have the potential to affect the existing school buildings and nearby residential community. Major anticipated impacts are emitted from the following sources:

(i) **Construction Activities:** Construction equipment, especially batching plants, Wet Mix Macadam (WMM) plants, and Hot Mix Plant (HMP), can generate dust emissions during material handling, mixing, and transportation processes. These emissions can contain particulate matter (PM_{10} and $PM_{2.5}$), SOx, NOx etc. that can degrade air quality.
(ii) Excavation, earthmoving, grading, and demolition activities (for Pine Mount School) disturb the soil and create airborne dust particles. Wind can carry these particles over considerable distances, impacting air quality in the surrounding area.
(iii) **Transport of Construction Materials**: The transportation of construction materials to and from the construction site can also generate dust, especially if the materials are not adequately covered or contained.
(iv) **Storage and Handling**: Storing and handling construction materials, particularly fine materials like sand, cement, and aggregates, can lead to dust emissions. Wind and human activities in these storage areas can further exacerbate the problem.
(v) **New Quarry/Crusher Plants:** The establishment of new quarry/crusher plants can lead to land clearance, dust emissions, and habitat disruption, which can affect air quality.
(vi) **Existing Quarry/Crusher Sites:** Sourcing materials from existing government approved and licensed quarry/crusher sites with established environmental safeguards and environmental permissions/clearances can reduce the environmental impact associated with new operations.

167. **Mitigation Measures:**
(i) **CTE/CTO for Construction Equipment:** The installation and operation of construction equipment like batching plants, crushers, WMM plants, and HMM plants often require obtaining Consent to Establish (CTE) and Consent to Operate (CTO) from the local pollution control authorities. These permits ensure compliance with emission standards and best practices to mitigate air quality impacts.
(ii) Quarry and mines also require Consent to Establish (CTE) and Consent to Operate (CTO) to ensure that their operations meet air quality standards and environmental regulations. These permissions shall be obtained prior to their establishment and

operations and the conditions stipulated in the permission shall be complied to manage the air quality.

(iii) **Dust Control:** Use water sprays, dust suppressants, dust screens and wind barriers to control dust emissions from construction activities, material transport, storage, and handling.

(iv) A temporary dust screen cum noise barrier of adequate height shall be provided on the boundary of the construction area at all three project sites to prevent the hampering of existing school activities due to generated dust from the construction activity.

(v) **Emission Controls:** Equip construction vehicles and machinery with emission control technologies like catalytic converters and diesel particulate filters to reduce the release of harmful pollutants.

(vi) **Fuel Efficiency:** Promote the use of energy-efficient equipment and machinery and their regular maintenance to minimize fuel consumption and emissions.

(vii) **Regular Maintenance:** Ensure that construction vehicles and equipment are well-maintained to optimize combustion efficiency and reduce emissions. Ensure all the vehicles should have PUC (Pollution Under Control) certificate.

(viii) **Compliance:** Adhere to air quality regulations and standards and monitor and report emissions as required. All the Construction vehicles and machineries should be regularly maintained to conform to the emission standards stipulated under Environment (Protection) Rules, 1986. All the DG sets will conform to the emission standards as stipulated under Environment (Protection) Rules, 1986.

(ix) Batching plants should be located at downwind (as far as possible) direction from the nearest settlement.

(x) Batching plants will have dust screens at the silos, aggregate batcher, feeder areas of adequate height.

(xi) Only crushers licensed by the PCB should be used along with dust screens around the outlet of crushed aggregates.

(xii) DG sets should be provided with adequate stack height and use of low sulfur diesel as fuel.

(xiii) LPG should be used as fuel source in construction camps instead of wood.

(xiv) Ambient air quality monitoring should be taken up at adequate location environment monitoring plan (To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark)

(xv) Contractor to prepare maintain logbook for water sprinkling

(xvi) PPE kits shall be provided to workers like eye protection goggles and masks, shoe cover, head cover, helmets, gown, respirators, safety vests, and face shields.

168. **Noise and Vibration.** The primary contributors to noise pollution stem from the movement of construction vehicles, the transportation of construction materials to the site, and the noise-generating activities taking place at the construction site. The noise level at the construction site may range from 58 dB(A) to 102 dB(A) depending on the activity. Attenuation of noise level to permissible limits of sensitive zones without acoustic barrier might take more than a kilometre. Specifically, concrete mixing and material handling activities are the principal sources of noise, and these activities are expected to occur consistently throughout the entire construction period. Major anticipated impacts are emitted from the following sources:

(i) **Construction Activities:** Construction sites are inherently noisy due to various activities like excavation, demolition (for Pine Mount School), concrete pouring, and the operation of heavy machinery and equipment. These activities can generate high noise levels that extend beyond the construction site boundaries.

(ii) A temporary acoustic barrier of adequate height shall be provided on the boundary of the construction area of all three project sites, to attenuate the noise generated due to the construction activity.

(iii) **Operation of Equipment and Machinery:** Construction vehicles, cranes, loaders, concrete mixing equipment, compactors, rollers, scissor lifts, generators, air

compressors, scaffolding, power tools, and other equipment often have engines and systems that produce noise during their operation. This noise can be particularly disruptive when equipment is in use for extended periods.

(iv) **Vibration from Heavy Machinery and Equipment:** The operation of large construction machinery, and other equipment can generate ground vibrations. These vibrations may be felt by students in the existing buildings and residents living near the construction site.

169. **Mitigation Measures:**

(i) **Noise Barriers:** Erecting noise barriers or sound walls around the construction area to block or reduce noise propagation to be installed.

(ii) **Construction Scheduling**: Carefully plan construction schedules to minimize noisy activities during sensitive hours, such as early mornings and late evenings. Restrict major noise generating activities during night-time 10:00 pm to 6:00 am.

(iii) For instance, noisy work can be scheduled after school hours or during weekends/ holidays to avoid affecting school activities.

(iv) **Equipment Selection:** Choose construction equipment and machinery that produce lower noise levels and vibrations when possible.

(v) **Noise Barriers and Enclosures:** Erect temporary barriers or screens around noisy equipment or construction sites to block or absorb sound. Materials like acoustic panels or thick, dense materials can be effective.

(vi) Enclosures: Use enclosures or shrouds for particularly noisy machinery to contain the sound.

(vii) **Community Engagement:** Maintain open lines of communication with residents and sensitive receptor facilities to address concerns and provide information about construction activities.

(viii) **Providing PPE's:** Provide personal protective equipment (e.g., Earmuffs) to all workers wherever noise is generated due to machinery operation. Provide required protective equipment like earmuffs to the students in the classroom which are near to the construction area.

(ix) **Regulatory Compliance:** Adhere to local noise and vibration regulations and standards to ensure compliance.

(x) Noise monitoring should be taken up at adequate location as per the environment monitoring plan (To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark)

(xi) Regular maintenance of equipment to ensure it operates efficiently and quietly.

(xii) If activities generating high level of vibration are proposed to be undertaken like use of heavy vibrating machines, then it will be required to establish initial data on the structural quality of nearby buildings and implement a vibration monitoring system. This monitoring should begin during the preconstruction phase and continue during activities like blasting or those generating high levels of vibration, if any. Additionally, strategies to mitigate vibration effects, including controlled vibration, reduced blasting charges, and the restoration of buildings if vibration-induced cracks occur, should be integrated into the project plan.

170. **Impacts on Surface and Groundwater.** During the construction phase, there can be considerable stress placed on local water resources. This stress is primarily a result of increased demand for water to support various construction activities. Construction requires water for tasks such as mixing concrete, dust suppression, and general site maintenance. The increased extraction of water from local sources can lead to a strain on the availability of water in the area, potentially affecting local communities and ecosystems. The modification of natural drainage patterns on the site resulting from excavation and construction activities can lead to altered stormwater runoff. Construction activities can pose a risk of contaminating both surface and groundwater sources in several ways:

(i) **Fuel and Chemical Spills:** Accidental spills of fuels, oils, or chemicals used in construction machinery and equipment can occur. These spills, if not properly managed, can infiltrate the soil and potentially reach groundwater sources, leading to contamination.
(ii) **Discharge of Wastewater:** Construction sites and construction camps are likely to generate wastewater and solid waste. If not appropriately treated and disposed of, wastewater can contaminate surface water bodies, such as rivers or streams, and infiltrate into groundwater.
(iii) Construction may alter natural drainage patterns by changing the flow of water through grading, excavation, or dumping of construction materials/ waste etc. This alteration can affect the seasonal drain's capacity to carry water and the hydrology of nearby ponds and potentially leading to water scarcity in the area.
(iv) **Solid Waste:** The improper disposal of solid waste from construction activities can contribute to contamination. Materials such as construction debris or hazardous waste can leach pollutants into the soil and water if not handled and disposed of correctly.

171. **Mitigation Measures:**
(i) Obtain approval/permission from competent authority if ground water abstraction through bore well is carried out or water is sourced from any other means.
(ii) Temporary storm drains should be designed according to site conditions to avoid contaminating water sources from storm water and spills. Use of oil spill kit shall be mandatory at locations of fuel storage and fuel locations.
(iii) Spills should be collected and disposed of as soon as they occur as per the Hazardous waste management rules. Oily waste/grease should be collected and skimmed using oil traps before being sold or delivered to authorized agencies. Sewage from construction camps, on the other hand, shall be collected in soak pits and septic tanks. A record of water use will be kept.
(iv) Use of environmentally friendly sanitation solutions, such as bio toilets and bio digestor septic tanks, or any other advanced small-scale sewage treatment systems shall be made by the contractors at labor camps. If the above-mentioned solutions are not feasible then at least septic tanks/ soak pits are to be installed.
(v) Silt barriers shall be installed around the banks of water bodies to avoid siltation, contamination, dumping of materials/ waste into it. If dumped it must be immediately cleared.
(vi) Use treated water for water sprinkling to optimize usage of water for dust suppression in access/haul roads, washing of vehicles, concrete mixing, etc. Littering and unauthorised discharge will be prohibited.
(vii) Solid garbage and earth materials shall not be dumped into open drains, water bodies be it seasonal or perennial.
(viii) Construction materials and debris shall be stored away from bodies of water or waterways, and only at approved construction zones.
(ix) All fuel and chemical storage (if required on-site) shall be located on an impermeable base within an embankment and will be surrounded by fencing. The storage facility shall be at least 100 m away from the from the water bodies.
(x) Provision for water conservation e.g., rainwater harvesting at the project site.
(xi) Monitoring of surface, ground water quality (also drinking water of workers) should be taken up at adequate location as per the environment monitoring plan (To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark).

172. **Impacts on Soil.** During excavation for construction, the removal of topsoil can result in the loss of fertile and nutrient-rich soil, which is vital for plant growth. This loss can impact future landscaping, greenery, and soil quality, requiring remediation efforts to restore it for vegetation.

173. Construction activities, especially earthmoving, cut and fill operations, and the presence of stockpiles, can disrupt natural soil stability and increase the risk of soil erosion. Erosion can lead to the displacement of soil particles, negatively affecting the surrounding environment and potentially causing sedimentation in nearby water bodies.

174. The construction phase can introduce contaminants to the soil through various means, including accidental oil or chemical spills, improper disposal of debris, and poor management of wastewater and waste from labor camps. Contaminated soil poses environmental and health risks and may require remediation.

175. The frequent movement of heavy construction vehicles and equipment can lead to soil compaction, reducing soil porosity and impairing its ability to absorb water. This compaction can negatively affect soil fertility and drainage. Additionally, it can impact access and haul roads, causing wear and rutting.

176. **Mitigation Measures:**

(i) Provision for appropriate storage of topsoil (top 15 cm of soil) in an appropriate way (to ensure that the organic/inorganic properties of soil are retained) should be made and reused for growing vegetation.
(ii) Excavated soil should be reused as much as possible for backfilling, landscaping and for other project areas.
(iii) To prevent seepage into project site soil, store hazardous materials such as diesel and used oil in an isolated room/ covered area with an impervious surface with a chamber to collect spilled oil that can be reused or recycled Spill kits/ spill tray will be used at DG set locations as well.
(iv) Fuel storage and replenishment locations should be kept away from drainage infrastructure and water bodies.
(v) Filling and transferring oil to and from containers must take place on an impermeable surface.
(vi) To avoid soil contamination Oil-Interceptors will be provided at wash down and refuelling areas. Precautions should be made to avoid changes in soil quality caused by human activities such as dumping of solid and liquid waste from the labor camps on open/ unlined ground surface.
(vii) It is crucial to implement proper soil management practices, erosion control measures, and waste handling protocols to mitigate these adverse effects on soil quality, the environment, and surrounding infrastructure.

177. **Waste Generation.** The following activities are anticipated to have impact on generation of solid and liquid waste during construction works and from the construction camp:

(i) Solid Waste Generation:

- **Construction Debris**: The primary source of solid waste during construction is construction debris. This includes materials like concrete rubble, bricks, wood, metals, and other discarded building materials.
- Asbestos Materials: There is a probability of finding AC structures during the construction. This shall pose health risk due to exposure to asbestos materials
- **Packaging Waste:** Construction materials often come packaged in various materials like cardboard, plastic, and metal. The removal and disposal of packaging materials contribute to solid waste generation.
- **Non-Hazardous Waste:** General non-hazardous waste generated at the construction camp, including food waste, packaging, and discarded items, also adds to the solid waste stream.

(ii) Liquid Waste Generation:

- **Wastewater:** Liquid waste is generated from various construction activities, particularly those involving the use of water, such as concrete mixing, dust suppression, and equipment cleaning. This wastewater can contain suspended solids, chemicals, and other contaminants.
- **Sanitary Waste:** Liquid waste from the construction camp includes domestic wastewater from toilets, showers, and kitchen facilities.

178. **Mitigation Measures:**

(i) **Waste Sorting:** Use a two-bin system to separate and store food waste and recyclables such as paper, plastic, glass, and scrap metal waste in designated waste bins/containers. The recyclables should be sold to local recyclers on a regular basis, while food waste should be disposed of through the municipal waste management agency.

(ii) Biodegradable waste will be preferably composted in -situ that can be utilized to establish a nursery on-site, contributing to the development of the planned green area. The municipal solid waste should be routed through proper collection and handover to local body for further disposal.

(iii) All the construction and demolition waste should be managed as per Construction and Demolition Waste Management Rules, 2016.

(iv) Recyclable waste should be appropriately directed to authorized recycling facilities, based on waste type.

(v) **Hazardous Waste Handling:** Safely manage and dispose of hazardous materials such as paints, solvents, spent oil, spilled oil, and chemicals according to Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and their subsequent amendments.

(vi) It is to be ensured that hazardous waste is not stored for more than 90 days.

(vii) **Asbestos Material Handling:** If it is found that AC structures are present during the survey, then the Contractor will prepare a detailed SOP for asbestos handling and management prior to disposal/ handling of the AC structures.

(viii) All AC pipes/ structures will be left in situ and untouched, if possible

(ix) In the event, that the asbestos fibers from AC structures were accidentally disturbed/exposed, the contractor should follow Safe disposal provisions as per the USEPA.

(x) Use of AC materials will be strictly prohibited at site.

(xi) **Wastewater Treatment:** Sewage from construction camps shall be collected in soak pits and septic tanks.

(xii) A sedimentation tank of adequate capacity shall be constructed for the batching plant.

(xiii) The treated water should undergo testing for alkalinity before being discharged into low-lying areas, water bodies, or open grounds. It would be better to reuse the treated water for non-potable uses.

(xiv) **Monitoring:** Regularly monitor waste generation rates and the effectiveness of waste management practices to adjust as needed. Monitoring and regulating alkalinity levels are crucial as excessive alkalinity can inhibit vegetation growth and pose harm to aquatic life.

179. **Ecosystem and Biodiversity.** Based on consultation with forest department, there are no threatened or endangered flora and fauna species recorded in the vicinity of all three component areas which may get affected. As the project sites, it is unlikely that there will be any adverse impacts on such species during the construction phase.

180. Furthermore, after the construction is completed, the project site will undergo landscaping efforts, including the planting of vegetation. Additionally, a green belt will be developed in accordance with the approved layout. These measures are intended to enhance the ecological quality of the site, provide habitat for local flora and fauna, and contribute positively to the overall environment following construction.

181. **Mitigation Measures:**

(i) **Erosion Control:** Implement erosion control measures to prevent soil erosion and protect adjacent habitats from sedimentation.
(ii) **Hazardous Materials Management:** Ensure strict management and containment of hazardous materials to prevent accidental spills.
(iii) **Stormwater Management:** Implement effective stormwater management practices to control runoff and reduce pollutant discharges.
(iv) **Noise and Vibration Mitigation:** Use noise barriers, scheduling restrictions, and vibration-dampening measures to mitigate disturbances to wildlife.
(v) **Environmental Monitoring:** Regularly monitor and assess the impact of construction activities on local ecosystems and adjust mitigation measures as needed.
(vi) A firm ban should be enforced against using fuelwood and shrubs as a source of fuel, and workers should be explicitly instructed not to cause harm to any wild or domestic animals in the region.
(vii) Laborers should receive training regarding Do's and Don'ts in relation to animals if encountered.
(viii) "Efficient disposal of solid and liquid waste must be guaranteed to prevent any contamination of soil or water bodies that could have adverse effects on the local species' habitats."
(ix) Restrict construction works to construction sites, halting earthworks at depots during monsoons, timely cleaning of construction sites, and planting trees can help mitigate the impacts on ecosystem and biodiversity.

182. **Potential loss of physical cultural resources.** Based on a Rapid Environment Assessment, there is no documented presence of heritage or archaeological sites/ monuments on any of the three proposed project sites.

183. **Mitigation Measures:** Contractors must implement a procedure for chance find of cultural, archaeological, historical artefacts during excavation in project area. If archaeological artifacts are unexpectedly found during construction, work will be immediately halted, and the Implementing Agency (IA) and the local cultural relics/heritage department will be informed of the discovery.

(i) All fossils, coins, ancient artifacts, structures, and other archaeological relics discovered on the site shall be the property of the government and shall be dealt with in accordance with the appropriate legislation.
(ii) The Contractor must take reasonable efforts to prevent workers or other individuals from removing and harming such goods or things.
(iii) The Contractor will immediately stop work at the site if such artifacts of archaeological importance are discovered during construction.
(iv) The Contractor must immediately notify the project authority of such discovery and follow the project authority's instructions for dealing with the same. Before instructing the Contractor to recommend work at the site, the Project Authority will obtain direction from the appropriate Archaeology Department.
(v) If any such archaeological relics are there and, it is destroyed or removed from the area without the knowledge of the competent authority that will be considered as violation of national regulations as well as SPS 2009

184. **Occupational Health and Safety:** Some of the occupational health and safety hazards associated with building construction include:

(i) **Heavy Lifting and Fall Hazards**: Construction often involves the manual handling of heavy materials such as concrete blocks, steel beams, and construction equipment components. Improper lifting techniques can lead to musculoskeletal injuries like

strains and sprains. Workers are often at risk of falls from heights usually from scaffoldings or platforms constructed temporarily for construction activities.

(ii) **Storage Hazards:** Inadequate storage of materials can result in cluttered work areas, increasing the risk of tripping, falling objects, and injuries caused by improperly stored materials.

(iii) **Equipment Usage:** The operation of machinery for material handling, like cranes and forklifts, poses risks if not operated by trained personnel or if safety protocols are not followed.

185. **Mitigation Measures:**

(i) An occupational health & safety Plan will be prepared and implemented by the contractor including Health & Safety reporting and incident/accident reporting procedure. Accidents will be reported immediately to ADB (within 48 hours). Root cause analysis and corrective actions take to avoid further accidents will also be submitted to ADB (preferably within 72 hours).

(ii) Accident register will be maintained at site and closed monthly by the site supervisor.

(iii) **Training:** Provide workers with proper training on equipment operation, safety procedures, and the handling of hazardous materials. Workers with adequate training and no acrophobia shall only be assigned height works and similar for works requiring specific skills or training.

(iv) **Personal Protective Equipment (PPE):** Mandate the use of appropriate PPE, such as helmets, gloves, safety goggles, and harnesses, as needed.

(v) **Safe Work Practices:** Implement and enforce safety protocols and work practices to minimize risks, including fall prevention measures and material handling guidelines.

(vi) Usage of fluorescent and retro refectory signage, in local language should be provided at construction sites.

(vii) The construction of scaffolding and temporary work platforms must be carefully designated and regularly inspected to ensure stability and safety for workers.

(viii) **Regular Inspections:** Conduct routine safety inspections and audits to identify and rectify potential hazards promptly.

(ix) **Health Monitoring:** Implement health monitoring programs to assess and address potential health impacts related to chemical exposures or noise levels, acrophobia, silicosis, impacted vision etc.

(x) **Emergency Response:** Establish emergency response plans and first-aid stations to address accidents and injuries promptly.

(xi) By diligently implementing these measures and fostering a safety-conscious work environment, we can minimize occupational health and safety risks, ensuring the well-being of all workers on the site.

186. **Labour Rights/ Influx of workforce in the area.** The influx of a diverse workforce into an area may lead to cultural conflicts, as workers from different backgrounds may have varying customs, languages, and practices. Misunderstandings and clashes can arise if not properly managed. The number of workers expected at peak level of the construction period are 200 workers at Shillong Public School, 250 at Jowai Public School and 100 at Pine Mount School.

187. The presence of a large number of workers can affect the social dynamics of the area, potentially leading to tensions between the existing community and the incoming workforce. An increased workforce population may strain local housing and physical infrastructure, potentially causing overcrowding and overuse of resources.

188. **Mitigation Measures:** By respecting labour rights, managing the influx of the workforce, promoting cultural understanding, and establishing effective conflict resolution mechanisms, we can create a harmonious work environment and minimize conflicts between contractors, labour, and the local community.

(i) Local people should be preferred for employment wherever possible, especially as construction workers/unskilled workforce.
(ii) Contractor shall provide all basic amenities to the workers in the camps so that reliance of workers on community infrastructure is less thus having lesser chances of conflicts
(iii) Contractor to monitor to avoid any conflict with local community due to influx of migrated labour.
(iv) Promote cultural awareness and sensitivity among project personnel to respect local customs, traditions, and values.
(v) Consider ways to contribute positively to the local community, such as supporting local schools, healthcare facilities, or other community projects. These contributions can help build goodwill.
(vi) Implement adequate security measures to safeguard both workers and residents. This includes controlling access to the construction site and addressing safety concerns.
(vii) Keep residents informed about construction schedules, potential disruptions, and any necessary safety precautions. Timely communication can prevent misunderstandings.
(viii) Continuously monitor the social and community aspects of the project's impact. Regularly report on progress and address any issues that arise promptly.
(ix) Regular meetings, forums, and feedback channels should be in place to address concerns and grievances promptly.
(x) A community liaison officer shall be appointed if social unrest or resentments are observed amongst the community.

189. **Worker's Camp and living condition:** Inadequate site selection and ineffective camp management can result in a range of adverse environmental consequences. These include the depletion of vegetation caused using wood for cooking, the degradation of nearby surface water bodies and soil quality due to improper handling of wastewater and solid waste, and an increased risk of communicable diseases spreading among both the workers and the local communities.

190. **Mitigation Measures:**
(i) Necessary permits from the concerned labour department should be obtained, pertaining records should be maintained at site with proper documentation.
(ii) The Contractor and project authority will ensure decent labour conditions for workers and compliance with applicable law and regulations in India.
(iii) Contractors will ensure that wages are being paid as per the requirement of minimum wages act and records are maintained.
(iv) Daily attendance register with name and signature of labour will be maintained.
(v) Notice board to display terms of employment giving details of wage rates, working hours, criterion for overtime etc. Payment of wages of workers (including subcontracted/casual labours) should be aligned with the payment of wages act.
(vi) The contractor to put in place a Code of Conduct (customized to local sensitivities and regulations) for worker-community interaction and on-site behaviour. Oblige workers to adhere to code of conduct. The Code of Conduct should take into consideration relevant legislation, safety rules, substance abuse, environmental sensitivity, communicable diseases, gender issues (sexual harassment), respect for local beliefs and customs, community interactions etc.
(vii) Local people should be preferred for employment wherever possible, especially as construction workers/unskilled workforce.
(viii) Contractor to ensure non-engagement of forced and child labour, gender equity, non-discrimination on employment and opportunity and freedom to express their view.
(ix) GRM will be disclosed to the workers and made accessible for reporting.

(x) Contractors should ensure access of necessary basic amenities and facilities such as drinking water, beds, mosquito net/ repellent, snake repellent, common kitchen, gender segregated toilet and crèches for female worker's children, if any.
(xi) Contractor to monitor to avoid any conflict with local community due to influx of migrated labour.
(xii) A record of water use will be kept.
(xiii) Littering and unauthorised discharge will be prohibited.
(xiv) Solid garbage and earth materials shall not be dumped into open drains, water bodies.

191. **Community health and safety.** Construction activities can disrupt daily school operations, causing noise, dust, and interruptions that affect students' learning experiences. Temporary relocation (if required) of students and staff can be stressful and inconvenient. Construction activities can pose safety hazards to students, staff, and the community if not properly managed. Increased traffic and heavy machinery around the school can create dangerous conditions.

192. **Mitigation Measures:**
(i) Schedule construction activities during school holidays, weekends, or off-hours to minimize disruption.
(ii) Use temporary partitions and sound barriers to reduce noise and dust within the school environment.
(iii) Provide clear communication to students, parents, and staff about the construction timeline and any changes to daily routines.
(iv) Implement strict safety protocols to protect students, staff, and the community from construction hazards.
(v) Restrict access to construction zones and provide clear signage and barriers.

193. **Demobilization: Site restoration and rehabilitation:** Potential community health and safety threat post construction.

194. **Mitigation Measures:**
Contractor will prepare site restoration plan which will be approved by the PIU/PMU.
The clean-up and restoration operations are to be implemented by the contractor prior to demobilization.
All construction zones, workers camps, plant sites, crushers etc. or any other area used/affected by the project will be left clean and tidy, to the satisfaction of the PIU/PMU.
The restored level of the ground will be as per the original level and condition or better.

195. **Impact on Nearby Settlements due to Traffic Congestion.** Increased construction related traffic can lead to congestion and inconvenience for residents.

196. **Mitigation Measures:** Implement traffic management plans, if necessary, schedule deliverables during off-peak hours, and encourage alternative transportation methods for workers.

197. **Community Engagement.** Lack of community involvement can lead to social unrest.

198. **Mitigation Measures:** Engage with the local community through public consultations, address concerns, and establish open communication channels.

D. Operation Phase

199. The project encompasses various activities, each with a diverse range of environmental impacts, necessitating comprehensive assessment. Each of these elements plays a critical role in evaluating and managing the environmental impact of the project during operation stage.

200. **Vehicles and Diesel Generator Emissions.** The primary sources of air pollution stems from emissions originating from vehicles and the exhaust outlets of DG sets. In this project, DG sets are installed solely as backup power sources, and it is anticipated that their contribution to pollution will be minimal.

201. Sulfur Dioxide (SO_2) and Nitrogen Oxides (NOx) emissions arise from the functioning of DG sets when the power grid experiences a failure. To reduce these emissions while DG sets are in operation, it is necessary to install appropriate control devices and ensure that the stack height adheres to CPCB (Central Pollution Control Board) regulations.

202. GHG emissions arise from the operation of DG sets, and electric consumption. The quantity of GHG emissions anticipated at each component and the emissions avoided due to solar power are given in the table below:

Table 41: GHG Emission Calculations

	Shillong Public School	Pine Mount School	Jowai Public School
Electrical Power Requirement (kW)	27	11	43
Total Electricity (kwh)	67500	27500	107500
Emissions from Electricity (kgCO2e)	48330.0	19690.0	76970.0
Total Electric Emissions annual			**145.0**
DG Set for Backup Supply	15KVA	No DG Set proposed	25 kVA
Consumption (Lt/Hr)	4	0	7
Emissions from DG (kgCO2e)	174.64	0.00	305.62
Total DG Emissions annual			**480.3**
Total Emissions annual			**625.2**
Solar panel (kWp)	3	3	3
Annual electricity generation (kWh)	4368	4368	4368
Emissions reduced from SPV (kgCO2e)	3127.49	3127.49	3127.49
Total Solar Emissions avoided (tCO2e)			**9.4**
Net Emissions annual (tCO2e)			**615.9**

DG = diesel generator, GHG = greenhouse gas, kgCO2e = kilogramme of carbon dioxide equivalent/square meter, kVA = kilo volt ampere, kW = kilowatt, kWp = kilowatt peak, kWh = kilowatt hour, Lt/hr = liter per hour, SPV = solar photovoltaic, tCO2e = tonnes of carbon dioxide equivalent.
Source: ADB estimates.

203. The minimum height of stack to be provided with each generator set can be worked out by using the following formula: -

H=h+0.2 KVA

- H=Total height of stack in meter
- h=height of the building in meters where the generator set is installed.
  KVA=Total generator capacity of the set in KVA

204. **Mitigation Measures:**

(i) Encourage the use of low-emission vehicles and promote alternative fuels like compressed natural gas (CNG) or electric vehicles. Implement emission standards and vehicle maintenance programs to reduce SO_2 and NOx emissions.
(ii) Adopt energy-efficient technologies, renewable energy sources, and eco-friendly building designs to reduce emissions associated with heating, cooling, and power generation, using energy-saving appliances, LED lighting, and ensuring proper insulation and HVAC system maintenance. Vehicle maintenance should be done on a regular basis.
(iii) All DG sets shall adhere to the emission standards outlined in the Environment (Protection) Rules, 1986. Optimize DG set operations through load management strategies, ensuring generators operate at optimal loads to minimize fuel consumption and emissions.
(iv) Compliance with all stipulated conditions given by concerned regulators.
(v) CTO to be renewed in timely manner from concerned pollution control board and conditions as stipulated in CTO should be strictly adhered to
(vi) Air quality monitoring should be taken up as per the environment monitoring plan (To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 provides different National and International standards, but the baseline data should be considered as benchmark).
(vii) The air quality shall adhere to the standards. If not, then corrective action to be taken should the reason of degraded quality be related to the Project activities.

205. **Energy efficiency and energy conservation:** Integration of energy efficiency and energy conservation component has been considered in the design.

206. **Mitigation Measures:** The detailed design ensures that environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, etc. are included. The design considers the following energy efficiency measures:

(i) Usage of recyclable materials like wood substitutes.
(ii) Installation of BEE certified equipment
(iii) Usage of energy efficient lighting fixtures (LED)
(iv) Provision of PV cells on roof for solar power for solar light.

207. **Regulatory Compliance:** To ensure compliance with regulatory requirements. Obtain permission and ensure validity throughout the implementation period. Ensure compliance with the terms/conditions of various permits such as, water abstraction permits, Fire License, PESO License etc. (as applicable)

208. **Air Quality:** Generation of particulate matter, sulfur dioxide and oxides of nitrogen due to operation of DG sets (in case of used due to power shortage).

209. **Mitigation Measures:**

(i) Inspection and maintenance of school vehicles will be done at regular intervals/as per manufacturer's specification and pollution under control certificate should be secured.
(ii) Regular maintenance of DG to be carried out.
(iii) Adequate height of stack should be provided for the DG sets.
(iv) Air quality monitoring should be taken up. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark.

210. **Wastewater from toilets, and laboratories, fecal sludge disposal.** Improper discharge of untreated wastewater from toilets, fecal sludge and wastewater from school laboratory operations will pollute soil and groundwater. The total water requirement and wastewater

generation during the operation of the facilities are given in the table below. The detailed estimations of water demand and wastewater calculation are given in Appendix 3.2.

Table 42: Water Requirement and Wastewater Generation

Components	Shillong Public School	Pine Mount School	Jowai Public School
Total water requirement	10.8 KLD	5.4 KLD	7.2 KLD
Total sewage generation	8.6 KLD (Septic tank capacity of 33 cu.m is proposed)	4.3 KLD (Septic tank capacity of 10.40 cu.m is Proposed)	5.7 KLD (Septic tank capacity of 33 cu.m is proposed)

cu.m = cubic meter, KLD = kiloliter per day.
Source: DSC.

211. The wastewater from the toilets will be disposed in the septic tanks and any stormwater will be directed into the municipal drain at all three project sites. The waste from the chemical laboratory may include minimal quantities of sodium hydroxide, potassium hydroxide, chemical reagents for identifying salts, and indicator substances, etc.

212. **Mitigation Measures:**

(i) Cleaning of septic tanks at regular intervals with the help of urban local bodies or authorized vendor.
(ii) Any effluent and sewage discharge shall comply with CPCB/SPCB/NGT standards whichever is stringent.
(iii) Compliance with all stipulated conditions given by concerned regulators shall be ensured.
(iv) Mechanism for proper segregation and collection of wastewaters should be ensured.
(v) Monitoring of Drinking/Groundwater and surface water quality should be taken up as per Environmental monitoring program (To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark).
(vi) Ensure provision of sufficient and proper storage containers and storage area with bund walls, for storage of laboratory wastewater prior to disposal of through licensed waste treaters
(vii) A chemical holding and neutralization tanks (30 gallon) have been proposed for storage and neutralization of chemical wastewater from laboratory and this waste shall be disposed of to an authorized hazardous waste disposal vendor
(viii) No chemical wastewater shall be directly disposed into the septic tank.

213. **Maintenance of Rainwater Harvesting Pits:** The following impacts are anticipated if the proper maintenance of rainwater harvesting pits is neglected.

(i) **Reduced Water Quality**: Without proper maintenance, rainwater harvesting pits can accumulate debris, sediment, and pollutants, leading to a decrease in water quality.
(ii) **Clogging:** Accumulated debris and sediment can clog the pit, reducing its capacity to capture and store rainwater effectively.
(iii) **Structural Damage:** Over time, the structural integrity of the pit may degrade due to erosion or settling of the surrounding soil.

214. **Mitigation Measures:**

(i) **Regular Cleaning:** Establish a schedule for regular cleaning and desilting of the rainwater harvesting pits. Remove debris and sediment to maintain water quality and prevent clogging.

(ii) **Erosion Control:** Implement erosion control measures in the surrounding area to prevent soil erosion, which can undermine the pit's structure.
(iii) **Regular Inspection:** Conduct routine inspections to identify any signs of damage or deterioration in the pit or its components. Address issues promptly to prevent further damage.
(iv) **Seasonal Preparations:** Prior to the rainy season, ensure that the pit is in good condition and ready to capture rainfall. This may involve cleaning and performing any necessary repairs.

215. **Solid Waste Generation (Hazardous and Non-hazardous).** During the operational phase of the project, minimal volume of additional solid waste is expected to be generated. To prevent inefficient disposal of this waste, it shall be systematically collected, distinguishing between biodegradable, non-biodegradable and domestic hazardous waste using color-coded bins, and stored in a designated garbage collection area. Estimated population considered for calculation of waste generation potential is provided in Table 44.

Table 43: Anticipated Additional Population During Operation Phase

Sl. No.	Component	Estimated additional population
1.	Shillong Public School	240
2.	Pine Mount School	120
3.	Jowai Public School	160

Source: Information provided by DBR consultant (DSC).

216. According to Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines the Institutional waste generation per capita per day range from 0.05 to 0.2 kg per capita per day.[28]

Table 44: Calculation of Waste Generation

Sl. No.	Component	No. of people	Standard Quantity	Total quantity of waste generated
1.	Shillong Public School	240	0.2 kg/cap/day	48 kg per day
2.	Pine Mount School	120	0.2 kg/cap/day	24 kg per day
3.	Jowai Public School	160	0.2 kg/cap/day	32 kg per day

kg/cap/day = kilogram per capita per day.
Source: PwC Analysis.

217. Inferring from the Table 45, the total additional solid waste generated from the component Shillong public school is 48 kg per day, pine mount school is 24 kg per day and Jowai public school is 32 kg per day.

218. Adequate space will be planned for collection of solid waste from various buildings in the proposed project site.

219. **Mitigation Measures:**
(i) **Segregation and Collection:** Proper segregation of different waste should be taken up which may include municipal waste (biodegradable and non-biodegradable), plastic, electronic waste, hazardous waste etc.
(ii) Establish a collection system for recyclable materials, including e-waste and plastic waste. Segregate these materials at the source for efficient recycling. Partner with authorized recyclers or recycling facilities for the proper disposal and recycling of electronic waste, plastics, and other recyclable materials.

[28] https://mohua.gov.in/upload/uploadfiles/files/URDPFI%20Guidelines%20Vol%20I(2).pdf

(iii) **Training and Awareness:** Train school staff on the proper handling and disposal of waste. Create awareness among all stakeholders about the importance of safe disposal.
(iv) **Regular Audits and Inspections**: Conduct regular audits and inspections to assess the effectiveness of waste management practices and make necessary improvements.

220. **Noise Environment.** Noise pollution arises from several sources, including vehicular traffic and D.G. sets, among others. It is imperative to implement effective measures to mitigate this noise pollution. High-noise-generating areas should be enclosed with appropriate and soundproof barriers. Furthermore, acoustic enclosed shall be provided for D.G. sets, which will bring ambient noise level to 70 Db at 3-meter distance as per CPCB norms.

221. **Mitigation Measures:**
(i) DG sets should be provided with acoustic enclosures.
(ii) If traffic noise is anticipated to be higher than the permissible limits, the facility sites will be encompassed with acoustic boundaries in combination with green belt with high and dense enough canopy/ building materials (door/window sheets) used will have acoustic properties and be properly maintained to retain such properties (such as repairing gaps, or broken sheets, replantation of green belt)
(iii) Landscaping: Use dense vegetation and natural features like trees and bushes as a natural sound barrier as far as possible. Develop Green belt.
(iv) Compliance with all stipulated conditions given by concerned regulators.
(v) Noise level monitoring should be taken up as per the environment monitoring plan (To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark).
(vi) All DG Sets shall be outdoor type silencer and acoustic enclosure as per CPCB and other relevant norms.

222. **Occupational and Community Health and Safety Risks.** Maintenance works such as repainting, landscaping, plumbing and electrical repairs, etc. may pose occupational and community health and safety risks.

223. **Mitigation Measures:**
- Depending on the nature of the maintenance work, provide and guarantee the use of personal protection equipment such as gloves, helmets, ear plugs, safety belts, and so on.
- Only qualified trained workers shall be engaged in repair and maintenance works
- The facilities should have emergency, preparedness and response plan and should be designed in commensurate with the requirement of concerned department (like Fire Department). Fire NoC should be secured from Fire Department and renewed in timely manner. Emergency preparedness plan should have the provision to manage potential risk likely associated with the industries located (planned to be located) in the vicinity.
- Adequate provisions will be in place to deal with situation in case of emergency like proper exit path, assembly area, area for water storage for fire emergency, public address system, alarm bells, etc.
- It is advisable to develop a traffic management plan.
- Emergency contact numbers shall be displayed.
- Provisions for a designated route for vehicle movement.
- Accidents if any will be reported to the management
- Prepare, review, and implement health and safety protocols to ensure safety of teachers, students and other workers.
- Conduct regular safety training sessions and drills to ensure all personnel are prepared for emergencies.

224. **Maintenance works:** Any impacts on landscape and aesthetics shall be addressed by implementing maintenance works including maintenance of green belt including vegetation care, litter control, irrigation, erosion control, maintenance of rainwater harvesting pits including inspection, cleaning, repairs and upkeep etc.

VII. ANALYSIS OF ALTERNATIVES

A. Introduction

225. In this chapter analysis of alternatives has been carried out for 'with' and 'without' project, location selection, project implementation scheduling and materials usage in the detailed design and construction of the project.

B. Without Project Scenario

226. The GoM has set an ambitious target of becoming a USD 10 billion economy by 2028, a two-fold increase from its current gross state domestic product of USD 5.68 billion. The state faces hurdles such as a low economic base with most people engaged in the agriculture sector, infrastructure challenges, limited wage employment, and a rural (80%) and unskilled population. The government has introduced numerous schemes and policies to boost economic activity across traditional and agro-based sectors in rural areas as well as to attract investments to generate much-needed jobs in sectors such as tourism, information technology (IT) and IT enabled services. However, a weak human capital base remains a critical and binding constraint. An ADB study on Northeast Economic Corridor that includes Meghalaya has identified high unemployment, unskilled workforce and poor skilling eco-system as key challenges hindering its development. Meghalaya has one of the least skilled workforces in India with only 27.3% of the state's workforce with secondary education or higher (compared to the national average of 39.1%) and high youth unemployment rate at 7.5%. The government aims to skill over 150,000 youth over the next five years. Meeting this target and ensuring meaningful results that lead to better employment and economic opportunities for the state's youth will require transformative interventions in the state's education and skills development systems. Hence, without a project scenario it is not desirable as the project will help GoM directly and indirectly in achieving USD 10 million economy target by 2028.

C. With Project Scenario

227. The project site scope targets one of the key stages of state youth education that will expand opportunities for further training and improve the quality of and access to skills training and innovation support. The other component of SHCDM-II project focuses on improvement in teaching quality in government schools that are not being covered by any scheme and will follow eligibility criteria to ensure fair and need-based coverage. Considering the connectivity issues in the state, a hybrid modality for delivery of digital content will be adopted. The MSIH sub- project will provide a balanced mix of skills training and support for innovation and entrepreneurship that cater to the local socioeconomic and cultural context, economic landscape, and youth aspirations. Hence, the project scenario is more desirable.

D. Project Location Alternatives

228. Since all three sites are brownfield sites, no alternatives for location are considered.

E. Material Usage and Sustainability considerations

229. In terms of design, quality materials (steel bars, cement, and bricks) will be appropriately selected (as per approved design specification) considering that the area is within the seismic zone V classification. There will be no use of asbestos containing sheets or pipes. Further, the roof top solar panel will also have capacity to generate 3.0 kVA power.

F. Conclusion

230. It is clear from the above that without project scenario is undesirable and the location of project is fixed. To make the project outcome and outputs sustainable, necessary measures have been included in the project design.

VIII. GRIEVANCE REDRESS MECHANISM

231. The ADB SPS 2009 mandates the establishment of a project-specific, responsive, and culturally appropriate grievance redress mechanism (GRM) that is readily accessible for receiving and facilitating the resolution of environmental and social safeguards-related complaints. The GRM is designed to assist affected persons in resolving their grievances by providing an accessible and trusted platform for seeking solutions and relief related to the project's environmental and social safeguards. It is important to note that the GRM will not address matters pending in a court of law. This GRM has been developed with consideration of the existing institutional and administrative framework of the state, incorporating the needs of STs and women, ensuring cultural acceptability and gender sensitivity.

232. The fundamental objectives of the GRM are: (i) To reach mutually agreed solutions satisfactory to both the Project and the affected persons for resolving environmental and social safeguards-related issues; (ii) To facilitate the smooth implementation of environmental and social safeguards planning documents and prevent delays in project implementation; (iii) To promote effective dialogue and open communication between the Project and its stakeholders; and (iv) To clearly define the roles and responsibilities of the various parties involved in the consideration and resolution of grievances.

A. Grievance Redress Process

233. The project will implement a four-tier Grievance Redress Committee (GRC) mechanism to address environmental and social safeguards-related complaints. The tiers are as follows:

Tier 1: Component/Village Level Forum (VLF)

234. The first tier operates at the Site/Town/Village Level, leveraging the traditional political systems of the major tribal groups. The VLF will consist of the village headmen, who is supported and trusted by the villagers. The composition of this forum will mirror traditional structures like the Dorbar Shnong, Elaka Dorbar, or Nokma Mela'a. The village headmen can seek the assistance of the following:

- **Component Head:** Co-chairs the VLF and serves as Member Secretary.
- **Monitoring Officers/Staff:** Provides guidance and assistance in grievance redressal.
- **Environmental, Social, and Gender Safeguard Experts of PMC and DSC:** Offers expertise and support.
- **Contractors/Vendors/Training Providers:** Directly addresses the complaints.

Tier 2: District Level Forum (DLF)

235. The second tier operates at the District Level, where grievances that cannot be resolved at the village level are escalated. The DLF will consist of:

- **Deputy Commissioner:** Chair of the DLF.
- **District Planning Officer:** Serves as Member Secretary.
- **Safeguards Focal(s):** Responsible for addressing specific grievances.
- **Subject-Matter Experts:** Officers nominated based on the nature of the grievance.
- **PIU Representative:** Represents the Project Implementation Unit.

- **Component Heads/Representatives:** Contributes to resolving issues.
- **Environmental, Social, and Gender Specialists of PMC and DSC**
- **Contractors/Vendors/Training Providers:** Engages directly with the complainant to resolve issues.

Tier 3: Project Implementation Unit Level Forum (PLF)

236. The third tier is at the Project Implementation Unit (PIU) level. The PLF will address grievances escalated from the District Level. The PLF will consist of:

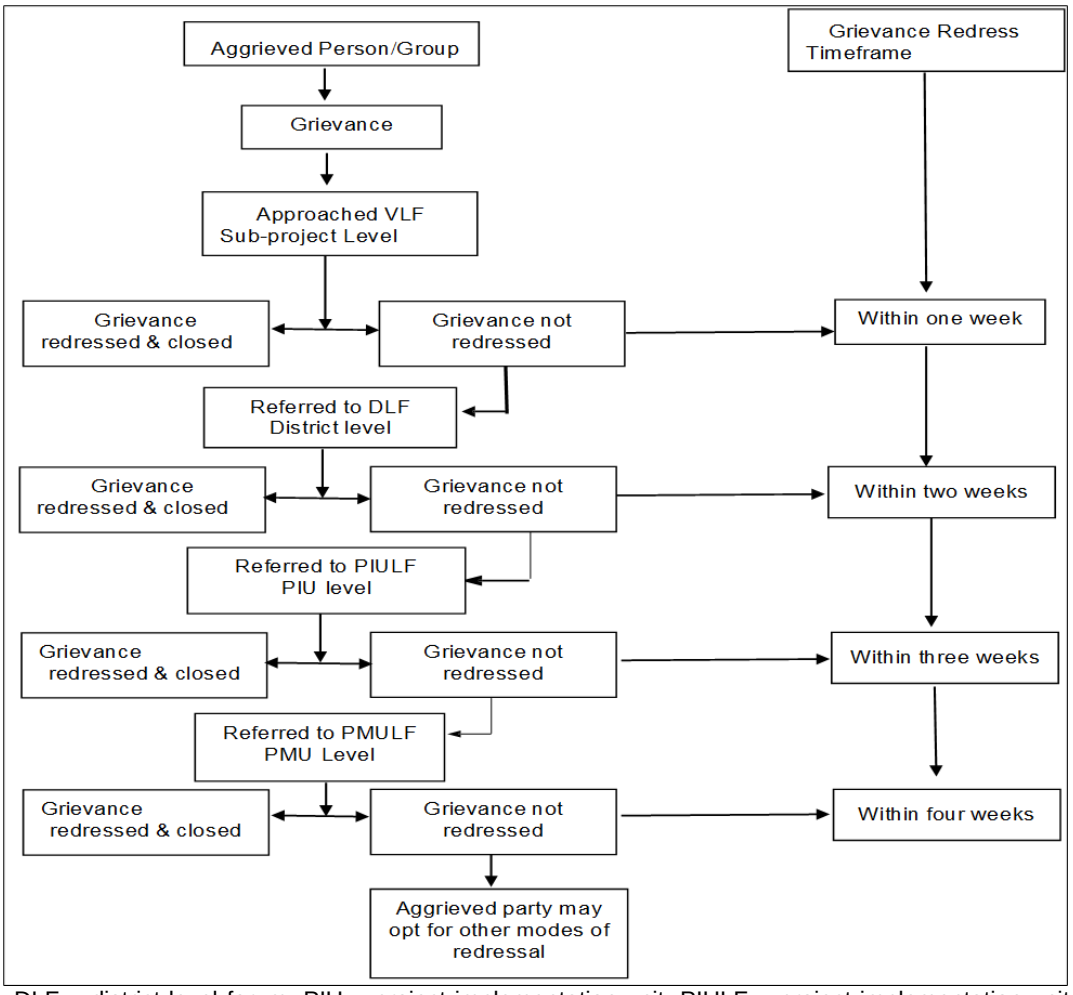
- **Chairperson/Team Leader of PIUs:** Leads the forum or delegates a representative.
- **PMU Representative:** Acts as a liaison between the PIU and PMU.
- **Safeguards Focal(s) at PIU Level:** Manages grievance resolution within the PIU.
- **Public Grievance Officer:** Oversees public grievance handling within the department.
- **District Level Forum Representative:** Ensures consistency in grievance handling.
- **Monitoring Officers/Staff of PIUs:** Provides ongoing support.
- **Environmental, Social, and Gender Specialists of PMC and DSC**
- **Contractors/Vendors/Training Providers:** Addresses issues directly with complainants.

Tier 4: Project Management Unit Level Forum (PMULF)

237. The final tier operates at the PMU level, dealing with grievances that cannot be resolved at the lower tiers. The PMULF will comprise:

- **Project Director:** Serves as the Chair of the forum.
- **PMU Officials:** Constitute the core members of the GRC at this level.
- **Safeguards Focal(s) at PMU Level:** Oversees grievance resolution at the PMU.
- **Additional Project Director:** Acts as the Member Secretary.
- **PIU Representatives:** Ensures coordination between PIU and PMU.
- **Contractors/Vendors/Training Providers:** Engages directly with the complainant.
- **Other Members:** May include nominated representatives of the Environmental, Social, and Gender Experts from PMC and DSC.

Figure 31: Grievance Redress Mechanism



DLF = district level forum, PIU = project implementation unit, PIULF = project implementation unit level forum, PMU = project management unit, PMULF = project management unit level forum, VLF = village level forum.
Source: ADB consultation with PIUs and PMU.

A. Grievance Record Keeping

238. Records of all grievances received will be maintained by PIUs and reported to the Social Safeguards Focal in the PMU for further consolidation. These records will include the contact details of the complainants, the dates the complaints were received, the nature of the grievances, agreed corrective actions and their implementation dates, and the outcomes. The number of grievances recorded, resolved, and their outcomes will be disclosed at the PIU office by the Social Safeguards Focal. A summary of this information will also be included in the semi-annual safeguard monitoring reports submitted to ADB. All GRC meeting deliberations and decisions will be recorded and made available for public reference. If ADB is involved in grievance resolution, it will maintain records of its proceedings and disclose them to all parties engaged in the hearings. All costs associated with GRC meetings, consultations, communication, reporting/information dissemination and resolutions will be borne by the Project. Complainants will not be charged any fees for these services.

B. Key Elements of the GRM Under the Project

239. The project GRM includes the following key elements and procedures to ensure satisfactory functioning:

240. **Grievance Registration Process:** Grievances can be registered in person or through a letter addressed to the Chairperson of the GRC. Before registering a complaint or query, a procedural step will assess its eligibility and verify that the issues raised fall within the scope of the GRM. Complaints or queries may be submitted in various forms, from verbal communications by mobile phone to formal written complaints, or through the grievance box installed in the PIU offices. They can be submitted directly by affected person or via third parties. All grievances, regardless of their source or form, will be accepted by the focal points at the respective level and registered in a grievance register. The registration form will be available to the public, and a sample grievance registration form is provided in Appendix 6.

241. **Redressal Durations and Disclosure Procedures:** The GRM will be publicly advertised and promoted to stakeholders. The GRM will specify the expected timeframes for acknowledgment, response, and resolution of grievances. To ensure community awareness, the GRM will be publicized through IEC campaigns, materials, and wall writings. The response time for the GRC is set at a maximum of four weeks, covering all four levels. A quorum of sixty percent attendance of committee members at all levels will be required. For site and district-level GRCs, participation of community members and representatives of STs and IPP implementing agencies will be mandatory. The PIU will also ensure that Display Boards with GRM information are installed at the site, with support from civil works contractors. The GRC will convene meetings as grievances are received, with the Chairperson responsible for organizing these meetings.

242. **Transparency and Good Governance:** For transparency, community members will be selected as GRC members at the site level. Grievances that cannot be resolved at the PIU or PMU level, or where the complainant is not satisfied with the decision, may be referred to the Commissioner and Secretary, Planning Department. Consultative meetings and the distribution of leaflets to STs will be conducted to educate them about the GRM and its escalation process, encouraging their use when necessary. The PMU will also ensure a mechanism is in place to address grievances from laborers and staff deployed at project sites by Contractors.

243. **Confidentiality.** The complainant's confidentiality will be strictly maintained by limiting access to complaint details to authorized personnel only, storing physical records in locked cabinets or secure rooms with restricted access, and redacting personal identifiers (such as names and contact details) from documents and reports shared outside the immediate complaint handling team.

244. **Feedback to the complainant.** The PIU will be responsible for ensuring that decisions regarding complaints received (at any level) are reported back to the aggrieved party with an acknowledgment of the same. The PIU will maintain records of this, which will be available for review by PMU.

245. **Costs.** The PIU will cover the costs involved in resolving the complaints (meetings, consultations, communication, and reporting/information dissemination), while the PMU will handle costs related to further action on intensified grievances.

246. **Court of Law.** Despite the project's GRM, an aggrieved person shall have access to the country's legal system at any stage. This access can run parallel to the GRM process and is not dependent on its outcome.

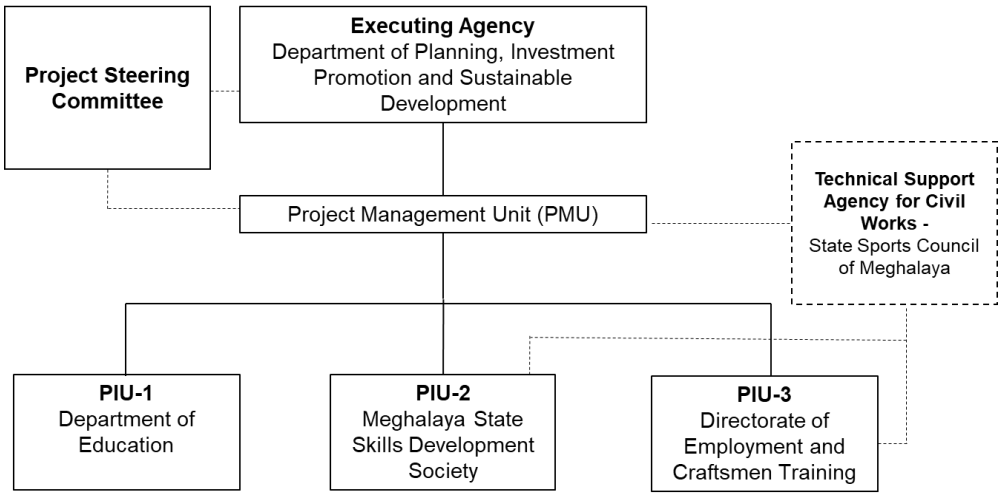
247. **ADB's Accountability Mechanism**. The person(s)/aggrieved party who are, or may, be adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The accountability mechanism provides an independent forum and process whereby people can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, the affected person(s)/aggrieved party should first make a good-faith effort to solve their problems by working with the ADB South Asia operations department including the India Resident Mission.

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Institutional Arrangements for Project Implementation

248. DPIPSD, GOM (hereafter, referred to as "the Planning Department") will serve as the executing agency for the proposed project. A project management unit (PMU) will be established within the Planning Department. DOE, MSSDS, and DECT will serve as implementing agencies. Each implementing agency will establish a project implementation unit (PIU). The Department of Education (DOE) will be the implementing agency for the three schools. The overall organizational structure of the project is shown in Figure 32.

Figure 32: Overall Organizational Structure



PIU = project implementation unit, PMU = project management unit.
Source: Stakeholder Consultation and Desktop Analysis.

249. The implementing agencies (IAs) in the project are MSSDS, DECT, and Department of Education (DOE). PIU-1 under the Department of Education will support PMU in project implementation of the component. DOE has established engineering wing[29] and the responsibilities includes (i) project planning and budgeting; (ii) procurement and contract management of works; (iii) overall responsible for procurement and contract management of civil works under output 1 and 2. (iv) prepare bid documents for goods, works, and service and execute bidding based on ADB Policy and Regulations and evaluation of bid proposals; (v) obtain ADB concurrence for bid documents, bid evaluation reports and contract awards in line with procurement plan; (vi) ensure compliance with ADB procurement policies and procedures; (vii) support PIU-1 in obtaining all clearances including administrative, regulatory, and all statutory approvals; (viii) oversee, coordinate, and monitor works (civil, electro-mechanical, plumbing) and

[29] PIU-1/8/ADB/Notification/2023/Phase-2/73 Dated 27th June 2024

supply of equipment and materials ensuring sound works supervision and high-quality control and any other technical matters and issue certificates for acceptance; (ix) measure and record acceptable works, check contractors'/suppliers' invoices, and recommend to PIU-1 for payments payable to the contractors; (x) support PIU-1 in managing contracts, variation orders; (xi) coordinate preparation of final measurement and 'as built' drawings; and monitor implementation; (xii) support PIU-1 (through contractors/suppliers) for safeguards compliance including compliances with safeguard frameworks and plans; (xiii) updating of safeguard documents asper detailed engineering design, implementation of GRM for grievance redressal, implementation of GESI, implementation of EMP; (xiv) implementation, monitoring and reporting for social safeguards, and GESI reporting to ADB, compliance with ADB's SPS 2009 and (xv) matters requiring higher level decision to project steering committee (PSC) and ADB.

250. The Project Steering Committee (PSC) headed by the Chief Secretary, with Senior most secretary of DPIPSD, Finance Department, Education Department and Labour Department, Chief Executive Officer-MSSDS, Secretary/Joint Secretary - DPIPSD as member secretary. The roles and responsibilities of PSC are – (i) the committee shall meet at least once in six months to discuss and deliberate upon the activities of the program. The quorum of at least one-third of the total strength is essential for the meeting of the Committee. The fresh meeting must be conveyed immediately by the Member Secretary in case the requirement of quorum is not met at any meeting; (ii) consider the project's annual work plan and budget, their subsequent alterations placed before it by the Convenor from time to time, and authorise the PSC to implement the annual work plan and budget with such notifications as the PSC may determine; (iii) consider the Project's Administration Manual and any subsequent revisions and approve it with such modifications as the PSC may determine; (iv) monitor and consider reports on the implementation and results of the PSC and take appropriate action to ensure the Project's progress; (v) ensure that all fiduciary, technical and safeguards requirements specified in the ADB's Project Agreement are fulfilled within requisite timeframes; (vi) ensure coordination between sectors for successful implementation and results of the project including providing guidance and directives to relevant State Departments; (vii) approve staffing of the PMU and PIUs, monitor the financial position and financial flows of the Project to ensure smooth disbursement and implementation; (viii) endure and review the annual external audit of project expenditures; (ix) adopt financial management and procurement procedures for the project; (x) provide financial and legal sanctions necessary for the implementation of the Project; (xi) do generally all such acts and things as may be necessary or incidental to carrying out the Project and achieving its objectives; (xii) shall notify any such sub-committees when necessary for implementation of the project.

251. The assistant project coordinator, DESL (an officer nominated by PIU-1) will be the focal point for all issues related to social and environment safeguards.

252. The schools component will be implemented by the Project Implementation Unit (PIU-1). The PIU-1 will be responsible to: (i) develop/strengthen state-level teacher professional development framework; (ii) develop a comprehensive teacher needs assessment tool and undertake physical assessment in project schools; (iii) digitize the teacher needs assessment tool and administer the tool online; (iv) develop and source teaching materials for teachers, incorporating teacher needs assessment findings, in project schools to enhance learning; (v) develop teacher training content based on needs assessment and prepare an annual training calendar; (vi) implement teacher training covering areas – English language development, subject content and pedagogy, strengthening 21st century skills, social emotional learning, and gender inclusive teaching; building digital competencies for teaching (vii) conduct refresher training of teachers; (viii) complete detailed design, issue IFB, and contract award for upgrading facilities, including hostel facilities in three project DIETs; (ix) complete construction and furnishing of the three project DIETs; (x) implement integrated STEM training for DERT, MBOSE, and other relevant education officials; (xi) conduct workshops for developing and utilizing item banks for formative and summative learning assessments in STEM subjects in grades 6,7,9,11 and 12; (xii) enhance existing app for learning assessment (M-Lens) to add new

assessments/item banks; (xiii) conduct training of teachers in project schools and education functionaries from BRCs and CRCs in implementing the learning assessments; (xiv) develop and implement remedial interventions to improve learning in STEM subjects at upper primary level in project schools.

253. The environment specialists (DSC, and PMC) will guide and advise the project director and the PIU in all safeguard-related matters. The input of both environmental specialists will be intermittent and mobilized as needed. They will work with PIU-I and ensure that the EMP for the school's component is implemented effectively. The DSC environmental specialist and contractor will submit monthly and quarterly reports to the PIU-1 and PMU. The PMU, with the assistance from the PMC environmental specialist will compile semi-annual environmental monitoring reports for submission to ADB. The PMU will submit a report to ADB through the Project Director's office. At the school site, DSC environmental specialist in close coordination with HSE officer of contractor will implement EMP. The DSC environmental specialist will visit the site as per need or to carry out capacity building training programs. The contractor HSE officer, DSC environmental specialist and PMC environmental specialist will also handle grievance redressal pertaining to environmental safeguards. Any other complex environmental safeguards issues will be brought to the team leader of PIU 1 for his attention along with practical options for addressing them.

254. The contractor(s) at project site(s) will appoint one officer as safeguard cum health and safety officer for the implementation of EARF and EMP requirements at sites.

255. **Project Management Unit.** The PMU in DPIPSD will establish the Environment and Social Safeguards desk, comprising focal persons responsible for ensuring compliance with environmental and social safeguards requirements. This desk will be supervised by the Additional Project Director, who will report to the Project Director of SHCDM Phase II. The PMU will have the following responsibilities:

i. Ensure components comply with the national and local statutory and legal environmental requirements, ADB SPS 2009, EARF and environmental safeguards provisions of the ADB loan covenant;
ii. Ensure components conform to the component selection guidelines as stipulated in the EARF;
iii. Review and approve the environmental categorization of future components;
iv. Review and approve component IEE reports, including EMPs, and ensure that component IEEs and EMPs are updated based on final detailed designs and submit to ADB for review, clearance and disclosure prior to bid invitation;
v. Ensure that updated IEEs based on final detailed design are provided to the construction contractor prior to start of construction;
vi. Ensure that the IEEs including EMPs are updated in case of changes in detailed design that may occur during implementation phase, and submitted to ADB for review, clearance and disclosure;
vii. Ensure timely disclosure of draft and updated IEEs in accessible formats for the public and affected persons.
viii. Ensure that IEEs with EMPs are included in bidding documents and civil works contracts;
ix. Review and approve site-specific EMPs (SEMPs) of contractors;
x. Provide oversight on environmental management aspects of the project, and ensure EMPs and SEMPs are implemented by contractors;
xi. Establish a system to monitor environmental safeguards performance of the Project
xii. Facilitate timely and ensure overall compliance with all national and local government rules and regulations regarding site and environmental permits/clearances/approvals as well as any other environmental requirements as relevant;

xiii. With support from PMC, prepare semi-annual environmental monitoring reports (SEMRs) and submit to ADB;
xiv. Ensure availability of budget for safeguards activities;
xv. Review, monitor and evaluate effectiveness with which the EMPs, SEMPs, and Health and Safety Plans are implemented, and recommend necessary corrective actions to be taken;
xvi. Ensure adequate awareness campaigns, information disclosure among affected communities and timely disclosure of final IEEs/EMPs and SEMRs, including corrective action plans, if any, in project website and in a form accessible to the public;
xvii. Address any grievances brought through the grievance redress mechanism (GRM) described in the IEE report in a timely manner;
xviii. Undertake regular review of safeguards-related loan covenants, and the compliance during project implementation; and
xix. Organize periodic capacity building and training programs on safeguards for stakeholders, PMU, PIUs and contractors.

256. **Project Implementation Unit.** The PIUs will have an Environment and Social Safeguards desk comprising focal persons responsible for ensuring compliance with environmental and social safeguards requirements. The PIUs will be supported by the PMC and DSC. The PIU will have the following responsibilities:

i. Screen and categorize components using the REA checklist and component selection criteria in the EARF
ii. Prepare IEEs for future components and ensure preparation according to this EARF and submit to PMU for review and approval.
iii. Ensure that IEEs are updated based on detailed design for review and approval of the PMU
iv. Ensure timely disclosure of draft and updated IEEs in accessible formats for the public and affected persons.
v. Review SEMPs prepared by the Contractor and endorsed to PMU for approval
vi. Oversee environmental safeguards management aspects of projects and ensure that EMP is implemented by project implementation offices and contractors.
vii. Support the PMU in coordinating across the project components in the overall management, implementation, monitoring, and reporting of environmental safeguards compliance.
viii. Conduct regular site visits, including spot checks, to ensure the EMP and/or SEMP are properly implemented;
ix. Review EMP implementation and monitoring reports from DLFs and contractors;
x. Review, monitor, and evaluate the effectiveness of the implementation of EMP, and recommend necessary corrective actions.
xi. Facilitate environmental safeguards training activities conducted by PMU for the project implementation offices, and contractors
xii. Ensure timely resolution of complaints and maintain an updated record of complaints
xiii. Prepare quarterly environmental safeguards monitoring reports to be submitted to the PMU.
xiv. Support the PMU in preparing and implementing a community awareness and participation plan, and support in preparing other informational and campaign materials.
xv. Identify any non-compliances and assist in preparing time-bound corrective action plans, if and as required.
xvi. Support all other environmental safeguards-related activities and tasks of the PMU as may be needed.

257. **District Level Forum.** The District Level Forum (DLF) will assign a safeguards focal person, and will have the following roles and responsibilities supported by the DSC:

i. Facilitate consultations and coordination with government regulatory agencies such as District Forest department, etc., with regards to required clearances/NOCs/permits to ensure timely component implementation
ii. Provide oversight on environmental safeguard management, ensuring EMP implementation by project offices and contractors.
iii. Review, monitor, and evaluate EMP implementation effectiveness; recommend corrective actions.
iv. Conduct regular site visits, including spot checks, to ensure the EMP and/or SEMP are properly implemented.
v. Prepare site visit and monthly reports on EMP implementation and submit to PIU
vi. Support the PIU in preparing quarterly reports on EMP implementation for submission to PMU
vii. Ensure prompt grievance redress through the grievance redress mechanism.
viii. Support in implementing the community awareness and participation plan, and in preparing other informational and campaign materials.
ix. Identify non-compliances and assist in preparing time-bound corrective action plans as required.

258. **Project Management Consultant.** A project management consulting firm (PMC) will be assisting the environmental and social safeguards desk at PMU and PIU level. A qualified environment specialist will be appointed by PMC to support project authority concerning EMP implementation, supervision, and reporting. The tasks assigned to the environment specialist of PMC are as follows:

i. Review component screening and categorization of the component based on this EARF and endorse to PMU for approval;
ii. Review initial environmental examination (IEE) reports prepared by the DSC including EMPs in accordance with ADB SPS and national laws, regulations, policies and guidelines and endorse to PMU for approval;
iii. Ensure relevant provisions from the updated/final IEE reports and EMPs including EMP implementation costs are incorporated in the respective bid and contract documents;
iv. Ensure the establishment of an effective grievance redress mechanism and conduct capacity building activities for GRC members
v. Ensure timely disclosure of draft and updated IEEs in accessible formats for the public and affected persons.
vi. Review SEMPs prepared by the Contractor, guide Contractors in improving SEMPs and endorse the same for approval of PMU
vii. Together with the social safeguards experts, conduct safeguards capacity building to ensure PMU, and PIU have the capacity to implement, monitor, and report on implementation of safeguards plans;
viii. Monitor implementation of EMPs at all work sites, including all potential safeguard issues
ix. Monitor any unanticipated environmental risks or impacts that arise during construction, implementation or operation of the component that were not considered in the IEE reports and EMPs, and prepare corrective action plan; ensure that these are implemented by the contractors and reported accordingly in environmental monitoring reports to ADB;
x. Build the capacity of project staff to establish, implement, and comply with ADB SPS and the EMP

xi. Review and check the quality of data and evaluate the effectiveness with which safeguards-related mitigation measures are implemented.
xii. Recommend actions to be taken as per ADB's safeguards policies to address environmental compliance concerns
xiii. Support the PMU/PIU/Site level GRCs in resolving complaints and disputes if any.
xiv. Prepare periodic safeguards monitoring reports in line with ADB's reporting requirements.
xv. Support the PMU and PIUs in obtaining applicable statutory safeguards clearances

259. **Design Supervision Consultant.** The design and supervision consultant (DSC) will support design and supervision and ensure safeguard implementation at the facility/component level. A qualified environmental expert will be appointed by DSC to support the PIU in ensuring EMP implementation, supervision, and reporting. The tasks assigned to the environmental expert of the DSC are as follows:

i. Support the PIU in screening and categorizing components using the REA checklist and component selection criteria in this EARF
ii. Ensure that component design include EHS measures described in the EARF
iii. Support the PIU in preparing IEEs for future components according to this EARF, for review and approval of the PMU
iv. Support the PIU in updating IEE based on detailed design for review and approval of the PMU
v. Support the DLF in facilitating consultations and coordination with government regulatory agencies such as District Forest department, etc., with regards to required clearances/NOCs/permits to ensure timely component project implementation
vi. Ensure timely disclosure of draft and updated IEEs in accessible formats for the public and affected persons.
vii. Conduct regular site visits, including spot checks, to ensure the EMP and/or SEMP are properly implemented.
viii. Support the DLF in preparing monthly progress reports to PIU
ix. Support the PIU in preparing quarterly reports on EMP implementation for submission to PMU
x. Guide the DLF in coordinating project components for overall environmental safeguard compliance management, implementation, monitoring, and reporting.
xi. Provide technical advice and on-the-job training to contractors as needed.
xii. Support the DLF in providing oversight on environmental safeguard management, ensuring EMP implementation by project offices and contractors.
xiii. Support the DLF in the review, monitoring, and evaluation of EMP implementation effectiveness; recommend corrective actions.
xiv. Facilitate environmental safeguards training for DLFs, project offices, and contractors.
xv. Guide DLF and project offices in promptly addressing grievances through the grievance redress mechanism.
xvi. Guide DLFs in preparing and implementing community awareness and participation plans; support preparation of campaign materials.
xvii. Identify non-compliances and assist in preparing time-bound corrective action plans as required.

260. **Civil Works Contractors.** The IEE reports with EMPs will form part of respective bidding and contract documents and verified by PMU. The contractors will be required to designate their respective environment, health and safety officers (or equivalent) to ensure effective implementation of EMPs during civil works. Contractors are to carry out all environmental mitigation and monitoring measures outlined in their contracts and the IEE reports. The contractors will be required to submit to their respective PIUs, for review and approval, their SEMPs that include the following: (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii)

specific mitigation measures following the approved EMP; (iii) monitoring program per EMP; and (iv) budget for SEMP and EMP implementation. No works can commence until SEMP is approved by PMU.

261. Specifically, the contractors will have the following responsibilities, among others that will be included in the bid and contract documents:

i. Ensure that the infrastructure development works are carried out in an environmentally friendly manner, minimizing environmental impacts while ensuring the health and safety of all its workers and the minimizing disturbance to the surrounding environment and communities;
ii. Consideration of ADB SPS, national regulations and the EMP during bid preparation and cost estimation;
iii. Hire or designate full time environment, health and safety officer (or equivalent) responsible for compliance to ADB SPS requirements, national regulations and the EMP. The officer/staff must have a clear term of reference and responsibilities to ensure that all environmental and social concerns are properly managed;
iv. Conduct daily to weekly site-inspections on EMP implementation;
v. Ensure regular reporting to the PIU/DLF on work progress and alert management on any potential issues or delays;
vi. Obtain the necessary permits and clearances, if any is required for the contractors, to implement the components;
vii. Ensure that all worker recruitment and OHS requirements are complied;
viii. Take necessary corrective action to rectify any non-conformance, including actions related to grievances;
ix. Institute an emergency plan for natural calamities/disasters and accidents at the site;
x. Follow chance finds procedures to discovery of any physical cultural artifact.
xi. Conduct joint walk-throughs with design engineers from project implementation offices and the DSC's social development expert/environmental expert at sites/sections ready for implementation.
xii. Assist in identifying the need for detailed measurement surveys and support the PIU in jointly conducting/updating detailed measurement surveys and census surveys to arrive at the final inventory of losses.
xiii. Support the DSC's environmental expert in updating the draft IEE and for submission to the PIU/PMU and to ADB for review and approval.
xiv. Ensure strict adherence to agreed impact avoidance and mitigation measures outlined in the EMP during implementation.
xv. Address all safeguards complaints, ensuring recording, reporting, and follow-up for the resolution of all grievances received.

262. A copy of the EMP/approved SEMP will be always kept on-site during the construction period. Non-compliance with, or any deviation from, the conditions set out in the EMP/SEMP constitutes a failure in compliance and will require corrective actions.

263. PMU will ensure that bidding and contract documents include specific provisions requiring contractors to comply with: (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the proposed project infrastructure sites.

264. Safeguards compliance will be monitored at the PMU, PIU, district and component levels as shown in Table 46.

Table 45: Institutional Arrangements for Environmental Safeguard Implementation

Level 1 – Component Level	**Head: Head/Principal of the Component**
	Members: Contractor's environment engineer and health and safety officer; staff nominated by components; nominated officer/staff at level 2; additional supporting staff are the monitoring officer/staff at resources of PMU and DSC mentioned at level 3 below.
Level 2 – District Level	**Head: Deputy Commissioner**
	Members: District planning officer; focal/s for safeguards; additional supporting staff are the monitoring officer/staff and resources of PMC and DSC mentioned at level 3 below. Other members (such as district forest entity; district urban entity; power electricity; district education; and other Government entities for the monitoring of EM and H&S) to be nominated by the Head.
	Supported by DSC
Level 3 – PIUs Level	**Head: Chairman of PIUs**
	Members: Monitoring officer/staff; focal/s for safeguards at PIU level; additional supporting are resources of PMC and DSC mentioned at level 4 below. Other members to be nominated by the Head.
	Supported by PMC
Level 4 – PMU Level	**Head: Project Director**
	Members: Additional project director; 2 (two) environment assistants (that may be recruited); focal/s for safeguards at PMU level; environment specialist of PMC and DSC; social safeguard of PMC and DSC; social development (gender) specialist of PMC

Note: Components implies location/facility for all civil works.
Source: Stakeholder Consultation and Desktop Analysis.

265. Table 47 summarizes the responsibilities of PMU, PIU, DLF and Contractor in implementing environmental safeguards. The EMP for the component for the project lifecycle (preconstruction, construction, and operation phases) is given in Tables 48 to 50**.**

Table 46: Responsibilities of PMU, PIU, DLF and Contractor in Environmental Safeguard Implementation

Contractor	DLF (supported by DSC)	PIU (supported by PMC and DSC)	PMU (supported by PMC)
• Preparation of site-specific Contractor's EMP (SEMP/CEMP) including Health and safety (H&S) plan in compliance with the ADB-approved Environmental Management Plan in	• Facilitate the E&S team in meeting with various Government functional entities viz. District Forest Entity, District Urban Entity, Power Electricity,	• Screen and categorize components using the REA checklist and component selection criteria in this EARF. • Prepare IEE-EMPs for respective components and updating the IEEs according to changes in scope or unanticipated	• Review and approve the screening and categorization of components by PIU. • Review of IEE/updated IEEs

Contractor	DLF (supported by DSC)	PIU (supported by PMC and DSC)	PMU (supported by PMC)
consultation with concerned PIUs and PMU and may be reviewed by Environment, Social and Gender Experts of PMC and DSC. • Day to day H&S and EMP implementation at site during construction stage, conducted with due diligence and in compliance with EMP. The online data capturing Form will be shared with the vendors/component head/etc for capturing progress report. • Securing regulatory permits such as Labor/Work permit/license, group insurance for laborers, Contractor's All Risk Insurance (CARI), Pollution Under Control (PUC) for vehicles and machinery and renewal of the permit/license/insurance on time. And Maintenance of records of regulatory permits/approvals prior to and during construction phase • Conduct Environmental Monitoring during pre-construction and construction phase with due diligence and in compliance with EMP. The online data capturing Form will be shared with the vendors/component head/etc for capturing progress report. • Provide required data/information for Monitoring Reporting	District Education, and other Government entities for the monitoring of EMP and Health and safety (H&S) implementation work of contractor. • Provide guidance to the contractor for achieving compliances. • Maintenance of records on regulatory permits/ approvals taken by contractor during construction phase • Identify areas where specific mitigation measure is needed from safeguard point of view (Corrective Action Plan) during construction stage due to underperformance by contractor's EMP, H&S implementation practice. • EMP implementation, Environmental Monitoring, and compliance to regulatory norms during operation phase • Submit monthly progress report to PIU. • Participate in GRM • Ensure GRM remain functional through implementation period. • Participate in Stakeholder consultations. • Provide requisite trainings to facility level staff on environment	impacts, if any, or based on detailed design • Ensure inclusion of EMP in the bid and contract documents • Ensure continuing consultations are conducted as part of project implementation. • Ensuring that the requisites clearances for environment and labour are at place prior to commencement of any work. Coordinate/consult with the component Head and the Contractor's experts for implementing EMP diligently and effectively. • Review of SEMP/CEMP/EHS plans prepared by Contractor, supported by the Environment, Social and Gender Experts from PMC and DSC for advice, suggestions, etc. to improve them. • Frequent monitoring of EMP and Health and safety (H&S) implementation work of contractor, supported by PMC, DSC and Contractor's experts. • Provide guidance to the contractor for achieving compliances, supported by PMC and DSC. • Maintenance of records on regulatory permits/approvals taken by contractor during construction phase • Identify areas where specific mitigation measure is needed from safeguard point of view (Corrective Action	of each component and submit to ADB. • Ensure allocation of fund for EMP implementation • Ensure inclusion of EMP in the bid and contract documents • Ensure disclosure of IEEs and SEMRs • Ensure continuing consultations are conducted as part of project implementation. • Assisting the relevant stakeholders such as PIUs/DLFs/Component level in Environment safeguards related activities. • Guide the field staff and PIUs in achieving compliance. • Review component progress reports submitted by DSC/contractors/ PMCs/PIUs/others from Environmental Unit at Component Level. • Final Review and approval of SEMP/CEMP/EHS plans prepared by Contractor and first review by PMC & DSC. • Assist in obtaining and renewing statutory permissions that are required to be taken by the project authority. • Prepare Semi-Annual Environmental

Contractor	DLF (supported by DSC)	PIU (supported by PMC and DSC)	PMU (supported by PMC)
to PIU and others engaged in Environmental management (like Component head) at Component level with due diligence. • Submit monthly progress report to PIU and others engaged in Environmental management (like Facility Principle) including EHS compliances along with Action Taken Report for any non-compliance, risks, issues, grievances, etc. to any Environmental matter raised by the Government/PIUs • Establish and participate in GRM with due diligence. • Participate in Stakeholder Engagement with due diligence. • Participate in the public consultation mission conducted by Govt Entity, PMC, or DSC. • Participate in capacity building on Environment, Social and Gender safeguard. • Maintenance of health and hygiene on site. • Identifying areas where specific mitigation measure is needed from safeguard point of view (Corrective Action Plan) during construction stage due to underperformance by contractor's EMP, H&S implementation practice.	safeguards requirements compliances for both construction and operations	Plan) during construction stage due to underperformance by contractor's EMP, H&S implementation practice. • EMP implementation, Environmental Monitoring, and compliance to regulatory norms during operation phase, supported by PMC, DSC, and Component head. • Provide inputs for preparation of Semi-Annual/Annual Environmental Monitoring Report (that will include H&S components), supported by PMC and DSC. • Participate in GRM • Ensure GRM remain functional through implementation period. • Participate in Stakeholder consultations. • Provide requisite trainings to facility level staff on environment safeguards requirements compliances for both construction and operations. • Assist in obtaining and renewing statutory permissions that are required to be taken by the project authority. • Ensure disclosure of IEEs and SEMRs	Monitoring Report and review inputs from PIU, with support of PMC & DSC, and accordingly submit to ADB. • Ensure formation of GRM • Ensure GRM remain functional through implementation period. • Provide requisite trainings to PIUs, DLFs, component level and vendors Officers/staff on environment safeguards requirements compliances for both construction and operations. • Coordination with Funding Agency and Reporting • Coordination with external regulatory authorities, supported by PMC and DSC. • Regular Coordination with Environmental Unit at Component Level, supported by PMC and DSC. • Get regular updates from site level on regulatory compliance and EMP Implementation, supported by PMC and DSC, PIUs, DLFs and Component heads. • Taking decision on corrective measures (if required), advised by PMC and DSC.

CEMP = construction environmental management plan, DLF = DSC = design and supervision consultants, E&S = EARF = environmental assessment and review framework, EMP = environmental management plan, GRM = grievance redress mechanism, IEE = initial environmental examination, PIU = project implementation unit, PMC = project management consulting firm, PMU = project management unit, SEMP = site-specific environmental management plan, SEMR = semi-annual environmental monitoring report.
Source: Stakeholder Consultation and Desktop Analysis.

B. Environmental management plan

Table 47: Environmental management plan: Shillong Public School

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
General (during entire project lifecycle)						
Legal register	Compliance to regulatory requirements, tracking of compliance to regulatory requirements	Set-up an integral compliance management system for ensuring regulatory compliance e.g., legal register should be developed for better monitoring of the compliance status of permits and approvals during pre-construction, construction and operational phase.	Verification of consent/permit documents	Throughout the project lifecycle (pre-construction, construction and operational phase)	Contractor, PIU, DSC, PMC, DLF	PMU
Grievance redress mechanism (GRM)	establish a grievance redressal process for receiving and dealing with the concerns and complaints of affected public and community, if any	A GRM will be developed and implemented to allow the community and workers to express their concerns with respect to environment-health-safety concerns, if any.	Verification of records of registered grievances and resolution outcomes; minutes of meetings.	Before initiation of construction works and throughout project lifecycle	Contractor, PIU, DSC, PMC, DLF, PMU	PMU
Stakeholder Engagement	Dissemination of information, engaging stakeholders in process of decision making	A Stakeholder Engagement Plan (SEP) may be developed by contractor to ensure that a consistent, comprehensive, informed and coordinated approach is taken up with the concerned stakeholders and disclosure of information, stakeholder consultations, and involvement/participation is ensured throughout the project cycle as and when required.	stakeholder engagement meetings/workshops.	Before initiation construction works and throughout the project lifecycle	Contractor, PIU, DSC, PMC, DLF, PMU	PMU
Design Phase						
Project Site Selection Criteria	Non-compliance with project site selection criteria	Screen the project site against the project site selection criteria	Records	During design stage	PIU, DLF, PMC, DSC	PMU
Building location and layout impacts	Potential concerns which may arise due to the location and layout of the school buildings include the following: lack of proper planning which may lead to energy inefficiency, unnecessary cutting of trees,	– The layout of the facilities will be such that the classrooms and administrative buildings are away from the noise generating sources such as road traffic, pumps, DG sets. – Building layout will be superimposed on the site features to avoid clearing trees	Compliance with GRIHA, ECBC, NBC for electrical works and compliance with NBC for plumbing works	Before initiation construction works and to be maintained during	Contractor, PIU, PMC, DSC, DLF	PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
	decreased rainwater infiltration, waterlogging, nuisance/ disturbance to community, students due to noise from diesel generator, odor from septic tanks and waste storage areas, traffic congestion management etc.	from the zones that are not going to be constructed. Minimization of tree cutting by identifying the areas to be retained as green or open areas. – Acoustic building materials for walls, windows, doors will be proposed based on the assessment of noise levels, if they are anticipated to be beyond the standards. – Acoustic enclosures will be provided to noise generating sources like DG sets, pumps etc. – Drainage layout will be well planned and ensured that it does not lead to waterlogging. – Measures to protect and stabilize the drain bank like RCC reinforcement to be installed. – Proper traffic circulation plan along with adequate parking will be ensured. – In case of open parking areas, possible usage of grasscrete may be explored. – Adequate provisions will be in place to deal with situation in case of emergency like proper exit path, assembly area, area for water storage for fire emergency, alarm bells, public address system, etc. – The detailed design has ensured that the environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, etc. are included. The design considers the following energy efficiency measures: – Usage of recyclable materials like wood substitutes. – Installation of BEE certified equipment – Usage of energy efficient lighting fixtures (LED)		operation phase		

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		– Provision of PV cells on roof for solar power for solar light. – Considering appropriate Bureau of Indian Standards Codes (BIS) for design, Seismic Zone V coefficient (IS: 1893 (Part I)-2002: Indian Standard Criteria for Earthquake Resistance Design of Structures (5th Revision) and IS:4326-1993: Indian Standard Code of Practice for Earthquake Resistance Design and Construction of Buildings (2nd Revision)), appropriate wind load factor (corresponding to the prevalent wind speed), and isolated square and strip foundations according to the recommendations of geotechnical survey.				
Climate change Design Considerations.	Failure in considering climate change parameters during design stage of the project can have several significant impacts, including: (i) Increased Energy Costs: Buildings designed without accounting for future climate conditions may require more energy for heating or cooling. This can lead to higher utility bills for occupants, making the building less cost-effective to operate. (ii) Decreased Comfort: Inadequate insulation and ventilation can result in uncomfortable indoor temperatures, making it less pleasant for occupants. This can impact productivity and overall well-being.	– Integrate adaptation measures such as green building and sustainability provisions – The detailed design has ensured that environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, etc. are included. The design considers the following energy efficiency measures: • Usage of recyclable materials like wood substitutes. • Installation of BEE certified equipment • Usage of energy efficient lighting fixtures (LED) • Provision of PV cells on roof for solar power for solar light. • Opting for materials sourced near the construction site serves a dual purpose. It not only minimizes fuel consumption linked to transportation but also mitigates the associated greenhouse gas emissions. By favouring local				

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
	(iii) Structural Vulnerability: Extreme weather events like storms, floods or heatwaves and natural disasters like earthquake, landslides, and cyclones are becoming more frequent and severe due to climate change. Buildings that aren't designed to withstand these conditions may be structurally vulnerable, leading to damage or safety risks. And can also lead to reduced longevity, the buildings may deteriorate more quickly. (iv) Environmental Impact: Energy-inefficient buildings contribute to higher greenhouse gas emissions. (v) Health Concerns: Poorly designed buildings can have indoor air quality issues, leading to health problems for occupants. This can include mould growth due to moisture infiltration or inadequate ventilation.	sourcing, a project can significantly curtail its carbon footprint while concurrently fostering regional economic sustainability. • Roof top and in other suitable locations rainwater harvesting structures will be proposed. • In case of open parking areas, possible usage of grasscrete may be explored.				
Seismic hazards, emergency response design considerations	The project sites are within Seismic Zone V and are prone to seismic hazards	– Considering appropriate Bureau of Indian Standards Codes (BIS) for design, Seismic Zone V coefficient (IS: 1893 (Part I)-2002: Indian Standard Criteria for Earthquake Resistance Design of Structures (5th Revision) and IS:4326-1993: Indian Standard Code of Practice for Earthquake Resistance Design and Construction of Buildings (2nd Revision)), appropriate wind load factor (corresponding to the prevalent	Detailed Design Drawings, Descriptions	During Design Stage	PIU, DSC, PMC	PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		wind speed), and isolated square and strip foundations according to the recommendations of geotechnical survey. – Adequate provisions will be in place to deal with situation in case of emergency like proper exit path, assembly area, area for water storage for fire emergency, public address system, alarm bells, etc. – When designing structures in areas susceptible to landslides, a comprehensive assessment is critical to mitigate both direct and indirect impacts. Here are the key details to be considered during the design phase: – 1. Site Investigation and Assessment – a. Geological Survey: Detailed mapping of the geological features, soil types, and rock formations. – b. Topographical Survey: Analysis of slope angles, elevation changes, and terrain features. Identification of natural drainage patterns and potential water accumulation areas. – 2. Risk Assessment – a. Landslide Hazard Analysis: Identification and mapping of potential landslide zones. – b. Vulnerability Assessment: Determining the potential impact on structures, infrastructure, and human lives. – 3. Design Considerations – a. Slope Stabilization Measures – Retaining Structures: Design of retaining walls, crib walls, and soil nailing to stabilize slopes.				

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		– Reinforcement: Use of geotextiles, geogrids, and soil reinforcement techniques to enhance slope stability. – Vegetation: Planting deep-rooted vegetation to stabilize the soil and reduce erosion. – b. Drainage Control – Surface Drainage: Designing proper surface drainage systems to direct water away from vulnerable slopes. – Subsurface Drainage: Installation of sub-drainage systems to reduce groundwater pressure and prevent water accumulation. – c. Grading and Excavation – Grading: Re-contouring of the landscape to reduce slope angles and improve stability. – Terracing: Creating terraces on steep slopes to reduce the risk of soil movement. – Cut and Fill: Proper management of cut and fill operations to maintain slope stability during construction.				
Securing clearances required prior to commencement of construction	If not followed strictly, it will lead to violation of regulatory requirements	– The permits or Certificates from concerned authorities (i.e., Water abstraction, Fire NoC, Tree Felling Permissions from Forest Department etc. [1]) as applicable prior to construction	Clearance letters/ permits/ Monitoring of stipulated conditions	Before site preparation	Contractor, PIU, DSC, PMC, DLF	PMU
Pre-construction phase						
Contractor's Environment, Health and Safety Experts	Inadequate Safeguard Performance during project implementation	o The Contractor to appoint One Environment Expert and one H&S Expert,[2] having relevant qualification and adequate experience in implementation of Environmental safeguards in the project till the engagement period of contractor.	Availability of the expert/s during construction phase.	Before initiation of site preparation	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		o The expert/s to prepare construction EMP (CEMP) including Health and safety (H&S) plan based on ADB cleared EMP if required to include the site-specific conditions pertaining to construction and associated activities. o The occupational health and safety plan for construction site and nearby community will also be prepared in detail by the Contractor. o The contractor to conduct baseline monitoring for all environmental parameters before start of the construction.	construction EMP (CEMP), EMP Monitoring Report			
Securing applicable Permits/consents from concerned authorities	To ensure compliance to regulatory requirements	o Consent to Establish and Consent to Operate (for facilities such as crusher, batching plant etc.) should be obtained as appropriate and terms/conditions mentioned in the consent must be complied with. o Prior Permission for ground water extraction shall be obtained from the central ground water board (CGWB) or other concerned authority for proposed borewells/abstraction of groundwater. o Registration and license to be obtained as per Contract Labour (regulation and abolition) Act 1970 or state act and rules. o Registration and license under Inter State Migrant Worker Act (in case migrant workers are engaged). o Conduct Environmental monitoring for parameters like Air Quality, Water Quality, Noise Quality and Soil Quality as per monitoring plan. This monitoring is to establish baseline environmental monitoring.	Permit document and integration of related measures into the specific EMPs	Before initiation of site preparation and construction	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
Alteration of land contour and drainage pattern	Changed storm water runoff from alterations of the site's natural drainage patterns due to excavation works in the sites, construction. Affect the existing seasonal drain present along the boundary of the site. Affect the slope stability of the site.	o Design of proposed facility components should enable efficient drainage of the sites and maintain natural drainage patterns to the extent possible. o Plan should be in place so that the drainage pattern of surrounding area is unaffected. o Since the existing seasonal drain is passing along the boundary of the project site, no realignment or shifting of drain is anticipated. o Slope protection measures shall be followed for maintaining slope stability.	Adoption of drainage plan in project	Before initiation of site preparation and construction, during construction	Contractor	DLF, DSC, PMC, PIU, PMU
Utility Shifting	Disruption of utility services to local community (if any)	o All utilities (including underground utilities if any) which are likely to be affected by the project should be shifted before start of construction. o The contractor is to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. o Necessary permission and payments[3] should be made to relevant utility service agencies to allow quick shifting and restoration of utility services. o Local people must be informed in prior through appropriate means about the time of shifting of utility structures and potential disruption of services if any. o If it is found that AC structures are present during the survey, then the Contractor will prepare a detailed SOP for asbestos handling and management prior to disposal/ handling of the AC structures. o All AC pipes/ structures will be left in situ and untouched, if possible o In the event, that the asbestos fibers from AC structures were accidentally disturbed/exposed, the contractor	Utility shifting plan, Intimation to local community	Before initiation of site preparation and construction	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		should follow Safe disposal provisions as per the USEPA. o Use of AC materials will be strictly prohibited at site.				
Tree felling:	Felling of trees (if any)	o In case of felling/cutting of any trees, Permission from competent authority (Forest Department) should be obtained. All efforts must be taken to conserve trees and avoid felling to the greatest extent practicable. o Before proceeding with any vegetation clearance or construction work, it is essential to conduct a survey to identify mature, older trees, and to actively consider alternative measures including transplantation to avoid their removal. o In consultation with concerned department compensatory plantation, green area development activities should be undertaken accordingly.	Tree Felling Permission, payment disbursed for felling and taking up of compensatory plantation, green area development plan, Site Inspection	Cutting prior to start of construction and monitoring monthly to avoid cutting of trees unnecessarily	Contractor[4]/	DLF, DSC, PMC, PIU, PMU
Chance find procedure	Accidental discovery of historical and archaeological resource/artefacts	o A rapid response procedure to protect chance finds while minimizing disruption to project activities should be in place. It will include the provisions to: i) consultation with the State Archaeology Department, ii) demarcation of the discovery site, iii) chance finds report, iv) arrival and actions of cultural authority, and v) suspension/non- suspension/further suspension of work o If archaeological artifacts are unexpectedly found during construction, work will be immediately halted, and the Implementing Agency (IA) and the local	Chance finds procedure, findings (if any) record	Before initiation construction works and implementation to be ensured throughout construction phase	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		cultural relics/heritage department will be informed of the discovery. [5]				
Site Induction Training	Lack of understanding of potential safeguard concerns and corresponding mitigation measures	o No works will be initiated by the contractor until the site induction training is carried out o Site induction training includes but not limited to i) discussion and review of EMP detailing specific environmental risks associated with their Scope of work; how to manage, requirement of legal compliances ii) Health and Safety Awareness	Record of Induction Trainings	Prior to start of work at site	Contractor	DLF, DSC, PMC, PIU, PMU
Labour Camp/Accommodation	Conflicts between locals and labours Health & Safety and environmental risks related to labour camps leading disruption and delay of construction works and quality of life of the laborers	Contractor to ensure the followings measures in consideration of the local conditions- o Construction camps should be established with prior permission from PCB as applicable. Camps will not be established on forest land, low lying/ flood prone areas and will be located as far as possible from the habitations, water bodies, harvesting structures, environmentally sensitive areas (at least 500 m away) etc. o Labour camp should comply with ILO guideline (preferably those ratified by India).[6] o The location, layout and basic facility of camp will be submitted to and approved by PMU/PIU before establishment. o Use of fuelwood should be strictly prohibited at labour camp/accommodation, Contractor should ensure supply of alternative clean fuel such as LPG and common cooking area with fire safety provisions in place. o The building materials used for camps will be sturdy and safe to ensure structural safety.	Visual observation/Site inspection/consultation with laborers	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		o No temporary or permanent constructions to be done on the locations of water bodies (including seasonal) identified within site even if there is no water and these water bodies shall be barricaded. o Provisions of labour camps with individual dwelling units supported with piped water supply, o Provision of common toilets/latrines and bathing facilities duly segregated for male and female labour o Provision of First aid facilities, beds, mosquito repellent/ net, snake repellent will be made. o Collection of domestic waste and sewage and proper disposal to be ensured as per rules o Labour camp should be developed to avoid possibility of flooding, any other natural hazards. o Organizing awareness camp on general health awareness with medical facility o Access to complaint register o Lighting and fencing will be provided. o Wildlife awareness training should be provided so that no wildlife, in case of chance encounter in the region is disturbed. o Precautions to be taken to protect the workers from insect/pest to reduce the risk to health. Use of insecticides complying with local regulations. o No liquor or prohibited drugs will be imported, sold, given to the workers of host community. o Awareness raising to immigrant workers/local community on communicable and sexually transmitted diseases such as HIV, AIDs and others.				

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		o Besides the above, the contractor to ensure the followings. – Workers will have access to an adequate and convenient supply of free potable water that meets national/local or WHO drinking water standards/ IS10500 (2012) standards. – All tanks used for the storage of drinking water should be covered to prevent water stored therein from becoming polluted or contaminated, – Ensure that drinking water quality is regularly monitored. – Use of environmentally friendly sanitation solutions, such as bio toilets and bio digestor septic tanks, or any other advanced small-scale sewage treatment systems shall be made by the that contractor. If the above-mentioned solutions are not feasible then at least septic tanks/ soak pits are to be installed.				
Construction Phase						
Sources of construction materials	Sourcing construction materials from unauthorised mining/ quarry sites can cause environmental impacts like habitat destruction, air & water pollution, resource depletion, soil erosion and degradation.	o Obtain construction materials only from government-approved quarries/vendors that are compliance to the environmental regulations. Verify suitability of all material sources and obtain approvals from PIU and DSC. o Creation of new borrow areas, quarries, etc., for the project should be avoided; if unavoidable, contractor to obtain all necessary clearances and permissions in prior	Documentation with respect to source of material; permit/clearance documents	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU
Land use, Drainage and Topography	Potential Impact on natural land Use/ contours, vegetation clearance, disturbance to natural	o Site levelling should be done with minimum alteration in contour level as possible while not disturbing the natural drainage system.				

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
	drainage patterns, water logging, and water pollution.	o It should be ensured the natural flow of water in the drain is retained to mitigate and vector nuisance in future due to stagnation of water. o Install adequate protection measures to prevent filling of existing drainage with spoils or construction materials/wastes. o Strip the topsoil and store properly (so that it maintains the organic/ inorganic properties of the soil) for reuse later. o Maximize the re-use of earth-cut materials, spoils, and construction debris/wastes.				
Generation of Construction and Demolition Waste and disposal of the same (as applicable)	Contamination of surrounding environment, risk to community health and safety, poor aesthetics	o The contractor to ensure regular collection and disposal of construction waste generated debris, concrete, metal cuttings waste, waste/used oil etc. through authorized vendor or by any other means in compliance with regulatory requirement. o Collection, storage, handling and disposal of Asbestos (if any) containing waste/material from the site should be managed in accordance with rules and guidelines on environmental management of construction & demolition (C& D) wastes by Central Pollution Control board (CPCB) and MoEFCC. Contractor should submit a demolition plan for the existing structures/ sheds (if any) within the premises that are likely to demolished for the proposed development works.	Demolition and Waste management program, evidence of contracting and disposal of C&D waste, record of generation of waste, visual observation	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU
Asbestos Materials	Health risk due to exposure to asbestos materials	o Obtain details from PHED/ Local body on location of underground AC pipes/ structures. o Contractor should conduct a survey with the assistance of PHED and / or NP on the presence of existing AC pipes/ structures at site (if any).	o Onsite observations & records o Asbestos management Plan	As and when required	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		o If it is found that AC structures are present during the survey, then the Contractor will prepare a detailed SOP for asbestos handling and management. ADB's Good Practice Guidance for the Management and Control of Asbestos: Protecting Workplaces and Communities from Asbestos Exposure Risks | Asian Development Bank (adb.org) will be followed along with other international guidelines in preparing the SOPs. o All AC pipes/ structures will be left in situ and untouched, if possible o In the event, that the asbestos fibers from AC structures were accidentally disturbed/exposed, the contractor should follow safe disposal provisions as per the USEPA https://www.epa.gov/asbestos/safe-work-practices o Use of AC materials will be strictly prohibited at site	o Reporting of Incidence by Contractor o Supervision report of Asbestos management in Semi-annual Environmental Monitoring Report (SEMR)			
Air Quality	o Dust Generation due to construction activities and transport, storage and handling of construction materials o Emission of air pollutants (HC, SO_2, NOx, CO etc.) from Construction vehicles and use of construction equipment and machinery	o The construction site will be barricaded with temporary dust capturing and noise attenuating barriers of adequate height as must be prescribed in the CTE. o Contractor to submit location and layout plan for storage areas of construction materials approved by PIU/PMU. o Transport, loading and unloading of loose and fine materials through covered vehicles. o Provisions for Paved approach roads. o Storage areas to be located downwind of the habitation area. o Water spraying on earthworks, unpaved haulage roads and other dust prone areas. o Provision of (Personal Protective Equipment) PPEs to workers.	Site Inspection/ Document review, monitoring results	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		o Regular maintenance of machinery and equipment as per SPCB requirements. o Batching plants should be located at downwind (as far as possible) direction from the nearest settlement. o Batching plants will have dust screens at the silos, aggregate batcher, feeder areas of adequate height. o Only crushers licensed by the PCB should be used o All DG Sets shall have acoustic enclosure as per CPCB and other relevant norms o DG sets should be provided with adequate stack height and use of low sulfur diesel as fuel. o LPG should be used as fuel source in construction camps instead of wood. o Ambient air quality monitoring should be taken up at adequate location on quarterly basis or as per the recommendation of SPCB or any other regulatory body. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark. o Contractor to prepare and maintain logbook for water sprinkling. o A temporary dust screen cum noise barrier of adequate height shall be provided on the boundary of the project site for dust control. o Use of fuelwood should be strictly prohibited at labour camp/accommodation, Contractor should ensure supply of alternative clean fuel such as LPG and common cooking area with fire safety provisions in place				

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
Noise and Vibration	Disturbance to local residents and sensitive receptors due to increased noise and vibration from construction activities and operation of equipment, machinery and construction vehicles	o The construction site will be barricaded with temporary dust capturing and noise attenuating barriers of adequate height as prescribed in the CTE. o All construction equipment/machineries to be timely serviced and maintained. o Construction equipment and machinery to be fitted with silencers and maintained properly. o Timing of noise generating activities should be restricted during daytime/school hours. o Noise generating operations may be taken up intermittently to avoid exposure to higher noise level for longer period. o Honking should be restricted near built-up areas. o Provision of PPEs should be kept for workers. o Noise monitoring should be taken up at adequate location on quarterly basis or as per the recommendation of SPCB or any other regulatory body. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark. o Blasting is not required for this project as raw material shall be purchase by authorized Vendor. o A temporary dust screen cum noise barrier of adequate height shall be provided around the construction area to mitigate the concerns associated with noise generation to the existing school activities. o All DG Sets shall be outdoor type with silencer and acoustic enclosure as per CPCB and other relevant norms.	Site Inspection, Document review, Visual observation, monitoring results	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
Surface and Groundwater	o Stress on water resources. o Contamination of surface and ground water with fuel and chemical spills; and discharge of wastewater/solid waste from the construction area/construction camps	o Obtain approval/permission from competent authority if ground water abstraction through bore well is carried out or water is sourced from any other means. o Permit conditions (if any) should be made in practice. These should be included in construction EMP by the contractor. o To avoid contaminating water, discharge of hazardous substances, chemicals, construction material and wastes into water courses, drainage systems should strictly be prohibited. o Silt fencing will be used along the waterbodies whenever works are conducted adjacent to them. o Dumping of waste, construction materials will be strictly prohibited into the water bodies even if they are dry. o Temporary Storm drains should be designed according to site conditions to avoid contamination of water sources from storm water runoff and spills. o All fuel and chemical storage (if required on-site) shall be located on an impermeable base within an embankment and will be surrounded by fencing. The storage facility shall be at least 100 m away from the water stream/bodies. o Use treated water for water sprinkling to optimize usage of water for dust suppression in access/haul roads, washing of vehicles, concrete mixing, etc. o The batching plant to have adequate capacity sedimentation tank. No untreated alkaline water from the BP will be discharged on open and unlined ground or water bodies. The treated water should undergo testing for alkalinity before being discharged into low-lying	Site Inspection, Document review, monitoring results.	Monthly	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		areas, water bodies, or open grounds. Reuse the treated water for non-potable uses should be ensured to the extent possible. o Labour engaged in the construction phase, should be sensitized about water conservation and encouraged for optimal use of water. o Maintain water consumption record. o Collection and disposal of spills immediately after occurrence of the event. The oily waste/grease will be collected and skimmed by oil traps and handed over to the authorized agents. o Contamination of nearby waterbodies due to surface runoff should be strictly avoided with the provisions of necessary measures like silt fencing. Silt/sediment should be collected and stockpiled for possible reuse. o Use of environmentally friendly sanitation solutions, such as bio toilets and bio digestor septic tanks, or any other advanced small-scale sewage treatment systems shall be made by the that contractor. If the above-mentioned solutions are not feasible then at least septic tanks/ soak pits are to be installed. o No temporary or permanent constructions to be done on the locations of water bodies (including seasonal ones) and these water bodies shall be barricaded. o Wastes/wastewater generated from labour camp must be collected at regular interval and transported to approved disposal location. Such wastes/wastewater must not be dumped/released in open environment under any circumstances.				

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		o Provision for water conservation e.g., rainwater harvesting at the project site. o Monitoring of surface, ground water quality (also drinking water of workers) should be taken up at adequate location on quarterly basis or as per the recommendation of SPCB or any other regulatory body. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark.				
Soil	o Loss of productive Topsoil due to excavation o Soil erosion due to Construction activities, earthwork, and cut and fill, stockpiles etc. o Contamination of soil due to leakage/ spillage of oil, debris generated from construction activities, poor management of effluent and waste generated from the labour camp. o Compaction of soil and impact on access/ haul roads due to movement of vehicles and equipment	o Provision for appropriate storage of separately stripped topsoil (15 cm) in an appropriate way (to ensure that the organic / inorganic properties of soil are retained) should be made and reused for growing vegetation. o Excavated soil should be reused as much as possible for backfilling, landscaping and for other project areas. o Oil spill kits will be placed at fuel storage, refuelling areas, DG sets, pump locations etc. o In case of any accidental spill, the soil should be cut and stored securely for disposal with hazardous waste. o Re-vegetation should be done in the area after the completion of construction, in order to reduce the risk of soil erosion. o As a best practice, site clearance, excavation and access road strengthening will not be carried out during the monsoon season to minimize erosion and run-off. o Camp site to be restored at the end. o Storage of hazardous material (like used oil, oil-soaked cotton/clothes etc.) in isolated room with impervious surface must be ensured to avoid potential soil contamination. The hazardous waste	Site Inspection, Document review, monitoring results.	Monthly	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		should be disposed of through PCB approved Hazardous Waste Management vendor. o Construction vehicles, machinery, and equipment to be stationed in the designated areas to avoid compaction. o Approach roads/haulage roads should be designed along the barren and hard soil area to reduce the possibility compaction of fertile soil. o To avoid soil contamination Oil-Interceptors will be provided at wash down and refuelling areas. o Monitoring of soil quality should be taken up at adequate location on quarterly basis or as per the recommendation of SPCB or any other regulatory body				
Solid/Liquid Waste /Hazardous Waste	o Solid/liquid Waste will be generated during construction works as well as from construction camp.	o The contractor to ensure daily collection and regular disposal of construction waste/ generated debris etc. o Segregation of waste should be ensured by using color coded bin system for biodegradable and non-biodegradable waste segregation. o Employees working at the site should be provided with training and awareness on the segregation of waste at source. o Biodegradable waste will be preferably composted in -situ that can be utilized to establish a nursery on-site, contributing to the development of the planned green area. o Collaborate with local authorities to transport and dispose waste in accordance with the regulatory requirements. o Biodegradable waste will be preferably composted in -situ that can be used as compost for landscaping.	Site Inspection, document verification	Monthly	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		o The municipal solid waste should be routed through proper collection and handover to local body for further disposal. o All the construction and demolition waste should be managed as per Construction and Demolition Waste Management Rules, 2016[7]. o Good housekeeping should be ensured. o Recyclable waste should be appropriately directed to authorized recycling facilities, based on waste type. o Waste oils/greases/oil contaminated cotton waste from equipment's should be properly collected and disposed through PCB authorized vendors. o Secured storage of civil construction materials including paint, thinner, etc. to be ensured. o Construction vehicles and equipment should undergo regular maintenance to avoid any oil leakages. o Offloading and loading protocols should be prepared for diesel, oil and used oil respectively and workers to be trained to prevent/contain spills and leaks. o Burning of any type of waste and dumping of waste at any unpermitted area (especially near watercourses) should be strictly prohibited. o Hazardous waste should be properly labelled, stored onsite at a location provided with impervious surface, shed and secondary containment system in accordance with Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016[8] and their subsequent amendments. o Hazardous waste will be disposed routinely through approved vendors and				

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		proper records will be maintained of the same. o It is to be ensured that hazardous waste is not stored for more than 90 days. o Regular collection and disposal (in compliance to regulatory requirement) of domestic waste and sewage generated from labour camp to be ensured.				
Ecosystem and Biodiversity	Loss of Vegetation and associated biodiversity due to site preparation and construction activities; accidental contamination of habitat condition	o Possibility of avoidance and minimization of tree felling should be thoroughly examined prior to project development. o Vegetation disturbance and clearance should be restricted to the Project activity area only. Prior to vegetation clearance and construction activities, old mature trees should be identified through a survey and options of avoidance should be explored. o Strict prohibition on use of fuel wood and shrubs from nearby areas as fuel should be imposed and workers should strictly be directed not to harm any wildlife in the area. o Labourers should be provided training about dos and don'ts when encountering wildlife or domesticated animals (to avoid conflict with community) o Wild animals if encountered shall be informed to the local forest department immediately. o The workers and staff will refrain from taking any action that could harm the animals etc. o Proper disposal of solid and liquid wastes should be ensured to avoid any kind of contamination of soil/waterbody which may affect the dwelling species.	Tree felling, plantation, record of plantation, survival rate of planted trees, Site Inspection	Monthly	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
Potential loss of physical cultural resources	Based on a Rapid Environment Assessment, there is no documented presence of heritage or archaeological sites/ monuments on any of the three proposed project sites.	o Contractors must implement a procedure for chance find of cultural, archaeological, historical artefacts during excavation in project area. If archaeological artifacts are unexpectedly found during construction, work will be immediately halted, and the Implementing Agency (IA) and the local cultural relics/heritage department will be informed of the discovery. o All fossils, coins, ancient artifacts, structures, and other archaeological relics discovered on the site shall be the property of the government and shall be dealt with in accordance with the appropriate legislation. o The Contractor must take reasonable efforts to prevent workers or other individuals from removing and harming such goods or things. o The Contractor will immediately stop work at the site if such artifacts of archaeological importance are discovered during construction. o The Contractor must immediately notify the project authority of such discovery and follow the project authority's instructions for dealing with the same. Before instructing the Contractor to recommend work at the site, the Project Authority will obtain direction from the appropriate Archaeology Department. o If any such archaeological relics are there and, it is destroyed or removed from the area without the knowledge of the competent authority that will be considered as violation of national regulations as well as SPS 2009	Chance finds procedure, findings (if any) record	Before initiation construction works and implementation to be ensured throughout construction phase	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
Occupational Health and Safety	Material handling and storage Possible injuries associated with working conditions and other occupational hazards	The contractor will require to comply with the following. o An occupational health and safety Plan will be prepared and implemented by the contractor including Health & Safety reporting and incident/accident reporting procedure. Accidents will be reported immediately to ADB (within 48 hours). Root cause analysis and corrective actions taken to avoid further accidents will also be submitted to ADB (preferably within 72 hours). o Accident register will be maintained at site and closed monthly by the site supervisor. o Provisions of PPEs viz., gloves, helmets, dust mask, ear plug, safety belt, etc. for the workers/staff depending on the type of works assigned to them (e.g., construction, excavation, welding, painting etc.) o A PPE matrix and its onsite inventory and deployment should be maintained. o Contractors to adopt and maintain safe working practices. o Usage of fluorescent and retro reflectory signage, in local language should be provided at construction sites. o Training to workers on safety procedures, precautions and hazardous material handling should be delivered. Workers with adequate training and no acrophobia shall only be assigned height works and similar for works requiring specific skills or training. o Organizing awareness camp on general health awareness with medical facility o Access to complaint register.	Site inspection, document verification, training records; consultation with workers	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		o Provision of first aid facilities, beds, mosquito repellent/ net, snake repellent will be made. o Collection of domestic waste and sewage and proper disposal to be ensured as per rules. o Appointment of safety officer should be ensured. o All regulations regarding safe scaffolding, ladders, working platforms, gangway, stair wells, excavations, trenches etc. should be complied with. The construction of scaffolding and temporary work platforms must be carefully designated and regularly inspected to ensure stability and safety for workers. o Use of hazardous material should be minimized/restricted to the extent possible. o Emergency plan should be prepared to respond to any accidents or emergencies. On-site display of emergency contact numbers of the city/local fire services, etc. to be ensured. o Adequate provisions will be in place to deal with situation in case of emergency like proper exit path, assembly area, area for water storage for fire emergency, public address system, alarm bells, etc. o On-site first aid kits and trained First Aid attendants should be provided to the extent possible. o Mock drill/Toolbox talks will be conducted at regular intervals and training record should be maintained at site. o Loading and unloading operation of equipment should be done under the supervision of a trained professional.				

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		o All work at height to be undertaken during daytime with sufficient sunlight. o On-site fire extinguishing equipment should be provided to handle any possible fire outbreaks. Fire extinguishers should be regularly checked and working condition of the same to be ensured. o A GRM will be implemented to allow the workers/labours to express their concerns, if any. o A grievance register will be maintained at site and details such as name of complainant, date and mode of complaint receipt, details of complaints, resolution details, resolution dates, mode of communication to the complainant etc. The register will be closed on monthly basis by the site supervisor and countersigned by the DSC and PMC environment expert/head. o Contractor to maintain good housekeeping to prevent trips, slips and falls.				
Labour Rights/ Influx of workforce in the area	Cultural and Behavioural Conflict. Conflict between contractor and labour.	o Necessary permits from the concerned labour department should be obtained, pertaining records should be maintained at site with proper documentation. o The Contractor and project authority will ensure decent labour conditions for workers and compliance with applicable law and regulations in India. o Contractors will ensure that wages are being paid as per the requirement of minimum wages act and records are maintained. o Daily attendance register with name and signature of labor will be maintained. o Notice board to display terms of employment giving details of wage rates, working hours, criterion for overtime etc.	Site inspection/document verification/training record/consultation with labours	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		Payment of wages of workers (including subcontracted/casual labours) should be aligned with the payment of wages act. o The contractor to put in place a Code of Conduct (customized to local sensitivities and regulations) for worker-community interaction and on-site behavior. Oblige workers to adhere to code of conduct. The Code of Conduct should take into consideration relevant legislation, safety rules, substance abuse, environmental sensitivity, communicable diseases, gender issues (sexual harassment), respect for local beliefs and customs, community interactions etc. Consider ways to contribute positively to the local community, such as supporting local schools, healthcare facilities, or other community projects. These contributions can help build goodwill. o Local people should be preferred for employment wherever possible, especially as construction workers/unskilled workforce. o Contractor to ensure non-engagement of forced and child labour, gender equality, non-discrimination on employment and opportunity and freedom to express their voice. o GRM will be disclosed to the workers and made accessible for reporting. o Contractors should ensure access of necessary basic amenities and facilities such as drinking water, kitchen, separate toilet (for male and female) and crèches for female worker's children, if any. o Contractor to monitor to avoid any conflict with local community due to influx of migrated labour.				

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		o Health Monitoring: Implement health monitoring programs to assess and address potential health impacts related to chemical exposures or noise levels, acrophobia, silicosis, impacted vision etc. o Provide medical insurance coverage (under the Workmen Compensation Act, 1923) for workers.				
Worker's Camp and living condition.	Inadequate site selection and ineffective camp management can result in a range of adverse environmental consequences.	o Necessary permits from the concerned labour department should be obtained, pertaining records should be maintained at site with proper documentation. o The Contractor and project authority will ensure decent labour conditions for workers and compliance with applicable law and regulations in India. o Contractors will ensure that wages are being paid as per the requirement of minimum wages act and records are maintained. o Daily attendance register with name and signature of labour will be maintained. o Notice board to display terms of employment giving details of wage rates, working hours, criterion for overtime etc. Payment of wages of workers (including subcontracted/casual labours) should be aligned with the payment of wages act. o The contractor to put in place a Code of Conduct (customized to local sensitivities and regulations) for worker-community interaction and on-site behaviour. Oblige workers to adhere to code of conduct. The Code of Conduct should take into consideration relevant legislation, safety rules, substance abuse, environmental sensitivity, communicable diseases, gender issues (sexual harassment), respect for local	Site inspection/document verification/training record/consultation with labours	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		beliefs and customs, community interactions etc. o Local people should be preferred for employment wherever possible, especially as construction workers/unskilled workforce. o Contractor to ensure non-engagement of forced and child labour, gender equity, non-discrimination on employment and opportunity and freedom to express their view. o GRM will be disclosed to the workers and made accessible for reporting. o Contractors should ensure access of necessary basic amenities and facilities such as drinking water, beds, mosquito net/ repellent, snake repellent, common kitchen, gender segregated toilet and crèches for female worker's children, if any. o Contractor to monitor to avoid any conflict with local community due to influx of migrated labour. o A record of water use will be kept. o Littering and unauthorised discharge will be prohibited. o Solid garbage and earth materials shall not be dumped into open drains, water bodies.				
Community Health, Safety, and Security.	o traffic congestion o Potential exposure to pollutants/hazardous material o Threat of emergency situation o Potential threat from the security personals to the local community (like abuse, unnecessary use of force etc.)	o Contractor should keep local residents informed about construction schedules, potential disruptions, and any necessary safety precautions. o Contractor to continuously monitor the social and community aspects of the project's impact. Regularly report on progress and address any issues that arise promptly.	Traffic management plan, consultation with contractor and local community, grievance register, visual observation, environmental monitoring reports, management plan for hazardous material and	Weekly site inspection	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		o A community liaison officer shall be appointed if social unrest or resentments are observed amongst the community. o The third-party vendors/suppliers especially associated with transport of construction materials and site cleaning should not be allowed to enter the premises without valid ID cards or gate pass. o The entry and exit inside the site will be strictly monitored. Unauthorized entry will be prohibited. o Excavation for foundations will be closed as soon as practicable to prevent people or animals falling into the excavation sites. o The transport of heavy loads will be undertaken out of normal working hours to the extent possible. o The contractor/project authority will make reasonable inquiries to ensure that those providing security are not implicated in past abuses; will train security staffs adequately in the use of force (and where applicable, firearms), and appropriate conduct toward workers and local communities. o Security personnel engaged should not use force except when used for preventive and defensive purposes in consideration to the nature and extent of threat. For any issue with the community, take support of local administration as needed. o Establish a Code of Conduct for worker/security persons community interaction and on-site behaviour. Oblige workers/security persons to adhere to code of conduct.	emergency preparedness plan			

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		o A GRM will be implemented to allow the community to express their concerns, if any. o All construction sites should be barricaded to restrict entry of general public to avoid chance of any accidents. o At least one traffic marshal/ flagmen will be deployed in junction/diversion point (at approach road to the project area and main road). o The traffic movement in the project area should be regulated to ensure safety measures for pedestrians. Traffic management plan may be developed as necessary. o speed limits for all Project vehicles will be implemented. o Training will be provided to all the drivers on safety measures. o Management Plan for Hazardous material and Emergency Preparedness plan should be in place. o Necessary mitigation measures as suggested for management of different environmental components (Air, Soil, surface water, ground water, noise, waste/effluent management etc.) should be adequately implemented				
Demobilization: Site restoration and rehabilitation	o Potential Community health and safety threat post construction	o Contractor will prepare site restoration plan which will be approved by the PIU/PMU. o The clean-up and restoration operations are to be implemented by the contractor prior to demobilization. o All construction zones, workers camps, plant sites, crushers etc. or any other area used/affected by the project will be left clean and tidy, to the satisfaction of the PIU/PMU. The restored level of the	Visual observation	Completion of construction work	Contractor	DLF, DSC, PMC, PIU, PMU

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		ground will be as per the original level and condition or better.				
Impact on Nearby Settlements due to Traffic Congestion	o Increased construction related traffic can lead to congestion and inconvenience for residents.	o Implement traffic management plans, if necessary, schedule deliverables during off-peak hours, and encourage alternative transportation methods for workers.	Traffic Management Plan	Weekly site inspection	Contractor	DLF, DSC, PMC, PIU, PMU
Community Engagement	o Lack of community involvement can lead to social unrest.	o Engage with the local community through public consultations, address concerns, and establish open communication channels.	Public Consultation	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU
Operational Phase						
Vehicles and Diesel Generator Emissions	The primary sources of air pollution stems from emissions originating from vehicles and the exhaust outlets of DG sets. In this project, DG sets are installed solely as backup power sources, and it is anticipated that their contribution to pollution will be minimal.	o Encourage the use of low-emission vehicles and promote alternative fuels like compressed natural gas (CNG) or electric vehicles. o Vehicle maintenance should be done on a regular basis. o All DG sets shall adhere to the emission standards outlined in the Environment (Protection) Rules, 1986. Optimize DG set operations through load management strategies, ensuring generators operate at optimal loads to minimize fuel consumption and emissions. o Compliance with all stipulated conditions given by concerned regulators. o CTO to be renewed in timely manner from concerned pollution control board and conditions as stipulated in CTO should be strictly adhered to				
Energy efficiency and energy conservation	Integration of energy efficiency and energy conservation component in design	o The detailed design has been ensured that environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, etc. are included. The design considers the following energy efficiency measures:	Review of relevant certifications	Prior to start of operation	Facility Head, DLF, DSC	PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		o Usage of recyclable materials like wood substitutes. o Installation of BEE certified equipment o Usage of energy efficient lighting fixtures (LED) o Provision of PV cells on roof for solar power for solar Light.				
Regulatory Compliance	To ensure compliance to regulatory requirements	Obtaining permission and ensuring that they remain valid throughout the implementation period. Ensuring compliance with the terms/conditions of various permits such as, water abstraction permits, Fire License, PESO License etc. (as applicable)	Verification of documents	Semi Annually	Facility Head, DLF, DSC,	PMC, PIU, PMU
Air Quality	Generation of Particulate Matter, Sulfur dioxide and Oxides of Nitrogen due to operation of DG sets (in case of used due to power shortage).	o Inspection and maintenance of school vehicles will be done at regular intervals/as per manufacturer's specification and pollution under control certificate should be secured. o Regular maintenance of DG to be carried out. o Adequate height of stack should be provided for the DG sets. o Air quality monitoring should be taken up. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark.	Site Inspection, Document review, stakeholder consultation	Once in each season at least at 2 locations except in monsoon season	Facility Head, DLF, DSC,	PIU, PMC, PMU
Wastewater from toilets and laboratories, **Fecal sludge disposal**	Improper discharge of untreated wastewater from toilets, fecal sludge and wastewater from school laboratory operations will pollute soil and groundwater.	Regular monitoring and clearing of septic tank (through authorized vendor/municipality support) should be ensured. Ensure provision of sufficient and proper storage containers and storage area with bund walls, for storage of laboratory wastewater prior to disposal of through licensed waste treaters No wastewater will be disposed into water bodies or open pits or grounds.	Site Inspection/ Document review, stakeholder consultation	Monthly	Facility Head, DLF, DSC,	PMC, PIU, PMU

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		Monitoring and observation of surrounding areas to ensure that no contamination is taking place due to liquid waste mis management. Conduct regular consultations with the surrounding community/ staff etc. to ensure there no spread of any infections/ disease that can be attributed to the mis management of liquid wastes from the facilities.				
Maintenance of Rainwater Harvesting Pits	If the proper maintenance of rainwater harvesting pits is neglected then there would be impacts like reduced water quality, clogging and structural damages.	o Regular Cleaning: Establish a schedule for regular cleaning and desilting of the rainwater harvesting pits. Remove debris and sediment to maintain water quality and prevent clogging. o Erosion Control: Implement erosion control measures in the surrounding area to prevent soil erosion, which can undermine the pit's structure. o Regular Inspection: Conduct routine inspections to identify any signs of damage or deterioration in the pit or its components. Address issues promptly to prevent further damage. o Seasonal Preparations: Prior to the rainy season, ensure that the pit is in good condition and ready to capture rainfall. This may involve cleaning and performing any necessary repairs.	Site Inspection	Monthly	Facility Head, DLF, DSC	PMC, PIU, PMU
Solid Waste Generation (Hazardous and Non-hazardous)	Generation of other kind of hazardous and nonhazardous waste due to school operation	o Proper segregation of different waste should be taken up which may include municipal waste (biodegradable and non-biodegradable), plastic, electronic waste, hazardous waste etc. o Requirement of separate authorization for hazardous waste (Hazardous Waste Management Rules) may be checked from pollution control board time to time. o Hazardous waste should be stored in clearly marked, leak-proof containers	Site Inspection, Document review, stakeholder consultation	Monthly	Facility Head, DLF, DSC	PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		that are resistant to corrosion and damage. Storage areas should be secure, well-ventilated, and equipped with spill containment measures. Each hazardous waste container must be clearly labelled with its contents, potential hazards, and handling instructions in compliance with the Hazardous and other Wastes (Management & Transboundary Movement) Rules, 2016. Hazardous waste should be handed over to authorized and licensed vendor only. o Ensure that inert waste is handed over to authorized municipal dumping yards or landfill sites in compliance with local waste disposal regulations. o Monitoring and observation of surrounding areas to ensure that no contamination is taking place due to waste mis management. o Conduct regular consultations with the surrounding community/ staff etc. to ensure there no spread of any infections/ disease that can be attributed to the mis management of wastes from the facilities.				
Soil and Water Resource	Potential contamination to surrounding soil and water environment due to improper waste and effluent/sewage management	o To avoid contamination to surrounding environment (soil and water resource) discharge of wastewater and indiscriminate dumping of solid waste should be strictly prohibited. o Provisions for rainwater harvesting should be made. Periodic cleaning of rainwater harvesting system to be carried out. The run-off from the previous surfaces and built-up areas of the project site should be routed through a carefully designed storm water	Site Inspection, Document review, stakeholder consultation	Once in each season at least at 2 locations except in monsoon season	Facility Head, DLF, DSC,	PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		drainage network discharging into rainwater harvesting structures. o Efficient Water saving devices/fixtures should be installed in toilets to reduce avoidable water consumption. o Water meters may be installed at the inlet point of water uptake and the discharge point to monitor the daily water consumption and identify any leakage (if any) o Regular monitoring of soil and water quality (ground and surface water from the project area and/or vicinity should be carried out. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark.				
Noise	Noise may be generated due to operation of DG sets (in case of use due to power shortage).	o DG sets should be provided with acoustic enclosures All DG Sets shall be outdoor type with silencer and acoustic enclosure as per CPCB and other relevant norms. CPCB recommends that the maximum permissible sound pressure level for new diesel generator (DG) sets with rated capacity up to 1000 KVA shall be 75 dB(A) at 1 meter from the enclosure surface. diesel generator sets should be provided with integral acoustic enclosure at the manufacturing stage. o If traffic noise is anticipated to be higher than the permissible limits, the facility sites will be encompassed with acoustic boundaries in combination with green belt with high and dense enough canopy/building materials (door/window sheets) used will have acoustic properties and be properly maintained to retain such properties (such as repairing	Site Inspection/ Document review	Once in each season at least at 2 locations except in monsoon season	Facility Head, DLF, DSC	PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		gaps, or broken sheets, replantation of green belt) o Noise levels would be reduced using noise absorbing material on roof walls and floors. o Noise level monitoring should be taken up. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark.				
Occupational and Community Health and Safety Risk	Occupational Health and Safety (OHS) risk Community Health and Safety risk	o A set of procedures defining the overall waste management system should be in place in consideration of scale and type of activities and identified hazards. This will include minimization, an adequate segregation at point of generation, safe handling, collection, temporary storage, marking, transport and disposal procedures; this will be, accompanied by systematic record keeping of waste quantity, type and final disposal. o Standard operating procedures on the use, storage and disposal of hazardous materials should be in place. o The facilities should have Emergency, preparedness and response plan and should be designed in commensurate with the requirement of concerned department (like Fire Department). Fire NoC should be secured from Fire Department and renewed in timely manner. Emergency preparedness plan should have the provision to manage potential risk likely associated with nearby areas o It is advisable to develop a traffic management plan. Additionally, it's essential to take all reasonable precautions and create an Emergency Preparedness Plan to mitigate potential	Site Inspection, Document review, stakeholder consultation	Monthly	Facility Head, DLF, DSC	PMC, PIU, PMU

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		risks, taking into account emergency scenarios such as fires, flooding, and accidental release or spillage of hazardous materials. Maintain an effective work permit system for vital tasks including electrical work and working at heights for maintenance works. o Provide adequate sanitation facilities. o The emergency contact number shall be displayed. o Provisions for a designated route for vehicle movement should be maintained. o Develop and implement robust health and safety protocols to protect students, school staffs and the community. o Conduct regular safety training sessions and drills to ensure all personnel are prepared for emergencies. o Develop community engagement programs that involve local residents in project-related activities, such as job fairs, skill development workshops, or community events. Encourage social interaction and collaboration between facility and locals to foster understanding and mutual respect. o Establish open channels of communication between project authority/representatives and local residents. o Hold regular meetings, forums, or community advisory groups to discuss project progress, address concerns, and provide updates on project activities. o Traffic and Parking management plan should be developed. o Develop and implement a code of conduct for contracted (if any) security				

Item/ Components	Potential concerns /Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		personnel to ensure that security personnel are screened for implication in past abuses including gender based violence (GBV) and adequately trained in the use of force and appropriate conduct toward the public and workers. The code of conduct will also include procedures to report incidents, for affected people to raise related grievances, for incident investigations. The code of conduct will also indicate that the contractor does not sanction use of force in relation to the project except preventive and defensive purposes in proportion to the nature and extent of the threat.				
Maintenance works	Landscaping and aesthetics	Maintenance of green belt including vegetation care, litter control, irrigation, erosion control, maintenance of rainwater harvesting pits including inspection, cleaning, repairs, and upkeep etc.	Visual observation, record of maintenance	Quarterly	Facility head, DLF, DC	PMC, PIU, PMU
Note: Additional measures (including permits/clearances) as mandated by any regulatory bodies (if any) time to time and/or conditions precedents of permits/clearances should also be implemented by Contractor and or EA (as applicable) in addition to mitigation measures as suggested in the EMP.						

AC = air conditioner, ADB = Asian Development Bank, AIDS = acquired immunodeficiency syndrome, BEE = Bureau of Energy Efficiency, dB = decibel, cm = centimeter, CO = carbon monoxide, CPCB =Central Pollution Control Board, CTO = consent to operate, DLF = district level forum, DSC = design and supervision consultant, ECBC = Energy Conservation Building Code, GRIHA = Green Rating for Integrated Habitat Assessment, H&S = health and safety, HC = hydrocarbon, HIV = human immunodeficiency virus ILO = International Labor Organization, KVA = kilo volt ampere, LED = light-emitting diode, LPG = liquefied petroleum gas, NBC = National Building Code, NO_x = nitrogen oxides, PCB = Pollution Control Board, PESO = Pollution and Explosives Safety Organization, PHED = public health engineering, PIU = project implementation unit, PMC = project management consulting firm, RCC = reinforced cement concrete, SO_2 = sulfur dioxide, SOP = standard operating procedure, SPCB = State Pollution Control Board, SPS = Safeguard Policy Statement, USEPA = United States Environmental Protection Agency.

[1] Responsibility of securing water abstraction permission (if that is to be continued during operation stage) would lie with PIU and PMC.

[2] Instead of one environment expert and one H&S expert, an expert with environment - health-safety expertise may also be considered if the person is qualified enough in terms of qualification and professional experience.

[3] Responsibility of making payment to concerned entity would lie with PIU/DLF

[4] In case it is defined so in the contract document

[5] If any such archaeological relics are found in the project site and, it is destroyed or removed from the area without the knowledge of the competent authority that will be considered as violation of national regulations as well as SPS 2009.

[6] https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/---multi/documents/publication/wcms_116344.pdf

[7] https://cpcb.nic.in/displaypdf.php?id=d2FzdGUvQyZEX3J1bGVzXzIwMTYucGRm

[8] https://cpcb.nic.in/displaypdf.php?id=aHdtZC9IV01fUnVsZXNfMjAxNi5wZGY=

Source: PwC Analysis, Stakeholder Consultation, Site Visit Findings

Table 48: Environmental management plan Pine Mount School

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
General (during entire project lifecycle)						
Legal register	Compliance to regulatory requirements, tracking of compliance to regulatory requirements	Set-up an integral compliance management system for ensuring regulatory compliance e.g., legal register should be developed for better monitoring of the compliance status of permits and approvals during pre-construction, construction and operational phase.	Verification of consent/permit documents	Throughout the project lifecycle (pre-construction, construction and operational phase)	Contractor, PIU, DSC, PMC, DLF	PMU
Grievance Redress Mechanism (GRM)	establish a grievance redressal process for receiving and dealing with the concerns and complaints of affected public and community, if any	A GRM will be developed and implemented to allow the community and workers to express their concerns with respect to environment-health-safety concerns, if any.	Verification of records of registered grievances and resolution outcomes; minutes of meetings.	Before initiation of construction works and throughout project lifecycle	Contractor, PIU, DSC, PMC, DLF, PMU	PMU
Stakeholder Engagement	Dissemination of information, engaging stakeholders in process of decision making	A stakeholder engagement plan (SEP) may be developed by contractor to ensure that a consistent, comprehensive, informed and coordinated approach is taken up with the concerned stakeholders and disclosure of information, stakeholder consultations, and involvement/participation is ensured throughout the project cycle as and when required.	stakeholder engagement meetings/workshops.	Before initiation construction works and throughout the project lifecycle	Contractor, PIU, DSC, PMC, DLF, PMU	PMU
Design Phase						
Project Site Selection Criteria	Non-compliance with project site selection criteria	Screen the project site against the project site selection criteria	Records	During design stage	PIU, DLF, PMC, DSC	PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
Building location and layout impacts	Potential concerns which may arise due to the location and layout of the school buildings include the following: lack of proper planning which may lead to energy inefficiency, unnecessary cutting of trees, decreased rainwater infiltration, waterlogging, nuisance/disturbance to community, students due to noise from diesel generator, odor from septic tanks and waste storage areas, traffic congestion management etc.	The layout of the facilities will be such that the classrooms and administrative buildings are away from the noise generating sources such as road traffic, pumps. Building layout will be superimposed on the site features to avoid clearing trees from the zones that are not going to be constructed. Minimization of tree cutting by identifying the areas to be retained as green or open areas. Acoustic building materials for walls, windows, doors will be proposed based on the assessment of noise levels, if they are anticipated to be beyond the standards. Acoustic enclosures will be provided to noise generating sources like pumps etc. Drainage layout will be well planned and ensured that it does not lead to waterlogging. Measures to protect and stabilize the drain bank like RCC reinforcement to be installed. Proper traffic circulation plan along with adequate parking will be ensured. In case of open parking areas, possible usage of grasscrete may be explored. Adequate provisions will be in place to deal with situation in case of emergency like proper exit path, assembly area, area for water storage for fire emergency etc. The detailed design has ensured that the environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, etc. are included. The design considers the following energy efficiency measures: Usage of recyclable materials like wood substitutes. Installation of BEE certified equipment	Compliance with GRIHA, ECBC, NBC for electrical works and compliance with NBC for plumbing works	Before initiation construction works and to be maintained during operation phase	Contractor, PIU, PMC, DSC, DLF	PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		Usage of energy efficient lighting fixtures (LED) Provision of PV cells on roof for solar power for solar light. Considering appropriate Bureau of Indian Standards Codes (BIS) for design, Seismic Zone V coefficient (IS: 1893 (Part I)-2002: Indian Standard Criteria for Earthquake Resistance Design of Structures (5th Revision) and IS:4326-1993: Indian Standard Code of Practice for Earthquake Resistance Design and Construction of Buildings (2nd Revision)), appropriate wind load factor (corresponding to the prevalent wind speed), and isolated square & strip foundations according to the recommendations of geotechnical survey.				
Climate change Design Considerations.	Failure in considering climate change parameters during design stage of the project can have several significant impacts, including: (i) Increased Energy Costs: Buildings designed without accounting for future climate conditions may require more energy for heating or cooling. This can lead to higher utility bills for occupants, making the building less cost-effective to operate. (ii) Decreased Comfort: Inadequate insulation and ventilation can result in uncomfortable indoor temperatures, making it less pleasant for occupants. This	Integrate adaptation measures such as green building and sustainability provisions (Refer to Table 42.) The detailed design has ensured that environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, etc. are included. The design considers the following energy efficiency measures: Usage of recyclable materials like wood substitutes. Installation of BEE certified equipment Usage of energy efficient lighting fixtures (LED) Provision of PV cells on roof for solar power for solar light. Opting for materials sourced near the construction site serves a dual purpose. It not only minimizes fuel consumption linked to transportation but also mitigates the associated greenhouse				

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
	can impact productivity and overall well-being. (iii) Structural Vulnerability: Extreme weather events like storms, floods or heatwaves and natural disasters like earthquake, landslides, and cyclones are becoming more frequent and severe due to climate change. Buildings that aren't designed to withstand these conditions may be structurally vulnerable, leading to damage or safety risks. And can also lead to reduced longevity, the buildings may deteriorate more quickly. (iv) Environmental Impact: Energy-inefficient buildings contribute to higher greenhouse gas emissions. (v) Health Concerns: Poorly designed buildings can have indoor air quality issues, leading to health problems for occupants. This can include mould growth due to moisture infiltration or inadequate ventilation.	gas emissions. By favouring local sourcing, a project can significantly curtail its carbon footprint while concurrently fostering regional economic sustainability. Roof top and in other suitable locations rainwater harvesting structures will be proposed. In case of open parking areas, possible usage of grasscrete may be explored.				
Seismic hazards, emergency response design considerations	The project sites are within Seismic Zone V and are prone to seismic hazards	Considering appropriate Bureau of Indian Standards Codes (BIS) for design, Seismic Zone V coefficient (IS: 1893 (Part I)-2002: Indian Standard Criteria for Earthquake Resistance Design of Structures (5th Revision) and IS:4326-1993: Indian Standard Code of Practice for Earthquake Resistance Design and Construction of Buildings (2nd Revision)), appropriate wind load factor	Detailed Design Drawings, Descriptions	During Design Stage	PIU, DSC, PMC	PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		(corresponding to the prevalent wind speed), and isolated square and strip foundations according to the recommendations of geotechnical survey. Adequate provisions will be in place to deal with situation in case of emergency like proper exit path, assembly area, area for water storage for fire emergency etc. When designing structures in areas susceptible to landslides, a comprehensive assessment is critical to mitigate both direct and indirect impacts. Here are the key details to be considered during the design phase: 1. Site Investigation and Assessment a. Geological Survey: Detailed mapping of the geological features, soil types, and rock formations. b. Topographical Survey: Analysis of slope angles, elevation changes, and terrain features. Identification of natural drainage patterns and potential water accumulation areas. 2. Risk Assessment a. Landslide Hazard Analysis: Identification and mapping of potential landslide zones. b. Vulnerability Assessment: Determining the potential impact on structures, infrastructure, and human lives. 3. Design Considerations a. Slope Stabilization Measures Retaining Structures: Design of retaining walls, crib walls, and soil nailing to stabilize slopes. Reinforcement: Use of geotextiles, geogrids, and soil reinforcement techniques to enhance slope stability. Vegetation: Planting deep-rooted vegetation to stabilize the soil and reduce erosion.				

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		b. Drainage Control Surface Drainage: Designing proper surface drainage systems to direct water away from vulnerable slopes. Subsurface Drainage: Installation of sub-drainage systems to reduce groundwater pressure and prevent water accumulation. c. Grading and Excavation Grading: Re-contouring of the landscape to reduce slope angles and improve stability. Terracing: Creating terraces on steep slopes to reduce the risk of soil movement. Cut and Fill: Proper management of cut and fill operations to maintain slope stability during construction.				
Securing clearances required prior to commencement of construction	If not followed strictly, it will lead to violation of regulatory requirements	The permits or certificates from concerned authorities (i.e., water abstraction, fire NoC, tree felling permissions from Forest Department etc. [1]) as applicable prior to construction	Clearance letters/permits/ Monitoring of stipulated conditions	Before site preparation	Contractor, PIU, DSC, PMC, DLF	PMU
Pre-construction phase						
Contractor's Environment, Health and Safety Experts	Inadequate Safeguard Performance during project implementation	The Contractor to appoint One Environment Expert and one H&S Expert,[2] having relevant qualification and adequate experience in implementation of Environmental safeguards in the project till the engagement period of contractor. The expert/s to prepare construction EMP (CEMP) including Health and safety (H&S) plan based on ADB cleared EMP if required to include the site-specific conditions pertaining to construction and associated activities. The occupational health and safety plan for construction site and nearby community	Availability of the expert/s during construction phase. construction EMP (CEMP), EMP Monitoring Report	Before initiation of site preparation	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		will also be prepared in detail by the Contractor. The contractor to conduct baseline monitoring for all environmental parameters before start of the construction.				
Securing applicable Permits/consents from concerned authorities	To ensure compliance to regulatory requirements	Consent to Establish and Consent to Operate (for facilities such as crusher, batching plant etc.) should be obtained as appropriate and terms/conditions mentioned in the consent must be complied with. Prior Permission for ground water extraction shall be obtained from the central ground water board (CGWB) or other concerned authority for proposed borewells/abstraction of groundwater. Registration and license to be obtained as per Contract Labour (regulation and abolition) Act 1970 or state act and rules. Registration and license under Inter State Migrant Worker Act (in case migrant workers are engaged). Conduct Environmental monitoring for parameters like Air Quality, Water Quality, Noise Quality and Soil Quality as per monitoring plan. This monitoring is to establish baseline environmental monitoring.	Permit document and integration of related measures into the specific EMPs	Before initiation of site preparation and construction	Contractor	DLF, DSC, PMC, PIU, PMU
Alteration of land contour and drainage pattern	Changed storm water runoff from alterations of the site's natural drainage patterns due to excavation works in the sites, construction. Affect the slope stability of the site.	Design of proposed facility components should enable efficient drainage of the sites and maintain natural drainage patterns to the extent possible. Plan should be in place so that the drainage pattern of surrounding area is unaffected. Slope protection measures shall be followed for maintaining slope stability.	Adoption of drainage plan in project	Before initiation of site preparation and construction, during construction	Contractor	DLF, DSC, PMC, PIU, PMU
Utility Shifting	Disruption of	All utilities (including underground utilities if any) which are likely to be affected by	Utility shifting plan,	Before initiation of site	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
	utility services to local community (if any)	the project should be shifted before start of construction. The contractor is to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. Necessary permission and payments[3] should be made to relevant utility service agencies to allow quick shifting and restoration of utility services. Local people must be informed in prior through appropriate means about the time of shifting of utility structures and potential disruption of services if any. If it is found that AC structures are present during the survey, then the Contractor will prepare a detailed SOP for asbestos handling and management prior to disposal/ handling of the AC structures. All AC pipes/ structures will be left in situ and untouched, if possible In the event, that the asbestos fibers from AC structures were accidentally disturbed/exposed, the contractor should follow Safe disposal provisions as per the USEPA. Use of AC materials will be strictly prohibited at site.	Intimation to local community	preparation and construction		
Tree felling:	Felling of trees (if any)	In case of felling/cutting of any trees, Permission from competent authority (Forest Department) should be obtained. All efforts must be taken to conserve trees and avoid felling to the greatest extent practicable. Before proceeding with any vegetation clearance or construction work, it is essential to conduct a survey to identify mature, older trees, and to actively consider alternative measures including transplantation to avoid their removal.	Tree Felling Permission, payment disbursed for felling and taking up of compensatory plantation, green area development plan, Site Inspection	Cutting prior to start of construction and monitoring monthly to avoid cutting of trees unnecessarily	Contractor[4]/	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		In consultation with concerned department compensatory plantation, green area development activities should be undertaken accordingly.				
Chance find procedure	Accidental discovery of historical and archaeological resource/artefacts	A rapid response procedure to protect chance finds while minimizing disruption to project activities should be in place. It will include the provisions to: i) consultation with the State Archaeology Department, ii) demarcation of the discovery site, iii) chance finds report, iv) arrival and actions of cultural authority, and v) suspension/non- suspension/further suspension of work If archaeological artifacts are unexpectedly found during construction, work will be immediately halted, and the Implementing Agency (IA) and the local cultural relics/heritage department will be informed of the discovery. [5]	Chance finds procedure, findings (if any) record	Before initiation construction works and implementation to be ensured throughout construction phase	Contractor	DLF, DSC, PMC, PIU, PMU
Site Induction Training	Lack of understanding of potential safeguard concerns and corresponding mitigation measures	No works will be initiated by the contractor until the site induction training is carried out Site induction training includes but not limited to i) discussion and review of EMP detailing specific environmental risks associated with their scope of work; how to manage, requirement of legal compliances ii) Health and Safety Awareness	Record of Induction Trainings	Prior to start of work at site	Contractor	DLF, DSC, PMC, PIU, PMU
Labour Camp/Accommodation	Conflicts between locals and labours	Contractor to ensure the followings measures in consideration of the local conditions- Construction camps should be established with prior permission from PCB as	Visual observation/site inspection/consultation with laborers	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
	Health and safety and environmental risks related to labour camps leading disruption and delay of construction works and quality of life of the laborers	applicable. Camps will not be established on forest land, low lying/ flood prone areas and will be located as far as possible from the habitations, water bodies, harvesting structures, environmentally sensitive areas (at least 500 m away) etc. Labour camp should comply with ILO guideline (preferably those ratified by India).[6] The location, layout and basic facility of camp will be submitted to and approved by PMU/PIU before establishment. Use of fuelwood should be strictly prohibited at labour camp/accommodation, Contractor should ensure supply of alternative clean fuel such as LPG and common cooking area with fire safety provisions in place. The building materials used for camps will be sturdy and safe to ensure structural safety. No temporary or permanent constructions to be done on the locations of water bodies (including seasonal) identified within site even if there is no water and these water bodies shall be barricaded. Provisions of labour camps with individual dwelling units supported with piped water supply, Provision of common toilets/latrines and bathing facilities duly segregated for male and female labour Provision of First aid facilities, beds, mosquito repellent/ net, snake repellent will be made. Collection of domestic waste and sewage and proper disposal to be ensured as per rules Labour camp should be developed to avoid possibility of flooding, any other natural hazards.				

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		Organizing awareness camp on general health awareness with medical facility Access to complaint register Lighting and fencing will be provided. Wildlife awareness training should be provided so that no wildlife, in case of chance encounter in the region is disturbed. Precautions to be taken to protect the workers from insect/pest to reduce the risk to health. Use of insecticides complying with local regulations. No liquor or prohibited drugs will be imported, sold, given to the workers of host community. Awareness raising to immigrant workers/local community on communicable and sexually transmitted diseases such as HIV, AIDs and others. Besides the above, the contractor to ensure the followings. Workers will have access to an adequate and convenient supply of free potable water that meets national/local or WHO drinking water standards/IS10500 (2012) standards. All tanks used for the storage of drinking water should be covered to prevent water stored therein from becoming polluted or contaminated, Ensure that drinking water quality is regularly monitored. Use of environmentally friendly sanitation solutions, such as bio toilets and bio digestor septic tanks, or any other advanced small-scale sewage treatment systems shall be made by the that contractor. If the above-mentioned solutions are not feasible then at least septic tanks/ soak pits are to be installed.				

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
Construction Phase						
Sources of construction materials	Sourcing construction materials from unauthorised mining/ quarry sites can cause environmental impacts like habitat destruction, air & water pollution, resource depletion, soil erosion and degradation.	Obtain construction materials only from government-approved quarries/vendors that are compliance to the environmental regulations. Verify suitability of all material sources and obtain approvals from PIU and DSC. Creation of new borrow areas, quarries, etc., for the project should be avoided; if unavoidable, contractor to obtain all necessary clearances and permissions in prior	Documentation with respect to source of material; permit/clearance documents	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU
Land use, Drainage and Topography	Potential Impact on natural land use/contours, vegetation clearance, disturbance to natural drainage patterns, water logging, and water pollution.	Site levelling should be done with minimum alteration in contour level as possible while not disturbing the natural drainage system. It should be ensured the natural flow of water in the drain is retained to mitigate and vector nuisance in future due to stagnation of water. Install adequate protection measures to prevent filling of existing drainage with spoils or construction materials/wastes. Strip the topsoil and store properly (so that it maintains the organic/ inorganic properties of the soil) for reuse later. Maximize the re-use of earth-cut materials, spoils, and construction debris/wastes.				
Generation of Construction and Demolition Waste and disposal of the same (as applicable)	Contamination of surrounding environment, risk to community health and safety, poor aesthetics	The contractor to ensure regular collection and disposal of construction waste generated debris, concrete, metal cuttings waste, waste/used oil etc. through authorized vendor or by any other means in compliance with regulatory requirement. Collection, storage, handling and disposal of Asbestos (if any) containing waste/material from the site should be managed in accordance with rules and guidelines on environmental	Demolition and Waste management plan, evidence of contracting and disposal of C&D waste, record of generation of waste, visual observation	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		management of construction and demolition (C&D) wastes by Central Pollution Control board (CPCB) and MoEFCC. Contractor should submit a demolition plan for the existing structures/ sheds (if any) within the premises that are likely to demolished for the proposed development works.				
Asbestos Materials	Health risk due to exposure to asbestos materials	Obtain details from PHED/ Local body on location of underground AC pipes/ structures. Contractor should conduct a survey with the assistance of PHED and / or NP on the presence of existing AC pipes/ structures at site (if any). If it is found that AC structures are present during the survey, then the Contractor will prepare a detailed SOP for asbestos handling and management. ADB's Good Practice Guidance for the Management and Control of Asbestos: Protecting Workplaces and Communities from Asbestos Exposure Risks | Asian Development Bank (adb.org) will be followed along with other international guidelines in preparing the SOPs. All AC pipes/ structures will be left in situ and untouched, if possible In the event, that the asbestos fibers from AC structures were accidentally disturbed/exposed, the contractor should follow Safe disposal provisions as per the USEPA https://www.epa.gov/asbestos/safe-work-practices Use of AC materials will be strictly prohibited at site	Onsite observations & records Asbestos management Plan Reporting of Incidence by Contractor Supervision report of Asbestos management in Semi-annual Environmental Monitoring Report (SEMR)	As and when required	Contractor	DLF, DSC, PMC, PIU, PMU
Air Quality	Dust Generation due to construction activities and transport, storage and	The construction site will be barricaded with temporary dust capturing and noise attenuating barriers of adequate height as must be prescribed in the CTE.	Site Inspection/ Document review, monitoring results	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
	handling of construction materials Emission of air pollutants (HC, SO_2, NOx, CO etc.) from Construction vehicles and use of construction equipment and machinery	Contractor to submit location and layout plan for storage areas of construction materials approved by PIU/PMU. Transport, loading and unloading of loose and fine materials through covered vehicles. Provisions for Paved approach roads. Storage areas to be located downwind of the habitation area. Water spraying on earthworks, unpaved haulage roads and other dust prone areas. Provision of (Personal Protective Equipment) PPEs to workers. Regular maintenance of machinery and equipment as per SPCB requirements. Batching plants should be located at downwind (as far as possible) direction from the nearest settlement. Batching plants will have dust screens at the silos, aggregate batcher, feeder areas of adequate height. Only crushers licensed by the PCB should be used LPG should be used as fuel source in construction camps instead of wood. Ambient air quality monitoring should be taken up at adequate location on quarterly basis or as per the recommendation of SPCB or any other regulatory body. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark. Contractor to prepare and maintain logbook for water sprinkling. A temporary dust screen cum noise barrier of adequate height shall be provided on the boundary of the project site for dust control.				

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		Use of fuelwood should be strictly prohibited at labour camp/accommodation, Contractor should ensure supply of alternative clean fuel such as LPG and common cooking area with fire safety provisions in place				
Noise and Vibration	Disturbance to local residents and sensitive receptors due to increased noise and vibration from construction activities and operation of equipment, machinery and construction vehicles	The construction site will be barricaded with temporary dust capturing and noise attenuating barriers of adequate height as prescribed in the CTE. All construction equipment/machineries to be timely serviced and maintained. Construction equipment and machinery to be fitted with silencers and maintained properly. Timing of noise generating activities should be restricted during daytime/school hours. Noise generating operations may be taken up intermittently to avoid exposure to higher noise level for longer period. Honking should be restricted near built-up areas. Provision of PPEs should be kept for workers. Noise monitoring should be taken up at adequate location on quarterly basis or as per the recommendation of SPCB or any other regulatory body. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark. Blasting is not required for this project as raw material shall be purchase by authorized Vendor. A temporary dust screen cum noise barrier of adequate height shall be provided around the construction area to mitigate the concerns associated with noise generation to the existing school activities.	Site Inspection, Document review, Visual observation, monitoring results	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
Surface and Groundwater	Stress on water resources. Contamination of surface and ground water with fuel and chemical spills; and discharge of wastewater/solid waste from the construction area/construction camps	Obtain approval/permission from competent authority if ground water abstraction through bore well is carried out or water is sourced from any other means. Permit conditions (if any) should be made in practice. These should be included in construction EMP by the contractor. To avoid contaminating water, discharge of hazardous substances, chemicals, construction material and wastes into water courses, drainage systems should strictly be prohibited. Silt fencing will be used along the waterbodies whenever works are conducted adjacent to them. Dumping of waste, construction materials will be strictly prohibited into the water bodies even if they are dry. Temporary Storm drains should be designed according to site conditions to avoid contamination of water sources from storm water runoff and spills. All fuel and chemical storage (if required on-site) shall be located on an impermeable base within an embankment and will be surrounded by fencing. The storage facility shall be at least 100 m away from the water stream/bodies. Use treated water for water sprinkling to optimize usage of water for dust suppression in access/haul roads, washing of vehicles, concrete mixing, etc. The batching plant to have adequate capacity sedimentation tank. No untreated alkaline water from the BP will be discharged on open and unlined ground or water bodies. The treated water should undergo testing for alkalinity before being discharged into low-lying areas, water bodies, or open grounds. Reuse the treated water for non-	Site Inspection, Document review, monitoring results.	Monthly	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		potable uses should be ensured to the extent possible. Labour engaged in the construction phase, should be sensitized about water conservation and encouraged for optimal use of water. Maintain water consumption record. Collection and disposal of spills immediately after occurrence of the event. The oily waste/grease will be collected and skimmed by oil traps and handed over to the authorized agents. Contamination of nearby waterbodies due to surface runoff should be strictly avoided with the provisions of necessary measures like silt fencing. Silt/sediment should be collected and stockpiled for possible reuse. Use of environmentally friendly sanitation solutions, such as bio toilets and bio digestor septic tanks, or any other advanced small-scale sewage treatment systems shall be made by the that contractor. If the above-mentioned solutions are not feasible then at least septic tanks/ soak pits are to be installed. No temporary or permanent constructions to be done on the locations of water bodies (including seasonal ones) and these water bodies shall be barricaded. Wastes/wastewater generated from labour camp must be collected at regular interval and transported to approved disposal location. Such wastes/wastewater must not be dumped/released in open environment under any circumstances. Provision for water conservation e.g., rainwater harvesting at the project site. Monitoring of surface, ground water quality (also drinking water of workers) should be taken up at adequate location on quarterly				

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		basis or as per the recommendation of SPCB or any other regulatory body. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark.				
Soil	Loss of productive topsoil due to excavation Soil erosion due to Construction activities, earthwork, and cut and fill, stockpiles etc. Contamination of soil due to leakage/ spillage of oil, debris generated from construction activities, poor management of effluent and waste generated from the labour camp. Compaction of soil and impact on access/ haul roads due to movement of vehicles and equipment	Provision for appropriate storage of separately stripped topsoil (15 cm) in an appropriate way (to ensure that the organic/inorganic properties of soil are retained) should be made and reused for growing vegetation. Excavated soil should be reused as much as possible for backfilling, landscaping and for other project areas. Oil spill kits will be placed at fuel storage, refuelling areas, pump locations etc. In case of any accidental spill, the soil should be cut and stored securely for disposal with hazardous waste. Re-vegetation should be done in the area after the completion of construction, in order to reduce the risk of soil erosion. As a best practice, site clearance, excavation and access road strengthening will not be carried out during the monsoon season to minimize erosion and run-off. Camp site to be restored at the end. Storage of hazardous material (like used oil, oil-soaked cotton/clothes etc.) in isolated room with impervious surface must be ensured to avoid potential soil contamination. The hazardous waste should be disposed of through PCB approved Hazardous Waste Management vendor. Construction vehicles, machinery, and equipment to be stationed in the designated areas to avoid compaction. Approach roads/haulage roads should be designed along the barren and hard soil	Site Inspection, Document review, monitoring results.	Monthly	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		area to reduce the possibility compaction of fertile soil. To avoid soil contamination Oil-Interceptors will be provided at wash down and refuelling areas. Monitoring of soil quality should be taken up at adequate location on quarterly basis or as per the recommendation of SPCB or any other regulatory body				
Solid/Liquid Waste /Hazardous Waste	Solid/liquid Waste will be generated during construction works as well as from construction camp.	The contractor to ensure daily collection and regular disposal of construction waste/ generated debris etc. Segregation of waste should be ensured by using color coded bin system for biodegradable and non-biodegradable waste segregation. Employees working at the site should be provided with training and awareness on the segregation of waste at source. Biodegradable waste will be preferably composted in -situ that can be utilized to establish a nursery on-site, contributing to the development of the planned green area. Collaborate with local authorities to transport and dispose waste in accordance with the regulatory requirements. Biodegradable waste will be preferably composted in -situ that can be used as compost for landscaping. The municipal solid waste should be routed through proper collection and handover to local body for further disposal. All the construction and demolition waste should be managed as per Construction and Demolition Waste Management Rules, 2016[7]. Good housekeeping should be ensured. Recyclable waste should be appropriately directed to authorized recycling facilities, based on waste type.	Site Inspection, document verification	Monthly	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		Waste oils/greases/oil contaminated cotton waste from equipment's should be properly collected and disposed through PCB authorized vendors. Secured storage of civil construction materials including paint, thinner, etc. to be ensured. Construction vehicles and equipment should undergo regular maintenance to avoid any oil leakages. Offloading and loading protocols should be prepared for diesel, oil and used oil respectively and workers to be trained to prevent/contain spills and leaks. Burning of any type of waste and dumping of waste at any unpermitted area (especially near watercourses) should be strictly prohibited. Hazardous waste should be properly labelled, stored onsite at a location provided with impervious surface, shed and secondary containment system in accordance with Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016[8] and their subsequent amendments. Hazardous waste will be disposed routinely through approved vendors and proper records will be maintained of the same. It is to be ensured that hazardous waste is not stored for more than 90 days. Regular collection and disposal (in compliance to regulatory requirement) of domestic waste and sewage generated from labour camp to be ensured.				
Ecosystem and Biodiversity	Loss of Vegetation and associated biodiversity due to site preparation and construction activities; accidental contamination of habitat condition	Possibility of avoidance and minimization of tree felling should be thoroughly examined prior to project development. Vegetation disturbance and clearance should be restricted to the Project activity area only. Prior to vegetation clearance and	Tree felling, plantation, record of plantation, survival rate of planted trees, Site Inspection	Monthly	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		construction activities, old mature trees should be identified through a survey and options of avoidance should be explored. Strict prohibition on use of fuel wood and shrubs from nearby areas as fuel should be imposed and workers should strictly be directed not to harm any wildlife in the area. Labourers should be provided training about dos and don'ts when encountering wildlife or domesticated animals (to avoid conflict with community) Wild animals if encountered shall be informed to the local forest department immediately. The workers and staff will refrain from taking any action that could harm the animals etc. Proper disposal of solid and liquid wastes should be ensured to avoid any kind of contamination of soil/waterbody which may affect the dwelling species.				
Potential loss of physical cultural resources	Based on a Rapid Environment Assessment, there is no documented presence of heritage or archaeological sites/monuments on any of the three proposed project sites.	Contractors must implement a procedure for chance find of cultural, archaeological, historical artefacts during excavation in project area. If archaeological artifacts are unexpectedly found during construction, work will be immediately halted, and the Implementing Agency (IA) and the local cultural relics/heritage department will be informed of the discovery. All fossils, coins, ancient artifacts, structures, and other archaeological relics discovered on the site shall be the property of the government and shall be dealt with in accordance with the appropriate legislation. The Contractor must take reasonable efforts to prevent workers or other individuals	Chance finds procedure, findings (if any) record	Before initiation construction works and implementation to be ensured throughout construction phase	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		from removing and harming such goods or things. The Contractor will immediately stop work at the site if such artifacts of archaeological importance are discovered during construction. The Contractor must immediately notify the project authority of such discovery and follow the project authority's instructions for dealing with the same. Before instructing the Contractor to recommend work at the site, the Project Authority will obtain direction from the appropriate Archaeology Department. If any such archaeological relics are there and, it is destroyed or removed from the area without the knowledge of the competent authority that will be considered as violation of national regulations as well as SPS 2009				
Occupational Health and Safety	Material handling and storage Possible injuries associated with working conditions and other occupational hazards	The contractor will require to comply with the following. An occupational health and safety plan will be prepared and implemented by the contractor including Health & Safety reporting and incident/accident reporting procedure. Accidents will be reported immediately to ADB (within 48 hours). Root cause analysis and corrective actions taken to avoid further accidents will also be submitted to ADB (preferably within 72 hours). Accident register will be maintained at site and closed monthly by the site supervisor. Provisions of PPEs viz., gloves, helmets, dust mask, ear plug, safety belt, etc. for the workers/staff depending on the type of works assigned to them (e.g., construction, excavation, welding, painting etc.)	Site inspection, document verification, training records; consultation with workers	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		A PPE matrix and its onsite inventory and deployment should be maintained. Contractors to adopt and maintain safe working practices. Usage of fluorescent and retro reflectory signage, in local language should be provided at construction sites. Training to workers on safety procedures, precautions and hazardous material handling should be delivered. Workers with adequate training and no acrophobia shall only be assigned height works and similar for works requiring specific skills or training. Organizing awareness camp on general health awareness with medical facility Access to complaint register. Provision of First aid facilities, beds, mosquito repellent/ net, snake repellent will be made. Collection of domestic waste and sewage and proper disposal to be ensured as per rules. Appointment of safety officer should be ensured. All regulations regarding safe scaffolding, ladders, working platforms, gangway, stair wells, excavations, trenches etc. should be complied with. The construction of scaffolding and temporary work platforms must be carefully designated and regularly inspected to ensure stability and safety for workers. Use of hazardous material should be minimized/restricted to the extent possible. Emergency plan should be prepared to respond to any accidents or emergencies. On-site display of emergency contact numbers of the city/local fire services, etc. to be ensured.				

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		On-site first aid kits and trained First Aid attendants should be provided to the extent possible. Mock drill/Toolbox talks will be conducted at regular intervals and training record should be maintained at site. Loading and unloading operation of equipment should be done under the supervision of a trained professional. All work at height to be undertaken during daytime with sufficient sunlight. On-site fire extinguishing equipment should be provided to handle any possible fire outbreaks. Fire extinguishers should be regularly checked and working condition of the same to be ensured. A Grievance redress mechanism (GRM) will be implemented to allow the workers/labours to express their concerns, if any. A Grievance register will be maintained at site and details such as name of complainant, date and mode of complaint receipt, details of complaints, resolution details, resolution dates, mode of communication to the complainant etc. The register will be closed on monthly basis by the site supervisor and countersigned by the DSC & PMC Environment expert/ Head. Contractor to maintain good housekeeping to prevent trips, slips and falls.				
Labour Rights/ Influx of workforce in the area	Cultural and Behavioural Conflict. Conflict between contractor and labour.	Necessary permits from the concerned labour department should be obtained, pertaining records should be maintained at site with proper documentation. The Contractor and project authority will ensure decent labour conditions for workers and compliance with applicable law and regulations in India.	Site inspection/ /document verification/Training record/ consultation with labours	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		Contractors will ensure that wages are being paid as per the requirement of minimum wages act and records are maintained. Daily attendance register with name and signature of labor will be maintained. Notice board to display terms of employment giving details of wage rates, working hours, criterion for overtime etc. Payment of wages of workers (including subcontracted/casual labours) should be aligned with the payment of wages act. The contractor to put in place a Code of Conduct (customized to local sensitivities and regulations) for worker-community interaction and on-site behavior. Oblige workers to adhere to code of conduct. The Code of Conduct should take into consideration relevant legislation, safety rules, substance abuse, environmental sensitivity, communicable diseases, gender issues (sexual harassment), respect for local beliefs and customs, community interactions etc. Consider ways to contribute positively to the local community, such as supporting local schools, healthcare facilities, or other community projects. These contributions can help build goodwill. Local people should be preferred for employment wherever possible, especially as construction workers/unskilled workforce. Contractor to ensure non-engagement of forced and child labour, gender equality, non-discrimination on employment and opportunity and freedom to express their voice. GRM will be disclosed to the workers and made accessible for reporting. Contractors should ensure access of necessary basic amenities and facilities				

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		such as drinking water, kitchen, separate toilet (for male and female) and crèches for female worker's children, if any. Contractor to monitor to avoid any conflict with local community due to influx of migrated labour. Health Monitoring: Implement health monitoring programs to assess and address potential health impacts related to chemical exposures or noise levels, acrophobia, silicosis, impacted vision etc. Provide medical insurance coverage (under the Workmen Compensation Act, 1923) for workers.				
Worker's Camp and living condition.	Inadequate site selection and ineffective camp management can result in a range of adverse environmental consequences.	Necessary permits from the concerned labour department should be obtained, pertaining records should be maintained at site with proper documentation. The Contractor and project authority will ensure decent labour conditions for workers and compliance with applicable law and regulations in India. Contractors will ensure that wages are being paid as per the requirement of minimum wages act and records are maintained. Daily attendance register with name and signature of labour will be maintained. Notice board to display terms of employment giving details of wage rates, working hours, criterion for overtime etc. Payment of wages of workers (including subcontracted/casual labours) should be aligned with the payment of wages act. The contractor to put in place a Code of Conduct (customized to local sensitivities and regulations) for worker-community interaction and on-site behaviour. Oblige workers to adhere to code of conduct. The Code of Conduct should take into consideration relevant	Site inspection/ /document verification/Training record/ consultation with labours	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		legislation, safety rules, substance abuse, environmental sensitivity, communicable diseases, gender issues (sexual harassment), respect for local beliefs and customs, community interactions etc. Local people should be preferred for employment wherever possible, especially as construction workers/unskilled workforce. Contractor to ensure non-engagement of forced and child labour, gender equity, non-discrimination on employment and opportunity and freedom to express their view. GRM will be disclosed to the workers and made accessible for reporting. Contractors should ensure access of necessary basic amenities and facilities such as drinking water, beds, mosquito net/ repellent, snake repellent, common kitchen, gender segregated toilet and crèches for female worker's children, if any. Contractor to monitor to avoid any conflict with local community due to influx of migrated labour. A record of water use will be kept. Littering and unauthorised discharge will be prohibited. Solid garbage and earth materials shall not be dumped into open drains, water bodies.				
Community Health, Safety, and Security.	traffic congestion Potential exposure to pollutants/hazardous material Threat of emergency situation Potential threat from the security personals to the local community (like	Contractor should keep local residents informed about construction schedules, potential disruptions, and any necessary safety precautions. Contractor to continuously monitor the social and community aspects of the project's impact. Regularly report on progress and address any issues that arise promptly.	Traffic management plan, Consultation with contractor and local community, Grievance Register, visual observation, environmental monitoring reports,	Weekly site inspection	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
	abuse, unnecessary use of force etc.)	A community liaison officer shall be appointed if social unrest or resentments are observed amongst the community. The third-party vendors/suppliers especially associated with transport of construction materials and site cleaning should not be allowed to enter into the premises without valid ID cards or gate pass. The entry and exit inside the site will be strictly monitored. Unauthorized entry will be prohibited. Excavation for foundations will be closed as soon as practicable to prevent people or animals falling into the excavation sites. The transport of heavy loads will be undertaken out of normal working hours to the extent possible. The contractor/project authority will make reasonable inquiries to ensure that those providing security are not implicated in past abuses; will train security staffs adequately in the use of force (and where applicable, firearms), and appropriate conduct toward workers and local Communities. Security personnel engaged should not use force except when used for preventive and defensive purposes in consideration to the nature and extent of threat. For any issue with the community, take support of local administration as needed. Establish a Code of Conduct for worker/security persons community interaction and on-site behaviour. Oblige workers/security persons to adhere to code of conduct. A Grievance redress mechanism (GRM) will be implemented to allow the community to express their concerns, if any.	Management Plan for Hazardous material and Emergency Preparedness plan			

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		All construction sites should be barricaded to restrict entry of general public to avoid chance of any accidents. At least one traffic marshal/ flagmen will be deployed in junction/diversion point (at approach road to the project area and main road). The traffic movement in the project area should be regulated to ensure safety measures for pedestrians. Traffic management plan may be developed as necessary. speed limits for all Project vehicles will be implemented. Training will be provided to all the drivers on safety measures. Management Plan for Hazardous material and Emergency Preparedness plan should be in place. Necessary mitigation measures as suggested for management of different environmental components (Air, Soil, surface water, ground water, noise, waste/effluent management etc.) should be adequately implemented				
Demobilization: Site restoration and rehabilitation	Potential Community health and safety threat post construction	Contractor will prepare site restoration plan which will be approved by the PIU/PMU. The clean-up and restoration operations are to be implemented by the contractor prior to demobilization. All construction zones, workers camps, plant sites, crushers etc. or any other area used/affected by the project will be left clean and tidy, to the satisfaction of the PIU/PMU. The restored level of the ground will be as per the original level and condition or better.	Visual observation	Completion of construction work	Contractor	DLF, DSC, PMC, PIU, PMU
Impact on Nearby Settlements due to Traffic Congestion	Increased construction related traffic can lead to congestion and	Implement traffic management plans, if necessary, schedule deliverables during off-peak hours, and encourage	Traffic Management Plan	Weekly site inspection	Contractor	DLF, DSC, PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
	inconvenience for residents.	alternative transportation methods for workers.				
Community Engagement	Lack of community involvement can lead to social unrest.	Engage with the local community through public consultations, address concerns, and establish open communication channels.	Public Consultation	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU
Operational Phase						
Vehicles Emissions	The primary sources of air pollution stems from emissions originating from vehicles.	Encourage the use of low-emission vehicles and promote alternative fuels like compressed natural gas (CNG) or electric vehicles. Vehicle maintenance should be done on a regular basis.				
Energy efficiency and energy conservation	Integration of energy efficiency and energy conservation component in design	The detailed design has been ensured that environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, etc. are included. The design considers the following energy efficiency measures: Usage of recyclable materials like wood substitutes. Installation of BEE certified equipment Usage of energy efficient lighting fixtures (LED) Provision of PV cells on roof for solar power for solar Light.	Review of relevant certifications	Prior to start of operation	Facility Head, DLF, DSC	PIU, PMU
Regulatory Compliance	To ensure compliance to regulatory requirements	Obtaining permission and ensuring that they remain valid throughout the implementation period. Ensuring compliance with the terms/conditions of various permits such as, water abstraction permits, Fire License, PESO License etc. (as applicable)	Verification of documents	Semi Annually	Facility Head, DLF, DSC,	PMC, PIU, PMU
Air Quality	Generation of Particulate Matter, Sulfur dioxide and Oxides of Nitrogen	Inspection and maintenance of school vehicles will be done at regular intervals/as per manufacturer's specification and pollution under control certificate should be secured.	Site Inspection, Document review, stakeholder consultation	Once in each season at least at 2 locations except in	Facility Head, DLF, DSC,	PIU, PMC, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		Air quality monitoring should be taken up. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark.		monsoon season		
Wastewater from toilets and laboratories, **Fecal sludge disposal**	Improper discharge of untreated wastewater from toilets, fecal sludge and wastewater from school laboratory operations will pollute soil and groundwater.	Regular monitoring and clearing of septic tank (through authorized vendor/municipality support) should be ensured. Ensure provision of sufficient and proper storage containers and storage area with bund walls, for storage of laboratory wastewater prior to disposal of through licensed waste treaters No wastewater will be disposed into water bodies or open pits or grounds. Monitoring and observation of surrounding areas to ensure that no contamination is taking place due to liquid waste mis management. Conduct regular consultations with the surrounding community/ staff etc. to ensure there no spread of any infections/ disease that can be attributed to the mis management of liquid wastes from the facilities.	Site Inspection/ Document review, stakeholder consultation	Monthly	Facility Head, DLF, DSC,	PMC, PIU, PMU
Maintenance of Rainwater Harvesting Pits	If the proper maintenance of rainwater harvesting pits is neglected then there would be impacts like reduced water quality, clogging and structural damages.	Regular Cleaning: Establish a schedule for regular cleaning and desilting of the rainwater harvesting pits. Remove debris and sediment to maintain water quality and prevent clogging. Erosion Control: Implement erosion control measures in the surrounding area to prevent soil erosion, which can undermine the pit's structure. Regular Inspection: Conduct routine inspections to identify any signs of damage or deterioration in the pit or its components. Address issues promptly to prevent further damage.	Site Inspection	Monthly	Facility Head, DLF, DSC	PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		Seasonal Preparations: Prior to the rainy season, ensure that the pit is in good condition and ready to capture rainfall. This may involve cleaning and performing any necessary repairs.				
Solid Waste Generation (Hazardous and Non-hazardous)	Generation of other kind of hazardous and nonhazardous waste due to school operation	Proper segregation of different waste should be taken up which may include municipal waste (biodegradable and non-biodegradable), plastic, electronic waste, hazardous waste etc. Requirement of separate Authorization for Hazardous waste (Hazardous Waste Management Rules) may be checked from pollution control board time to time. Hazardous waste should be stored in clearly marked, leak-proof containers that are resistant to corrosion and damage. Storage areas should be secure, well-ventilated, and equipped with spill containment measures. Each hazardous waste container must be clearly labelled with its contents, potential hazards, and handling instructions in compliance with the Hazardous and other Wastes (Management & Transboundary Movement) Rules, 2016. Hazardous waste should be handed over to authorized and licensed vendor only. Ensure that inert waste is handed over to authorized municipal dumping yards or landfill sites in compliance with local waste disposal regulations. Monitoring and observation of surrounding areas to ensure that no contamination is taking place due to waste mis management. Conduct regular consultations with the surrounding community/staff etc. to ensure there no spread of any infections/ disease that can be attributed to the mis	Site Inspection, Document review, stakeholder consultation	Monthly	Facility Head, DLF, DSC	PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		management of wastes from the facilities.				
Soil and Water Resource	Potential contamination to surrounding soil and water environment due to improper waste and effluent/sewage management	To avoid contamination to surrounding environment (soil and water resource) discharge of wastewater and indiscriminate dumping of solid waste should be strictly prohibited. Provisions for rainwater harvesting should be made. Periodic cleaning of rainwater harvesting system to be carried out. The run-off from the previous surfaces and built-up areas of the project site should be routed through a carefully designed storm water drainage network discharging into rainwater harvesting structures. Efficient Water saving devices/ fixtures should be installed in toilets to reduce avoidable water consumption. Water meters may be installed at the inlet point of water uptake and the discharge point to monitor the daily water consumption and identify any leakage (if any) Regular monitoring of Soil and Water Quality (Ground and Surface Water) from the project area and/or vicinity should be carried out. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark.	Site Inspection, Document review, stakeholder consultation	Once in each season at least at 2 locations except in monsoon season	Facility Head, DLF, DSC,	PMC, PIU, PMU
Noise	Noise may be generated due to traffic.	If traffic noise is anticipated to be higher than the permissible limits, the facility sites will be encompassed with acoustic boundaries in combination with green belt with high and dense enough canopy/ building materials (door/window sheets) used will have acoustic properties and be properly maintained to retain such properties (such as repairing	Site Inspection/ Document review	Once in each season at least at 2 locations except in monsoon season	Facility Head, DLF, DSC	PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		gaps, or broken sheets, replantation of green belt) Noise levels would be reduced using noise absorbing material on roof walls and floors. Noise level monitoring should be taken up. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark.				
Occupational and Community Health and Safety Risk	Occupational Health and Safety (OHS) risk Community Health and Safety risk	A set of procedures defining the overall waste management system should be in place in consideration of scale and type of activities and identified hazards. This will include minimization, an adequate segregation at point of generation, safe handling, collection, temporary storage, marking, transport and disposal procedures; this will be, accompanied by systematic record keeping of waste quantity, type and final disposal. Standard operating procedures on the use, storage and disposal of hazardous materials should be in place. The facilities should have Emergency, preparedness and response plan and should be designed in commensurate with the requirement of concerned department (like Fire Department). Fire NoC should be secured from Fire Department and renewed in timely manner. Emergency preparedness plan should have the provision to manage potential risk likely associated with nearby areas It is advisable to develop a traffic management plan. Additionally, it's essential to take all reasonable precautions and create an Emergency Preparedness Plan to mitigate potential risks, taking into account emergency	Site Inspection, Document review, stakeholder consultation	Monthly	Facility Head, DLF, DSC	PMC, PIU, PMU

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		scenarios such as fires, flooding, and accidental release or spillage of hazardous materials. Maintain an effective work permit system for vital tasks including electrical work and working at heights for maintenance works. Provide adequate sanitation facilities. The emergency contact number shall be displayed. Provisions for a designated route for vehicle movement should be maintained. Develop and implement robust health and safety protocols to protect students, school staffs and the community. Conduct regular safety training sessions and drills to ensure all personnel are prepared for emergencies. Develop community engagement programs that involve local residents in project-related activities, such as job fairs, skill development workshops, or community events. Encourage social interaction and collaboration between facility and locals to foster understanding and mutual respect. Establish open channels of communication between project authority/representatives and local residents. Hold regular meetings, forums, or community advisory groups to discuss project progress, address concerns, and provide updates on project activities. Traffic and Parking management plan should be developed. Develop and implement a code of conduct for contracted (if any) security personnel to ensure that security personnel are screened for implication in past abuses including Gender Based Violence (GBV)				

Item/ Components	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/ Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		and adequately trained in the use of force and appropriate conduct toward the public and workers. The code of conduct will also include procedures to report incidents, for affected people to raise related grievances, for incident investigations. The code of conduct will also indicate that the contractor does not sanction use of force in relation to the project except preventive and defensive purposes in proportion to the nature and extent of the threat.				
Maintenance works	Landscaping and aesthetics	Maintenance of green belt including vegetation care, Litter Control, Irrigation, Erosion Control, maintenance of Rainwater Harvesting Pits including inspection, cleaning, repairs, and upkeep etc.	Visual observation, record of maintenance	Quarterly	Facility Head, DLF, DC	PMC, PIU, PMU
Note: Additional measures (including permits/clearances) as mandated by any regulatory bodies (if any) time to time and/or conditions precedents of permits/clearances should also be implemented by Contractor and or EA (as applicable) in addition to mitigation measures as suggested in the EMP.						

AC = air conditioner, ADB = Asian Development Bank, AIDS = acquired immunodeficiency syndrome, BEE = Bureau of Energy Efficiency, dB = decibel, cm = centimeter, CO = carbon monoxide, CPCB =Central Pollution Control Board, CTO = consent to operate, DLF = district level forum, DSC = design and supervision consultant, ECBC = Energy Conservation Building Code, GRIHA = Green Rating for Integrated Habitat Assessment, H&S = health and safety, HC = hydrocarbon, HIV = human immunodeficiency virus ILO = International Labor Organization, KVA = kilo volt ampere, LED = light-emitting diode, LPG = liquefied petroleum gas, NBC = National Building Code, NO_x = nitrogen oxide, PCB = Pollution Control Board, PESO = Pollution and Explosives Safety Organization, PHED = public health engineering, PIU = project implementation unit, PMC = project management consulting firm, RCC = reinforced cement concrete, SO_2 = sulfur dioxide, SOP = standard operating procedure, SPCB = State Pollution Control Board, SPS = Safeguard Policy Statement, USEPA = United States Environmental Protection Agency.

[1] Responsibility of securing water abstraction permission (if that is to be continued during operation stage) would lie with PIU and PMC.

[2] Instead of one environment expert and one H&S expert, an expert with environment - health-safety expertise may also be considered if the person is qualified enough in terms of qualification and professional experience.

[3] Responsibility of making payment to concerned entity would lie with PIU/DLF

[4] In case it is defined so in the contract document

[5] If any such archaeological relics are found in the project site and, it is destroyed or removed from the area without the knowledge of the competent authority that will be considered as violation of national regulations as well as SPS 2009.

[6] https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/---multi/documents/publication/wcms_116344.pdf

[7] https://cpcb.nic.in/displaypdf.php?id=d2FzdGUvQyZEX3J1bGVzXzIwMTYucGRm

[8] https://cpcb.nic.in/displaypdf.php?id=aHdtZC9IV01fUnVsZXNfMjAxNi5wZGY=

Source: PwC Analysis, Stakeholder Consultation, Site Visit Findings.

Table 49: Environmental management plan Jowai Public School

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
General (during entire project lifecycle)						
Legal register	Compliance to regulatory requirements, tracking of compliance to regulatory requirements	Set-up an integral compliance management system for ensuring regulatory compliance e.g., legal register should be developed for better monitoring of the compliance status of permits and approvals during pre-construction, construction and operational phase.	Verification of consent/permit documents	Throughout the project lifecycle (pre-construction, construction and operational phase)	Contractor, PIU, DSC, PMC, DLF	PMU
Grievance redress mechanism (GRM)	establish a grievance redressal process for receiving and dealing with the concerns and complaints of affected public and community, if any	A GRM will be developed and implemented to allow the community and workers to express their concerns with respect to Environment-Health-Safety concerns, if any.	Verification of records of registered grievances and resolution outcomes; minutes of meetings.	Before initiation of construction works and throughout project lifecycle	Contractor, PIU, DSC, PMC, DLF, PMU	PMU
Stakeholder Engagement	Dissemination of information, engaging stakeholders in process of decision making	A stakeholder engagement plan (SEP) may be developed by contractor to ensure that a consistent, comprehensive, informed and coordinated approach is taken up with the concerned stakeholders and disclosure of information, stakeholder consultations, and involvement/participation is ensured throughout the project cycle as and when required.	stakeholder engagement meetings/workshops.	Before initiation construction works and throughout the project lifecycle	Contractor, PIU, DSC, PMC, DLF, PMU	PMU
Design Phase						
Project Site Selection Criteria	Non-compliance with project site selection criteria	Screen the project site against the project site selection criteria	Records	During design stage	PIU, DLF, PMC, DSC	PMU
	Potential concerns which may arise due to the location and layout of the school buildings include the following: lack of proper planning which may lead to energy inefficiency,	The layout of the facilities will be such that the classrooms and administrative buildings are away from the noise generating sources such as road traffic, pumps, DG sets.	Compliance with GRIHA, ECBC, NBC for electrical works and compliance with NBC for plumbing works	Before initiation construction works and to be maintained during	Contractor, PIU, PMC, DSC, DLF	PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
Building location and layout impacts	unnecessary cutting of trees, decreased rainwater infiltration, waterlogging, nuisance/ disturbance to community, students due to noise from diesel generator, odor from septic tanks and waste storage areas, traffic congestion management etc.	Building layout will be superimposed on the site features to avoid clearing trees from the zones that are not going to be constructed. Minimization of tree cutting by identifying the areas to be retained as green or open areas. Acoustic building materials for walls, windows, doors will be proposed based on the assessment of noise levels, if they are anticipated to be beyond the standards. Acoustic enclosures will be provided to noise generating sources like DG sets, pumps etc. Drainage layout will be well planned and ensured that it does not lead to waterlogging. Measures to protect and stabilize the drain bank like RCC reinforcement to be installed. Proper traffic circulation plan along with adequate parking will be ensured. In case of open parking areas, possible usage of grasscrete may be explored. Adequate provisions will be in place to deal with situation in case of emergency like proper exit path, assembly area, area for water storage for fire emergency etc. The detailed design has ensured that the environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, etc. are included. The design considers the following energy efficiency measures: Usage of recyclable materials like wood substitutes. Installation of BEE certified equipment Usage of energy efficient lighting fixtures (LED)		operation phase		

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		Provision of PV cells on roof for solar power for solar light. Considering appropriate Bureau of Indian Standards Codes (BIS) for design, Seismic Zone V coefficient (IS: 1893 (Part I)-2002: Indian Standard Criteria for Earthquake Resistance Design of Structures (5th Revision) and IS:4326-1993: Indian Standard Code of Practice for Earthquake Resistance Design and Construction of Buildings (2nd Revision)), appropriate wind load factor (corresponding to the prevalent wind speed), and isolated square and strip foundations according to the recommendations of geotechnical survey.				
Climate change Design Considerations.	Failure in considering climate change parameters during design stage of the project can have several significant impacts, including: (i) Increased Energy Costs: Buildings designed without accounting for future climate conditions may require more energy for heating or cooling. This can lead to higher utility bills for occupants, making the building less cost-effective to operate. (ii) Decreased Comfort: Inadequate insulation and ventilation can result in uncomfortable indoor temperatures, making it less pleasant for occupants. This can impact productivity and overall well-being.	Integrate adaptation measures such as green building and sustainability provisions The detailed design has ensured that environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, etc. are included. The design considers the following energy efficiency measures: Usage of recyclable materials like wood substitutes. Installation of BEE certified equipment Usage of energy efficient lighting fixtures (LED) Provision of PV cells on roof for solar power for solar light. Opting for materials sourced near the construction site serves a dual purpose. It not only minimizes fuel consumption linked to transportation but also mitigates the associated greenhouse gas emissions. By favouring local sourcing, a project can significantly				

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
	(iii) Structural Vulnerability: Extreme weather events like storms, floods or heatwaves and natural disasters like earthquake, landslides, and cyclones are becoming more frequent and severe due to climate change. Buildings that aren't designed to withstand these conditions may be structurally vulnerable, leading to damage or safety risks. And can also lead to reduced longevity, the buildings may deteriorate more quickly. (iv) Environmental Impact: Energy-inefficient buildings contribute to higher greenhouse gas emissions. (v) Health Concerns: Poorly designed buildings can have indoor air quality issues, leading to health problems for occupants. This can include mould growth due to moisture infiltration or inadequate ventilation.	curtail its carbon footprint while concurrently fostering regional economic sustainability. Roof top and in other suitable locations rainwater harvesting structures will be proposed. In case of open parking areas, possible usage of grasscrete may be explored.				
Seismic hazards, emergency response design considerations	The project sites are within Seismic Zone V and are prone to seismic hazards	Considering appropriate Bureau of Indian Standards Codes (BIS) for design, Seismic Zone V coefficient (IS: 1893 (Part I)-2002: Indian Standard Criteria for Earthquake Resistance Design of Structures (5th Revision) and IS:4326-1993: Indian Standard Code of Practice for Earthquake Resistance Design and Construction of Buildings (2nd Revision)), appropriate wind load factor (corresponding to the prevalent wind	Detailed Design Drawings, Descriptions	During Design Stage	PIU, DSC, PMC	PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		speed), and isolated square & strip foundations according to the recommendations of geotechnical survey. Adequate provisions will be in place to deal with situation in case of emergency like proper exit path, assembly area, area for water storage for fire emergency etc. When designing structures in areas susceptible to landslides, a comprehensive assessment is critical to mitigate both direct and indirect impacts. Here are the key details to be considered during the design phase: 1. Site Investigation and Assessment a. Geological Survey: Detailed mapping of the geological features, soil types, and rock formations. b. Topographical Survey: Analysis of slope angles, elevation changes, and terrain features. Identification of natural drainage patterns and potential water accumulation areas. 2. Risk Assessment a. Landslide Hazard Analysis: Identification and mapping of potential landslide zones. b. Vulnerability Assessment: Determining the potential impact on structures, infrastructure, and human lives. 3. Design Considerations a. Slope Stabilization Measures Retaining Structures: Design of retaining walls, crib walls, and soil nailing to stabilize slopes. Reinforcement: Use of geotextiles, geogrids, and soil reinforcement techniques to enhance slope stability. Vegetation: Planting deep-rooted vegetation to stabilize the soil and reduce erosion.				

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		b. Drainage Control Surface Drainage: Designing proper surface drainage systems to direct water away from vulnerable slopes. Subsurface Drainage: Installation of sub-drainage systems to reduce groundwater pressure and prevent water accumulation. c. Grading and Excavation Grading: Re-contouring of the landscape to reduce slope angles and improve stability. Terracing: Creating terraces on steep slopes to reduce the risk of soil movement. Cut and Fill: Proper management of cut and fill operations to maintain slope stability during construction.				
Securing clearances required prior to commencement of construction	If not followed strictly, it will lead to violation of regulatory requirements	The permits or Certificates from concerned authorities (i.e., Water abstraction, Fire NoC, Tree Felling Permissions from Forest Department etc. [1]) as applicable prior to construction	Clearance letters/ permits/ Monitoring of stipulated conditions	Before site preparation	Contractor, PIU, DSC, PMC, DLF	PMU
Pre-construction phase						
Contractor's Environment, Health and Safety Experts	Inadequate Safeguard Performance during project implementation	The Contractor to appoint One Environment Expert and one H&S Expert,[2] having relevant qualification and adequate experience in implementation of Environmental safeguards in the project till the engagement period of contractor. The expert/s to prepare construction EMP (CEMP) including Health and safety (H&S) plan based on ADB cleared EMP if required to include the site-specific conditions pertaining to construction and associated activities.	Availability of the expert/s during construction phase. construction EMP (CEMP), EMP Monitoring Report	Before initiation of site preparation	Contractor	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		The occupational health and safety plan for construction site and nearby community will also be prepared in detail by the Contractor. The contractor to conduct baseline monitoring for all environmental parameters before start of the construction.				
Securing applicable Permits/consents from concerned authorities	To ensure compliance to regulatory requirements	Consent to Establish and Consent to Operate (for facilities such as crusher, batching plant etc.) should be obtained as appropriate and terms/conditions mentioned in the consent must be complied with. Prior Permission for ground water extraction shall be obtained from the central ground water board (CGWB) or other concerned authority for proposed borewells/abstraction of groundwater. Registration and license to be obtained as per Contract Labour (regulation and abolition) Act 1970 or state act and rules. Registration and license under Inter State Migrant Worker Act (in case migrant workers are engaged). Conduct Environmental monitoring for parameters like Air Quality, Water Quality, Noise Quality and Soil Quality as per monitoring plan. This monitoring is to establish baseline environmental monitoring.	Permit document and integration of related measures into the specific EMPs	Before initiation of site preparation and construction	Contractor	DLF, DSC, PMC, PIU, PMU
Alteration of land contour and drainage pattern	Changed storm water runoff from alterations of the site's natural drainage patterns due to excavation works in the sites, construction.	Design of proposed facility components should enable efficient drainage of the sites and maintain natural drainage patterns to the extent possible. Plan should be in place so that the drainage pattern of surrounding area is unaffected. Slope protection measures shall be followed for maintaining slope stability.	Adoption of drainage plan in project	Before initiation of site preparation and construction, during construction	Contractor	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
Utility Shifting	Disruption of utility services to local community (if any)	All utilities (including underground utilities if any) which are likely to be affected by the project should be shifted before start of construction. The contractor is to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. Necessary permission and payments[3] should be made to relevant utility service agencies to allow quick shifting and restoration of utility services. Local people must be informed in prior through appropriate means about the time of shifting of utility structures and potential disruption of services if any. If it is found that AC structures are present during the survey, then the Contractor will prepare a detailed SOP for asbestos handling and management prior to disposal/handling of the AC structures. All AC pipes/ structures will be left in situ and untouched, if possible In the event, that the asbestos fibers from AC structures were accidentally disturbed/exposed, the contractor should follow Safe disposal provisions as per the USEPA. Use of AC materials will be strictly prohibited at site.	Utility shifting plan, Intimation to local community	Before initiation of site preparation and construction	Contractor	DLF, DSC, PMC, PIU, PMU
Tree felling:	Felling of trees (if any)	In case of felling/cutting of any trees, Permission from competent authority (Forest Department) should be obtained. All efforts must be taken to conserve trees and avoid felling to the greatest extent practicable. Before proceeding with any vegetation clearance or construction work, it is essential to conduct a survey to identify mature, older trees, and to actively	Tree Felling Permission, payment disbursed for felling and taking up of compensatory plantation, green area development plan, Site Inspection	Cutting prior to start of construction and monitoring monthly to avoid cutting of trees unnecessarily	Contractor[4]/	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		consider alternative measures including transplantation to avoid their removal. In consultation with concerned department compensatory plantation, green area development activities should be undertaken accordingly.				
Chance finds procedure	Accidental discovery of historical and archaeological resource/artefacts	A rapid response procedure to protect chance finds while minimizing disruption to project activities should be in place. It will include the provisions to: i) consultation with the State Archaeology Department, ii) demarcation of the discovery site, iii) chance finds report, iv) arrival and actions of cultural authority, and v) suspension/non- suspension/further suspension of work If archaeological artifacts are unexpectedly found during construction, work will be immediately halted, and the Implementing Agency (IA) and the local cultural relics/heritage department will be informed of the discovery. [5]	Chance finds procedure, findings (if any) record	Before initiation construction works and implementation to be ensured throughout construction phase	Contractor	DLF, DSC, PMC, PIU, PMU
Site Induction Training	Lack of understanding of potential safeguard concerns and corresponding mitigation measures	No works will be initiated by the contractor until the site induction training is carried out Site induction training includes but not limited to i) discussion and review of EMP detailing specific environmental risks associated with their Scope of work; how to manage, requirement of legal compliances ii) Health and Safety Awareness	Record of Induction Trainings	Prior to start of work at site	Contractor	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
Labour Camp/Accommodation	Conflicts between locals and labours Health & Safety and environmental risks related to labour camps leading disruption and delay of construction works and quality of life of the labors	Contractor to ensure the followings measures in consideration of the local conditions- Construction camps should be established with prior permission from PCB as applicable. Camps will not be established on forest land, low lying/ flood prone areas and will be located as far as possible from the habitations, water bodies, harvesting structures, environmentally sensitive areas (at least 500 m away) etc. Labour camp should comply with ILO guideline (preferably those ratified by India).[6] The location, layout and basic facility of camp will be submitted to and approved by PMU/PIU before establishment. Use of fuelwood should be strictly prohibited at labour camp/accommodation, Contractor should ensure supply of alternative clean fuel such as LPG and common cooking area with fire safety provisions in place. The building materials used for camps will be sturdy and safe to ensure structural safety. No temporary or permanent constructions to be done on the locations of water bodies (including seasonal) identified within site even if there is no water and these water bodies shall be barricaded. Provisions of labour camps with individual dwelling units supported with piped water supply, Provision of common toilets/latrines and bathing facilities duly segregated for male and female labour Provision of First aid facilities, beds, mosquito repellent/ net, snake repellent will be made.	Visual observation/ Site inspection/ consultation with labours	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		Collection of domestic waste and sewage and proper disposal to be ensured as per rules Labour camp should be developed to avoid possibility of flooding, any other natural hazards. Organizing awareness camp on general health awareness with medical facility Access to complaint register Lighting and fencing will be provided. Wildlife awareness training should be provided so that no wildlife, in case of chance encounter in the region is disturbed. Precautions to be taken to protect the workers from insect/pest to reduce the risk to health. Use of insecticides complying with local regulations. No liquor or prohibited drugs will be imported, sold, given to the workers of host community. Awareness raising to immigrant workers/local community on communicable and sexually transmitted diseases such as HIV, AIDS and others. Besides the above, the contractor to ensure the followings. Workers will have access to an adequate and convenient supply of free potable water that meets national/local or WHO drinking water standards/ IS10500 (2012) standards. All tanks used for the storage of drinking water should be covered to prevent water stored therein from becoming polluted or contaminated, Ensure that drinking water quality is regularly monitored. Use of environmentally friendly sanitation solutions, such as bio toilets and bio				

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		digestor septic tanks, or any other advanced small-scale sewage treatment systems shall be made by the that contractor. If the above-mentioned solutions are not feasible then at least septic tanks/ soak pits are to be installed.				
Construction Phase						
Sources of construction materials	Sourcing construction materials from unauthorised mining/ quarry sites can cause environmental impacts like habitat destruction, air & water pollution, resource depletion, soil erosion and degradation.	Obtain construction materials only from government-approved quarries/vendors that are compliance to the environmental regulations. Verify suitability of all material sources and obtain approvals from PIU and DSC. Creation of new borrow areas, quarries, etc., for the project should be avoided; if unavoidable, contractor to obtain all necessary clearances and permissions in prior	Documentation with respect to source of material; permit/clearance documents	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU
Land use, Drainage and Topography	Potential Impact on natural land Use/ contours, vegetation clearance, disturbance to natural drainage patterns, water logging, and water pollution.	Site levelling should be done with minimum alteration in contour level as possible while not disturbing the natural drainage system. It should be ensured the natural flow of water in the drain is retained to mitigate and vector nuisance in future due to stagnation of water. Install adequate protection measures to prevent filling of existing drainage with spoils or construction materials/wastes. Strip the topsoil and store properly (so that it maintains the organic/ inorganic properties of the soil) for reuse later. Maximize the re-use of earth-cut materials, spoils, and construction debris/wastes.				
Generation of Construction and Demolition Waste and disposal of the	Contamination of surrounding environment, risk to	The contractor to ensure regular collection and disposal of construction waste generated debris, concrete, metal cuttings waste, waste/used oil etc.	Demolition and Waste management plan, evidence of contracting and disposal of C&D	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
same (as applicable)	community health and safety, poor aesthetics	through authorized vendor or by any other means in compliance with regulatory requirement. Collection, storage, handling and disposal of Asbestos (if any) containing waste/material from the site should be managed in accordance with rules and guidelines on environmental management of construction & demolition (C& D) wastes by Central Pollution Control board (CPCB) and MoEFCC. Contractor should submit a demolition plan for the existing structures/ sheds (if any) within the premises that are likely to demolished for the proposed development works.	waste, record of generation of waste, visual observation			
Asbestos Materials	Health risk due to exposure to asbestos materials	Obtain details from PHED/Local body on location of underground AC pipes/ structures. Contractor should conduct a survey with the assistance of PHED and/or NP on the presence of existing AC pipes/ structures at site (if any). If it is found that AC structures are present during the survey, then the Contractor will prepare a detailed SOP for asbestos handling and management. ADB's Good Practice Guidance for the Management and Control of Asbestos: Protecting Workplaces and Communities from Asbestos Exposure Risks | Asian Development Bank (adb.org) will be followed along with other international guidelines in preparing the SOPs. All AC pipes/ structures will be left in situ and untouched, if possible In the event, that the asbestos fibers from AC structures were accidentally disturbed/exposed, the contractor should follow Safe disposal provisions	Onsite observations and records Asbestos management Plan Reporting of Incidence by Contractor Supervision report of Asbestos management in Semi-annual Environmental Monitoring Report (SEMR)	As and when required	Contractor	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		as per the USEPA https://www.epa.gov/asbestos/safe-work-practices Use of AC materials will be strictly prohibited at site				
Air Quality	Dust generation due to construction activities and transport, storage and handling of construction materials Emission of air pollutants (HC, SO_2, NOx, CO, etc.) from Construction vehicles and use of construction equipment and machinery	The construction site will be barricaded with temporary dust capturing and noise attenuating barriers of adequate height as must be prescribed in the CTE. Contractor to submit location and layout plan for storage areas of construction materials approved by PIU/PMU. Transport, loading and unloading of loose and fine materials through covered vehicles. Provisions for paved approach roads. Storage areas to be located downwind of the habitation area. Water spraying on earthworks, unpaved haulage roads and other dust prone areas. Provision of PPEs to workers. Regular maintenance of machinery and equipment as per SPCB requirements. Batching plants should be located at downwind (as far as possible) direction from the nearest settlement. Batching plants will have dust screens at the silos, aggregate batcher, feeder areas of adequate height. Only crushers licensed by the PCB should be used All DG Sets shall have acoustic enclosure as per CPCB and other relevant norms DG sets should be provided with adequate stack height and use of low sulfur diesel as fuel. LPG should be used as fuel source in construction camps instead of wood.	Site inspection/document review, monitoring results	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		Ambient air quality monitoring should be taken up at adequate location on quarterly basis or as per the recommendation of SPCB or any other regulatory body. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark. Contractor to prepare and maintain logbook for water sprinkling. A temporary dust screen cum noise barrier of adequate height shall be provided on the boundary of the project site for dust control. Use of fuelwood should be strictly prohibited at labour camp/accommodation, Contractor should ensure supply of alternative clean fuel such as LPG and common cooking area with fire safety provisions in place				
Noise and Vibration	Disturbance to local residents and sensitive receptors due to increased noise and vibration from construction activities and operation of equipment, machinery and construction vehicles	The construction site will be barricaded with temporary dust capturing and noise attenuating barriers of adequate height as prescribed in the CTE. All construction equipment/machineries to be timely serviced and maintained. Construction equipment and machinery to be fitted with silencers and maintained properly. Timing of noise generating activities should be restricted during daytime/school hours. Noise generating operations may be taken up intermittently to avoid exposure to higher noise level for longer period. Honking should be restricted near built-up areas. Provision of PPEs should be kept for workers. Noise monitoring should be taken up at adequate location on quarterly basis or as per the recommendation of SPCB or any	Site inspection, document review, Visual observation, monitoring results	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		other regulatory body. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark. Blasting is not required for this project as raw material shall be purchase by authorized Vendor. A temporary dust screen cum noise barrier of adequate height shall be provided around the construction area to mitigate the concerns associated with noise generation to the existing school activities. All DG Sets shall be outdoor type with silencer and acoustic enclosure as per CPCB and other relevant norms.				
Surface and Groundwater	Stress on water resources. Contamination of surface and ground water with fuel and chemical spills; and discharge of wastewater/solid waste from the construction area/construction camps	Obtain approval/permission from competent authority if ground water abstraction through bore well is carried out or water is sourced from any other means. Permit conditions (if any) should be made in practice. These should be included in construction EMP by the contractor. To avoid contaminating water, discharge of hazardous substances, chemicals, construction material and wastes into water courses, drainage systems should strictly be prohibited. Silt fencing will be used along the waterbodies whenever works are conducted adjacent to them. Dumping of waste, construction materials will be strictly prohibited into the water bodies even if they are dry. Temporary Storm drains should be designed according to site conditions to avoid contamination of water sources from storm water runoff and spills. All fuel and chemical storage (if required on-site) shall be located on an impermeable	Site inspection, document review, monitoring results.	Monthly	Contractor	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		base within an embankment and will be surrounded by fencing. The storage facility shall be at least 100 m away from the water stream/bodies. Use treated water for water sprinkling to optimize usage of water for dust suppression in access/haul roads, washing of vehicles, concrete mixing, etc. The batching plant to have adequate capacity sedimentation tank. No untreated alkaline water from the BP will be discharged on open and unlined ground or water bodies. The treated water should undergo testing for alkalinity before being discharged into low-lying areas, water bodies, or open grounds. Reuse the treated water for non-potable uses should be ensured to the extent possible. Labour engaged in the construction phase, should be sensitized about water conservation and encouraged for optimal use of water. Maintain water consumption record. Collection and disposal of spills immediately after occurrence of the event. The oily waste/grease will be collected and skimmed by oil traps and handed over to the authorized agents. Contamination of nearby waterbodies due to surface runoff should be strictly avoided with the provisions of necessary measures like silt fencing. Silt/sediment should be collected and stockpiled for possible reuse. Use of environmentally friendly sanitation solutions, such as bio toilets and bio digestor septic tanks, or any other advanced small-scale sewage treatment systems shall be made by the that contractor. If the above-mentioned				

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		solutions are not feasible then at least septic tanks/soak pits are to be installed. No temporary or permanent constructions to be done on the locations of water bodies (including seasonal ones) and these water bodies shall be barricaded. Wastes/wastewater generated from labour camp must be collected at regular interval and transported to approved disposal location. Such wastes/wastewater must not be dumped/released in open environment under any circumstances. Provision for water conservation e.g., rainwater harvesting at the project site. Monitoring of surface, ground water quality (also drinking water of workers) should be taken up at adequate location on quarterly basis or as per the recommendation of SPCB or any other regulatory body. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark.				
Soil	Loss of productive Topsoil due to excavation Soil erosion due to Construction activities, earthwork, and cut and fill, stockpiles etc. Contamination of soil due to leakage/ spillage of oil, debris generated from construction activities, poor management of effluent and waste generated from the labour camp. Compaction of soil and impact on access/ haul roads due to movement	Provision for appropriate storage of separately stripped topsoil (15 cm) in an appropriate way (to ensure that the organic/inorganic properties of soil are retained) should be made and reused for growing vegetation. Excavated soil should be reused as much as possible for backfilling, landscaping and for other project areas. Oil spill kits will be placed at fuel storage, refuelling areas, DG sets, pump locations etc. In case of any accidental spill, the soil should be cut and stored securely for disposal with hazardous waste.	Site Inspection, Document review, monitoring results.	Monthly	Contractor	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
	of vehicles and equipment	Re-vegetation should be done in the area after the completion of construction, in order to reduce the risk of soil erosion. As a best practice, site clearance, excavation and access road strengthening will not be carried out during the monsoon season to minimize erosion and run-off. Camp site to be restored at the end. Storage of hazardous material (like used oil, oil-soaked cotton/clothes etc.) in isolated room with impervious surface must be ensured to avoid potential soil contamination. The hazardous waste should be disposed of through PCB approved hazardous waste management vendor. Construction vehicles, machinery, and equipment to be stationed in the designated areas to avoid compaction. Approach roads/haulage roads should be designed along the barren and hard soil area to reduce the possibility compaction of fertile soil. To avoid soil contamination oil-interceptors will be provided at wash down and refuelling areas. Monitoring of soil quality should be taken up at adequate location on quarterly basis or as per the recommendation of SPCB or any other regulatory body				
Solid/Liquid Waste /Hazardous Waste	Solid/liquid Waste will be generated during construction works as well as from construction camp.	The contractor to ensure daily collection and regular disposal of construction waste/ generated debris etc. Segregation of waste should be ensured by using color coded bin system for biodegradable and non-biodegradable waste segregation. Employees working at the site should be provided with training and awareness on the segregation of waste at source.	Site Inspection, document verification	Monthly	Contractor	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		Biodegradable waste will be preferably composted in -situ that can be utilized to establish a nursery on-site, contributing to the development of the planned green area. Collaborate with local authorities to transport and dispose waste in accordance with the regulatory requirements. Biodegradable waste will be preferably composted in -situ that can be used as compost for landscaping. The municipal solid waste should be routed through proper collection and handover to local body for further disposal. All the construction and demolition waste should be managed as per Construction and Demolition Waste Management Rules, 2016[7]. Good housekeeping should be ensured. Recyclable waste should be appropriately directed to authorized recycling facilities, based on waste type. Waste oils/greases/oil contaminated cotton waste from equipment's should be properly collected and disposed through PCB authorized vendors. Secured storage of civil construction materials including paint, thinner, etc. to be ensured. Construction vehicles and equipment should undergo regular maintenance to avoid any oil leakages. Offloading and loading protocols should be prepared for diesel, oil and used oil respectively and workers to be trained to prevent/contain spills and leaks. Burning of any type of waste and dumping of waste at any unpermitted area (especially near watercourses) should be strictly prohibited.				

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		Hazardous waste should be properly labelled, stored onsite at a location provided with impervious surface, shed and secondary containment system in accordance with Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016[8] and their subsequent amendments. Hazardous waste will be disposed routinely through approved vendors and proper records will be maintained of the same. It is to be ensured that hazardous waste is not stored for more than 90 days. Regular collection and disposal (in compliance to regulatory requirement) of domestic waste and sewage generated from labour camp to be ensured.				
Ecosystem and Biodiversity	Loss of Vegetation and associated biodiversity due to site preparation and construction activities; accidental contamination of habitat condition	Possibility of avoidance and minimization of tree felling should be thoroughly examined prior to project development. Vegetation disturbance and clearance should be restricted to the Project activity area only. Prior to vegetation clearance and construction activities, old mature trees should be identified through a survey and options of avoidance should be explored. Strict prohibition on use of fuel wood and shrubs from nearby areas as fuel should be imposed and workers should strictly be directed not to harm any wildlife in the area. Labourers should be provided training about dos and don'ts when encountering wildlife or domesticated animals (to avoid conflict with community) Wild animals, if encountered, shall be informed to the local forest department immediately.	Tree felling, plantation, record of plantation, survival rate of planted trees, site Inspection	Monthly	Contractor	DLF, DSC, PMC, PIU, PMU

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		The workers and staff will refrain from taking any action that could harm the animals etc. Proper disposal of solid and liquid wastes should be ensured to avoid any kind of contamination of soil/waterbody which may affect the dwelling species.				
Potential loss of physical cultural resources	Based on a Rapid Environment Assessment, there is no documented presence of heritage or archaeological sites/ monuments on any of the three proposed project sites.	Contractors must implement a procedure for chance find of cultural, archaeological, historical artifacts during excavation in project area. If archaeological artifacts are unexpectedly found during construction, work will be immediately halted, and the Implementing Agency (IA) and the local cultural relics/heritage department will be informed of the discovery. All fossils, coins, ancient artifacts, structures, and other archaeological relics discovered on the site shall be the property of the government and shall be dealt with in accordance with the appropriate legislation. The Contractor must take reasonable efforts to prevent workers or other individuals from removing and harming such goods or things. The Contractor will immediately stop work at the site if such artifacts of archaeological importance are discovered during construction. The Contractor must immediately notify the project authority of such discovery and follow the project authority's instructions for dealing with the same. Before instructing the Contractor to recommend work at the site, the Project Authority will obtain direction from the appropriate Archaeology Department.	Chance finds procedure, findings (if any) record	Before initiation construction works and implementation to be ensured throughout construction phase	Contractor	DLF, DSC, PMC, PIU, PMU

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		If any such archaeological relics are there and, it is destroyed or removed from the area without the knowledge of the competent authority that will be considered as violation of national regulations as well as SPS 2009				
Occupational Health and Safety	Material handling and storage Possible injuries associated with working conditions and other occupational hazards	The contractor will require to comply with the followings. An occupational health and safety plan will be prepared and implemented by the contractor including Health & Safety reporting and incident/accident reporting procedure. Accidents will be reported immediately to ADB (within 48 hours). Root cause analysis and corrective actions taken to avoid further accidents will also be submitted to ADB (preferably within 72 hours). Accident register will be maintained at site and closed monthly by the site supervisor. Provisions of PPEs viz., gloves, helmets, dust mask, ear plug, safety belt, etc. for the workers/staff depending on the type of works assigned to them (e.g., construction, excavation, welding, painting etc.) A PPE matrix and its onsite inventory and deployment should be maintained. Contractors to adopt and maintain safe working practices. Usage of fluorescent and retro reflectory signage, in local language should be provided at construction sites. Training to workers on safety procedures, precautions and hazardous material handling should be delivered. Workers with adequate training and no acrophobia shall only be assigned height works and	Site inspection, document verification, training records; consultation with workers	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		similar for works requiring specific skills or training. Organizing awareness camp on general health awareness with medical facility Access to complaint register. Provision of first aid facilities, beds, mosquito repellent/net, snake repellent will be made. Collection of domestic waste and sewage and proper disposal to be ensured as per rules. Appointment of safety officer should be ensured. All regulations regarding safe scaffolding, ladders, working platforms, gangway, stair wells, excavations, trenches etc. should be complied with. The construction of scaffolding and temporary work platforms must be carefully designated and regularly inspected to ensure stability and safety for workers. Use of hazardous material should be minimized/restricted to the extent possible. Emergency plan should be prepared to respond to any accidents or emergencies. On-site display of emergency contact numbers of the city/local fire services, etc. to be ensured. On-site first aid kits and trained First Aid attendants should be provided to the extent possible. Mock drill/Toolbox talks will be conducted at regular intervals and training record should be maintained at site. Loading and unloading operation of equipment should be done under the supervision of a trained professional. All work at height to be undertaken during daytime with sufficient sunlight.				

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		On-site fire extinguishing equipment should be provided to handle any possible fire outbreaks. Fire extinguishers should be regularly checked and working condition of the same to be ensured. A Grievance redress mechanism (GRM) will be implemented to allow the workers/labours to express their concerns, if any. A Grievance register will be maintained at site and details such as name of complainant, date and mode of complaint receipt, details of complaints, resolution details, resolution dates, mode of communication to the complainant etc. The register will be closed on monthly basis by the site supervisor and countersigned by the DSC and PMC environment expert/ Head. Contractor to maintain good housekeeping to prevent trips, slips and falls.				
Labour Rights/ Influx of workforce in the area	Cultural and Behavioural Conflict. Conflict between contractor and labour.	Necessary permits from the concerned labour department should be obtained, pertaining records should be maintained at site with proper documentation. The Contractor and project authority will ensure decent labour conditions for workers and compliance with applicable law and regulations in India. Contractors will ensure that wages are being paid as per the requirement of minimum wages act and records are maintained. Daily attendance register with name and signature of labor will be maintained. Notice board to display terms of employment giving details of wage rates, working hours, criterion for overtime etc. Payment of wages of workers (including subcontracted/casual labours) should be aligned with the payment of wages act.	Site inspection//document verification/training record/consultation with labours	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

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		The contractor to put in place a Code of Conduct (customized to local sensitivities and regulations) for worker-community interaction and on-site behavior. Oblige workers to adhere to code of conduct. The Code of Conduct should take into consideration relevant legislation, safety rules, substance abuse, environmental sensitivity, communicable diseases, gender issues (sexual harassment), respect for local beliefs and customs, community interactions etc. Consider ways to contribute positively to the local community, such as supporting local schools, healthcare facilities, or other community projects. These contributions can help build goodwill. Local people should be preferred for employment wherever possible, especially as construction workers/unskilled workforce. Contractor to ensure non-engagement of forced and child labour, gender equality, non-discrimination on employment and opportunity and freedom to express their voice. GRM will be disclosed to the workers and made accessible for reporting. Contractors should ensure access of necessary basic amenities and facilities such as drinking water, kitchen, separate toilet (for male and female) and crèches for female worker's children, if any. Contractor to monitor to avoid any conflict with local community due to influx of migrated labour. Health monitoring: implement health monitoring programs to assess and address potential health impacts related				

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		to chemical exposures or noise levels, acrophobia, silicosis, impacted vision etc. Provide medical insurance coverage (under the Workmen Compensation Act, 1923) for workers.				
Worker's Camp and living condition.	Inadequate site selection and ineffective camp management can result in a range of adverse environmental consequences.	Necessary permits from the concerned labour department should be obtained, pertaining records should be maintained at site with proper documentation. The Contractor and project authority will ensure decent labour conditions for workers and compliance with applicable law and regulations in India. Contractors will ensure that wages are being paid as per the requirement of minimum wages act and records are maintained. Daily attendance register with name and signature of labour will be maintained. Notice board to display terms of employment giving details of wage rates, working hours, criterion for overtime etc. Payment of wages of workers (including subcontracted/casual labours) should be aligned with the payment of wages act. The contractor to put in place a Code of Conduct (customized to local sensitivities and regulations) for worker-community interaction and on-site behaviour. Oblige workers to adhere to code of conduct. The Code of Conduct should take into consideration relevant legislation, safety rules, substance abuse, environmental sensitivity, communicable diseases, gender issues (sexual harassment), respect for local beliefs and customs, community interactions etc. Local people should be preferred for employment wherever possible,	Site inspection//document verification/training record/consultation with labours	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

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		especially as construction workers/unskilled workforce. Contractor to ensure non-engagement of forced and child labour, gender equity, non-discrimination on employment and opportunity and freedom to express their view. GRM will be disclosed to the workers and made accessible for reporting. Contractors should ensure access of necessary basic amenities and facilities such as drinking water, beds, mosquito net/ repellent, snake repellent, common kitchen, gender segregated toilet and crèches for female worker's children, if any. Contractor to monitor to avoid any conflict with local community due to influx of migrated labour. A record of water use will be kept. Littering and unauthorised discharge will be prohibited. Solid garbage and earth materials shall not be dumped into open drains, water bodies.				
Community Health, Safety, and Security.	Traffic congestion Potential exposure to pollutants/hazardous material Threat of emergency situation Potential threat from the security personals to the local community (like abuse, unnecessary use of force etc.)	Contractor should keep local residents informed about construction schedules, potential disruptions, and any necessary safety precautions. Contractor to continuously monitor the social and community aspects of the project's impact. Regularly report on progress and address any issues that arise promptly. A community liaison officer shall be appointed if social unrest or resentments are observed amongst the community. The third-party vendors/suppliers especially associated with transport of construction materials and site cleaning should not be	Traffic management plan, consultation with contractor and local community, grievance register, visual observation, environmental monitoring reports, management plan for hazardous material and emergency preparedness plan	Weekly site inspection	Contractor	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		allowed to enter the premises without valid ID cards or gate pass. The entry and exit inside the site will be strictly monitored. Unauthorized entry will be prohibited. Excavation for foundations will be closed as soon as practicable to prevent people or animals falling into the excavation sites. The transport of heavy loads will be undertaken out of normal working hours to the extent possible. The contractor/project authority will make reasonable inquiries to ensure that those providing security are not implicated in past abuses; will train security staffs adequately in the use of force (and where applicable, firearms), and appropriate conduct toward workers and local communities. Security personnel engaged should not use force except when used for preventive and defensive purposes in consideration to the nature and extent of threat. For any issue with the community, take support of local administration as needed. Establish a Code of Conduct for worker/security persons community interaction and on-site behaviour. Oblige workers/security persons to adhere to code of conduct. A Grievance redress mechanism (GRM) will be implemented to allow the community to express their concerns, if any. All construction sites should be barricaded to restrict entry of general public to avoid chance of any accidents. At least one traffic marshal/ flagmen will be deployed in junction/diversion point (at approach road to the project area and main road).				

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		The traffic movement in the project area should be regulated to ensure safety measures for pedestrians. Traffic management plan may be developed as necessary. Speed limits for all Project vehicles will be implemented. Training will be provided to all the drivers on safety measures. Management Plan for Hazardous material and Emergency Preparedness plan should be in place. Necessary mitigation measures as suggested for management of different environmental components (air, soil, surface water, ground water, noise, waste/effluent management etc.) should be adequately implemented				
Demobilization: Site restoration and rehabilitation	Potential Community health and safety threat post construction	Contractor will prepare site restoration plan which will be approved by the PIU/PMU. The clean-up and restoration operations are to be implemented by the contractor prior to demobilization. All construction zones, workers camps, plant sites, crushers etc. or any other area used/affected by the project will be left clean and tidy, to the satisfaction of the PIU/PMU. The restored level of the ground will be as per the original level and condition or better.	Visual observation	Completion of construction work	Contractor	DLF, DSC, PMC, PIU, PMU
Impact on Nearby Settlements due to Traffic Congestion	Increased construction related traffic can lead to congestion and inconvenience for residents.	Implement traffic management plans, if necessary, schedule deliverables during off-peak hours, and encourage alternative transportation methods for workers.	Traffic Management Plan	Weekly site inspection	Contractor	DLF, DSC, PMC, PIU, PMU
Community Engagement	Lack of community involvement can lead to social unrest.	Engage with the local community through public consultations, address concerns, and establish open communication channels.	Public Consultation	Monthly basis	Contractor	DLF, DSC, PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
Operational Phase						
Vehicles and Diesel Generator Emissions	The primary sources of air pollution stems from emissions originating from vehicles and the exhaust outlets of DG sets. In this project, DG sets are installed solely as backup power sources, and it is anticipated that their contribution to pollution will be minimal.	Encourage the use of low-emission vehicles and promote alternative fuels like compressed natural gas (CNG) or electric vehicles. Vehicle maintenance should be done on a regular basis. All DG sets shall adhere to the emission standards outlined in the Environment (Protection) Rules, 1986. Optimize DG set operations through load management strategies, ensuring generators operate at optimal loads to minimize fuel consumption and emissions. Compliance with all stipulated conditions given by concerned regulators. CTO to be renewed in timely manner from concerned pollution control board and conditions as stipulated in CTO should be strictly adhered to				
Energy efficiency and energy conservation	Integration of energy efficiency and energy conservation component in design	The detailed design has been ensured that environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, etc. are included. The design considers the following energy efficiency measures: Usage of recyclable materials like wood substitutes. Installation of BEE certified equipment Usage of energy efficient lighting fixtures (LED) Provision of PV cells on roof for solar power for solar Light.	Review of relevant certifications	Prior to start of operation	Facility Head, DLF, DSC	PIU, PMU

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Regulatory Compliance	To ensure compliance to regulatory requirements	Obtaining permission and ensuring that they remain valid throughout the implementation period. Ensuring compliance with the terms/conditions of various permits such as, water abstraction permits, fire license, PESO License etc. (as applicable)	Verification of documents	Semi Annually	Facility Head, DLF, DSC,	PMC, PIU, PMU
Air Quality	Generation of particulate matter, sulfur dioxide, and oxides of nitrogen due to operation of DG sets (in case of used due to power shortage).	Inspection and maintenance of school vehicles will be done at regular intervals/as per manufacturer's specification and pollution under control certificate should be secured. Regular maintenance of DG to be carried out. Adequate height of stack should be provided for the DG sets. Air quality monitoring should be taken up. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark.	Site inspection, document review, stakeholder consultation	Once in each season at least at 2 locations except in monsoon season	Facility Head, DLF, DSC,	PIU, PMC, PMU
Wastewater from toilets and laboratories, **Fecal sludge disposal**	Improper discharge of untreated wastewater from toilets, fecal sludge and wastewater from school laboratory operations will pollute soil and groundwater.	Regular monitoring and clearing of septic tank (through authorized vendor/municipality support) should be ensured. Ensure provision of sufficient and proper storage containers and storage area with bund walls, for storage of laboratory wastewater prior to disposal of through licensed waste treaters No wastewater will be disposed into water bodies or open pits or grounds. Monitoring and observation of surrounding areas to ensure that no contamination is taking place due to liquid waste mis management. Conduct regular consultations with the surrounding community/ staff etc. to ensure there no spread of any infections/ disease that can be attributed to the mis	Site inspection/document review, stakeholder consultation	Monthly	Facility Head, DLF, DSC,	PMC, PIU, PMU

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		management of liquid wastes from the facilities.				
Maintenance of Rainwater Harvesting Pits	If the proper maintenance of rainwater harvesting pits is neglected then there would be impacts like reduced water quality, clogging and structural damages.	Regular Cleaning: Establish a schedule for regular cleaning and desilting of the rainwater harvesting pits. Remove debris and sediment to maintain water quality and prevent clogging. Erosion Control: Implement erosion control measures in the surrounding area to prevent soil erosion, which can undermine the pit's structure. Regular Inspection: Conduct routine inspections to identify any signs of damage or deterioration in the pit or its components. Address issues promptly to prevent further damage. Seasonal Preparations: Prior to the rainy season, ensure that the pit is in good condition and ready to capture rainfall. This may involve cleaning and performing any necessary repairs.	Site Inspection	Monthly	Facility Head, DLF, DSC	PMC, PIU, PMU
Solid Waste Generation (Hazardous and Non-hazardous)	Generation of other kind of hazardous and non-hazardous waste due to school operation	Proper segregation of different waste should be taken up which may include municipal waste (biodegradable and non-biodegradable), plastic, electronic waste, hazardous waste etc. Requirement of separate authorization for hazardous waste (Hazardous Waste Management Rules) may be checked from pollution control board time to time. Hazardous waste should be stored in clearly marked, leak-proof containers that are resistant to corrosion and damage. Storage areas should be secure, well-ventilated, and equipped with spill containment measures. Each hazardous waste container must be clearly labelled with its contents, potential hazards, and handling instructions in compliance with the Hazardous and other Wastes	Site inspection, document review, stakeholder consultation	Monthly	Facility Head, DLF, DSC	PMC, PIU, PMU

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		(Management & Transboundary Movement) Rules, 2016. Hazardous waste should be handed over to authorized and licensed vendor only. Ensure that inert waste is handed over to authorized municipal dumping yards or landfill sites in compliance with local waste disposal regulations. Monitoring and observation of surrounding areas to ensure that no contamination is taking place due to waste mis management. Conduct regular consultations with the surrounding community/staff etc. to ensure there no spread of any infections/disease that can be attributed to the mis management of wastes from the facilities.				
Soil and Water Resource	Potential contamination to surrounding soil and water environment due to improper waste and effluent/sewage management	To avoid contamination to surrounding environment (soil and water resource) discharge of wastewater and indiscriminate dumping of solid waste should be strictly prohibited. Provisions for rainwater harvesting should be made. Periodic cleaning of rainwater harvesting system to be carried out. The run-off from the previous surfaces and built-up areas of the project site should be routed through a carefully designed storm water drainage network discharging into rainwater harvesting structures. Efficient Water saving devices/ fixtures should be installed in toilets to reduce avoidable water consumption. Water meters may be installed at the inlet point of water uptake and the discharge point to monitor the daily water consumption and identify any leakage (if any)	Site Inspection, Document review, stakeholder consultation	Once in each season at least at 2 locations except in monsoon season	Facility Head, DLF, DSC,	PMC, PIU, PMU

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		Regular monitoring of Soil and Water Quality (Ground and Surface Water) from the project area and/or vicinity should be carried out. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark.				
Noise	Noise may be generated due to operation of DG sets (in case of use due to power shortage).	DG sets should be provided with acoustic enclosures All DG Sets shall be outdoor type with silencer and acoustic enclosure as per CPCB and other relevant norms. CPCB recommends that the maximum permissible sound pressure level for new diesel generator (DG) sets with rated capacity up to 1000 KVA shall be 75 dB(A) at 1 meter from the enclosure surface. diesel generator sets should be provided with integral acoustic enclosure at the manufacturing stage. If traffic noise is anticipated to be higher than the permissible limits, the facility sites will be encompassed with acoustic boundaries in combination with green belt with high and dense enough canopy/building materials (door/window sheets) used will have acoustic properties and be properly maintained to retain such properties (such as repairing gaps, or broken sheets, replantation of green belt) Noise levels would be reduced using noise absorbing material on roof walls and floors. Noise level monitoring should be taken up. To ensure adequacy of safeguard performance, the standards as provided in Appendix 6.1 should be considered as benchmark.	Site inspection/ document review	Once in each season at least at 2 locations except in monsoon season	Facility Head, DLF, DSC	PMC, PIU, PMU

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Occupational and Community Health and Safety Risk	Occupational Health and Safety (OHS) risk Community Health and Safety risk	A set of procedures defining the overall waste management system should be in place in consideration of scale and type of activities and identified hazards. This will include minimization, an adequate segregation at point of generation, safe handling, collection, temporary storage, marking, transport and disposal procedures; this will be, accompanied by systematic record keeping of waste quantity, type and final disposal. Standard operating procedures on the use, storage and disposal of hazardous materials should be in place. The facilities should have emergency, preparedness and response plan and should be designed in commensurate with the requirement of concerned department (like Fire Department). Fire NoC should be secured from Fire Department and renewed in timely manner. Emergency preparedness plan should have the provision to manage potential risk likely associated with nearby areas It is advisable to develop a traffic management plan. Additionally, it's essential to take all reasonable precautions and create an Emergency Preparedness Plan to mitigate potential risks, taking into account emergency scenarios such as fires, flooding, and accidental release or spillage of hazardous materials. Maintain an effective work permit system for vital tasks including electrical work and working at heights for maintenance works. Provide adequate sanitation facilities.	Site Inspection, Document review, stakeholder consultation	Monthly	Facility Head, DLF, DSC	PMC, PIU, PMU

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		The emergency contact number shall be displayed. Provisions for a designated route for vehicle movement should be maintained. Develop and implement robust health and safety protocols to protect students, school staffs and the community. Conduct regular safety training sessions and drills to ensure all personnel are prepared for emergencies. Develop community engagement programs that involve local residents in project-related activities, such as job fairs, skill development workshops, or community events. Encourage social interaction and collaboration between facility and locals to foster understanding and mutual respect. Establish open channels of communication between project authority/representatives and local residents. Hold regular meetings, forums, or community advisory groups to discuss project progress, address concerns, and provide updates on project activities. Traffic and Parking management plan should be developed. Develop and implement a code of conduct for contracted (if any) security personnel to ensure that security personnel are screened for implication in past abuses including Gender Based Violence (GBV) and adequately trained in the use of force and appropriate conduct toward the public and workers. The code of conduct will also include procedures to report incidents, for affected people to raise related grievances, for incident investigations. The code of conduct will				

Item/Component	Potential concerns/Impact	Mitigation, Management and Enhancement Measures	Means of Verification/ Monitoring Procedure	Timelines/Frequency of Monitoring	Responsibility for implementation	Supervision Responsibility
		also indicate that the contractor does not sanction use of force in relation to the project except preventive and defensive purposes in proportion to the nature and extent of the threat.				
Maintenance works	Landscaping and aesthetics	Maintenance of green belt including vegetation care, litter control, irrigation, erosion control, maintenance of rainwater harvesting pits including inspection, cleaning, repairs, and upkeep etc.	Visual observation, record of maintenance	Quarterly	Facility Head, DLF, DC	PMC, PIU, PMU
Note: Additional measures (including permits/clearances) as mandated by any regulatory bodies (if any) time to time and/or conditions precedents of permits/clearances should also be implemented by Contractor and or EA (as applicable) in addition to mitigation measures as suggested in the EMP.						

AC = air conditioner, ADB = Asian Development Bank, AIDS = acquired immunodeficiency syndrome, BEE = Bureau of Energy Efficiency, BIS = bureau of Indian standards codes, dB = decibel, cm = centimeter, CO = carbon monoxide, CEMP = construction environmental management plan, CGWB = central ground water board, CPCB =Central Pollution Control Board, CTO = consent to operate, C&D = construction and demolition, DLF = district level forum, DG = diesel generator, DSC = design and supervision consultant, ECBC = Energy Conservation Building Code, EMP = environmental management plan, GRIHA = Green Rating for Integrated Habitat Assessment, GRM = grievance redress mechanism, H&S = health and safety, HC = hydrocarbon, HIV = human immunodeficiency virus, ILO = International Labor Organization, KVA = kilo volt ampere, LED = light-emitting diode, LPG = liquefied petroleum gas, MoEFCC = Ministry of Environment, Forest and Climate Change, NBC = National Building Code, NoC = no objection certificate, NOx = nitrogen oxide, PCB = Pollution Control Board, PESO = Pollution and Explosives Safety Organization, PHED = public health engineering, PPE = personal protective equipment, PIU = project implementation unit, PMC = project management consulting firm, RCC = reinforced cement concrete, SEP= stakeholder engagement plan, SEMR = Semi-annual Environmental Monitoring Report, SO2 = sulfur dioxide, SOP = standard operating procedure, SPCB = State Pollution Control Board, SPS = Safeguard Policy Statement, USEPA = United States Environmental Protection Agency, WHO = World Health Organization.

[1] Responsibility of securing water abstraction permission (if that is to be continued during operation stage) would lie with PIU and PMC.

[2] Instead of one environment expert and one H&S expert, an expert with environment - health-safety expertise may also be considered if the person is qualified enough in terms of qualification and professional experience.

[3] Responsibility of making payment to concerned entity would lie with PIU/DLF

[4] In case it is defined so in the contract document

[5] If any such archaeological relics are found in the project site and, it is destroyed or removed from the area without the knowledge of the competent authority that will be considered as violation of national regulations as well as SPS 2009.

[6] https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/---multi/documents/publication/wcms_116344.pdf

[7] https://cpcb.nic.in/displaypdf.php?id=d2FzdGUvQyZEX3J1bGVzXzIwMTYucGRm

[8] https://cpcb.nic.in/displaypdf.php?id=aHdtZC9IV01fUnVsZXNfMjAxNi5wZGY=

Source: PwC Analysis, Stakeholder Consultation, Site Visit Findings.

C. Environmental monitoring program

266. It is expected that project proponent and other concerned entities like the contractor, PMC will ensure and demonstrate compliance with the regulatory requirements and adhere to the measures as suggested in the document. The environmental monitoring indicators are formulated to ensure and demonstrate conformance with EMP. Monitoring of environmental and health - safety parameters and comparing them with benchmarks set by regulatory authorities will help the project authority to assess the safeguard performance and identify gaps or non-conformance and ensuring immediate actions. The indicators/parameters as mentioned in Table 51 will be monitored during various phases of component life cycle to assess the adequacy of safeguard implementation works and to take further necessary action in case desired performance is not achieved. The cost for implementation of environmental monitoring program will be budgeted in the EMP and bill of quantities (BOQs).

Table 50: Environmental Monitoring Program for Each Component

Sl. No.	Key Indicators	Monitoring Parameter	Period and Frequency	Location	Sample Size	Implementation Responsibility	Supervision responsibility
Pre-Construction Phase (baseline monitoring)							
1.	Ambient Air Quality	Measurement of $PM_{10,}$ $PM_{2.5}$, SO_2, NOx, CO	Once at 2 locations (except monsoon)	upwind, downwind and crosswind locations	2	Contractor through NABL accredited/MoEFCC registered monitoring laboratory	PMC, DLF, PIU, PMU
2.	Ambient Noise quality	Measurement of Noise Pressure Level in dB(A) as per National Ambient Noise Standards	Once at 2 locations (except monsoon)	upwind, downwind and crosswind locations	2	Contractor through NABL accredited/ MoEFCC registered monitoring laboratory	PMC, DLF, PIU, PMU
3.	Ground Water quality and Drinking Water	Key Physicochemical and biological parameters as per IS 10500 (2012)	Once at 2 locations (except monsoon)	upslope and downslope locations	2	Contractor through NABL accredited/ MoEFCC registered monitoring laboratory	PMC, DLF, PIU, PMU
4.	Surface Water quality	Key Physicochemical and biological parameters as per IS: 2296 Specifications/ CPCB criteria	Once at 2 locations (except monsoon)	upstream and downstrea m of flowing water body and 1 location in case of stagnant water body	2	Contractor through NABL accredited/ MoEFCC registered monitoring laboratory	PMC, DLF, PIU, PMU
5.	Soil Quality	Soil parameters viz. pH, SAR, Water holding capacity, Organic matter, Conductivity,	Once at least at 2 locations	preferably near the treated effluent discharge points	2	Contractor through NABL accredited/ MoEFCC registered	PMC, DLF, PIU, PMU

Sl. No.	Key Indicators	Monitoring Parameter	Period and Frequency	Location	Sample Size	Implementation Responsibility	Supervision responsibility
		Organic Carbon, Nitrogen, Phosphorous, Potassium Alkalinity, Acidity, heavy metals, trace metals, Alkalinity, Acidity.				monitoring laboratory	
Construction Phase (1 Year)							
6.	Ambient Air Quality	Measurement of PM_{10}, $PM_{2.5}$, SO_2, NOx, CO	Once in each season at 2 locations (except monsoon)	upwind, downwind and crosswind locations	6 nos	Contractor through NABL accredited/ MoEFCC registered monitoring laboratory	PMC, DLF, PIU, PMU
7.	Ambient Noise quality	Measurement of Noise Pressure Level in dB(A) as per National Ambient Noise Standards	Once in each season at 2 locations (except monsoon)	upwind, downwind and crosswind locations	6nos.	Contractor through NABL accredited/ MoEFCC registered monitoring laboratory	PMC, DLF, PIU, PMU
8.	Ground Water quality and Drinking Water	Key Physicochemical and biological parameters as per IS 10500 (2012)	Once in each season at 2 locations (except monsoon)	upslope and downslope locations	6 nos.	Contractor through NABL accredited/ MoEFCC registered monitoring laboratory	PMC, DLF, PIU, PMU
9.	Surface Water quality	Key Physicochemical and biological parameters as per IS: 2296 Specifications/ CPCB criteria	Once in each season at 2 locations (except in monsoon)	upstream and downstrea m if flowing water body and 1 location in case of stagnant water body	6 nos.	Contractor through NABL accredited/ MoEFCC registered monitoring laboratory	PMC, DLF, PIU, PMU
10.	Soil Quality	Soil parameters viz. pH, SAR, Water holding capacity, Organic matter, Conductivity, Organic Carbon, Nitrogen, Phosphorous, Potassium Alkalinity, Acidity, heavy metals, trace metals, Alkalinity, Acidity.	Once in each season at least at 2 locations (except in monsoon season)	preferably near the treated effluent discharge points	6 nos.	Contractor through NABL accredited/ MoEFCC registered monitoring laboratory	PMC, DLF, PIU, PMU

Sl. No.	Key Indicators	Monitoring Parameter	Period and Frequency	Location	Sample Size	Implementation Responsibility	Supervision responsibility
11.	EHS Site Inspections	Regulatory compliances, performance against EMP	Monthly-Quarterly	Project Site and associated areas	4-12	Contractor through external authorized auditor	PMC, DLF, PIU, PMU
12.	Trees Cutting/Green Area development	Record of tree felling (if applicable) and plantation; plantation within premise or any other suitable areas in discussion with concerned authority. Species survival rate	Quarterly	Project Site and associated areas	4 times	Contractor	PMC, DLF, PIU, PMU
13.	Traffic safety arrangements	Traffic management plan, visual observation; consultation with contractor	Regularly during construction phase	Project Site and associated areas	Continuous	Contractor	PMC, DLF, PIU, PMU
14.	Accidents	records of all types of accidents, near miss records during construction period.	Regularly during construction phase	Project Site and associated areas	Continuous	Contractor	PMC, DLF, PIU, PMU
15.	Records of Grievance	All pertinent to EHS underperformance /concerns	Regularly during construction phase	-	Continuous	Contractor	PMC, DLF, PIU, PMU
Operation Phase (assuming 1 year)[30]							
16.	Ambient Air Quality	Measurement of PM_{10}, $PM_{2.5}$, SOx, NOx, CO	Once in each season at 2 locations except in monsoon season	upwind and downwind near facility premises	6 nos.	DSC/Facility	PIU/ PMU
17.	Ambient Noise quality	Measurement of Noise Pressure Level in dB(A) as per National Ambient Noise Standards	Once in each season at 2 locations except in monsoon season	near facility premises	6 nos.	DSC/Facility	PIU/ PMU
18.	Ground Water quality and Drinking Water	Key Physicochemical and biological parameters as per IS 10500 (2012)	Once in each season at least at 2 locations except in monsoon season	near facility premises and nearby village	6 nos.	DSC/Facility	PIU/ PMU

[30] DSC will be holding implementation responsibility till the day of their association in the project.

Sl. No.	Key Indicators	Monitoring Parameter	Period and Frequency	Location	Sample Size	Implementation Responsibility	Supervision responsibility
19.	Surface Water quality (depending on availability)	Key Physicochemical and biological parameters as per IS: 2296 Specifications	Once in each season at least at 2 locations except in monsoon season	preferably near the treated effluent discharge points	6 nos.	DSC/Facility	PIU/PMU
20.	Soil Quality	Soil parameters viz. pH, SAR, Water holding capacity, Organic matter, Conductivity, Organic Carbon, Nitrogen, Phosphorous, Potassium Alkalinity, Acidity, heavy metals, trace metals, Alkalinity, Acidity.	Once in each season at least at 2 locations except in monsoon season	preferably near the treated effluent discharge points	6 nos.	DSC/Facility	PIU/PMU
21.	Green area maintenance	Survival of planted trees	Quarterly		4 times	DSC/Facility	PIU/ PMU

CO = carbon monoxide, CPCB = Central Pollution Control Board, dB = decibel, DLF = district level forum, DSC = design and supervision consultants, EHS = environment, health and safety, EMP = environmental management plan, IS = Indian Standards, MoEFCC = Ministry of Environment, Forest, and Climate Change, NABL = National Accreditation Board for Testing and Calibration Laboratories, NO_x = nitrogen oxides, pH = potential of hydrogen, PIU = project implementation unit, PM = particulate matter, PMC = project management consulting firm, PMU = project management unit, SO_2 = sulfur dioxide, SAR = sodium adsorption ratio.

267. To ensure adequacy of safeguard performance, the standards as provided in **Appendix 5** should be considered as benchmark. The template for Environmental Monitoring report is included in **Appendix 6**. A sample EHS daily inspection/monitoring checklist for contractors is given in **Appendix 7** and a sample environmental safeguards site inspection checklist for PMU/PIU/PMC/DSC is given in **Appendix 8**.

D. Budget for Environmental management plan Implementation

268. Most of the mitigation measures require the contractors to adopt good site practices, which should be part of their normal procedures already. This budgetary provision of approximately INR 1574200 (USD 18748.99) for each site includes mitigation, monitoring, and capacity building costs (over and above the components to be covered under Project Cost). The summary of budget for the environmental management costs for the component is presented in Table 52.

Table 51:Budget for Environmental management plan for each Site

S. No	Component	Unit	Quantity	Unit Cost (INR)	Total Cost (INR.)	Remarks
A	**Fixed Cost**					
A.1.	**Design and Preconstruction Phase**					
1	Regulatory Clearances/Permits like Tree Felling Permission and Compensatory Plantation				To be covered under project cost	Statutory fees to be paid by EA as per actuals

S. No	Component	Unit	Quantity	Unit Cost (INR)	Total Cost (INR.)	Remarks
2	Regulatory clearances/permits like CTE/CTO, authorization etc., workman compensation insurance etc.	Lumpsum			To be covered under project cost	fees to be paid by contractor as per actuals
4	Contractors qualified environment health and safety expert/s, PMC's and DSC's qualified environmental experts, PIU and PMU level qualified environmental expert				To be covered under project cost	till the end of defect liability period or issuance of project closure report whichever is later
5	Baseline Monitoring: Ambient Air quality	Number	2	10000	20000	To be done by contractor
6	Baseline Monitoring: Ambient Noise quality	Number	2	2500	5000	To be done by contractor
7	Baseline Monitoring: Ground Water quality and Drinking Water	Number	2	8000	16000	To be done by contractor
8	Baseline Monitoring: Surface Water quality	Number	2	8000	16000	To be done by contractor
9	Baseline Monitoring: Soil Quality	Number	2	8000	16000	To be done by contractor
10	Shifting of Utility (if applicable)				To be covered under project cost	Responsibility of making payment to concerned entity would lie with EA
A.2.	**Construction Phase (1 Year)**					
1	Traffic management at worksite (signage, Warning Lights etc.)	Lumpsum			50000	To be prepared by Contractor
2	Horticulture and Green Area Development	Lumpsum			800000	To be done by Contractor
3	Waste and wastewater management				To be covered under project cost	To be done by Contractor
4	Monitoring: Ambient Air Quality	Number	6	10000	60000	To be done by Contractor
5	Monitoring: Ambient Noise quality	Number	6	2500	15000	To be done by Contractor
6	Monitoring: Ground Water quality and Drinking Water	Number	6	8000	48000	To be done by Contractor
7	Monitoring: Surface Water quality	Number	6	8000	48000	To be done by Contractor
8	Monitoring: Soil Quality	Number	6	8000	48000	To be done by Contractor
9	Rainwater Harvesting structures				To be covered under project cost	To be done by Contractor
10	Noise Barrier near school and residential areas				To be covered under project cost	To be done by Contractor
11	Restoration of construction site				To be covered under project cost	To be done by Contractor
A.3.	**Operation Phase (1 year)**					
1	Regulatory Clearances/Permits like Fire NoC, etc.				To be covered under project cost	Statutory fees to be paid by facilities as per actuals
2	Waste and wastewater management (including installation and management of Septic tank)				To be covered under project cost	
3	Monitoring: Ambient Air Quality	Number	6	10500	63000	To be done by DSC till the date of their

S. No	Component	Unit	Quantity	Unit Cost (INR)	Total Cost (INR.)	Remarks
						appointment and by the facilities after that
4	Monitoring: Ambient Noise quality	Number	6	2700	16200	To be done by DSC till the date of their appointment and by the facilities after that
5	Monitoring: Ground Water quality and Drinking Water	Number	6	8500	51000	To be done by DSC till the date of their appointment and by the facilities after that
6	Monitoring: Surface Water quality (depending on availability)	Number	6	8500	51000	To be done by DSC till the date of their appointment and by the facilities after that
7	Monitoring: Soil Quality	Number	6	8500	51000	To be done by DSC till the date of their appointment and by the facilities after that
8	EHS audit Annually	Number	1	60000	60000	
9	Green area maintenance (Monitoring of Survival of trees): Annually	Number	4	10000	40000	To be done by facilities
A.4.	Others					
1	Implementation of emergency preparedness plan, grievance redress mechanisms, stakeholder engagement activities, traffic management, etc.				To be covered under project cost	
2	Implementation of corrective action plan				To be covered under project cost	Budget should be allocated as per actual basis by EA or contractor depending on nature of measures to be taken
3	Training and capacity building	Lumpsum			100000	
4	Tree felling and plantation				To be covered under Project Cost	Budget should be allocated as per the discussion with concerned regulator at the time of getting permission.
Total Cost INR					**1574200**	**INR 15.7 L**

CTE = consent to establish, CTO = consent to operate, DSC = design and supervision consultants, EA = executing agency, EHS = environment, health and safety, INR = Indian rupee, NoC = no objection clearance, PIU = project implementation unit, PMC = project management consulting firm, PMU = project management unit,
Note: This budget is prepared based on detailed design of Shillong Public school and Jowai public school and preliminary design of pine mount school. This needs to be updated based on final updated detailed design of all pine mount school and if any changes made in the detailed designs of other two schools, stipulations of statutory or other competent authorities, change in scope, identification of unanticipated impacts, if required. Both the draft and updated EMP budget will be included in the bid and contract documents after these are reviewed and cleared by ADB. Budget for EHS site inspections by the DSC has been included in their contract and no separate budget is needed.

E. EMP Implementation Monitoring and Reporting

269. The PMU, and PIU will undertake their respective roles in site inspections and document review to verify compliance with the EMP and SEMP, and progress toward the outcome. The contractor will conduct day-to-day implementation of the SEMP. During construction, the environmental specialist of DSC will monitor the contractor's performance. During the operation phase, monitoring will be the responsibility of the PIU-1. The Environmental specialist of PMC and DSC will support PMU in preparation of semi-annual reports until project completion.

270. The contractor will submit monthly reports to the PIU. The monthly reports will include compilation of copies of monitoring sheets accomplished and duly signed by the contractor's

EHS Officer (or equivalent) daily. A sample daily monitoring sheet which can be used by the contractor is in Appendix 7. This monitoring sheet is indicative which can be further enhanced depending on the actual situations at component construction site.

271. The PIU will submit quarterly environmental monitoring reports to PMU, which will include summary of monthly monitoring activities of contractor and results of any independent monitoring or inspection activities of the PIU. In the conduct of these independent inspection activities, PIU will be supported by PMC and DSC in this regard. A sample inspection checklist is in Appendix 8. This checklist is indicative which can be further enhanced depending on the actual situations at component construction site.

272. Environment monitoring report for this Project will be required to be submitted semi-annually to ADB for review and disclosure until project completion. The PMU will submit the SEMR to ADB within 30 days after the end of each monitoring period for review and disclosure on ADB website. The PMC and DSC's Environment Safeguard Specialists will assist the PIU and PMU in finalizing the semi-annual environmental monitoring reports. The template for the SEMR is attached as Appendix 6. Safeguards compliance status shall also be included in the quarterly progress reports submitted to ADB.

X. CONCLUSION AND RECOMMENDATIONS

273. The proposed components upgradation of infrastructure in schools Shillong Public School, Pine Mount School and Jowai Public School under the project "Supporting Human Capital Development in Meghalaya Phase II" will be a brownfield development. The proposed schools are expected to provide a better learning environment for students and teachers.

274. The proposed facilities for Shillong Public School include a new building with provisions for classroom (06 no), digital classroom (01 no), science Laboratories (03 no. for Physics, Chemistry, Biology), separate toilet for boys & girls- (01 of each), multipurpose Hall (01 no), staff Room (01 No). Renovation of some existing room i.e., Computer classroom (01 no), Library (01 no). Solar panel shall be installed. No demolition of existing structures will be carried out.

275. The proposed facilities for Pine Mount School include a new building with provisions for science laboratory (03 nos. separate laboratories for physics, chemistry, and biology), digital classroom (02 no.), library (01 no.), multipurpose hall (01 no. of 150 capacities), arts and crafts room (01 no.), separate toilet for girls (01 no.) and school office (01 no.). Staff/office room (01 no) need to dismantle the old one and construct new one. Solar panel shall be installed.

276. The proposed facilities for Jowai Public School include a new building with provisions for classroom (Proposed-8, Approved-4), Digital classroom (01 no.), science laboratories (01 no.), library (01 no.), toilet for boys &girls (01 nos. of each), girls activity room (01 no.), multipurpose hall (01 no.), staff room with toilet (01 no.). Renovation of old computer room to physics laboratory, old library to girls' common room, old staff room to chemistry laboratory. Solar panel shall be installed.

277. The components are located within school compounds. The lands are owned by the schools and are free from any land dispute. There are no environmentally sensitive areas such as protected areas like national parks or wildlife sanctuaries or protected cultural or archaeological sites. The construction of school buildings and renovation works will have temporary, site-specific environmental impacts which are usual construction-related impacts such as noise, dust generation, silt generation, construction waste generation, and occupational and community health and safety risks. These can be readily mitigated through the measures indicated in the EMP. Since the proposed works are within schools, measures to ensure health

and safety of students, teachers and other school staff/workers will be implemented including but not limited to construction site fencing, noise barriers/attenuation devices, coordination with school administrator and proper work scheduling. Potential adverse impacts that are associated with the operation phase can be mitigated upfront through incorporation of environmental requirements in the detailed engineering design, including climate change adaptation measures.

278. Public consultation was conducted as part of the environmental assessment process and will continue throughout component implementation. The EMP, its mitigation and monitoring programs, contained herewith shall be included within the bidding and contract documents. The contractor shall be contractually responsible in implementing the requirements of the EMP through its site-specific environmental management plan and will adopt all the conditions of the EMP and add site specific elements that are not currently known. The contractor will be contractually bound to comply with all the requirements stipulated in the EMP and its associated environmental costs.

279. Since the proposed facilities do not exceed the threshold built-up area (BUA) of 20,000m^2 for buildings under the EIA Notification 2006, Environment Clearance (EC) from concerned authority is not required to be obtained prior to commencement of construction works. The components will only require consent to operate from pollution control board for operation of DG sets and the same may be applicable during construction phase for operation of DG sets, and hot mix plant, concrete batching plant if installed by the contractor. The facility also requires other licenses/NoC like labour license, Fire NoC, tree felling permissions, water abstraction etc during construction phase and CTO for DG set during operation phase.

280. All three components will not require clearance from the forest department and the ASI/State Department of Archaeology as they are not located in any of the environmentally and culturally sensitive or protected areas.

281. The Environmental Category for the proposed components has been determined as Category B as per ADB's SPS 2009. As per the requirement of ADB for Category B (environment), this IEE has been conducted to identify the potential environmental impacts of the proposed development and devise appropriate mitigation measures for the project lifecycle. This IEE has been prepared based on the detailed designs of Shillong Public School and Jowai Public School and will be updated to incorporate changes due to detailed design of Pine Mount School, conditions stipulated in EC, unanticipated impacts, if any that are not part of this IEE and submitted to ADB for review and clearance. The ADB-cleared EMP and updated EMP, if any will be made part of the bid and contract documents and implemented. No work can commence until the final IEE is approved by ADB and provided to the Contractor, and the SEMP is approved by the PIU.

Appendix 1: Rapid Environmental Assessment Checklist[1]
Shillong Public School

Rapid Environmental Assessment (REA) Checklist: General

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Office of Safeguards (OSPT) for approval by OSPT Director.

(ii) This checklist focuses on environmental issues and concerns and includes an Asbestos Screening Tool. To ensure that social dimensions are adequately considered, refer also to ADB's: (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:	Supporting Education and Skills Development Facility — Project Preparation Support for Supporting Human Capital Development in Meghalaya (Phase II) **Component: Shillong Public School**
Sector Division:	Education

Screening questions	Yes	No	Remarks
A. Project siting Is the project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		√	There is no cultural heritage site near the project site.
▪ Legally protected area (core zone or buffer zone)		√	The proposed project site is not located in any protected area.

[1] Source: Information provided by Design Supervision Consultant (DSC) in March 2024.

Screening questions	Yes	No	Remarks
▪ Wetland		√	There is no wetland site near the project site.
▪ Mangrove		√	Not applicable
▪ Estuarine		√	Not applicable
▪ Special area for protecting biodiversity		√	
B. Potential environmental impacts Will the project cause:			
▪ impairment of historical/cultural areas; disfiguration of landscape, or potential loss/damage to physical cultural resources?		√	Not applicable as there are no government notified cultural heritage sites within or adjacent to the proposed project site. Land use is not affected as the proposed project will be developed within the school and no additional land is required.
▪ disturbance to precious ecology (e.g., sensitive or protected areas)?		√	No protected areas like sanctuary, national parks etc., not located in 10km radius of the project area. Itshyrwat Reserve Forest located in an arial distance 3.25 km. Upper Shillong protected Forest located in an aerial distance 1.81 km from Shillong Public School.
▪ alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?	√		There is one surface water body (seasonal drain) around 3 m from the project site. Improper waste management and poor material handling during construction phase may affect surface water quality and flow of this drain. However, this will be prevented through implementation of effective mitigation measures included in the EMP. No alteration to water resource is envisaged, but there might be an impact on the adjacent seasonal drain on clogging it with improper waste management during construction and operation phases.

Screening questions	Yes	No	Remarks
▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?	√		There is one surface water body (a seasonal drain) around 3 m from project site. Improper waste management and poor material handing during construction phase may affect the surface water quality and flow of water in this drain. However, this will be prevented through implementation of effective mitigation measures included in the EMP.
▪ increased air pollution due to project construction and operation?	√		The main source of air emission during construction is excavation, leveling, transportation of construction materials, use of construction equipment's, handling, mixing loading and unloading of construction materials. During operation phase, occasional emission from usage of DG set is envisaged. Impact due to gaseous emission and dust generation will be adequately mitigated by adopting measures. These will be included in the EMP.
▪ noise and vibration due to project construction or operation?	√		The main sources of noise include movement of vehicles for loading and unloading of construction materials, handling of equipment, operation of concrete mixing plants, site preparation activities. The noise may impact to the construction workers and areas close to the site. During operation, the noise level may increase due to the movement of vehicles.
▪ involuntary resettlement of people (physical displacement and/or economic displacement)?		√	The construction of the proposed project is within the school boundary. No human settlements are within the project area.
▪ disproportionate impacts on the poor, women and children, indigenous peoples, or other vulnerable groups?		√	No such impacts anticipated.

Screening questions	Yes	No	Remarks
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as sexually transmitted infections and HIV/AIDS) from workers to local populations?	√		Poor sanitation quality at the site (including contractor's camp, if any) could affect the hygiene or aesthetic of immediate vicinity due to wastewater releases and improper solid waste management. These are potential sources of vector-borne diseases. The project would need to provide measures to avoid or minimize this impact, such as following the mandatory waste disposal through government authorized collection services and treatment of wastewater generated by construction camp. In case migratory labours are involved and construction camps are created for the project, possibility of transmission of communicable diseases can't be ruled out. These can be adequately mitigated by adopting measures included in the EMP.
▪ creation of temporary breeding habitats for mosquitoes and rodents that may transmit diseases?	√		Solid waste segregated and handed over to municipal board and wastewater shall be stored in septic tank of capacity 33 33 cu.m and through regular interval it shall be cleaned by authorized agency. These impacts can be adequately mitigated by adopting measures included in the EMP.
▪ social conflicts if workers from other regions or countries are hired?		√	The proposed construction of a new G+1 RCC building and retrofitting works will require very minimal labourers and hence local labourers shall be employed to the extent possible.
▪ large population influx during project construction and operation that causes an increased burden on social infrastructure and services (such as water supply and sanitation systems)?	√		The project requires a limited amount of labour during construction which will be hired from locality of the project. The contractor shall provide water, cooking fuel, accommodation, and adequate access to proper hygiene and sanitation conditions. During the operation, the social infrastructure and service may be affected due to the increase of students and teachers.
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	√		This may occur during the construction phase. However, adequate mitigation will be implemented to mitigate the risk.

Screening questions	Yes	No	Remarks
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel, and other chemicals during construction and operation?	√		Improper management of used oil, chemicals, paints due to transport, storage and use may expose the community to risks. It will be minimized by implementing mitigation measures on a regular basis.
▪ community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation, and decommissioning?	√		This may impact the teachers, students and other school staff. However, adequate mitigation measures will be implemented to mitigate the risk.
▪ generation of solid waste and/or hazardous waste?	√		The solid waste shall be generated from labour camp. Segregation should be done at source and handed over to the municipal board for safe disposal. Used oil from diesel generator (DG) set and chemical/paint containing drum shall be generated during construction activity and handed over to authorized vendor only.
▪ use of chemicals?	√		During construction phase, fuel, paints, and chemical will be used and will undergo mitigation measures during storage and use.
▪ generation of wastewater during construction or operation?	√		In construction phase, wastewater generated from labour camp may impact the near project area if not treated or disposed properly. During operation phase, sewage will be generated from school and shall be stored in septic tank with 33 cu.m capacity. It shall be cleaned through regular intervals.

ASBESTOS SCREENING TOOL

ASBESTOS SCREENING TOOL Screening Questions	Yes*	Maybe *	No	Remarks *For those with answers of YES and MAYBE, document the potential likelihood of asbestos being encountered.
Does the proposed project involve, or potentially involve, any of the following activities that are commonly associated with asbestos use:				
• Construction/commissioning of a new asset?	√			The proposed building shall have provisions for classroom (06 no), digital classroom (01 no), science Laboratories (03 no. for Physics, Chemistry, Biology), separate toilet for boys and girls- (01 of each), multipurpose hall (01 no), and staff room (01 no).
• Refurbishment/demolition of an existing asset?	√			No demolition of the existing structure will be carried out. However, renovation of some existing rooms i.e., computer classroom (01 no), library (01 no) will be carried out.
• Post-disaster response, involving reconstruction, repair, or removal of damaged assets?			√	Not applicable.
• Maritime activities?			√	Not applicable
• Water supply, sanitation, wastewater, sewerage, or water hygiene initiatives?	√			Water supply from PHE department. For wastewater treated through septic tank.
• Earthworks, remedial activities, or solid waste management?	√			The solid waste shall be generated from labour camp. Segregation should be done at source and handed over to the authority for safe disposal.
• Power, telecommunications, or energy supply infrastructure?	√			No utility shifting will be carried out for the proposed project.
• Maintenance, demolition, transportation, or disposal of wastes associated with the above activities?	√			No demolition of the existing structure will be carried out. However, renovation of some existing rooms i.e., computer classroom (01 no), library (01 no) will be carried out. The transportation or disposal of waste will be carried out by as per rule.

Note: If you answered YES or MAYBE to the above questions, assume that the project is likely to encounter asbestos as a direct or indirect result of project-related activities and proceed to the TOOLKIT FOR SCREENING

Pine Mount School

Rapid Environmental Assessment (REA) Checklist: General

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Office of Safeguards (OSPT) for approval by OSPT Director.

(ii) This checklist focuses on environmental issues and concerns and includes an Asbestos Screening Tool. To ensure that social dimensions are adequately considered, refer also to ADB's: (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:	Supporting Education and Skills Development Facility — Project Preparation Support for Supporting Human Capital Development in Meghalaya (Phase II) **Component: Pine Mount School**
Sector Division:	Education

Screening questions	Yes	No	Remarks
A. Project siting Is the project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		√	There are no cultural heritage sites near the project site.
▪ Legally protected area (core zone or buffer zone)		√	The proposed project site is not located in any protected area.
▪ Wetland		√	There is no wetland site near the project site.

Screening questions	Yes	No	Remarks
▪ Mangrove		√	Not applicable
▪ Estuarine		√	Not applicable
▪ Special area for protecting biodiversity		√	
C. Potential environmental impacts Will the project cause:			
▪ impairment of historical/cultural areas; disfiguration of landscape, or potential loss/damage to physical cultural resources?		√	Not applicable as there are no government notified cultural heritage sites within or adjacent to the proposed project site. However, there will be no change in land use as the proposed project will be developed within the school and no additional land required.
▪ disturbance to precious ecology (e.g., sensitive or protected areas)?		√	No protected areas like sanctuary, national parks etc.; not located in 10km radius of the project area. Upper Shillong Protected Forest is located in an arial distance 0.3 km from Pine Mount School.
▪ alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?	√		There is one surface water body (Umsyrpi river) around 500 m from the project site. Improper waste management and poor material handling during construction phase may deteriorate surface water quality. However, this will be prevented through implementation of effective mitigation measures included in the EMP.
▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?	√		There is one surface water body (Umsyrpi river) around 500 m from the project site. Improper waste management and poor material handling during construction phase may deteriorate surface water quality. However, this will be prevented through implementation of effective mitigation measures included in the EMP.

Screening questions	Yes	No	Remarks
▪ increased air pollution due to project construction and operation?	√		The main source of air emission during construction is excavation, leveling, transportation of construction materials, use of construction equipment's, handling, mixing loading and unloading of construction materials. During operation phase, occasional emission from usage of DG set is envisaged. Impact due to gaseous emission and dust generation will be adequately mitigated by adopting measures. These will be included in the EMP.
▪ noise and vibration due to project construction or operation?	√		The main sources of noise include movement of vehicles for loading and unloading of construction materials, handling of equipment, operation of concrete mixing plants, site preparation activities. The noise may impact to the construction workers and areas close to the site. During operation, the noise level may increase due to the movement of vehicles.
▪ involuntary resettlement of people (physical displacement and/or economic displacement)?		√	The construction of the proposed project is within the school boundary. No human settlements are within the project area.
▪ disproportionate impacts on the poor, women and children, indigenous peoples, or other vulnerable groups?		√	No such impacts anticipated.

Screening questions	Yes	No	Remarks
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as sexually transmitted infections and HIV/AIDS) from workers to local populations?	√		Poor sanitation quality at the site (including Contractor's camp, if any) could affect the hygiene or aesthetic of immediate vicinity due to wastewater releases and improper solid waste management. These are potential sources of vector-borne diseases. The project will need to provide measures to avoid or minimize this impact, such as following the mandatory waste disposal through government authorized collection services and treatment of wastewater generated by construction camp. In case migratory labours are involved and construction camps are created for the project, possibility of transmission of communicable diseases can't be ruled out. These can be adequately mitigated by adopting measures included in the EMP.
▪ creation of temporary breeding habitats for mosquitoes and rodents that may transmit diseases?	√		Solid waste segregated and handed over to municipal board. Wastewater will be stored in septic tank and will be cleaned by authorized agency at regular intervals. These impacts can be adequately mitigated by adopting measures included in the EMP.
▪ social conflicts if workers from other regions or countries are hired?		√	The proposed construction of a new RCC building and retrofitting works will require very minimal labourers. Labourers will be employed to the extent possible.
▪ large population influx during project construction and operation that causes an increased burden on social infrastructure and services (such as water supply and sanitation systems)?	√		The project requires a limited amount of labour during construction which will be hired from locality of the project. The contractor shall provide water, cooking fuel, accommodation, and adequate access to proper hygiene and sanitation conditions. However, the project will significantly burden the social infrastructure and service. During the operation, the social infrastructure and service may be affected due to the increase in the number of students and teachers.

Screening questions	Yes	No	Remarks
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	√		This may be impacted during construction phase. However, adequate mitigation will be implemented to address the risk.
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel, and other chemicals during construction and operation?	√		Improper management of used oil, chemical, paints due to transport, storage, and use may expose the community to risk. It will be minimized by implementing mitigation measures on a regular basis.
▪ community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation, and decommissioning?	√		This may impact the teachers, students, and other school staff. However, adequate mitigation measures will be implemented to address the risk.
▪ generation of solid waste and/or hazardous waste?	√		Solid waste shall be generated from labor camp. Segregation should be done at source and handed over to the authority for safe disposal. Used oil from DG set and chemical/paint containing drum shall be generated during construction activity and handed over to authorized vendor only.
▪ use of chemicals?	√		During construction phase fuel, paints and chemical will be used and will undergo mitigation measures during storage and use.
▪ generation of wastewater during construction or operation?	√		In construction phase, wastewater generated from labor camp may impact the near project area if not treated or disposed properly. During operation phase, sewage will be generated from school. This needs to be treated prior to discharge as per guidelines.

ASBESTOS SCREENING TOOL

Screening Questions	Yes*	Maybe*	No	Remarks *For those with answers of YES and MAYBE, document the potential likelihood of asbestos being encountered.
Does the proposed project involve, or potentially involve, any of the following activities that are commonly associated with asbestos use:				
• Construction/commissioning of a new asset?	√			The proposed building will have provisions for science laboratories (03 nos. separate laboratories for physics, chemistry, and biology), digital classroom (02 no.), library (01no.), multipurpose hall (01no. of 150 capacities), arts and crafts room (01 no.), separate toilet for both boys and girls (01 no. each) and school office (01 no.).
• Refurbishment/demolition of an existing asset?	√			Old staff/office room (01 no) needs to be dismantled to construct a new one.
• Post-disaster response, involving reconstruction, repair, or removal of damaged assets?			√	Not applicable.
• Maritime activities?			√	Not applicable.
• Water supply, sanitation, wastewater, sewerage, or water hygiene initiatives?	√			Water supply from PHE department. For wastewater treated through septic tanks, cleaning will be conducted on regular intervals.
• Earthworks, remedial activities, or solid waste management?	√			The solid waste will be generated from labour camp. Segregation should be done at source and handed over to the authority for safe disposal.
• Power, telecommunications, or energy supply infrastructure?	√			No utility shifting will be carried out for the proposed project.
• Maintenance, demolition, transportation, or disposal of wastes associated with the above activities?	√			Old staff/office room (01 no) needs to be dismantled to construct a new one. However, the transportation or disposal of waste will be carried out by as per rule.

Note: If you answered YES or MAYBE to the above questions, assume that the project is likely to encounter asbestos as a direct or indirect result of project-related activities and proceed to the TOOLKIT FOR SCREENING

Jowai Public School

Rapid Environmental Assessment (REA) Checklist: General

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Office of Safeguards (OSPT) for approval by OSPT Director.

(ii) This checklist focuses on environmental issues and concerns and includes an Asbestos Screening Tool. To ensure that social dimensions are adequately considered, refer also to ADB's: (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:	Supporting Education and Skills Development Facility —Project Preparation Support for Supporting Human Capital Development in Meghalaya (Phase II) **Component: Jowai Public School**
Sector Division:	Education

Screening questions	**Yes**	**No**	**Remarks**
A. Project siting Is the project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		√	There is no cultural heritage site near the project site.
▪ Legally protected area (core zone or buffer zone)		√	The proposed project site is not located in any protected area.
▪ Wetland		√	There is no wetland site near the project site.
▪ Mangrove		√	Not applicable

Screening questions	Yes	No	Remarks
▪ Estuarine		√	Not applicable.
▪ Special area for protecting biodiversity		√	
D. Potential environmental impacts Will the project cause:			
▪ impairment of historical/cultural areas; disfiguration of landscape, or potential loss/damage to physical cultural resources?		√	Not applicable as there are no government notified cultural heritage sites within or adjacent to the proposed project site. However, there will be no change in land use as the proposed project will be developed within the school and no additional land required.
▪ disturbance to precious ecology (e.g., sensitive or protected areas)?		√	No protected areas like sanctuary, national parks etc.; not located in 10km radius of the project area.
▪ alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?		√	No impact on water hydrology of waterways and no alteration of watercourse is envisaged. The Myntdu river is already distant from the work site (2.36 km away).
▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?		√	There is one surface water body (Myntdu River) around 2.36 km from the project site. The river is already distant from the work site. Nevertheless, implementation of effective mitigation measures will be included in the EMP.
▪ increased air pollution due to project construction and operation?	√		The main source of air emission during construction is excavation, leveling, transportation of construction materials, use of construction equipment, and handling, mixing, loading and unloading of construction materials. During operation phase, occasional emission from usage of DG set is envisaged. Impact due to gaseous emission and dust generation will be adequately mitigated by adopting measures. These will be included in the EMP.

Screening questions	Yes	No	Remarks
▪ noise and vibration due to project construction or operation?	√		The main sources of noise include movement of vehicles for loading and unloading of construction materials, handling of equipment, operation of concrete mixing plants, and site preparation activities. The noise may impact to the construction workers and areas close to the site. During operation, the noise level may increase due to the movement of vehicles.
▪ involuntary resettlement of people (physical displacement and/or economic displacement)?		√	The construction of the proposed project is within the school boundary. No human settlements are within the project area.
▪ disproportionate impacts on the poor, women and children, indigenous peoples, or other vulnerable groups?		√	No such impacts anticipated.
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as sexually transmitted infections and HIV/AIDS) from workers to local populations?	√		Poor sanitation quality at the site (including Contractor's camp, if any) could affect the hygiene or aesthetic of immediate vicinity due to wastewater releases and improper solid waste management. These are potential sources of vector-borne diseases. The project will need to provide measures to avoid or minimize this impact, such as following the mandatory waste disposal through government authorized collection services and treatment of wastewater generated by construction camp. In case migratory labours are involved and construction camps are created for the project, possibility of transmission of communicable diseases can't be ruled out. These can be adequately mitigated by adopting measures included in the EMP.
▪ creation of temporary breeding habitats for mosquitoes and rodents that may transmit diseases?	√		Solid waste will be segregated and handed over to municipal board. Wastewater will be stored in septic tank and will be cleaned by authorized agency in regular intervals. These impacts can be adequately mitigated by adopting measures included in the EMP.
▪ social conflicts if workers from other regions or countries are hired?		√	The proposed construction of a new RCC building and retrofitting works will require very minimal labourers. Local labourers will be employed to the extent possible.

Screening questions	Yes	No	Remarks
▪ large population influx during project construction and operation that causes an increased burden on social infrastructure and services (such as water supply and sanitation systems)?	√		The project requires a limited number of labour during construction which will be hired from locality of the project. The contractor shall provide water, cooking fuel, accommodation, and adequate access to proper hygiene and sanitation conditions. During the operation, social infrastructure and service may be affected due to the increase in the number of students and teachers.
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	√		This may be impacted during construction phase. However, adequate mitigation will be implemented to mitigate the risk.
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel, and other chemicals during construction and operation?	√		Improper management of used oil, chemical, paints due to transport, storage, and use may expose the community to risk. It will be minimized by implementing mitigation measures on a regular basis.
▪ community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation, and decommissioning?	√		This may impact the teachers, students and other school staff. However, adequate mitigation measures will be implemented to mitigate the risk.
▪ generation of solid waste and/or hazardous waste?	√		The solid waste will be generated from labour camp. Segregation should be done at source and handed over to the authority for safe disposal. Used oil from DG set and chemical/paint containing drum will be generated during construction activity. This should be handed over to authorized vendor only.
▪ use of chemicals?	√		During construction phase, fuel, paints, and chemical will be used and will undergo mitigation measures during storage and use.

Screening questions	Yes	No	Remarks
▪ generation of wastewater during construction or operation?	√		In construction phase, wastewater will be generated from labour camp and may impact the near project area if not treated or disposed properly. During operation phase, sewage will be generated from school. This will be stored in septic tanks and cleaned at regular intervals.

ASBESTOS SCREENING TOOL

Screening Questions	Yes*	Maybe*	No	Remarks *For those with answers of YES and MAYBE, document the potential likelihood of asbestos being encountered.
Does the proposed project involve, or potentially involve, any of the following activities that are commonly associated with asbestos use:				
• Construction/commissioning of a new asset?	√			The proposed building shall have provisions for classrooms (Proposed-8, Approved-4), digital classroom (01 no.), science laboratories (01 no.), library (01 no.), toilet for boys and girls (01 nos. of each), girls activity room (01 no.), multipurpose hall (01 no.), staff room with toilet (01 no.).
• Refurbishment/demolition of an existing asset?	√			No demolition activity will be carried out. However, there will be renovation of old computer room to physics laboratory, old library to girls' common room, old staff room to chemistry laboratory.
• Post-disaster response, involving reconstruction, repair, or removal of damaged assets?			√	Not applicable.
• Maritime activities?			√	Not applicable.
• Water supply, sanitation, wastewater, sewerage, or water hygiene initiatives?	√			Water supply from PHE department. For wastewater treated through septic tank.
• Earthworks, remedial activities, or solid waste management?	√			The solid waste will be generated from labour camp. Segregation should be done at source and handed over to the authority for safe disposal.
• Power, telecommunications, or energy supply infrastructure?	√			No utility shifting will be carried out for the proposed project.
• Maintenance, demolition, transportation, or disposal of wastes associated with the above activities?	√			No demolition activity is carried out. However, there will be renovation of old computer room to physics laboratory, old library to girls common room, old staff room to chemistry laboratory. The transportation or disposal of waste will be carried out by as per rule.

Note: If you answered YES or MAYBE to the above questions, assume that the project is likely to encounter asbestos as a direct or indirect result of project-related activities and proceed to the TOOLKIT FOR SCREENING.

Appendix 2: ADB SPS Policy Principles

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

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

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

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

5. Carry out meaningful consultation with affected people and facilitate their informed participation. Ensure women's participation in consultation. Involve stakeholders, including affected people and concerned nongovernment organizations, early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and considered. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment. Establish a grievance redress mechanism to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance.

6. Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders.

7. Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.

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

precautionary approach to the use, development, and management of renewable natural resources.

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

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

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

Appendix 3.1: Calculation of Built-Up Area

Shillong Public School		**Pine Mount School**		**Jowai Public School**	
Lower Ground Floor	417.30 sq.m	Office Block	79.00 sq.m	Academic Building	1460.40 sq.m
Ground Floor	544.85 sq.m	Laboratory Building	239.40 sq.m	Multipurpose Hall	434.50 sq.m
First Floor	577.30 sq.m	Extension of existing building	516.00 sq.m	Toilet Block	52.70 sq.m
Terrace	68.80 sq.m				
Grand Total	**1607.80 sq.m**	**Grand Total**	**834.40 sq.m**	**Grand Total**	**1947.60 sq.m**

Source: Information provided by the design and supervision consultants (DSC) in March 2024.

Appendix 3.2: Estimations for Water Demand, and Sewage Generation[1]

Shillong Public School

S.No.	Type of Floor	Description	Daily Water Demand in 45 Liters per Person B	Total Demand in Liters
1	School	Ground and First Floor	45	10800

Source: NBC 2016 - Part 9, Page No.- 623 - Water requirements for buildings other than residences.

Based upon Utilization Factor (UF) = 70% - Assuming two and half (2.5) day storage of potable water is required:

Total Demand x UF x Storage

10800 litres x0.7 x 2.5
=18900, say 19,000 liters

Sewage Generation (80%of water demand) LPD	Sewage Generation round off KLD			
8640	8.6			

KLD = kiloliters per day, LPD = liters per day.

[1] Source: Information provided by Design Supervision Consultant (DSC) in March 2024.

SEPTIC TANKS AND SOAK PIT

(A) CAPCITIES AND SIZES OF SEPTIC TANKS ACCORDING TO THE I.S.RECOMMENDATIONS :-

	No.Users	Length m	Breadth m	Lliquid Depth 'D' For sludge removal interval of		Lliquid capacity for sludge removal interval of		
				1 year m	2 years m	1 year m	2 years m	
(c)	FOR HOSTEL AND BOARDING SCHOOLS :							
	50	5.00	1.60	1.30	1.40	10.40	11.20	
	100	5.70	2.10	1.40	1.70	16.80	20.40	
	150	7.70	2.40	1.40	1.70	25.80	31.90	
	200	8.90	2.70	1.40	1.70	33.60	41.00	Assumed
	300	10.70	3.30	1.40	1.70	49.90	50.00	

NOTES:

1. Septic tank should have minimum width of 0.75 m and minimum depth of one meter below water level. It should be of minimum of 1 m3 capacity. Length of the tank should be 2 to 4 times the width.

2. Every septic tank should be provided with a ventilating pipe of at least 5 cm diameter.

3. Min. Free Board above water level = 30 cm.

4. Volume of digested sludge is assumed as 0.00021 m3 per capita per day for the purpose of calculating septic tank capacity.

Pine Mount School

S.No.	Type of Floor	Description	Daily Water Demand in 45 Liters per Person B	Total Demand in Liters
1	School	Ground and First Floor	45	5400
5400				

Based upon Utilization Factor (UF) = 70% - Assuming
Two and Half (2.5) day storage of Potable Water as require
Total Demand x UF x Storage

5400 liters x 0.7 x 2.5
9450 liters, say 9500 litres.

Sewage Generation (80% water demand) LPD	Sewage Generation round off KLD
4320	4.3

KLD = kiloliter per day, LPD = liter per day.

SEPTIC TANKS AND SOAK PIT

(A) CAPCITIES AND SIZES OF SEPTIC TANKS ACCORDING TO THE I.S.RECOMMENDATIONS :-

(a) FOR DOMESTIC PURPOSES :

	No.Users	Length m	Breadth m	Lliquid Depth 'D' For sludge removal interval of		Lliquid capacity for sludge removal interval of	
				1 year m	2 years m	1 year m	2 years m
	5	1.50	0.75	1.00	1.05	1.12	1.18
	10	2.00	0.90	1.00	1.40	1.80	2.52
	15	2.00	0.90	1.30	2.00	2.34	3.60
	20	2.30	1.10	1.30	1.80	3.30	4.55
	50	4.00	1.40	1.30	2.00	7.28	11.20
(b)	**FOR HOUSING COLONIES:**						
	100	8.00	2.60	1.00	1.04	22.04	23.32
	150	10.60	2.70	1.00	1.15	28.60	32.90
	200	12.40	3.70	1.00	1.15	33.40	44.20
	300	14.60	3.90	1.00	1.15	56.90	64.90
(c)	**FOR HOSTEL AND BOARDING SCHOOLS :**						
	50	**5.00**	**1.60**	**1.30**	**1.40**	**10.40**	**11.20**
	100	5.70	2.10	1.40	1.70	16.80	20.40
	150	7.70	2.40	1.40	1.70	25.80	31.90
	200	8.90	2.70	1.40	1.70	33.60	41.00
	300	10.70	3.30	1.40	1.70	49.90	50.00

1. Septic tank should have minimum width of 0.75 m and minimum depth of one meter below water level. It should be of minimum of 1 m3 capacity. Length of the tank should be 2 to 4 times the width.

2. Every septic tank should be provided with a ventilating pipe of at least 5 cm diameter.

3. Min. Free Board above water level = 30 cm.

4. Volume of digested sludge is assumed as 0.00021 m3 per capita per day for the purpose of calculating

Jowai Public School

S.No.	Type of Floor	Description	Daily Water Demand in 45 Liters per Person B	Total Demand in Liters
1	SCHOOL	Ground and First Floor	45	7200
7200				

Based upon Utilization Factor (UF) = 70% - Assuming Two and Half (2.5) day storage of Potable Water as require

Total Demand x UF x Storage

7200 litres x0.7 x 2.5

12600 litres, say **13000 litres.**

Sewage Generation (80% of total water demand) LPD	Sewage Generation round off KLD
5760	5.7

KLD = kiloliter per day, LPD = liter per day.

SEPTIC TANKS AND SOAK PIT

(A) CAPCITIES AND SIZES OF SEPTIC TANKS ACCORDING TO THE I.S.RECOMMENDATIONS :-

	No.Users	Length m	Breadth m	Lliquid Depth 'D' For sludge removal interval of		Lliquid capacity for sludge removal interval of		
				1 year m	2 years m	1 year m	2 years m	
(c)	FOR HOSTEL AND BOARDING SCHOOLS :							
	50	5.00	1.60	1.30	1.40	10.40	11.20	
	100	5.70	2.10	1.40	1.70	16.80	20.40	
	150	7.70	2.40	1.40	1.70	25.80	31.90	
	200	8.90	2.70	1.40	1.70	33.60	41.00	Assumed
	300	10.70	3.30	1.40	1.70	49.90	50.00	

NOTES:

1. Septic tank should have minimum width of 0.75 m and minimum depth of one meter below water level. It should be of minimum of 1 m3 capacity. Length of the tank should be 2 to 4 times the width.

2. Every septic tank should be provided with a ventilating pipe of at least 5 cm diameter.

3. Min. Free Board above water level = 30 cm.

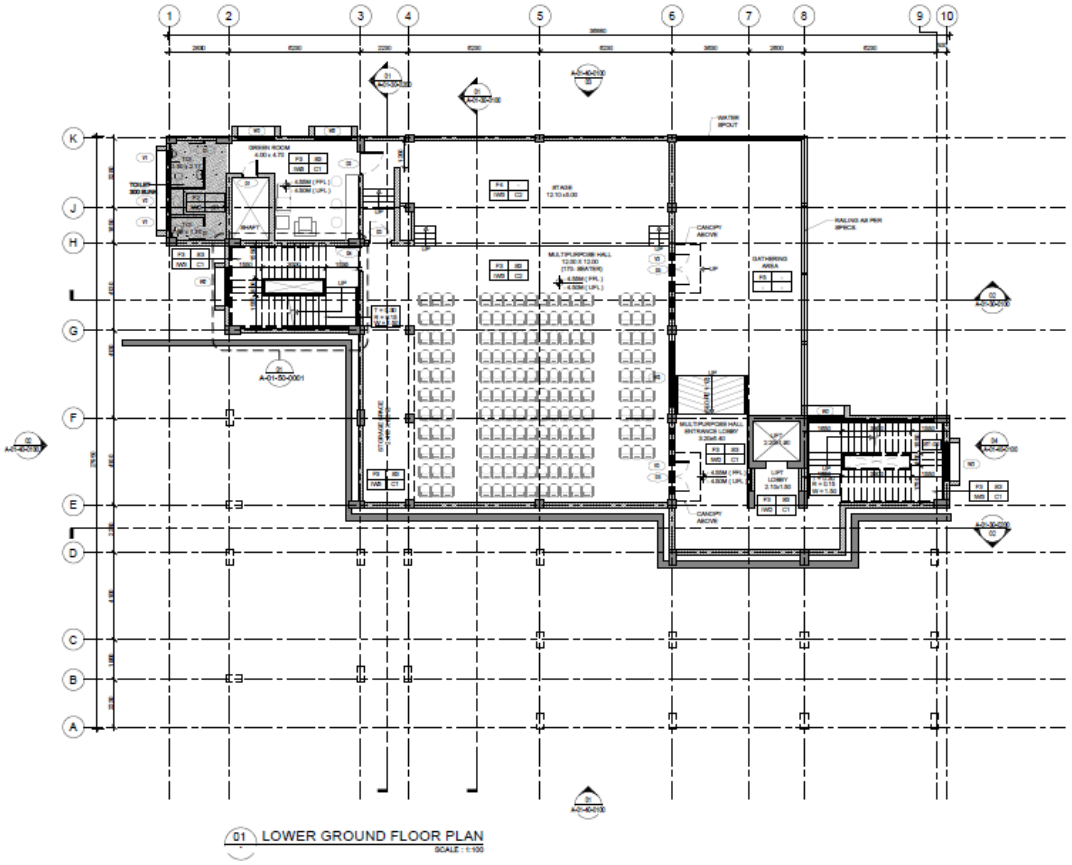
4. Volume of digested sludge is assumed as 0.00021 m3 per capita per day for the purpose of calculating septic tank capacity.

Source: Design Team/MEP Team

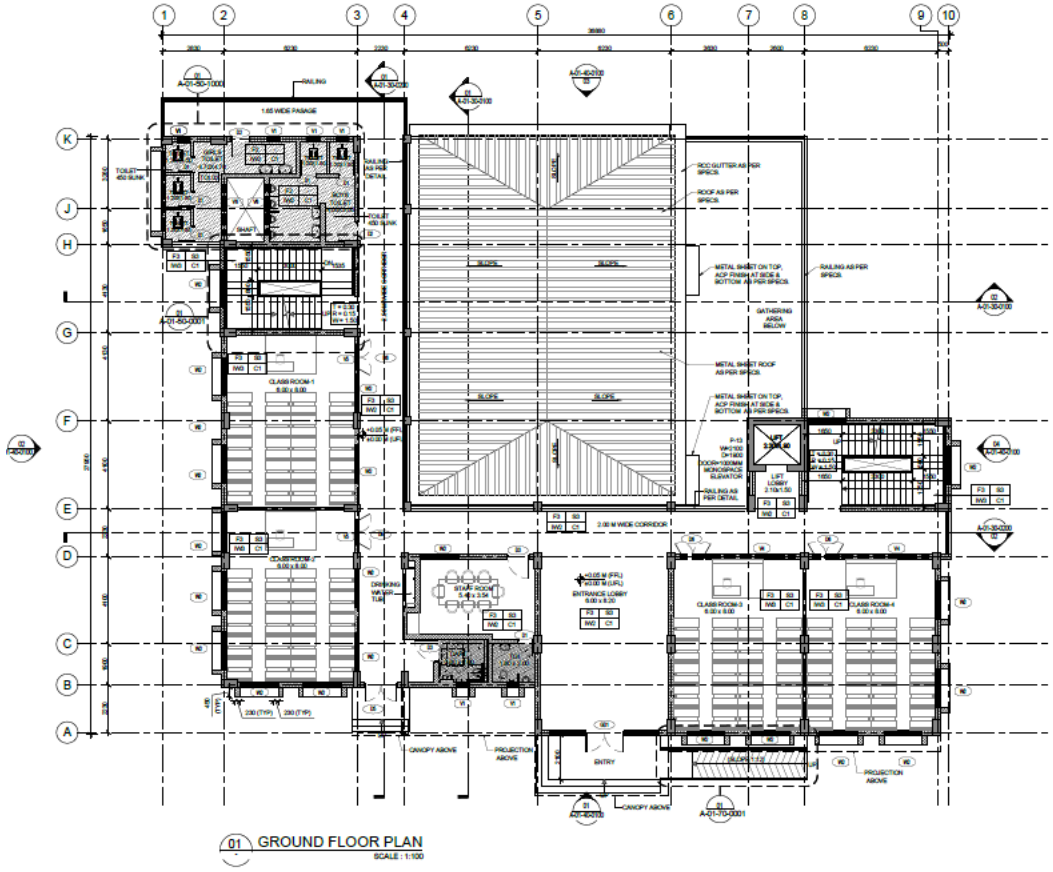
Appendix 3.3: Floor plans of proposed components

Shillong Public School

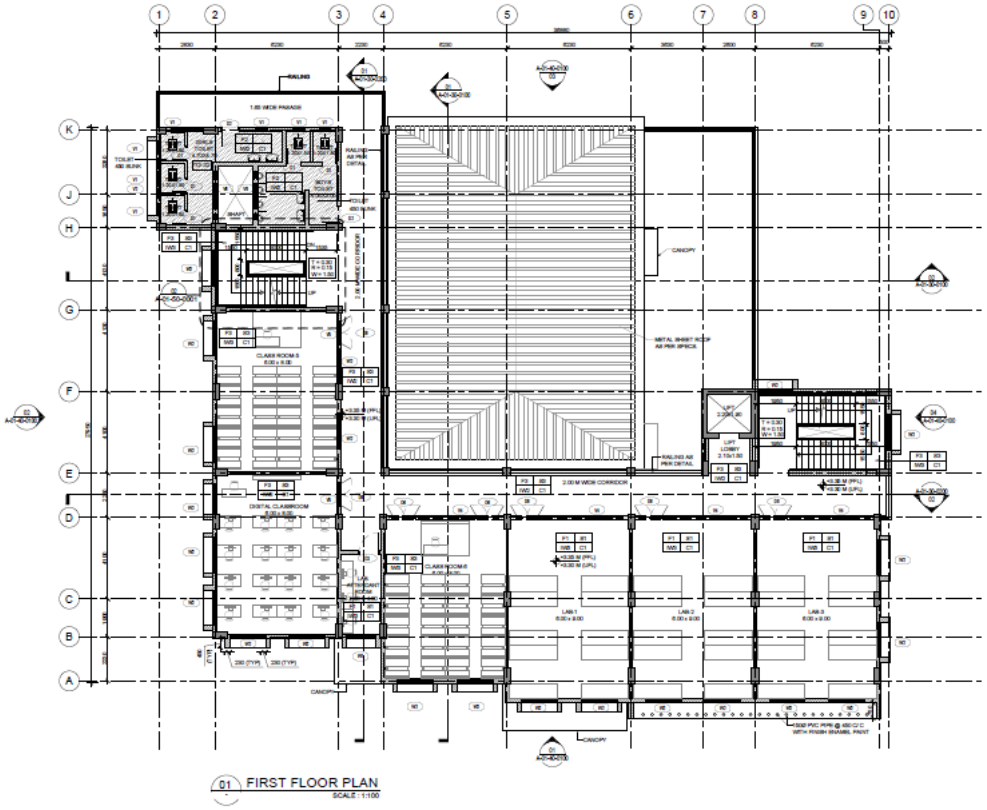
Lower Ground Floor Plan of Shillong Public School



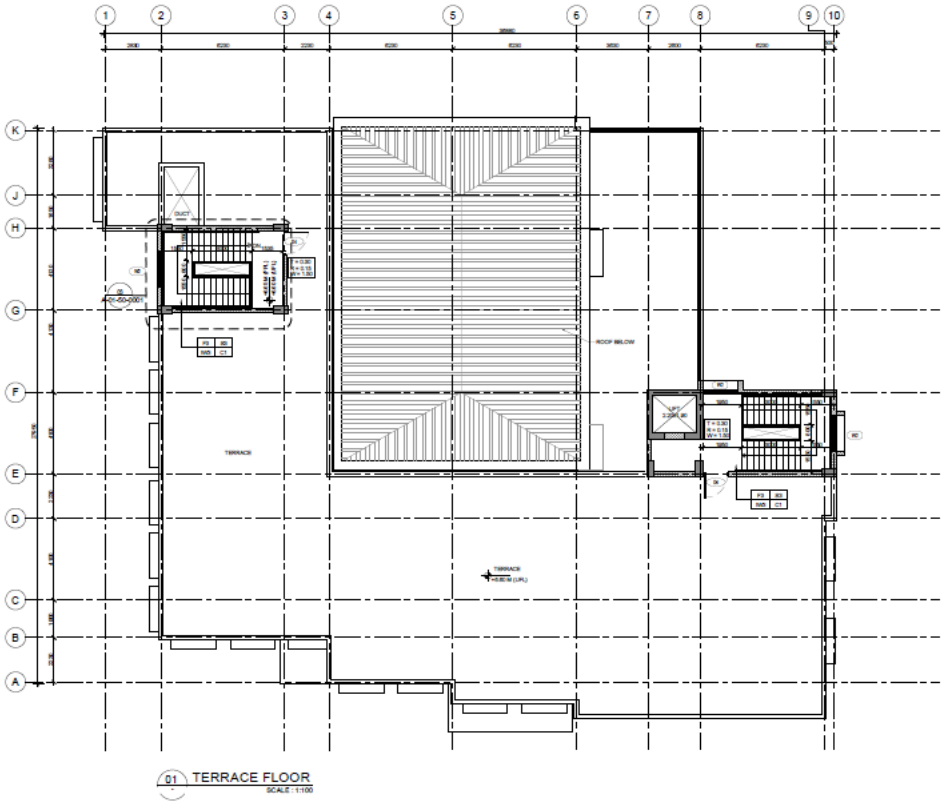
Ground Floor Plan of Shillong Public School



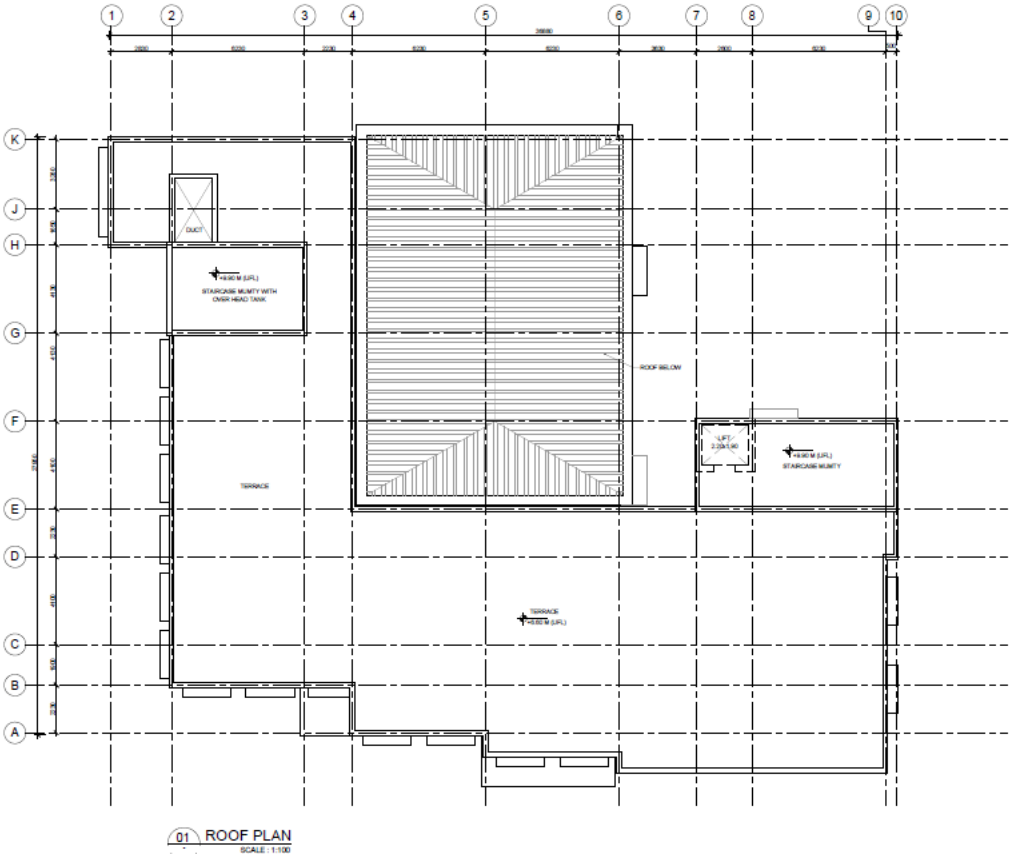
First Floor Plan of Shillong Public School



Terrace Floor Plan of Shillong Public School

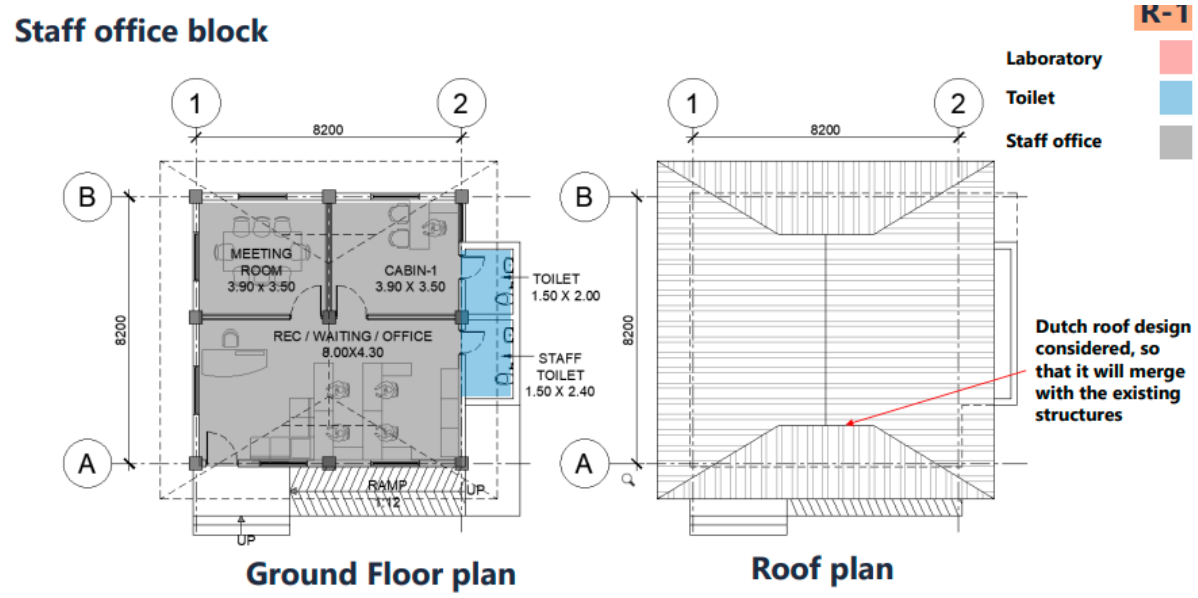


Roof Plan of Shillong Public School



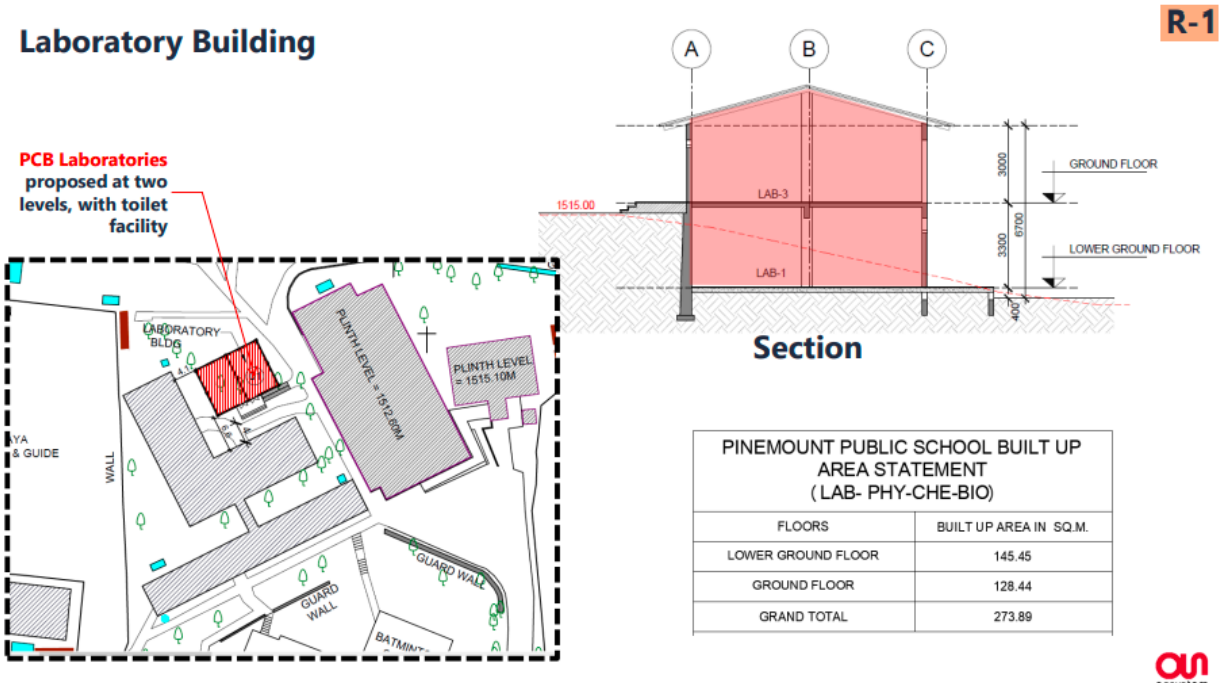
Pine Mount School

Staff Office Block of Pine Mount School



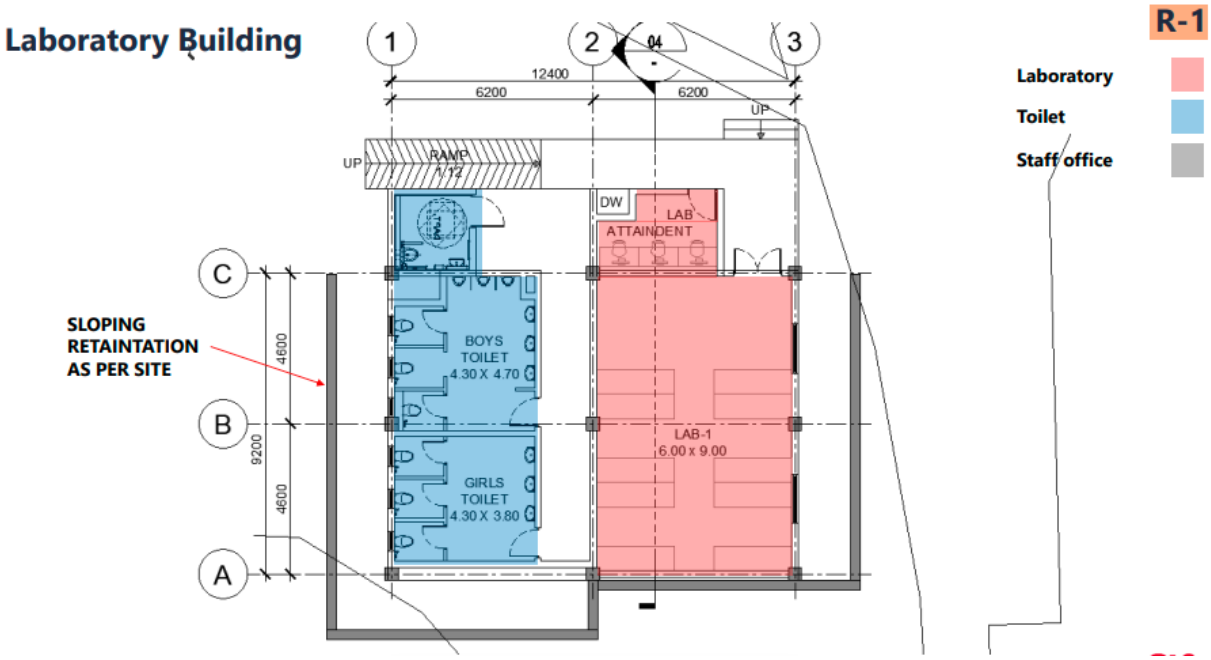
PINEMOUNT OFFICE BLDG BUILT UP AREA STATEMENT	
GROUND FLOOR	79.00 SQ.M.

Site Plan and Section of Laboratory Building of Pine Mount School

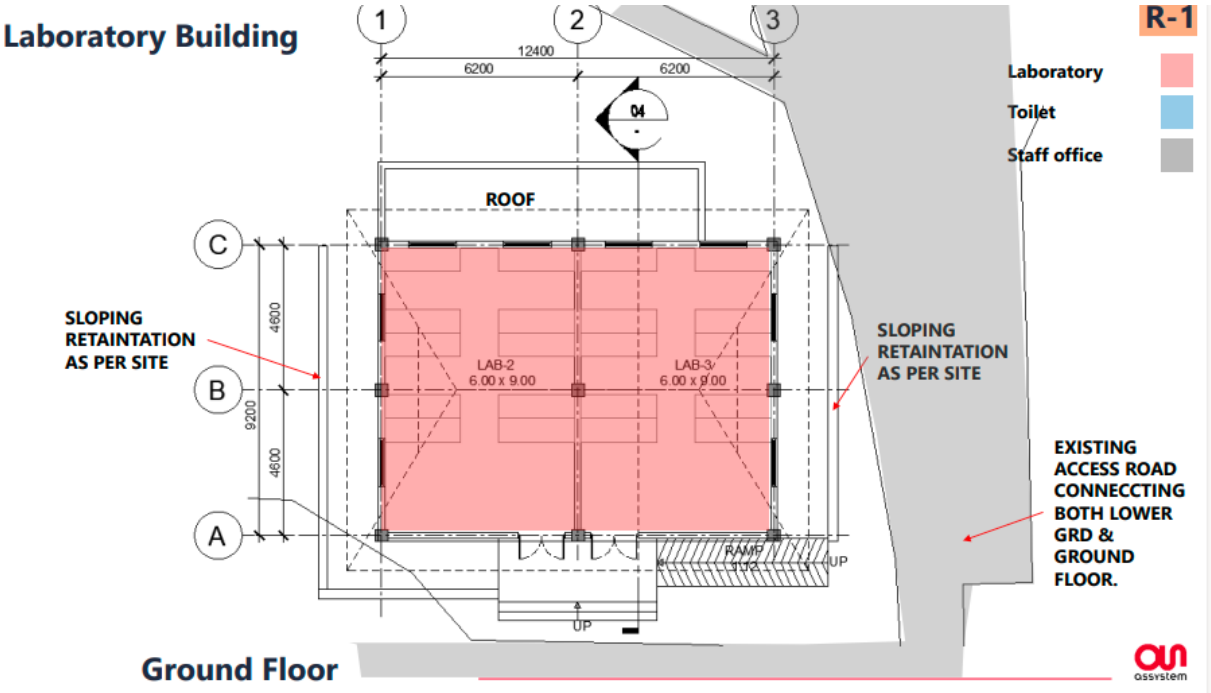


PINEMOUNT PUBLIC SCHOOL BUILT UP AREA STATEMENT (LAB- PHY-CHE-BIO)	
FLOORS	BUILT UP AREA IN SQ.M.
LOWER GROUND FLOOR	145.45
GROUND FLOOR	128.44
GRAND TOTAL	273.89

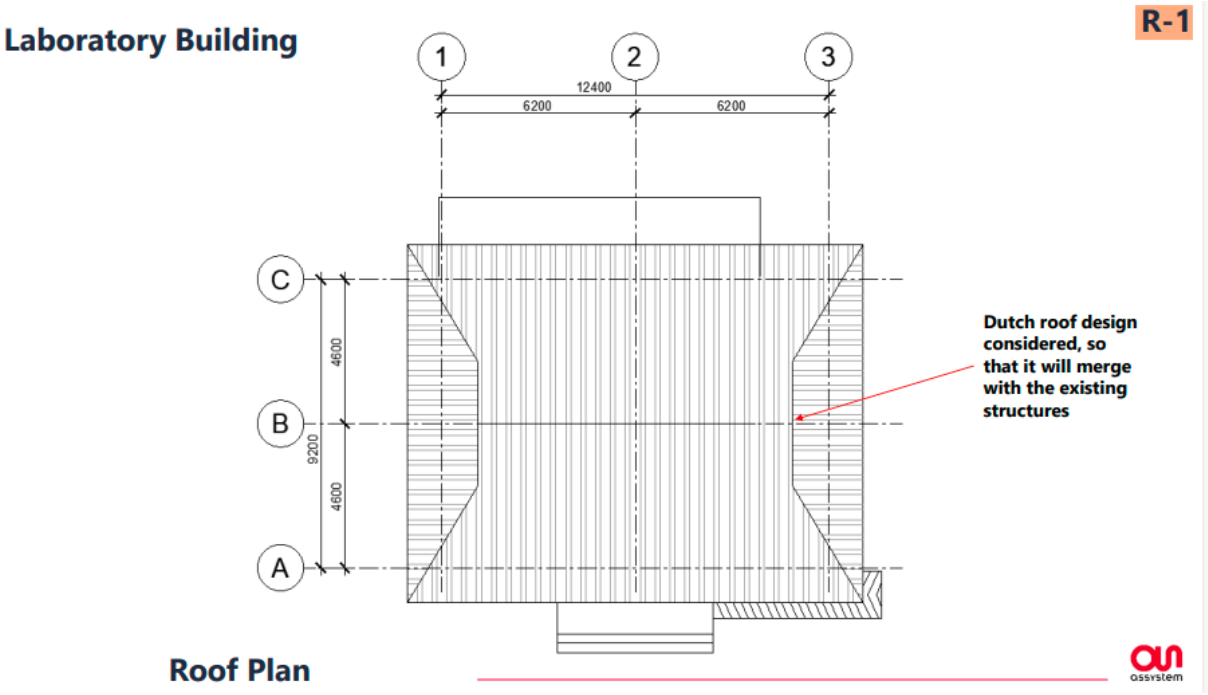
Lower Ground Floor Plan of Laboratory Building



Ground Floor Plan of Laboratory Building

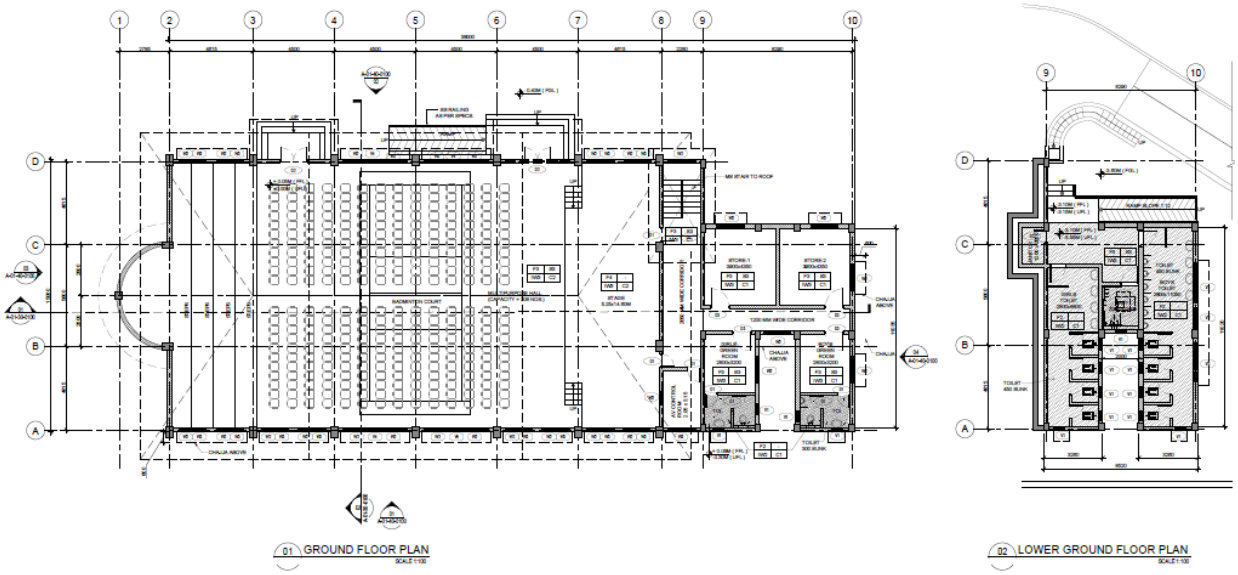


Roof Plan of Laboratory Building

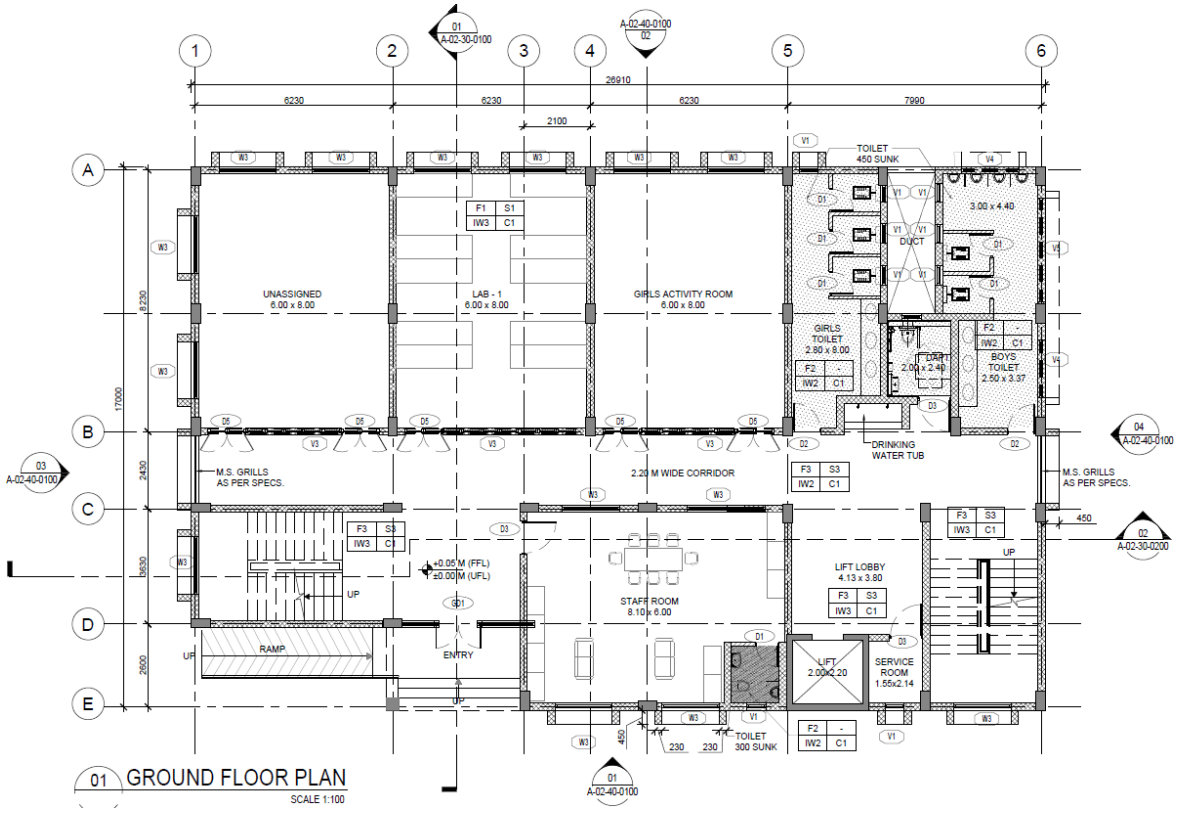


Jowai Public School

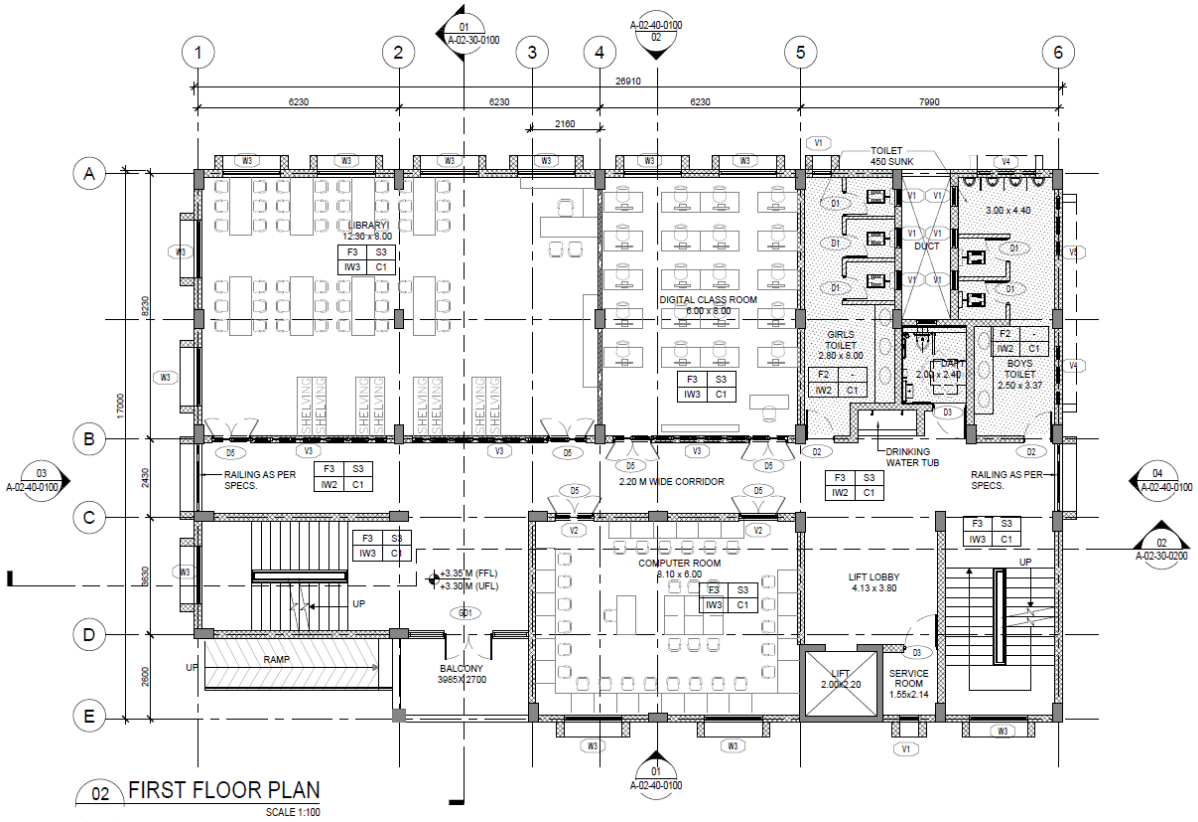
Ground Floor and Lower Ground Floor Plan of Multipurpose Hall at Jowai Public School



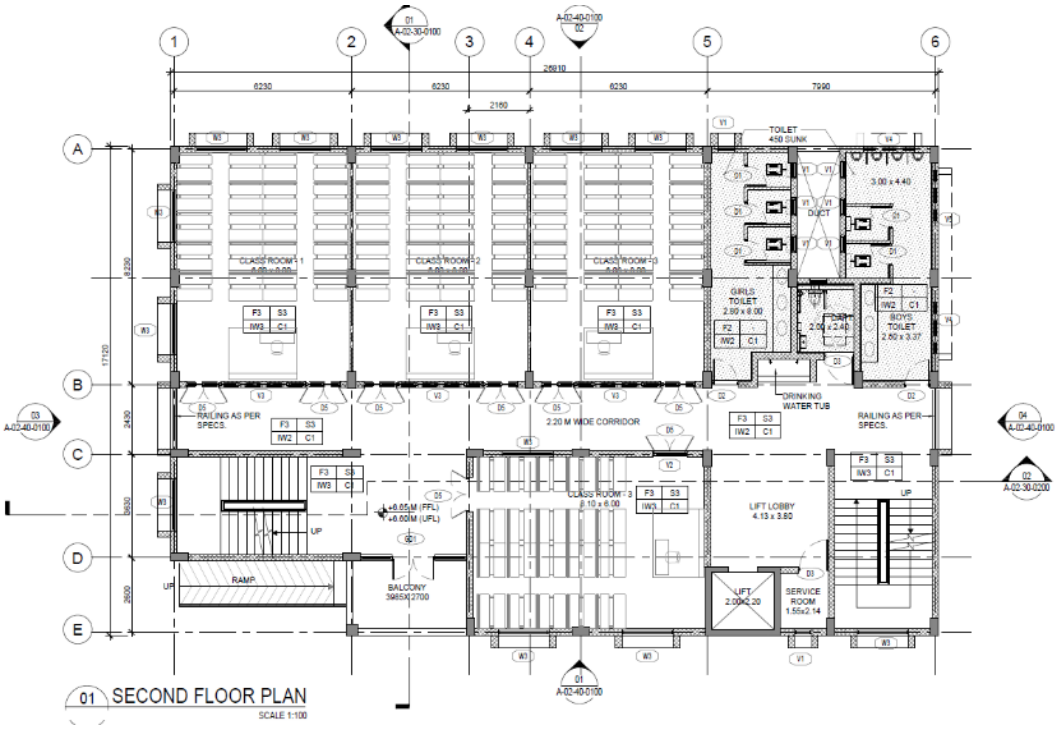
New Academic Building (Ground Floor Plan) of Jowai Public School



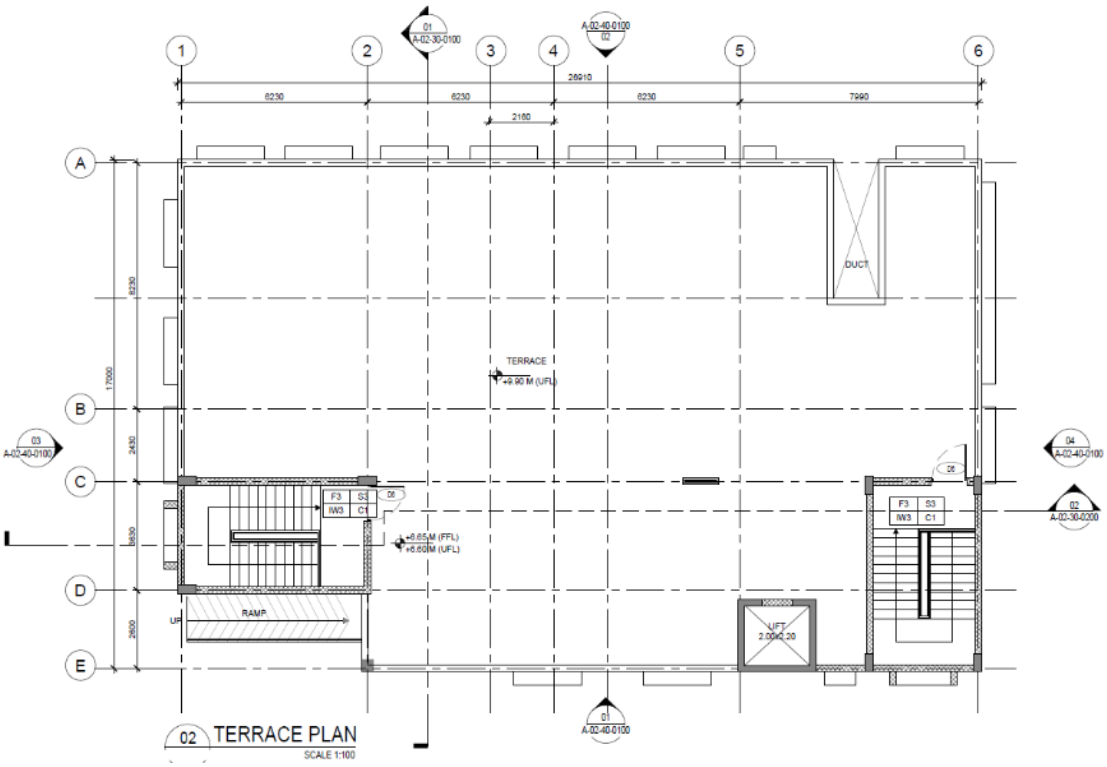
New Academic Building (First Floor Plan) of Jowai Public School



New Academic Building (Second Floor Plan) of Jowai Public School



New Academic Building (Terrace Plan) of Jowai Public School



Source: Design Team.

Appendix 3.4: Electric Demand Calculations

Shillong Public School

Shillong Public School at Meghalaya

S. NO.	Description	Load	Remarks
1	Lighting Load	8.91	
2	Power Load	14.1	
3	UPS Load	3.0	
4	Lift Load	7.5	
5	PHE	3	
6	Fire	2	
	Total Load	**38.51**	KW

Overall diversity @ 70% 27 KW

DG Set

Load in KW 10.8
Load in KVA @ pf of 0.8 13.54
Load at 85% 15.93
DG Set Selected 15 KVA, 415 Volt, 3 Phase Radiator cooled with acoustic enclosure

UPS Selection

Load in KW 3.0
Load in KVA @ pf of 0.9 3.302
Loading at 85% 3.88
UPS Selection 5 KVA, 3 Phase, 230 Volt

Pine Mount School

Pine Mount School at Meghalaya

S. NO.	Description	Load	Remarks
1	Lighting Load	2.77	
2	Power Load	7.8	
3	UPS Load	2.9	
4	PHE	3	
	Total Load	**16.39**	KW

Overall diversity @ 70% 11 KW

UPS Selection

Load in KW	2.9
Load in KVA @ pf of 0.9	3.18
Loading at 85%	3.74
UPS Selection	5 KVA, 3 Phase, 415 Volt

Jowai Public School

Jowai School at Meghalaya

S. NO.	Description	Load	Remarks
1	Lighting Load	12.30	
2	Power Load	27.0	
3	UPS Load	10.4	
4	Lift Load	7.5	
5	PHE	3	
6	Fire	2	
	Total Load	**62.11**	KW

Overall diversity @ 70% 43 KW

DG Set

Load in KW	16.0
Load in KVA @ pf of 0.8	20.00
Load at 85%	23.53
DG Set Selected	25 KVA, 415 Volt, 3 Phase Radiator cooled with acoustic enclosure

UPS Selection

Load in KW	10.4
Load in KVA @ pf of 0.9	11.509
Loading at 85%	13.54
UPS Selection	15 KVA, 3 Phase, 415 Volt

Appendix 3.5: Fire Alarm System Norms - NBC

Table 7 — (*Continued*)

Sl No.	Type of Building Occupancy	Type of Installation								Water Supply (litre)		Pump Capacity (litre/min)	
		Fire Exting-uisher	First Aid Hose Reel	Wet Riser	Down Comer	Yard Hydrant	Automatic Sprinkler System	Manually Operated Electronic Fire Alarm Systems (*see* Note 1)	Automatic Detection and Alarm System (*see* Note 2)	Under-ground Static Water Storage Tank Combined Capacity for Wet Riser, Yard Hydrant and Sprinklers per Set of Pumps	Terrace Tank over Respective Tower Terrace	Pump Near Underground Static Water Storage Tank (Fire Pump) with Minimum Pressure of 3.5 kg/cm^2 at Remotest Location	At the Terrace Tank Level with Minimum Pressure of 3.5 kg/cm^2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2)	15 m and above but not exceeding 30 m	R	R	R	NR	R	R	R	R	150 000	20 000	(*see* Note 11)	NR
3)	Above 30 m in height	R	R	R	NR	R	R	R	R	200 000	20 000	(*see* Note 11)	NR
e)	**Hotels (A-6)**	R	R	R	NR	R	R	R	R	250 000	20 000	(*see* Note 12)	NR
	EDUCATIONAL BUILDINGS (B) (*see* Note 16)												
1)	Less than 15 m in height												
	i) Ground plus one or more storeys	R	R	NR	NR	NR	R (*see* Note 4)	NR	NR	NR	10 000 (5 000) (*see* Note 6)	NR	450 (450) (*see* Note 6)
2)	15 m and above but not exceeding 24 m in height	R	R	NR	R	NR	R (*see* Note 4)	R	NR	NR	25 000	NR	900
3)	Above 24 m but	R	R	R	NR	R	R	R	NR	50 000	(5 000)	(*see* Note 14)	NR

Notes:

1. MOEFA System shall also include talk-back system and public address system for the occupancies given in the table for (d) (I) (iii) under A-5, (a) (I) (iv) and (a) (2) under C-I, and (a) (2) under D-I to D-5, in all buildings 15 m and above in height, except for A-3 and A-4 occupancies where these shall be provided for buildings of height 24 m and above. These shall also be provided in car parking areas more than 300 m2 and in multi-level car parking irrespective of their areas.

2. Automatic detection and alarm system is not required to be provided in car parking area. Such detection system shall however be required in other areas of car parking such as electrical rooms, cabins and other areas.

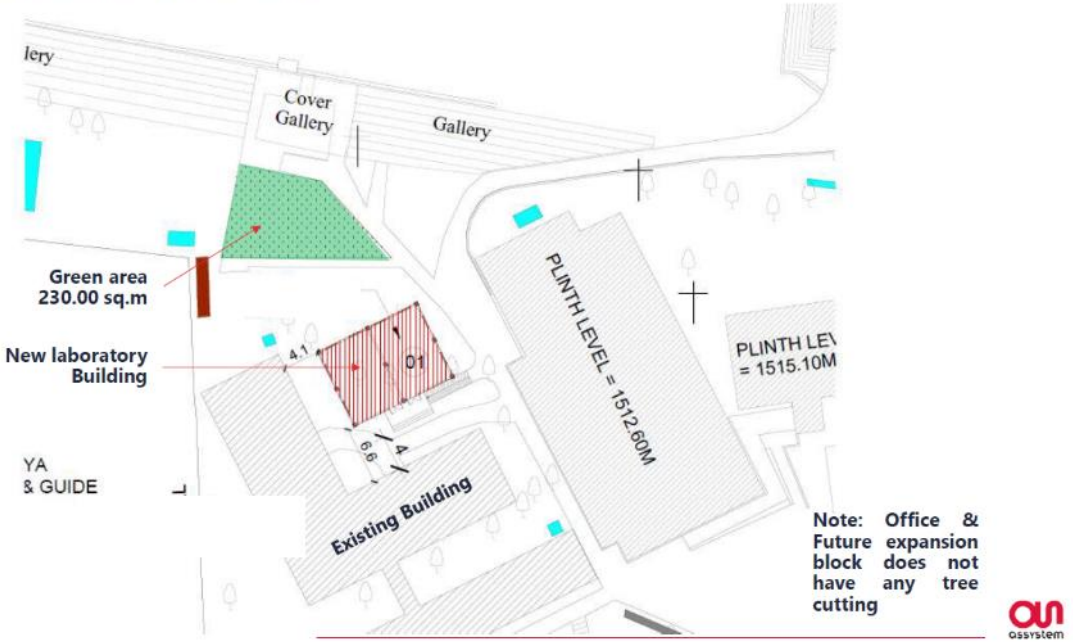
3. Required to be installed in basement, if area of basement exceeds 200 m2.

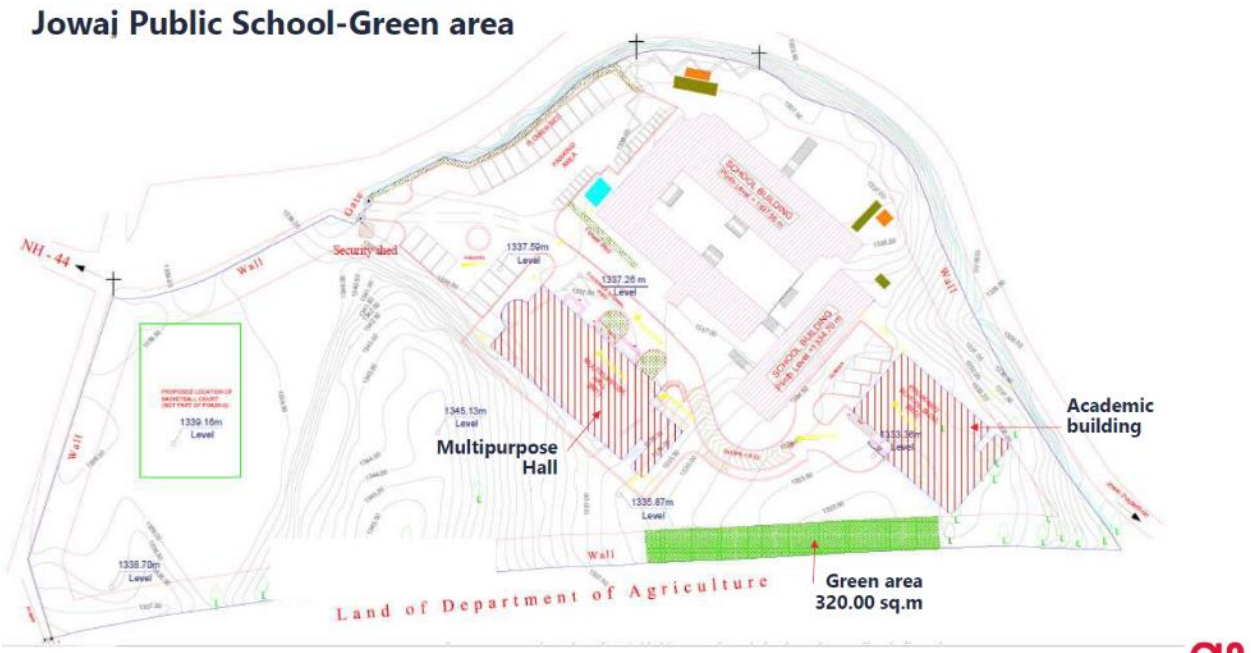
4. 16 Buildings above 30 m in height not to be permitted for Group B, Group C, Group D and Group F occupancies.

Appendix 3.6: Landscaping areas of three schools

Shillong Public School-Green area

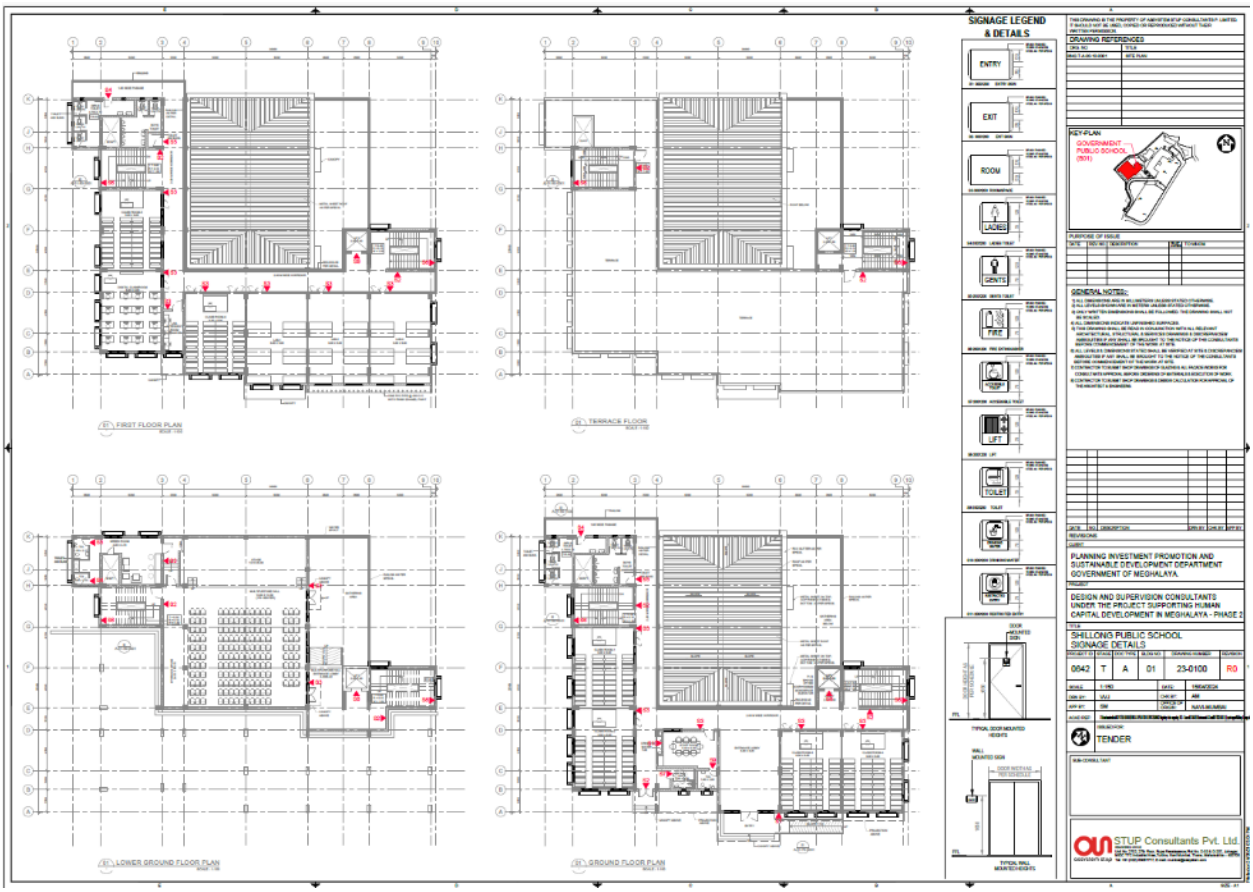
Pine Mount School-Green area

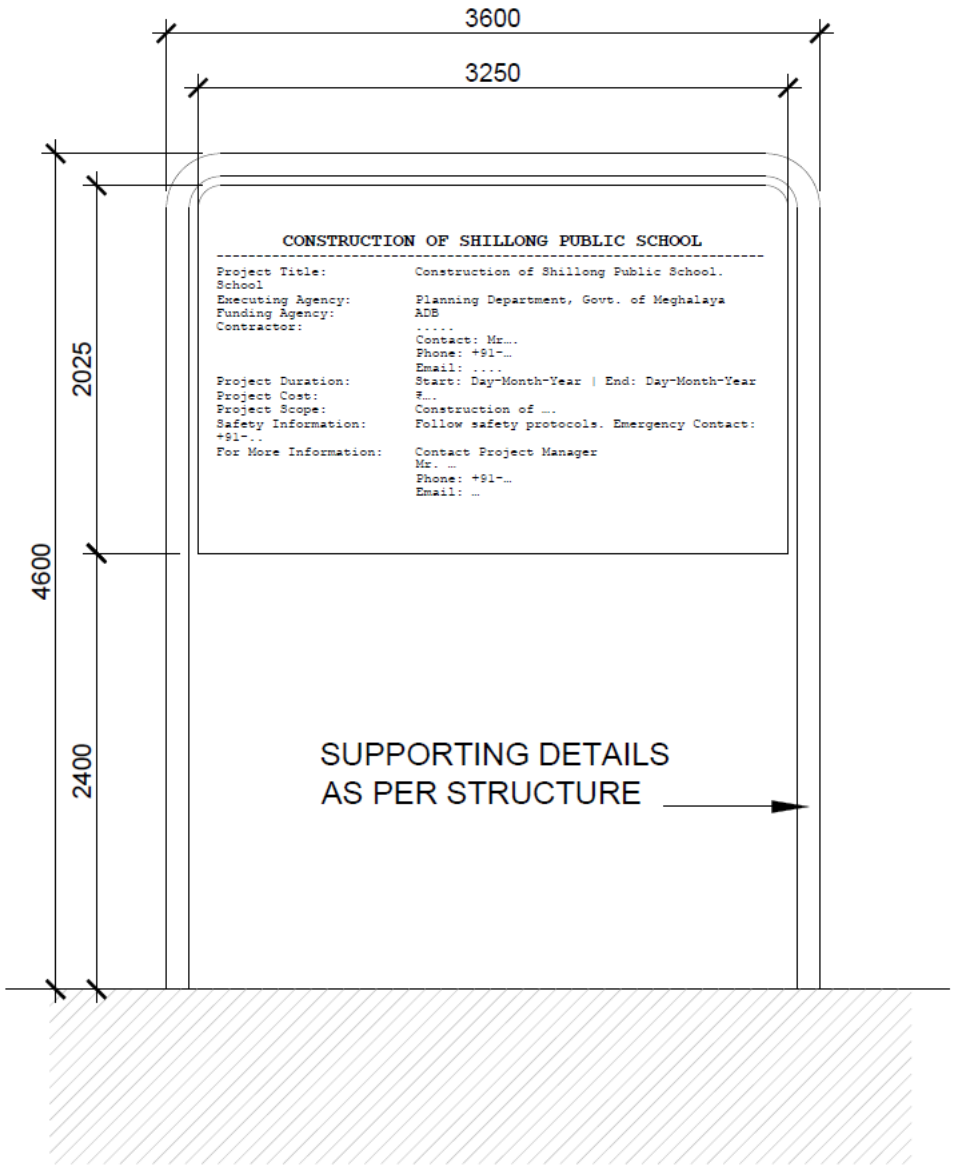



Jowai Public School-Green area
NH - 44
Wall
Gate
Security shed
1337.59m Level
1337.26 m Level
1339.16m Level
1345.13m Level
Multipurpose Hall
1335.87m Level
1333.36m Level
Academic building
1338.70m Level
Wall
Land of Department of Agriculture
Green area 320.00 sq.m

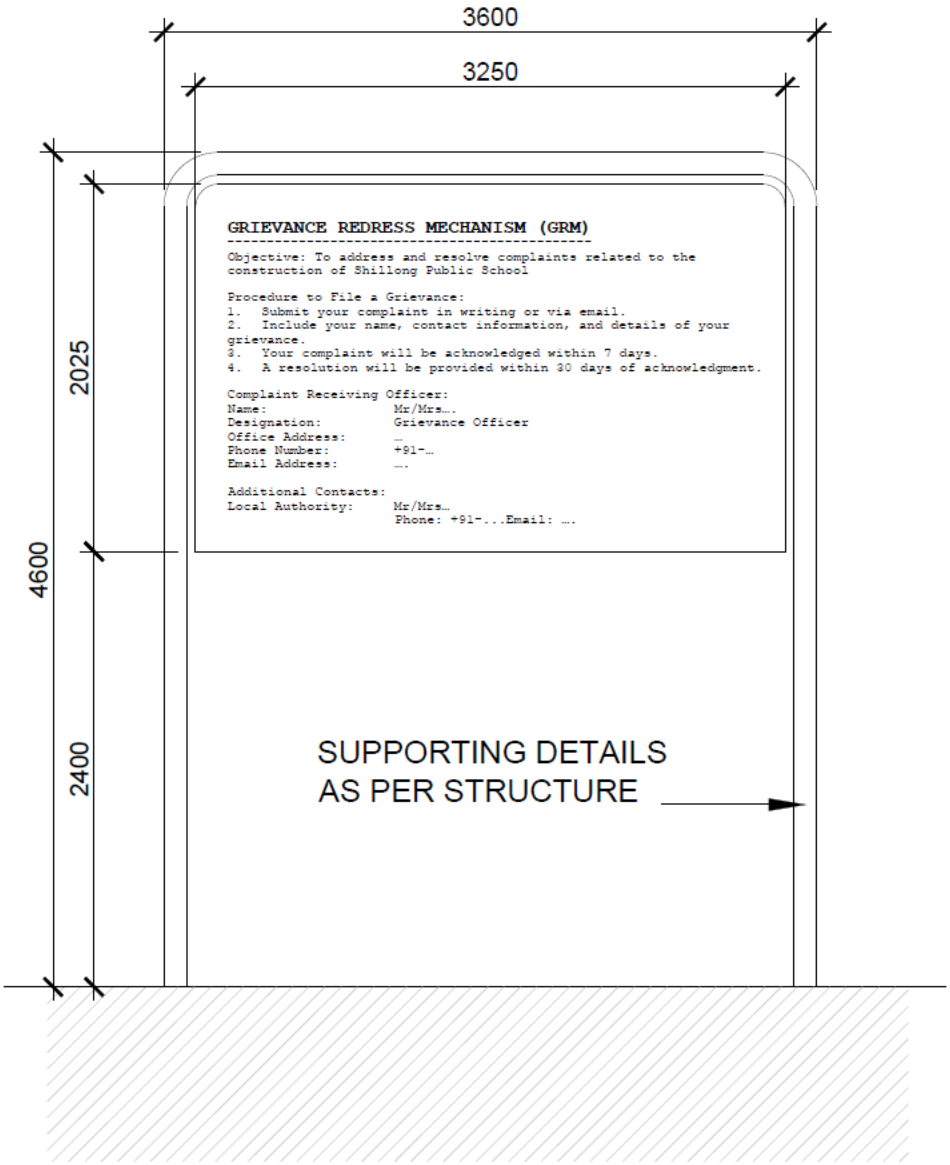
Appendix 3.7: Signage Details

Shillong Public School



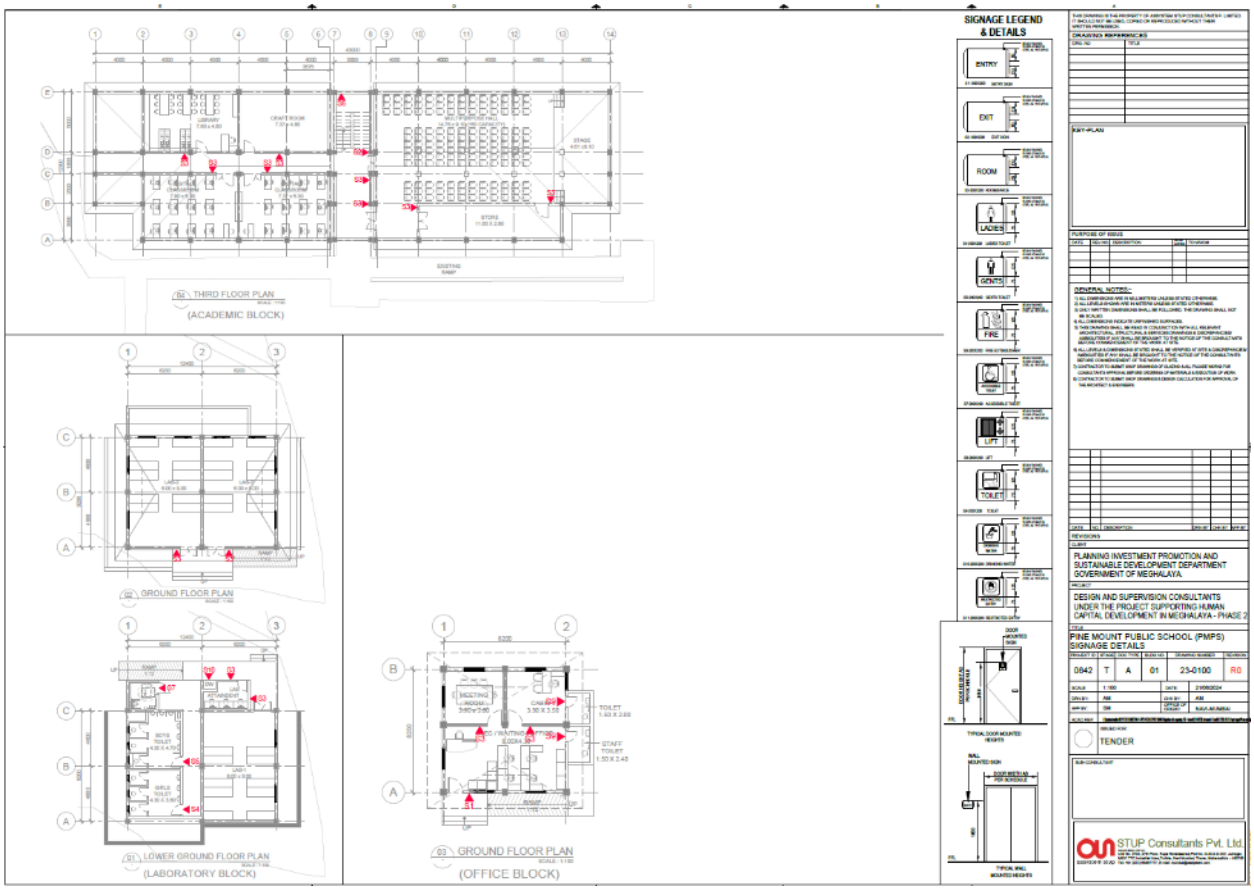


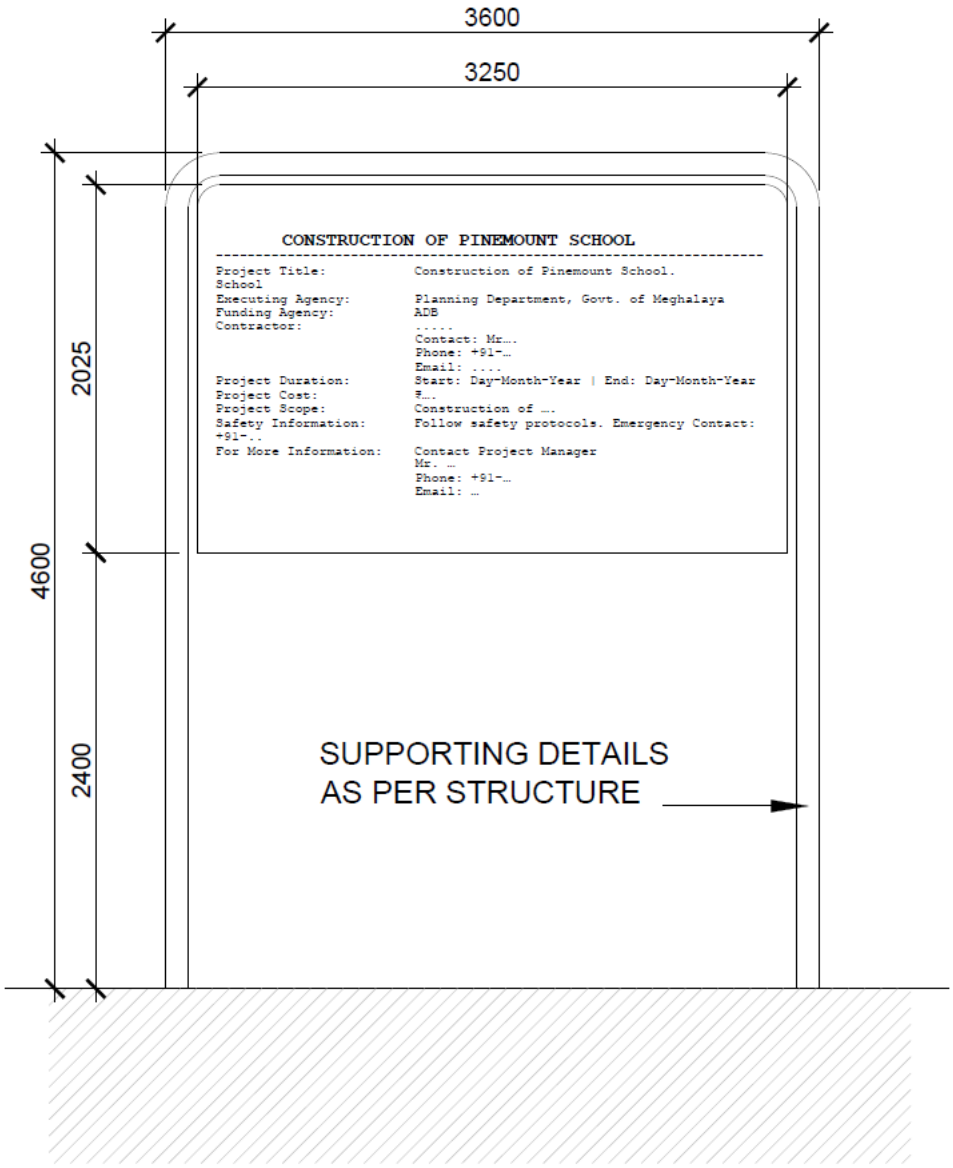
PROJECT INFORMATION BOARD DESIGN INTENT



GRM BOARD DESIGN INTENT

Pine Mount School





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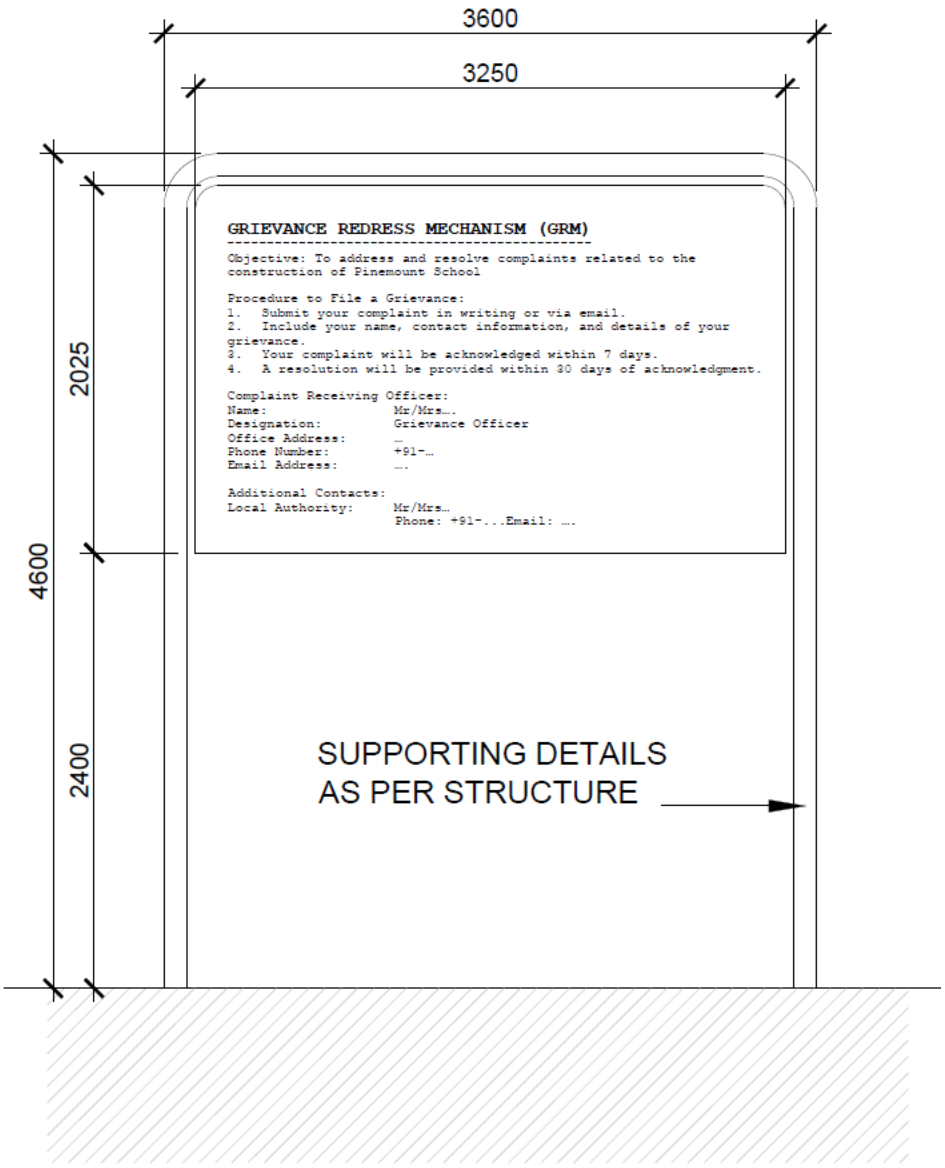
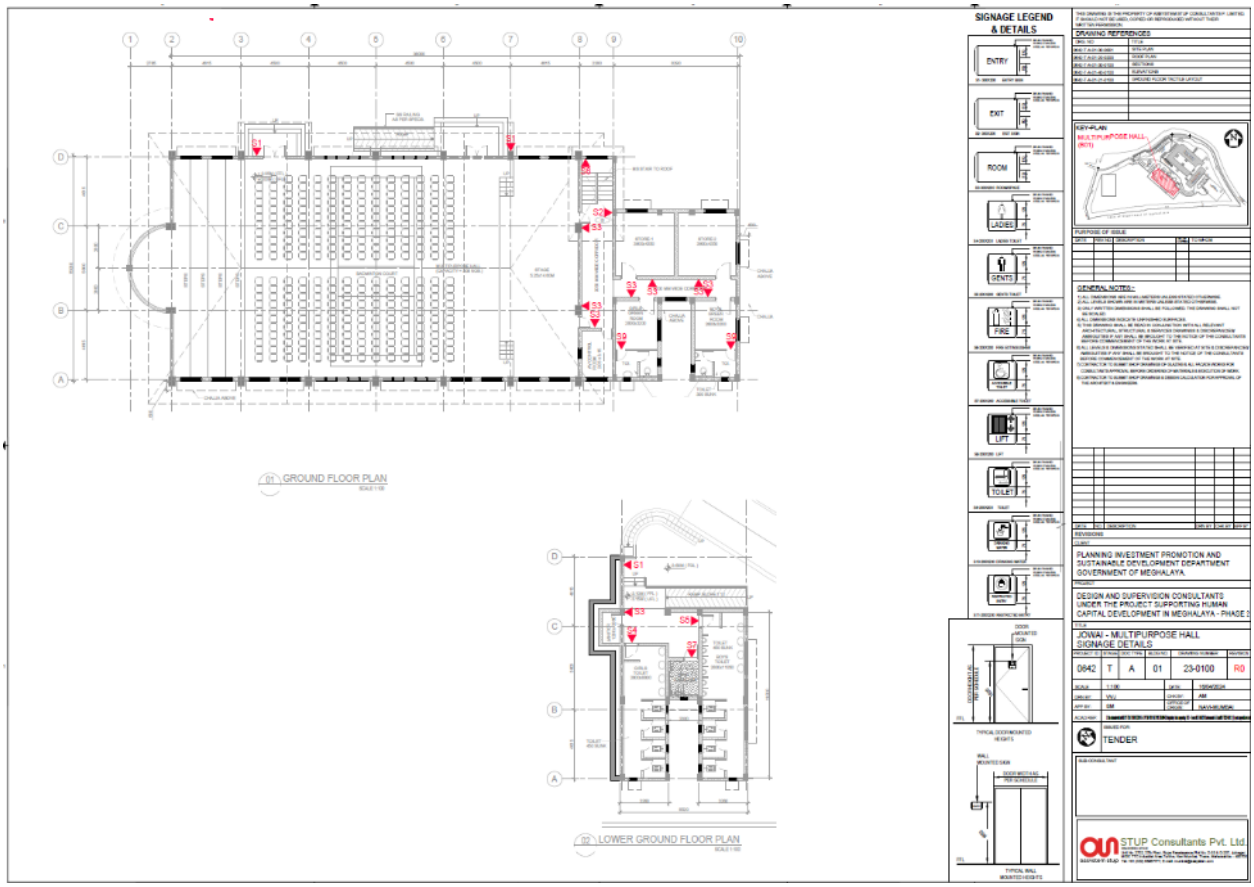
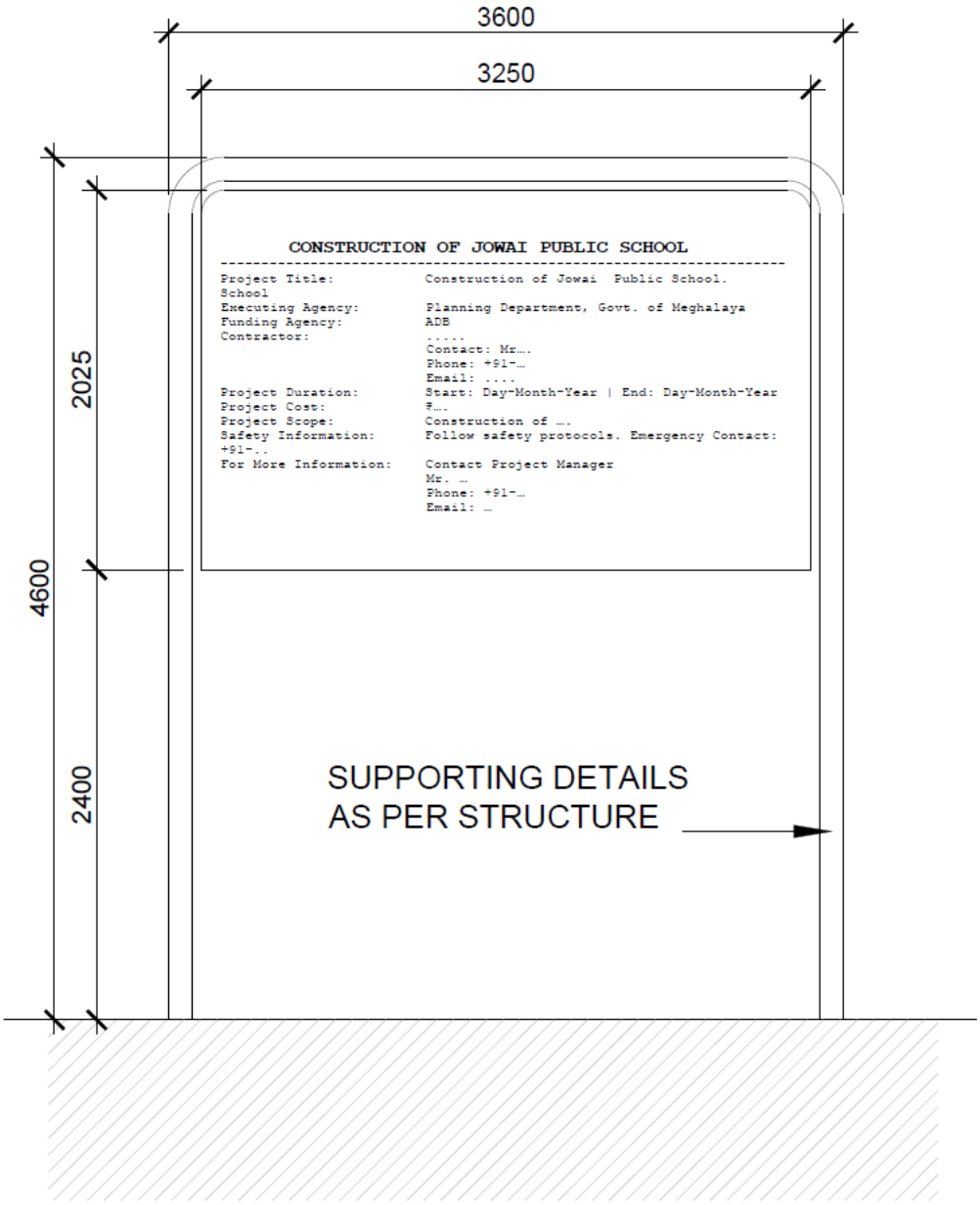


GRM BOARD DESIGN INTENT

Jowai Public School




SIGNAGE LEGEND & DETAILS
ENTRY
EXIT
ROOM
LADIES
GENTS
FIRE
LIFT
TOILET
02 FIRST FLOOR PLAN
02 TERRACE PLAN
01 GROUND FLOOR PLAN
01 SECOND FLOOR PLAN
PLANNING INVESTMENT PROMOTION AND SUSTAINABLE DEVELOPMENT DEPARTMENT GOVERNMENT OF MEGHALAYA
DESIGN AND SUPERVISION CONSULTANTS UNDER THE PROJECT SUPPORTING HUMAN CAPITAL DEVELOPMENT IN MEGHALAYA - PHASE 2
JOWAI PUBLIC SCHOOL- ACADEMIC BLOCK
SIGNAGE DETAILS
TENDER
STUP Consultants Pvt. Ltd.



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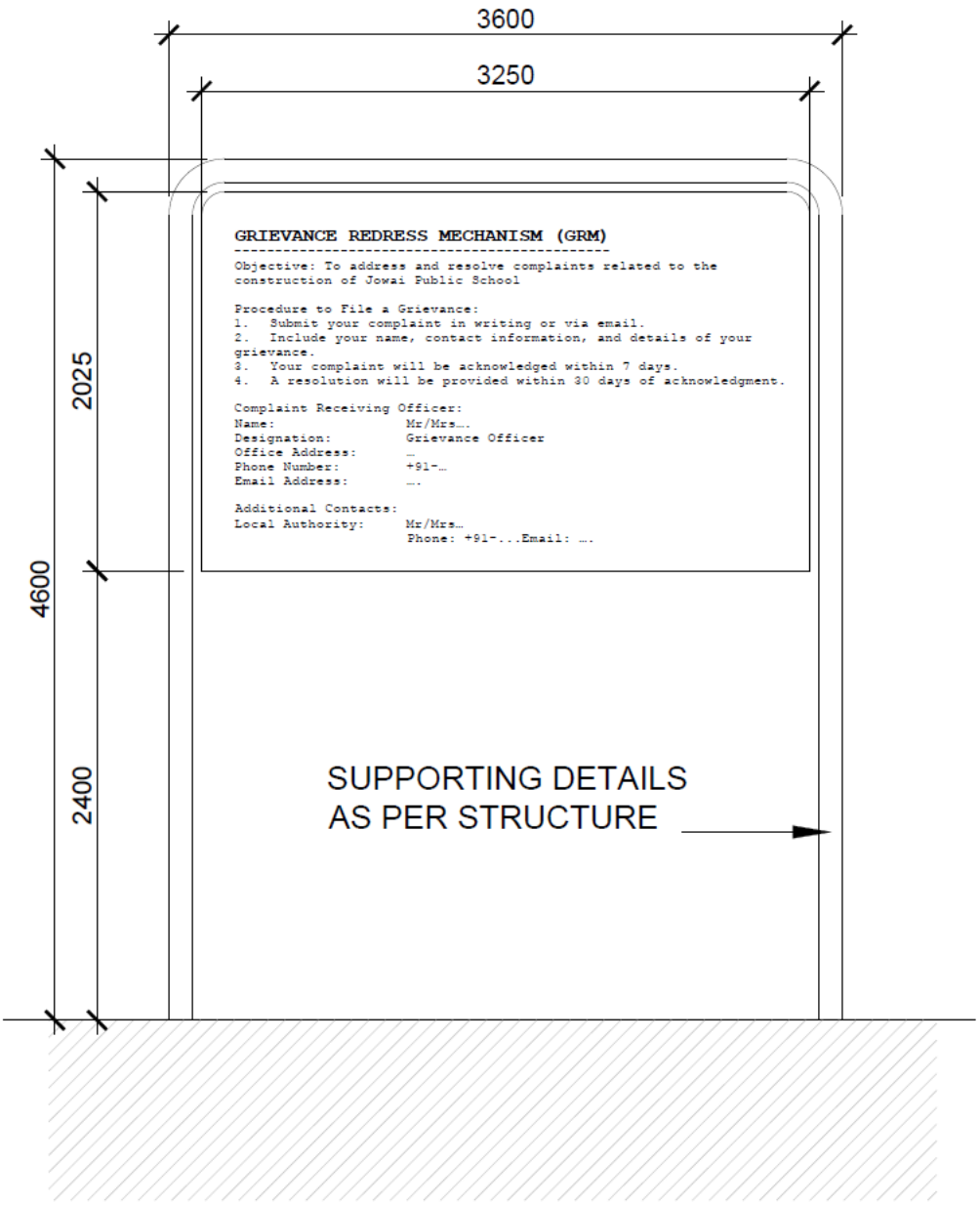
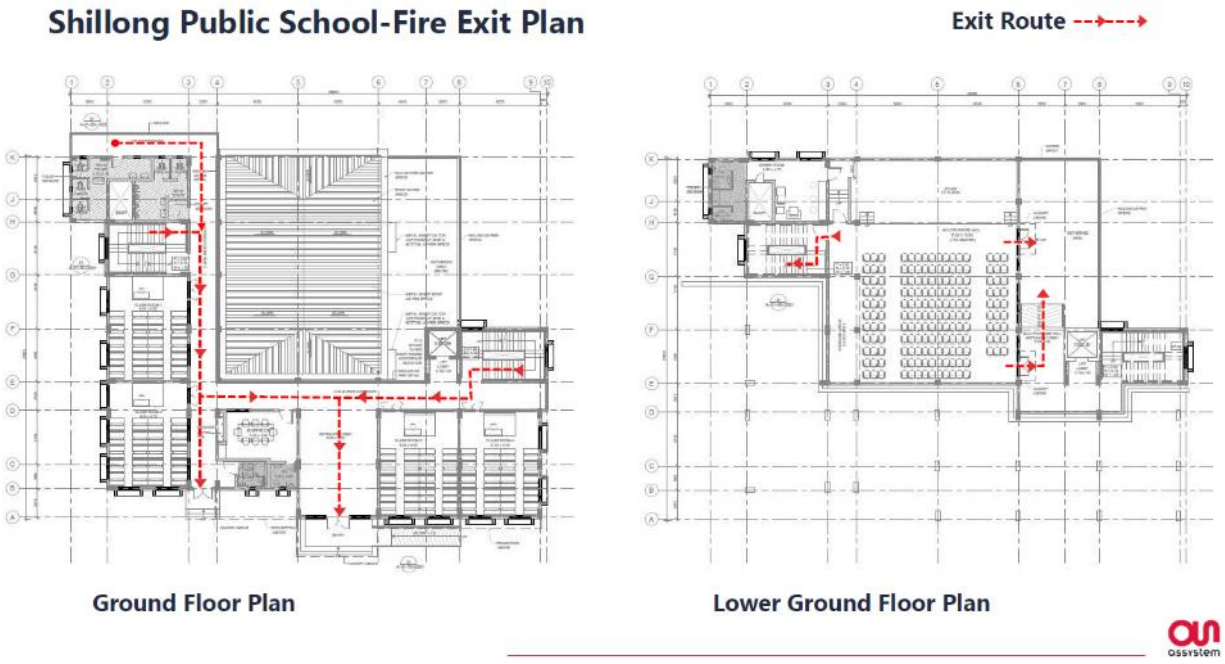
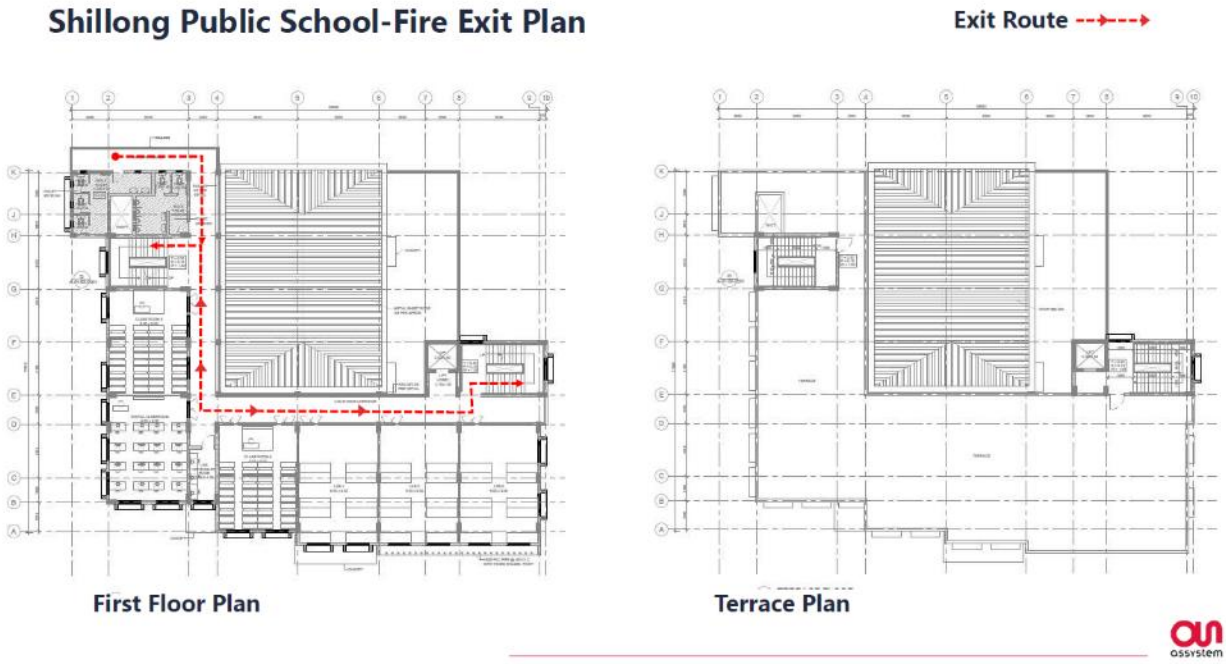


GRM BOARD DESIGN INTENT

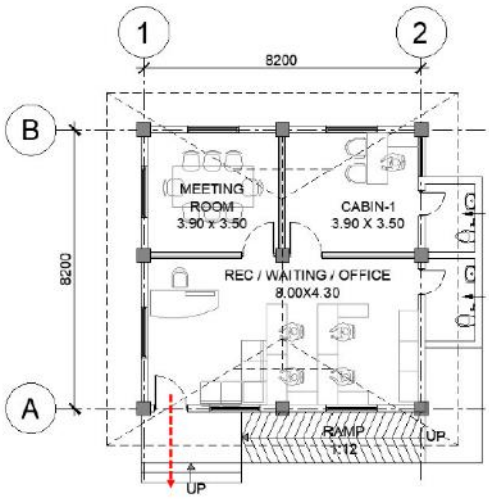
Appendix 3.8: Evacuation Plans





Pine Mount School-Fire Exit Plan
Office Block

Exit Route

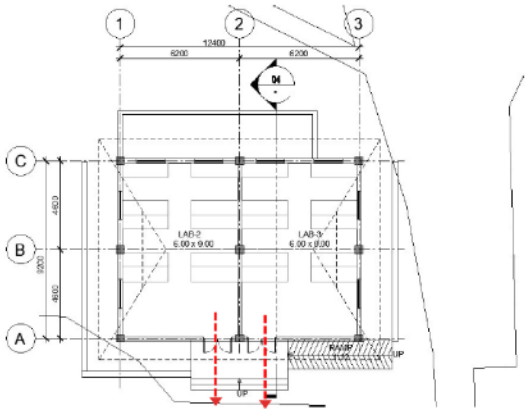


Ground Floor Plan

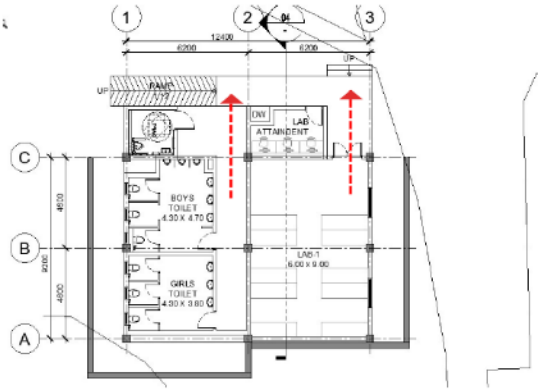
Pine Mount School-Fire Exit Plan
Laboratory Block

Exit Route

Open space



Open space

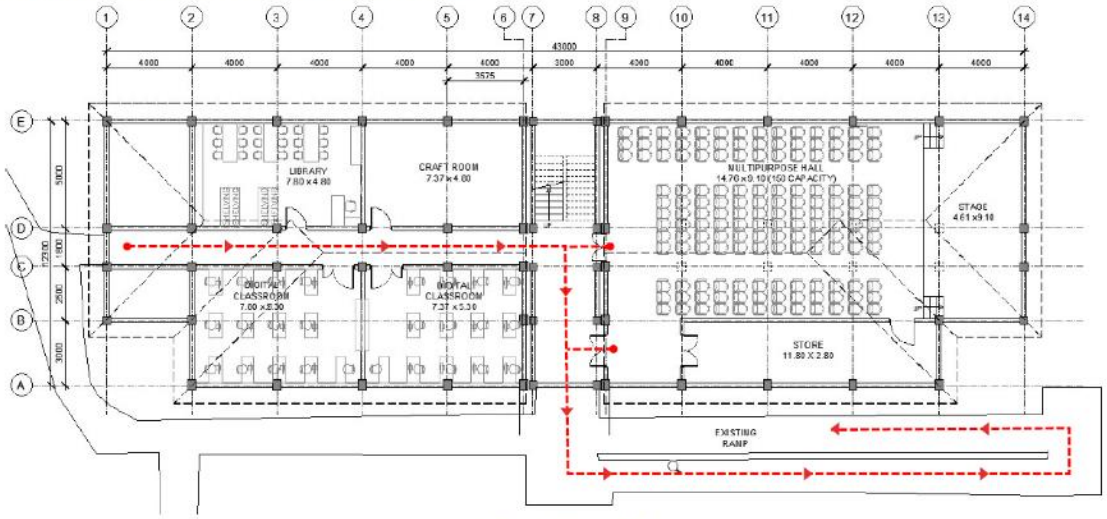


Ground Floor Plan

Lower Ground Floor Plan

Pine Mount School-Fire Exit Plan
Expansion on Existing Building

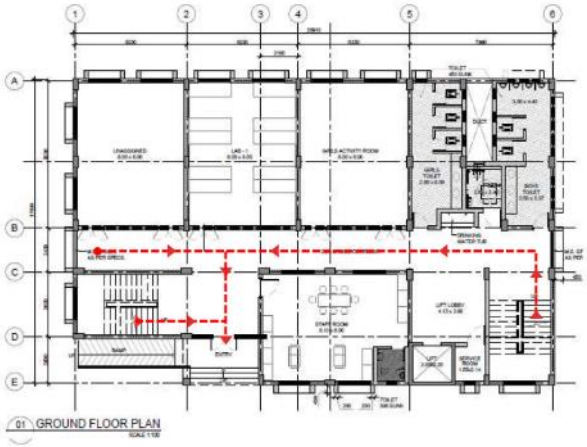
Exit Route

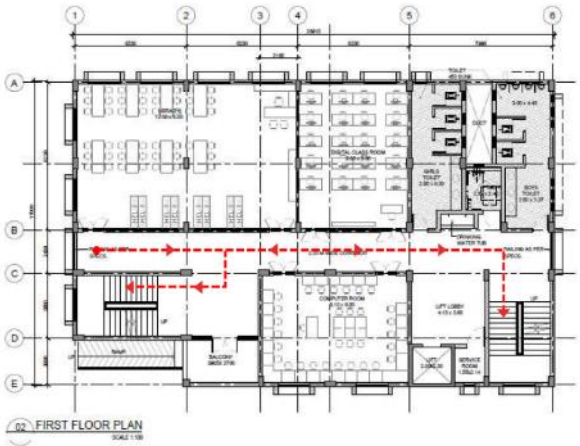


Third Floor Plan

Jowai Public School-Fire Exit Plan
Academic building

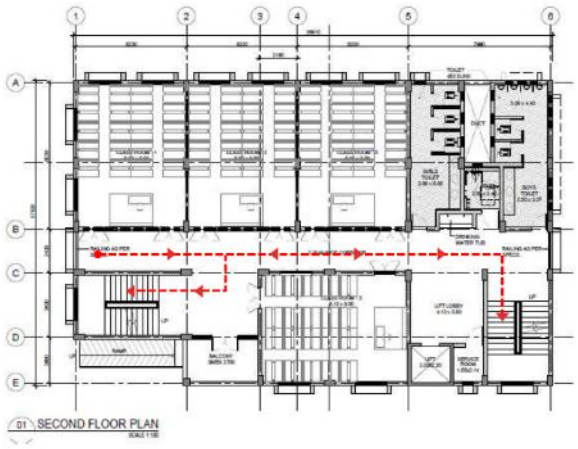
Exit Route

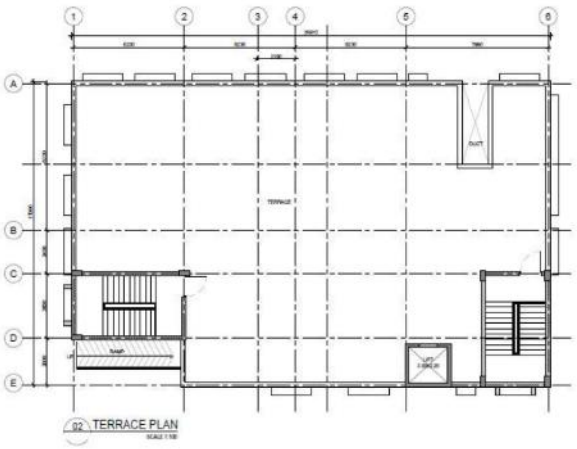




Jowai Public School-Fire Exit Plan
Academic Building

Exit Route





Appendix 4: Attendance sheets for Community Consultation on Proposed Components

Community Consultation at Shillong Public School

Project Name/No. Supporting Human Capital Development in meghalaya (Phase-II)	Annexure:

Community Consultation Attendance Sheet

Project	Shillong Public School							
District		Taluka			Block/Ward No		GP/MC	
Settlement		PS/Thana			Coordinate		Venue	
Date	15/03/2024	Time	11:00 AM		Total No. of Participants	Male: 6	Female: 4	Total: 10

Sl. No.	Name	Age	Gender	Caste	Occupation	Contact Details	Signature
1	E. Lyngdoh	64	Female	S.T.	Retired	9863061430	
2	C. B. Nongkynrih	41	Female	S.T	ICDS	9774429430	
3	D. M. Lyngrat	41.	female	S.T	" "	6033174879	
4	W. Syiemiong	65	Male	S.T.	Retired	7994016679	
5	R. S. Lyngdoh.	69	Male	S.T.	Retired	8259973195	
6	Kevin Thyrniew	31	Male	ST	Student	9774615541	
7	Khrawbok Thyrniang	32	Male	ST	Student	9774074133	
8	Wanbok Lyngdoh	30	Male	ST	Employed	8257876605	

9	David Tael Kdynsah	30	M	ST	Lecturer/PTI	9774714678	
10	E. W. Wanga	49.	F.	ST.	Social Work	9436110924	
11	Icydora Maulot	36	F	ST	Monitoring Officer	9774430814	
12	Doreen C. Kyllo	32	F	ST	District Manager	7308326174	
13							
14							
15							
16							
17							
18							
19							
20							

Community Consultation at Pine Mount School

Project Name/No. Supporting Human Capital Development in Meghalaya (Phase - II) Pine Mount School - Community Consultation | Annexure:

Community Consultation Attendance Sheet

Project	Pine Mount School-Community Consultation.						
District		Taluka		Block/Ward No		GP/MC	
Settlement		PS/Thana		Coordinate		Venue	
Date	15/03/2024	Time	2:30 PM	Total No. of Participants	Male	Female	Total

Sl. No.	Name	Age	Gender	Caste	Occupation	Contact Details	Signature
1	Yousiful Kurbah	40 yrs	Female	ST	Govt. Servant	6909268787	[signature]
2	Kelinda Khang	47	Female	S.T	Govt. Service	9774576534.	K. Khang
3	Manesha Marsaing	48	Female	ST	Govt Servant	8794587156	M. Marsiniang
4	Phuladevi Rai	54	Female	ST	Govt. Servant	~~9774630~~ ~~116~~	[signature]
5	W. Lawriniang	47	Female	St		9774630 116	W. L
6	Rubi Kumari Roy	32	Female	General	House wife	9862415067	R.K. Roy
7	Bleda warjri	35	female	St	House wife	9862156892	B. warjri
8	persaralin chyne	37	Female	St	House wife	9435430384	P. Chyne

Project Name/No.

Annexure:

9	Kunti scharaya	55	Female	General	House wife	9862150953 9862150095	Kunti
10	Rokshana	38	Female	General	House wife	8257864948	
11	NINFR	55	Female	General	House Wife		VINFR
12	MAURISIA	54	Female	S.T	Govt Servant	9485436408	
13	ROSESALYIVE KHARKYMBA	50	Female	S.T.	Govt Servant	8014357086	
14	Maya Chettri	36	Female	General	House Wife	7085817347	
15	Kabita Chetri	40	Female	General	House wife	7005794148	
16	Ibakmenlang K. bhoi	22	Female	S.T	labourer	9485398676	I. K. bhoi
17	Shalendis Myrthong	19	Female	S.T	Labaour	8730840095	S. Myrthong
18	Icydora Maulot	37	Female	ST	Movi Losing officer	9774430814	
19	Mrs Wertimon Daw	56	Female	ST	Vice Principal	8731023027	
20	Doreen C. Shylla	32	Female	ST	District Manag	7308386774	
21							
22							

Community Consultation at Jowai Public School

Community Consultation Attendance Sheet

Project	Jowai Public School							
District		Taluka			Block/Ward No		GP/MC	
Settlement		PS/Thana			Coordinate		Venue	
Date	12/03/2024	Time	12:30 PM		Total No. of Participants	Male	Female	Total
						5	6	

Sl. No.	Name	Age	Gender	Caste	Occupation	Contact Details	Signature
1	Shri H.C. Dichan	63 yrs.	Male	ST	Retd. G. Service	7005924433	12/3/2
2	Shri C.D Syiem	35 yrs	M	ST	-	9856699554	
3	Shri D. Sutnga	35 yrs	m	ST	Business	9862263388	12/3/2
4	Smt - M. Syiem	62 yrs	F	ST	Retd. Service	9862424603.	12/3/24
5	Smt. D. Malang	58 yrs	F	ST	Rtd. Service	7629814034	12/3/24
6	Smt N. Lamare	60 yrs	F	ST	Retd Service	9856001814	12/3/24.
7	Smt. R. Sungoh	54 yrs	F	ST.	Business	9383286951	12/03/24
8	Shri. B. Kwanlang	48 yrs	M	ST	JMO / PIU-1	7005058928	

Annexure:

9	Einam Biam	52 yrs	F	ST	Teacher	9863136425	
10	Smt R.M. Lalro	57 yrs	F	ST	Teacher	9863016155	
11	Smt S. Shylla	47 yrs	F	ST	Teacher	7005602245	
12	Shri S. Messar	54	M	ST	Teacher	8974279116	
13	Shri J. Joseph	56 yrs	M	General	Teacher	9862208805	
14	Shri M.S. Kharshing	55 yrs	M	ST	Principal	9863081652	
15	Amir Kumar	54 yrs.	M	ST	Env. Expert	9873275596	
16	Sadeqee Hussain	49 Yr.	M	Gen	Social Safeguard	9354538211	
17	Anusha Adhikaripur	26 yrs	F	Gen	Environmental expert	9354751392	
18							
19							
20							

Appendix 5: Comparison Between Indian and International Environmental Standards

Comparison Between Indian Ambient Air Quality Standards and International Standards (WHO)

Ambient Air Quality Standards Parameter	Location	India Ambient Air Quality Standard-2009 (µg/m3)	WHO Air Quality Guidelines (µg/m3) Recommended 2021	Applicable Per ADB SPS (µg/m3)
PM_{10}	Industrial Residential, Rural and Other Areas	60 (Annual) 100 (24-hr)	15 (Annual) 45 (24-hr)	15 (Annual) 45 (24-hr)
	Sensitive Area	60 (Annual) 100 (24-hr)	15 (Annual) 45 (24-hr)	15 (Annual) 45 (24-hr)
$PM_{2.5}$	Industrial Residential, Rural and Other Areas	40 (Annual) 60 (24-hr)	5 (Annual) 15 (24-hr)	5 (Annual) 15 (24-hr)
	Sensitive Area	40 (Annual) 60 (24-hr)	5 (Annual) 15 (24-hr)	5 (Annual) 15 (24-hr)
SO_2	Industrial Residential, Rural and Other Areas	50 (Annual) 80 (24-hr)	40(24-hr)	50 (Annual) 40 (24-hr)
	Sensitive Area	20 (Annual) 80 (24-hr)	40(24-hr)	20 (Annual) 40 (24-hr)
NO_2	Industrial Residential, Rural and Other Areas	40 (Annual) 80 (24-hr)	10(Annual) 25 (24-hr)	10(Annual) 25 (24-hr)
	Sensitive Area	30 (Annual) 80 (24-hr)	10(Annual) 25 (24-hr)	10(Annual) 25 (24-hr)
CO	Industrial Residential, Rural and Other Areas	2,000 (8-hr) 4,000 (1-hr)	4000 (24-hr)	2,000 (8-hr) 4,000 (1-hr) 4,000 (24-hr)
	Sensitive Area	2,000 (8-hr) 4,000 (1-hr)	4000 (24-hr)	2,000 (8-hr) 4,000 (1-hr) 4,000 (24-hr)
Ozone (O_3)	Industrial Residential, Rural and Other Areas	100 (8-hr) 180 (1-hr)	100 (8-hr) 60 (peak season)	100 (8-hr) 60 (peak season)
	Sensitive Area	100 (8-hr) 180 (1-hr)	100 (8-hr) 60 (peak season)	100 (8-hr) 60 (peak season)
Lead (Pb)	Industrial, Residential, Rural and Other Areas	0.5 (Annual) 1.0 (24-hr)		0.5 (Annual) 1.0 (24-hr)
	Sensitive Area	0.5 (Annual) 1.0 (24-hr)		0.5 (Annual) 1.0 (24-hr)
Ammonia (NH_3)	Industrial Residential, Rural and Other Areas	100 (Annual) 400 (24-hr)		100 (Annual) 400 (24-hr)
	Sensitive Area	100 (Annual) 400 (24-hr)		100 (Annual) 400 (24-hr)
Benzene (C_6H_6)	Industrial Residential, Rural and Other Areas	5 (Annual)		5 (Annual)
	Sensitive Area	5 (Annual)		5 (Annual)

Ambient Air Quality Standards Parameter	Location	India Ambient Air Quality Standard-2009 (µg/m3)	WHO Air Quality Guidelines (µg/m3) Recommended 2021	Applicable Per ADB SPS (µg/m3)
Benzo(o)pyrene (BaP) particulate phase only	Industrial Residential, Rural and Other Areas	0.001 (Annual)		0.001 (Annual)
	Sensitive Area	0.001 (Annual)		0.001 (Annual)
Arsenic (As)	Industrial Residential, Rural and Other Areas	0.006 (Annual)		0.006 (Annual)
	Sensitive Area	0.006 (Annual)		0.006 (Annual)
Nickel (Ni)	Industrial Residential, Rural and Other Areas	0.02 (Annual)		0.02 (Annual)
	Sensitive Area	0.02 (Annual)		0.02 (Annual)

µg/m3 = microgram per cubic meter, CO = carbon monoxide, hr = hour, NO_2 = nitrogen dioxide, PM = particulate matter, SO = sulfur dioxide, ug/m = microgram per cubic meter, SPS = Safeguard Policy Statement, WHO = World Health Organization.
Note: The values applicable as per ADB SPS, if not followed shall be supported with relevant justification.
Source: India Ambient Air Quality Standards (2009), WHO Air Quality Guidelines (2021)

Comparison Between Indian Noises Level Standard and International Standards (WHO)

Receptor/ Source	India National Noise Level Standards (dBA)		WHO Guidelines Value For Noise Levels Measured Out of Doors (One Hour LAeq in dBA)		Applicable Per ADB SPS dBA	
	Day	Night	07:00 – 22:00	22:00 – 07:00	Day	Night
Industrial area	75	70	70	70	70	70
Commercial area	65	55	70	70	65	55
Residential Area	55	45	55	45	55	45
Silent Zone	50	40	55	45	50	40

dB = decibel, LAeq = A-weighted Equivalent Continuous Sound Level, SPS = Safeguard Policy Statement, WHO = World Health Organization.
Note: The values applicable as per ADB SPS, if not followed shall be supported with relevant justification.
Source: India National Noise Level Standards; Guidelines for Community Noise, World Health Organization (WHO), 1999.

Comparative Analysis of Drinking/Ground Water Standards for Selective (indicative) Parameters

Parameter	Unit	Acceptable Limit (IS 10500:2012)[a]	Standard limits as per WHO Guidelines[b]	Applicable Standards as per ADB SPS
Turbidity	NTU	1	-	1
pH		6.5-8.5	-	6.5 – 8.5
Color	Hazen units		-	5
Taste and		Agreeable		Agreeable

Parameter	Unit	Acceptable Limit (IS 10500:2012)[a]	Standard limits as per WHO Guidelines[b]	Applicable Standards as per ADB SPS
Odor				
TDS	mg/l	500	No health-based guideline value is proposed	500
Iron	mg/l	0.3	No health-based guideline value is proposed	0.3
Manganese	mg/l	0.1	0.4	0.1
Arsenic	mg/l	0.01	0.01	0.01
Cadmium	mg/l	0.003	0.003	0.003
Chromium	mg/l	0.05	0.05	0.05
Cyanide	mg/l	0.05	0.07	0.05
Fluoride	mg/l	1	1.5	1
Lead	mg/l	0.01	0.01	0.01
Ammonia	mg/l	0.5	1.5	0.5
Chloride	mg/l	250	200 - 300	250
Sulphate	mg/l	200	No health-based guideline value has been derived	200
Nitrate	mg/l	45	50	45
Copper	mg/l	0.05	2	0.05
Total Hardness	mg/l	200	-	200
Calcium	mg/l	75	-	75
Zinc	mg/l	5	No health-based guideline value is proposed	5
Mercury	mg/l	0.001	0.006	0.001
Aluminum	mg/l	0.03	-	0.03
Residual Chlorine	mg/l	0.2	-	0.2
E-coli	MPN/100ml	Must not be detectable in nay 100 ml sample	-	Must not be detectable in any 100 ml sample
Total Coliform	MPN/100ml		-	

IS = Indian standard, mg/l = milligram per liter, ml = milliliter, MPN = most probable number, NTU = nephelometric turbidity unit, pH = potential hydrogen, SPS = Safeguard Policy Statement, TDS = total dissolved solids, WHO = World Health Organization.

Sources:

[a] https://cpcb.nic.in/wqm/BIS_Drinking_Water_Specification.pdf

[b] https://cpcb.nic.in/who-guidelines-for-drinking-water-quality/

Appendix 6: Template for Environmental Monitoring Report

Environmental Monitoring Report

Semiannual Report {Insert Number}

Reporting Period {From Month Year to Month Year}
Date {Month Year}

IND: Supporting Human Capital Development in Meghalaya (Phase II)

Prepared by {Consultant and/or Implementing Agency} for the {Executing Agency} and for the Asian Development Bank

Environmental Safeguards Monitoring Report

{Red text serves as guide for report preparation, please delete it when the report is finalized}

TITLE PAGE

LIST OF ABBREVIATIONS {All abbreviations used in the report should be listed here as well as being spelt out in full the first time they appear in the report}

TABLE OF CONTENTS

EXECUTIVE SUMMARY {Maximum two-page summary following table like the sample below, if necessary cross reference the relevant section of the main report for details to keep summary succinct}

Project Name	
Executing Agency	
Implementing Agency	
Environment Safeguards Categorization	
Environment Safeguards Documentation	EARF/EIA/IEE/Existing Facilities CAP/EMP
Project Stage Obtained	Design/Pre-Construction/Construction/Commissioning/O&M
Detailed Design Required Post-Approval	Yes/No if yes include remarks on status of design progress (%) and if more than one design package, provide details if any differences between the status
Contract(s) Awarded	Yes/No if more than one contract package, provide details
Bidding Document(s) Include EMP Cleared by ADB	Yes/No if more than one contract package, provide details if any difference between the status
Contract(s) Awarded Include EMP Cleared by ADB	Yes/No if more than one contract package, provide details if any difference between the status
National Environment, Health and Safety Clearance(s) Obtained	Yes/No/NA provide details if any clearances are outstanding or there is any difference between the status of contract packages,use NA if any clearances not yet required
Contractor(s) Given Access to Site	Yes/No if more than one contract package, provide details if any

	difference between the status
Construction Progress (%)	If more than one contract package, provide details if any difference between the status
Unanticipated Impacts including Change of Scope or Design	Yes/No if yes, provide brief details with how the IEE and EMP updated as required
Number of Site Inspections and Audits Undertaken by Environment Safeguards Staff in Reporting Period	
Corrective Action Required from Previous Reporting Period	Yes/No/NA use NA if this is the first project reporting period
Outstanding Corrective Action this Reporting Period	Yes/No/NA if yes, provide bulleted summary of the key actions still required, use NA if the response to above is No or NA
Non-Compliances Recorded this Reporting Period	Yes/No if yes, provide bulleted summary of the key non-compliances recorded
Corrective Action Required	Yes/No if yes, provide bulleted summary of the key actions to be taken in response to non-compliances including timeline andbudget

Number of Health and Safety Incidents	Provide brief details including how they were responded to
GRM Functional	Yes/No briefly elaborate on set up if differs to description in IEE/EMP
Number of Unresolved Grievances from Prior Reporting Period	
Number of Grievances Received in Reporting Period	
Number of Grievances Resolved this Reporting Period	
Number of Grievances Still Outstanding	Provide brief details with timeline for resolution
Number of Grievances referred to Court of Law	Provide brief details
Number of Grievances referred to the Accountability Mechanism	Provide brief details

1.0 Introduction

2.0 Brief Project Description

{Maximum two pages to succinctly convey who the executing and implementing agencies are, the project outputs, construction works involved, details of contract packages, details of construction camps and other related facilities, national and ADB environmental safeguards project categorizations, and the environment safeguard documents (dates) applicable to the project}

{Include maps and plans showing the project site locations and project area of influence}

{Include table and/or organogram of environmental safeguards staffing and relationships between executing and implementing agencies, consultants, contractors, subcontractors, lenders, etc.}

3.0 Project Progress Status and Implementation Schedule

{Describe the implementation stage reached (design, pre-construction, construction, commissioning or O&M) and the % progress, main project activities and milestonesachieved during the reporting period, including bidding documents issued and contracts awarded during the reporting period etc. No need to repeat progress information included in previous monitoring

reports if no change, cross reference the previous monitoring reportsif needed}

{Highlight any unanticipated impacts in relation to change in the project scope, locations of components, construction methods, and/or implementation schedule during the reporting period, if none confirm this.}

{Highlight any changes in the project organization and environmental safeguards staffing during the reporting period, if none confirm this}

{Report on any unanticipated impacts and updates to IEE/EMP that were required during the reporting period, status of delivery of documents, required amendments, consultation and disclosure undertaken etc.}

{The project Gantt chart may be included}

{Include a simplified table like the sample below to report progress}

Project Component/Stage	Target Completion Date {Revised Target Date, if delayed}	Progress Status {not yet started; ongoing; completed}	Percent Completed	Remarks
Medical college Component (construction phase)	*Example for reporting period Jul-Dec 2022*			
Contract award	31 Jan 2022	Completed	100%	Contract awarded to XYZ contractor, copy of EMP included
Construction (site clearance, earthworks, civil works, installation	31 Mar 2022 (original target completion was 31	Ongoing	85%	There was a delayin the delivery of

of equipment, …)	Dec 2018)			

4.0 Compliance to National Regulations and International Agreements

{Status of compliance and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required. Provide explanations of any instances where the requirements of regulations or agreements were breached along with details of responses taken to rectify the breach once identified. Include all the applicable National Regulations and International Agreements following the sample table below}

National Regulation or International Agreement	Compliance Requirements under the Regulation or Agreement including any Environmental Clearances Required	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non-compliance including timeline and budget}

5.0 Compliance to Environmental Covenants from the ADB Loan Agreement

{Status of compliance and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required. Provide explanations of any instances where covenants were breached along with details of responses taken to rectify the breach once identified. Include all the applicable Loan Agreement covenants on environment following the sample table below}

Schedule #, Para. #	Covenant	Compliance Status {complied; partially	Remarks {provide details (evidence) to

		complied; not complied; still ongoing or n/a at current stage of the project}	show how compliance was achieved; or explain the corrective action to be taken if there was non-compliance including timeline and budget}

6.0 Compliance to Environmental Assessment and Review Framework

{Status of compliance and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required. Provide explanations of any instances where tasks allocated to the executing or implementing agency and any consultants have not been undertaken along with details of responses taken to rectify the situation once identified. Include all applicable organizations with responsibility for environmental safeguards following the sample table below}

Organization	Tasks	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non-compliance including timeline and budget}
Executing Agency			
Implementing Agency			
Consultants…			
Contractors			

7.0 Compliance to Contract

{Status of compliance and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required. Provide explanations of any

instances where tasks allocated to the contractor have not been undertaken along with details of responses taken to rectify the situation once identified. Include all contract packages and provisions relating to environment, health and safety management following the sample table below}

Contract Package	Contract Provisions	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide sufficient details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non-compliance including timeline and budget}
Package 1	Clause xx: Environment Protection	Partially complied	Provide details, if given in EMP compliance table just refer the table
Package 2	Clause xx EMP	Partially complied	Provide details, if given in EMP compliance table just refer the table
Package 3…			

8.0 Compliance to Environmental management plan and Corrective Action Plan (if any)

{With reference to the EMP (design, pre-construction, construction or operation as applicable in a particular reporting period) of the project, include a table following sample table below with the compliancestatus during the reporting period, with sufficient details (evidence) to show how compliance was achieved, or corrective action to be taken if there was non-compliance including timeline and budget}

{Flag if previous environmental monitoring report(s) included corrective action plan, if it did details of that corrective action plan should be incorporated into the EMP table and compliance status reported}

{Provide explanations of any instances where performance standards were temporarily exceeded during the reporting period, along with details of any response taken to rectify the exceedance once identified, even if at the end of the reporting period the project is deemed as being compliant}

{Copies of clearances, CEMP, construction method statements, and other documentation produced in accordance with EMP during the reporting period should be included as an appendix}

Item #	Environment Management Measures	Prior Corrective Action, if any	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide sufficient details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non- compliance includingtimeline and budget}

Item #	Management measures as per CAP drawn as part of audit of existing facilities, if any	Prior Corrective Action	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide sufficient details (evidence) to show how compliance was achieved; or explain thecorrective action to be taken if there was non- compliance including timeline and budget}

9.0 **Environmental** Safeguards Capacity Building

{With reference to the EMP capacity development plan summarize trainings for the executing and implementing agencies, contractors, and subcontractors, and other activities completed. Include as appendices the training agenda, attendance sheets, andphotos. If no trainings or other activities in reporting period, please confirm. Copies of training records related to EMP during the reporting period should be included as an appendix}

Trainings	Number and Position of Participant/s	Location/s and Date/s	Remarks

10.0 **Environmental** Safeguards Inspection and audits

{Site inspections and audits completed summarize the number and type of site visits, persons

involved, the issues covered, and status of compliance with them, the number ofnon-compliance notices given out to the contractor because of the site visit, and the checklists/reporting format used (sample of checklists and reports to be included as an appendix)}

Date	Type and Purpose of Visit	Location/s Visited	EA, IA, Consultant Staff Participating	Remarks

11.0 Quantitative Environmental Monitoring

{Environmental monitoring: Summarize in a table the reporting results period's quantitative monitoring activities and data obtained in accordance with the environmental monitoring program of the project. Provide explanations of any instances where performance standards were exceeded along with details of responses taken to rectify the exceedance once identified.}

Typically, this section will include the results of:Noise

and vibration surveys

Water quality surveys Air quality surveys

Flora and fauna surveys etc.

{Indicate the monitoring locations using a map or plan, dates, times, duration of samples as applicable, weather conditions as applicable, parameters measured, equipment used,standards, tests, and limits used etc.}

{Corrective actions with timeline and budget are required to ensure any exceedances willbe prevented in the future}

{Graphs can be used in this section to show trends; however, large tables of data or multiple graphs should be attached as an appendix.

{Calibration and QA certifications of monitoring equipment and laboratories analyzing samples

should be included as an appendix}

12.0 Occupational and Community Health and Safety Monitoring

{Health and safety monitoring results – summarize the reporting period's health and safety activities and data obtained in accordance with the Environmental monitoring program of the project. Provide explanations of any instances where performance standards wereexceeded along with details of responses taken to rectify the exceedance once identified}

{Corrective actions with timeline and budget are required to ensure any exceedances willbe prevented in the future}

{Include the occupational and community trainings/drills/inspections conducted during the reporting period following the sample table below. Include as appendices the training/drill/inspection agenda, attendance sheets, and photos. If no trainings/drills/inspections, please confirm}

Trainings/Drills/ Inspections	Number and Position of Participant/s	Location/s and Date/s	Remarks
Example: Fire Drill	50 Laborers	Construction Camp, 15 Aug 2018	Participants safely evacuated the site…

{If there was any near-miss or accident, illness, or other occupational or community healthand safety related incident during the reporting period (or a previously reported incident with ongoing rectification) report following the sample table below. Include as appendices work safety checklists, incident reports, and other relevant supporting documents. If no incidents, please confirm}

	Number and Position of Person/s Involved	Location/s and Date/s of Incident	Detailed Description of Incident- Attach root cause analysis report	Time-bound Corrective Action
Fatality				
Non-fatal Injury				

(Lost Time)				
Non-fatal Injury (Minor)				
Near-miss				
Illness				
Other Incidents				

13.0 Meaningful Consultation and Grievance Redress

{Meaningful consultation ~~r~~eport on any ongoing consultation undertaken, and main issues raised by consultees; detailed consultation records should be included as an appendix. If no ongoing consultation, please confirm}

Date		Component and Venue			
Sl.no	Participants Name	Occupation	Gender	Issues raised by participants	Response Given by EA/PMC/Contractors

{Include a brief description of the GRM, provide a flowchart, list of grievance redress committee members and any trainings they have received}

{If there was any grievance or complaint, regardless informal or minor, during the reporting period (or previously reported complaint with ongoing rectification) provide the corrective action taken following the sample table below. Detailed grievance records and response reports should be included as an appendix}

Complainant's name & contact details	Date/s of Complaint	mode of communication to EA/ADB	Description of Complaint	Resolution details	Date of resolution	Mode of communication to complainant

14.0 Compliance to recommendations of Previous reporting period EMR

Non-compliance identified in previous EMR	Corrective Action recommended in previous EMR	Compliance status	Continued noncompliance, if any (please add this to the current EMR's recommendation as continued NCs)

15.0 Conclusions and Recommendations

{Summarize the project's environmental performance during the reporting period based on the previous sections and, if any non-compliance identified, provide detailed recommendations including responsibilities, timeliness and budget for the preparation and completion of corrective action}

{If non-compliance is major or not readily addressed then a separate corrective action plan may need to be prepared. For minor and readily addressed non-compliances the corrective action plan can be incorporated into this final section of the environmental monitoring report following the sample table below}

Non-compliance	Corrective Action to be Taken	Responsibility	Timeline	Budget

APPENDICES

Photographs {Include relevant photographs of the project site and project area of influence taken during the reporting period to provide evidence of compliance and/or non-compliance. For each photo, provide a caption with description of what it illustrates, accurate location, and date taken}

Supporting Documents

{E.g. Maps and plans, Sample checklists and reports Clearances and documentationTraining records, Detailed monitoring data, laboratory results etc.Calibration and QA certificates,

Consultation records, Meeting agendas and attendance records,Grievance records,

Environment, health and safety reports etc.}

Appendix 7: Sample EHS Daily Inspection/Monitoring Checklist for Contractors

SAMPLE DAILY MONITORING SHEET FOR CONTRACTORS

NAME OF PROJECT

Contractor Monitoring Sheet

Name of Component: _____

Location: _____

Supervising PIU: _____

Contractor: _____

Contractor EHS Supervisor (or equivalent): _____

Date of monitoring: _____

Summary of Findings

Monitoring Item	Status	Remarks
1. Compliance with Local Permit Requirements	(Secured/Application Submitted/Not Applicable)	
Location/zoning permits		
Permit to construct		
Building permit		
Transport/hauling permits		
2. Compliance with IEE Requirements	(Approved/Under Preparation/Submitted to PMU for Approval/Not Applicable)	
Site-specific EMP (SEMP)		
Corrective Action Plan, if any		
3. Compliance with SEMP		
Construction Site	(Satisfactory/Needs Improvement/Not Implemented/Not Applicable)	
Conduct of toolbox talk		
Use of PPE		
Rest areas for male and female workers		
Toilets for male and female workers		
Medical kits		
Drinking water supply		
Dust control		
Noise control		
Solid waste management		
Wastewater management		

Monitoring Item	Status	Remarks
Chemicals storage (fuel, oil, etc.)		
Siltation or erosion control		
Heavy equipment staging / parking area		
Barricades around excavation sites		
Access to residential houses/shops/businesses		
Traffic routing signages		
Lightings at night		
Trench shoring / landslide protection		
Construction Workers' Camp Site	(Available/Needs Improvement /Not Available Not Applicable)	
Quarters for male and female workers		
Sleeping utilities (e.g. beds, pillows, blankets, mosquito nets, etc.)		
Power/Electricity supply		
Drinking water supply		
Toilets for male and female workers		
General purpose water supply (cooking, washing, bathing)		
Cooking facilities and areas		
Solid waste management		
Wastewater management		
Pest control		
4. Implementation of GRM	(Yes/No or None/Under Resolution)	
Complaints		
Complaints resolution		
5. Environmental Quality Measurement	(Passed/Failed/Not Applicable)	
Ambient air quality sampling		
Noise level measurement		
Receiving water quality sampling		

Other Issues: _____

_____

_____

_____

Attachments:

1. Copies of permits secured, if any.

2. Photos taken at worksites, if any.

(photos attached in previous monitoring sheets should not be used again).

3. Laboratory results of environmental quality measurements, if any.

Prepared by: _____

Name, Designation and Signature

Appendix 8: Sample Environmental Safeguards Site Inspection Checklist for PMU/PIU/PMC/DSC

SAMPLE SITE INSPECTION CHECKLIST FOR PMU/PIU/PMC/DSC

Project: _____ Date: _____

Component / Location: _____

MONITORING/INSPECTION QUESTIONS		FINDINGS			COMMENTS/ CLARIFICATIONS
1.	Supervision and Management On-Site	Yes	No	NA	
	Is an EHS supervisor available?				
	Is a copy of the SEMP available?				
	Are daily toolbox talks conducted on site?				
2.	The Facilities	Yes	No	NA	
	Are there a medical and first aid kits on site?				
	Are emergency contact details available on-site?				
	Are there PPEs available? What are they?				
	Are the PPEs in good condition?				
	Are there firefighting equipment on site?				
	Are there separate sanitary facilities for male and female workers?				
	Is drinking water supply available for workers?				
	Is there a rest area for workers?				
	Are storage areas for chemicals available and with protection? in safe locations?				
3.	Occupational Health and Safety	Yes	No	NA	
	Are the PPEs being used by workers?				
	Are excavation trenches provided with shores or protection from landslide?				
	Is breaktime for workers provided?				
	How many for each type of collection vehicle is in current use?				
4.	Community Safety	Yes	No	NA	
	Are excavation areas provided with barricades around them?				
	Are safety signages posted around the sites?				
	Are temporary and safe walkways for pedestrians available near work sites?				
	Is there a record of treated wastewater quality testing/measurement?				
5.	Solid Waste Management	Yes	No	NA	

MONITORING/INSPECTION QUESTIONS		FINDINGS			COMMENTS/ CLARIFICATIONS
	Are excavated materials placed sufficiently away from watercourses?				
	Is solid waste segregation and management in place?				
	Is there a regular collection of solid wastes from work sites?				
6.	Wastewater Management	Yes	No	NA	
	Are there separate sanitary facilities for various types of use (septic tanks, urination, washing, etc.)?				
	Is any wastewater discharged to storm drains?				
	Is any wastewater being treated prior to discharge?				
	Are measures in place to avoid siltation of nearby drainage or receiving bodies of water?				
	Are silt traps or sedimentation ponds installed for surface runoff regularly cleaned and freed of silts or sediments?				
7.	Dust Control	Yes	No	NA	
	Is the construction site watered to minimize generation of dust?				
	Are roads within and around the construction sites sprayed with water on regular intervals?				
	Is there a speed control for vehicles at construction sites?				
	Are stockpiles of sand, cement and other construction materials covered to avoid being airborne?				
	Are construction vehicles carrying soils and other spoils covered?				
	Are generators provided with air pollution control devices?				
	Are all vehicles regularly maintained to minimize emission of black smoke? Do they have valid permits?				
8.	Noise Control	Yes	No	NA	
	Is the work only taking place between 7 am and 7 pm, weekdays?				
	Do generators operate with doors closed or provided with sound barrier around them?				
	Is idle equipment turned off or throttled down?				
	Are there noise mitigation measures adopted at construction sites?				

MONITORING/INSPECTION QUESTIONS		FINDINGS			COMMENTS/ CLARIFICATIONS
	Are neighbouring residents notified in advance of any noisy activities expected at construction sites?				
9.	Traffic Management	Yes	No	NA	
	Are traffic signages available around the construction sites and nearby roads?				
	Are re-routing signages sufficient to guide motorists?				
	Are the excavation sites along roads provided with barricades with reflectors?				
	Are the excavation sites provided with sufficient lighting at night?				
10.	Recording System	Yes	No	NA	
	Do the contractors have recording system for SEMP implementation?				
	Are the daily monitoring sheets accomplished by the contractor EHS supervisor (or equivalent) properly compiled?				
	Are laboratory results of environmental sampling conducted since the commencement of construction activities properly compiled?				
	Are these records readily available at the site and to the inspection team?				

Other Issues: _____

_____

_____

_____

Prepared by: _____

Name, Designation, and Signature