Environmental Assessment and Review Framework

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Project Number: 53067-004
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IND: Inclusive, Resilient and Sustainable Housing for Urban Poor Sector Project in Tamil Nadu – PART B

Prepared by the Tamil Nadu Slum Clearance Board for the Asian Development Bank.

Location	Photographs	Observations
Proposed Relocation Site (new): REDDIARPATTI **Date of site visit**: 26.09.2019		• The proposed relocation site falls under the Municipal Corporation limits • It is well connected to NH7 and located at a distance of 4.5 km from the city bus terminus • It abuts private land on one side and is adjacent to an existing TNSCB settlement and upcoming (under construction) TNSCB settlement for about 450 families • All slums proposed for relocation to this new site are located at a distance of 9-10 km • No sensitive natural or human receptors in close proximity to the proposed relocation site • Leveling of land prior to construction is anticipated • It will require an environmental clearance (EC) from the state EIA authority due to the proposed built-up area of 45,000 square meters • Primary health care center located at a distance of 2.5 km • Proposed STP of adequate design and capacity will linked to the ongoing UGSS scheme • There is a private Children's Home next to the proposed site • Chicken coop (encroachment by private land owner) is on TNSCB land with some herb / fruit bearing trees that will be retained through optimum site design and allocation of open space
Slum proposed or relocation (existing): KARUPANTHURAI at the banks of the THAMIRABARANI RIVER		• Dwelling units situated along the banks of the river THAMIRABARANI • Area faced severe floods in years 1989,1992 and 2015 • Drinking water is supplied through Corporation • Encroachers are not having patta • SWM is maintained by the corporation • Street light facility is provided • Common toilets have been provided; however open defecation is common • Residents do not have patta • Livelihood opportunities available in nearby areas
Slum propsed for relocation (existing):		• Dwelling units situated along the banks of the river THAMIRABARANI • Area faced severe floods in years 1989,1992 and 2015

Location	Photographs	Observations
WEST KOKARAKULAM at the banks of the THAMIRABARANI RIVER	 	• Drinking water is supplied through Corporation • Encroachers are not having patta • SWM is maintained by the corporation • Street light facility is provided • Common toilets have been provided; however open defecation is common • Residents do not have patta • Livelihood opportunities available in nearby areas
Slum proposed for relocation (existing): ELANTHAKULUM		• Dwelling units are located in the ELANTHAI KULAM periphery area • Residents do not have patta • • Concrete structures have been built on the lake-bed after filling • Religious structures constructed (church / temple) • Situated at a distance of 4.5 km from the proposed relocation site • Area prone to flooding • Drinking water is supplied through corporation; some of the dwelling units are having their own bore well facility • Street light facility is provided • SWM maintained by the corporation. • Common public toilets have been provided; however, open defecation is common

Location	Photographs	Observations
		• Household wastewater directly discharges into the pond / tank (kulam)
		• Place of worship on the bund of the pond
		• Place of worship built within the pond, on the edge of the pond

Location	Photographs	Observations
Slum proposed for relocation (existing): PILLAIKULAM	 	• Dwelling units are located in the PILLAIKULAM periphery area • Residents do not have patta • Drinking water is supplied through bore well provided with a pump house • SWM is maintained by the Corporation • Some dwelling units have toilet facilities, however these discharges directly into the pond/ tank (kulam). • Most the dwelling units G+1 'pucca' / concrete structures • Street light facility is provided • It is located at a distance of 13 km from the proposed relocation site

Table A3.1. GENERAL ANTICIPATED IMPACTS – NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
	All Subproject Components [3]								
	A. Physical Resources								
1	Climate Risks	Subproject vulnerability due to climate risks	M	Indirect/ Irreversible		X			• Integrate climate change adaptation measures into detailed design • Specifications for use of materials with the lowest embedded Greenhouse gases (GHG) • Specify local materials from licensed and /or local providers that minimize transport distance • Specify materials that are recycled, have recycled content or are from sustainable sources

[1] In their bids, all contractors will be required to respond to the subproject specific IEE and EMP requirements, which shall take reference of the mitigation measures described in these Tables A3.1, A3.2 and A3.3 at a minimum. All contractors will be required to prepare a site-specific Environmental Management Plan (C-EMP) including sub-plans and Standard Operation & Maintenance Plans (SOMPs) detailed in Table 6.4 of the EARF. These plans will be prepared under the supervision of the TNSCB PIDs and in consultation and support of Urban Local Bodies (ULBs) as required. The plans will be reviewed and cleared by TNSCB PMU prior to any subproject activity. Each contractor will be required to assign a person responsible for environment, health and safety (Contractor-EHS) and grievance redress mechanism (Contractor-GRM) as well as for Asbestos Containing Materials (Contractor-ACM).

[2] With Category A excluded, the magnitude of impacts is predictable and will be relatively low for all subprojects. To maintain the integrity of the assessment process, the "Potential Impact" has been categorized as Low, Medium, High (L/M/H) while nature of impact is descried as Direct / Indirect, Local/Regional, Reversible / Irreversible.

[3] Subproject components under new housing development will include a) New buildings for housing and other uses; b) Supporting services as such as electricity supply, water supply, onsite sanitation system e.g., a sewage treatment plant, septic tanks, etc., / wastewater collection, treatment and disposal; access roads; storm water drainage for runoff; rainwater harvesting tanks / pits, and solid waste management – segregation and collection.

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
2	Topography (Land and Vegetation)	Potential adverse impact on sensitive receptors[4]	L	Direct/Local / Irreversible		X	x	X	• Undertake detailed walk over survey to establish site conditions prior to any subproject activity • Subproject selected to avoid sensitive receptors such as habitats of conservation value, households / structures, Physical Cultural Resources (PCRs) • Locate site where these is low risk of flooding
		Lack of sufficient design and planning to ensure long term sustainability of subproject and protection of assets created	L	Direct/Local / Irreversible		X	x	X	• Detailed design to integrate recommendations from geo-tech / topo investigations for site planning and civil works for all new housing development and supporting services • Site design to allow efficient drainage and maintain natural drainage patterns • Consider potential impacts from extreme weather events in design of subproject components

[4] "Receptor": the resource (human / natural environment / economic / social) that is potentially going to receive and have to cope with an impact; "Sensitivity": ability to cope with an impact and/or its importance to India. It is generally accepted that human health is always a high sensitivity receptor, however in terms of environmental/natural resources, the sensitivity varies according to the receptor e.g. scrubland with no significant biodiversity is considered less sensitive than a water body which may support aquatic ecosystems, local biodiversity and/or livelihoods through fishing or marine tourism. "Magnitude": the size of the potential impact. Impacts may be short term and considered low magnitude (e.g. noise, dust or vibration) or high magnitude and long term (e.g. global impacts due to the project).

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						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									• Detailed design will include provisions for ensuring effective maintenance and protection of assets created
		Change in the natural physical features and current aesthetics due to the construction and operation of the subproject	H	Direct/Local / Reversible		X	x	X	• Vegetation clearances strictly restricted to the works sites • Minimize permanent and temporary land take for civil works • All temporary land-take resorted to pre-construction conditions • Develop and implement o Site Restoration Plan (after completion of civil works) o New Housing Development Standard Operation & Maintenance Plan (during operation)
		Stockpiling of materials	H	Direct/Local / Reversible			x		• Storage of construction material confined to work sites in a way to ensure that there is no obstruction to natural drainage pattern, efficient drainage is maintained • Stockpiles to be covered to reduce dust generation • Develop and implement – o Materials Management Plan (including warehouses / storage)

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
		Borrow pits / Spoils re-use / disposal	H	Direct/Local / Reversible		X	x		• Borrow pits and spoils disposal sites (if any), identified and utilized as per pre-approved plans from the relevant authority • To be located at least 100m from existing residential areas to reduce dust and noise from these sites • Vehicles covered during transportation to avoid spillage • Rehabilitate and vegetate spent borrow areas and spoil disposal sites as soon as possible after closure to prevent soil erosion and dust generation • Develop and implement – o Spoils Re-use / Disposal Plan
		Sources of materials	M	Direct/Local / Reversible		x	x		• Maximize the re-use of earth-cut materials, spoils, and construction & demolition debris / wastes • Specify materials that are recycled, have recycled content or are from sustainable sources • In case required, use borrow pits licensed by the relevant authority, if the re-use options are not feasible
		Hazardous materials	H	Direct/Local / Reversible		x	x	X	• Temporary secured area set up for storage and handling of hazardous and polluting materials

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									• Design, as needed, a permanent ('bunded') impermeable surface capable of carrying 110% volume of materials for accidental spills or leakage • Delivery and acceptance of all hazardous materials / equipment will be accompanied by a Materials Safety Data Sheets (MSDS) and/or be certified that it is polychlorinated biphenyl-free (PCB) free • Licensed vendors/ companies to collect transport and dispose used / unused hazardous materials / wastes • Vehicle / equipment maintenance and refueling to be done offsite or within designated service area on impermeable surfaces and away from water sources / water bodies • Develop and implement – ○ Hazardous Materials Control Plan
3	Physical Cultural Resources (PCRs)	Potential impact on archaeological, historical or cultural important sites	L	Direct/Local / Reversible		X	x		• Detailed walk over survey / and buffer selection to avoid sensitive receptors such as PCRs • Establish and implement (as required "Chance Find Procedures'

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									• Consult with local ASI office if any construction activities in close proximity to World / Local Heritage Sites and obtain prior permission (requires prior permission of ASI for undertaking works within 100-300 m of the boundary of the protected / heritage monuments). • Any impact on heritage needs to be assessed and included within the environmental assessment process. This includes the need to conduct and implement Heritage Impact Assessment and Management Plan in close consultation and support of the ASI • Conduct training of works on PCRs and Chance Find Procedures during orientation / induction
	B. Environmental Resources								
1	Air Quality	Impact on air quality during general construction activities due to increase in dust emissions and vehicular emissions	H	Direct/Local / Reversible		x	x		• Work sites to be enclosed / barricaded • Air quality monitoring once before the start of civil works to establish the baseline; monthly during the civil works (as per the confirmed construction schedule) and once after completion of the civil works

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									(location: at new housing development) • Periodic watering at construction sites, construction staging areas, unpaved areas, exposed dust prone construction stockpiles • Maintenance of project construction vehicles, equipment, machinery, etc. • Control vehicle speed to ≤ 8 km/h in unpaved areas including unpaved approach roads; Post the speed limit sign in these areas • Install wheel washing equipment or conduct wheel washing manually at each exit of the construction sites and at asphalt/concrete mixing stations to prevent trucks from carrying muddy or dusty substances on public roads • Store dust-prone materials in areas with shelters on four sides and on top; If such materials have to be stored in open area, cover with strong tarpaulin • Vehicles with an open load-carrying case, which transport potentially dust-producing materials, shall have proper fitting sides and tail boards;

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									Dust-prone materials shall not be loaded to a level higher than the side and tail boards, and shall always be covered with a strong tarpaulin • Develop and implement - o Dust Control Plan
2	Noise	Noise/ vibration due to general construction activities and vehicular movement	H	Direct/Local / Reversible		X	x	x	• Noise level measurements once before the start of the civil works to establish the baseline; monthly during the civil works (as per the confirmed construction schedule) and once after completion of the civil works (location: new housing development) • Proper maintenance of vehicles / equipment/ machineries so that the ambient noise standards are met, refer to Section 2 of EARF • Restriction of noise generating activities at night or if required, no night time construction within 500 m of the nearest household) • Restrictions on the movement of heavy construction vehicles at night • Use of Personal Protective Equipment (PPE) like ear plugs, mufflers, etc. • Develop and implement – o Noise Control Plan

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
3	Surface and Ground Water Quality	Pollution due to runoff from general construction activities Siltation of water sources / water bodies due to spillage of construction wastes / slurry	H	Direct/Local / Reversible		X	x		• Surface and ground water quality monitoring once before start of civil works to establish the baseline; once during civil works and once after completion of civil works (location: new housing development) [5] • Construction / workers camps, stockpiles of materials, etc., to be located away from water bodies / water sources / drainage leading to water bodies / water sources • No disposal of construction & demolition debris / wastes into water bodies / water sources • Collect wastewater from construction activities in sedimentation tanks, retention ponds, and filter tanks to remove silts and oil • Install and operate temporary silt traps along drainage and/or sedimentation tanks on construction sites to treat and process water and muddy runoff with high concentrations of

[5] Mitigation of water quality impact during construction shall be based on site specific water quality monitoring results conducted once before start of civil works to establish baseline. In India, the Central Pollution Control Board has identified water quality requirements in terms of a few chemical characteristics, known as primary water quality criteria. Further, Bureau of Indian Standards has also recommended water quality parameters for different uses in the standard IS 2296:1992. Weblink: http://cwc.gov.in/sites/default/files/annexure-2.pdf

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									suspended solids. If necessary, use flocculants such as polyacrylamide (PAM) to facilitate sedimentation • If there are nearby public sewers, install pipelines to convey sewage / wastewater to public sewers • No vehicle / equipment / machinery maintenance activity close to water bodies / water sources / drainage • Develop and implement – o Construction Wastewater Management Plan
		Pollution due to oil / lubricant / fuel spillage	M	Direct/Local / Reversible		X	x	x	• Temporary secured area set up for storage and handling of hazardous and polluting materials with a containment tray or provided with bunds • Design, as applicable, a permanent ('bunded') impermeable surface capable of carrying 110% volume of materials for accidental spills or leakage; site it at least 100 m away from water bodies/ water sources / drainage • Develop and implement – Spills Response Plan o Provide with cleanup kits

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									○ Keep a stock of absorbent materials (e.g. sand, earth or commercial products) on site to deal with spillages and train staff in their use ○ Protocol for immediate action utilizing absorbents (final disposal at an approved waste disposal facility) • If refueling in the field is required, it shall be done from road-licensed fuel trucks away from water bodies / water sources / drainage
4	Soil and Geology	Damage due to seismic activity	L	Direct/ Regional/ Irreversible		x			• Site selection and design considering the geological conditions; design should consider seismicity as per national guidance on seismic design that calls for identification of a maximum credible earthquake scenario and associated ground acceleration parameters • Tamil Nadu is in Zone II and III
		Soil erosion	M	Direct/Local / Reversible		x	x		• Avoidance of new housing development on sites that are prone to the soil erosion • Detailed design to integrate recommendations from geo-tech / topo investigations

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						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									• Soil quality testing as part of the detailed engineering design scope • Consideration of suitable slope and soil type • Proper land leveling and grading for stabilization and other erosion-prone working areas, at spoils disposal sites and permanent stabilization measures at least **within 30 days** of end of construction period • Close attention to drainage provision; maintain natural drainage patterns • Restore vegetation cover on any backfilled areas to prevent soil erosion; If restoration is carried out during periods of hot or extreme weather, ensure adequate aftercare to maximize survival
		Pollution due to oil / lubricant / fuel spillage	M	Direct/Local / Reversible		x	x		• Temporary secured area set up for storage and handling of hazardous and polluting materials with a containment tray or provided with bunds • Design, as applicable, a permanent (‘bunded’) impermeable surface capable of carrying 110% volume of materials for accidental spills or

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									leakage; site it at least 100 m away from water bodies/ water sources / drainage • Develop and implement – Spills Response Plan • If refueling in the field is required, it shall be done from road-licensed fuel trucks away from water bodies / water sources / drainage
	C. Ecological Resources								
1	Terrestrial Ecology	Loss of ecology	L	Direct/Local / Irreversible		x	x	x	• Undertake detailed walk over survey to establish site conditions prior to any subproject activity • No use of chemicals (pesticides / herbicides) • Minimize vegetation clearing confined to the footprint of work (construction and construction staging) sites • Avoidance of tree cutting at new housing development • Plant trees and re-vegetate the site immediately after construction; Only native plant species of local prevalence will be used for re-vegetation • Restoring temporarily disturbed areas / land take to pre-construction conditions Develop and implement –

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									○ Site Restoration Plan (after completion of civil works) ○ New Housing Development Standard Operation & Maintenance Plan (during operation stage)
2	Terrestrial Fauna	Species vulnerability to anticipated change in habitat	L	Direct/Local / Irreversible		x			• None anticipated since new housing development located in urban and peri-urban areas with access to economic services / activities; but will be re-assessed for each specific subproject • If required, undertake ground surveys to assess impacts of subproject activity / any constructed new access / approach roads situated close to habitat of conservation value to inform the detailed design and incorporate relevant mitigation measures in the environmental assessment
3	Avifauna	Disturbance to the local avifauna	L	Direct/Local / Irreversible		x			• None anticipated since new housing development located in urban and peri-urban areas with access to economic services / activities • • Allocation of open space reservation (OSR) equivalent to

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									10 percent of total area at a resettlement site; and additional 15 percent of green belt area for subprojects that require Environmental Clearance (EC) ; this is anticipated to attract local avifauna
4	Aquatic Ecology	Not anticipated	L	Direct/Local / Irreversible		x			• None anticipated since new housing development will not be situated in close proximity to rivers or lakes, but will be re-assessed for each specific subproject • • If required, undertake surveys to assess impacts of subproject activity / any constructed new access / approach roads situated close to rivers or lakes to inform the detailed design and incorporate relevant mitigation measures in the environmental assessment
D. Human Environment									
1	Occupational Health and Safety	Exposure to hazards for workers working on asphalt mixing, concrete mixing, cement, etc.	H	Direct/Local / Reversible		x	x	x	• Develop and implement – Occupational Environment, Health and Safety (EHS) Plan and Emergency Response Plan (ERPs) at work sites ○ E.g. IFC (WB) EHS Guidelines on Occupational

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									Environment, Health and Safety ○ Strictly enforce the use of PPE during construction such as goggles, gloves , noise reducing mufflers, head-lamps, stand-alone outdoor lighting, **h**igh visibility safety vests with reflective striping for night-time works (if any), and respirators to construction workers doing asphalt concrete and cement concrete road paving to minimize skin exposure to and inhalation of fumes and dust ○ Training of workers for specific type of work engagement, e.g. STP operation and maintenance, sludge handling and disposal, electric transformer operation and maintenance, pumping equipment operation and maintenance, CNG/ LPG / Diesel genset operation and

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									maintenance, etc. ○ Create awareness health & safety risks of transmittable diseases (HIV/AIDs / COVID-19), child labor, bonded labor or forced labor
		Fires, explosion and other accidents	H	Direct / Local / Irreversible			x	X	• Strictly enforce the use of PPE during construction and operation and maintenance • Develop and implement – Occupational EHS Plan and ERP during construction and operation • Regular inspection of equipment / machineries for faults • Log accidents
		Provision of construction / workers accommodation	H	Direct/Local / Reversible			x		• Provide adequate workers accommodation in line with IFC (WBG) guidelines IFC Guidance Note/ Workers Accommodation
		Unhygienic conditions at construction / workers camps	H	Direct/Local / Reversible			x		• Provide water and sanitation facilities (situated separately for men and women); regular cleaning and disinfection of camps • Provide temporary electricity connection • Provide portable water / storage tanks

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									• Provide health checkup / access to medical care • Provide waste bins and collection, no final disposal onsite • Discharge construction / workers camp sewage / wastewater into onsite septic tanks or connect to local public sewer system
2	Community Health and Safety	Excessive disturbance to communities due to prolonged construction	M	Direct/Local / Reversible		x	x	X	• Meaningful consultations with communities to keep them informed of anticipated activities, in particular those that may result in disruption with respect to area access, utilities, and noisy or dust-generating activities that are likely to result in significant disturbance • Identify and adhere to strict construction schedule • Liaise with schools that are in close proximity to construction sites on school examination periods and scale down construction activities during such periods • Alert communities and residents if night time construction work shall occur nearby (no night time construction within 500 m of the nearest household) and ensure alternative access is provided

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									• Ensure communities are aware of Grievance Redress Mechanism (GRM) entry points • Create awareness of health & safety risks of transmittable diseases (HIV/AIDs / COVID-19), child labor, bonded labor or forced labor • Develop and implement – ○ Community Health and Safety Plan
		Temporary traffic management	M	Direct/Local / Reversible		X	x		• Develop and implement - Traffic Control Plan together with the local traffic police prior to any construction activities • Avoid high density areas for movement of construction vehicles • Proper traffic signs at the construction sites with information on nature and duration of work for public safety • Schedule transport routes and activities during non-peak hours; in case of lane closures, deploy workers to direct traffic • Erect speed limit signs of 8 km/h on all unpaved approach roads and unpaved construction site areas as a means of controlling fugitive dust emission in unpaved areas

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
		Access to construction sites	M	Direct/Local / Reversible			x		• Make all sites secure, and discourage access by members of the public through appropriate fencing, signage and/or security personnel, as appropriate
		Utility services interruptions	M	Direct/Local / Reversible		X	x		• Assess construction locations in advance and identify potential for disruption to utility services and risks before starting construction • Any damage or hindrance/disadvantage to local communities, businesses, persons, etc., caused by the premature removal or insufficient replacement of public utilities is subject to full compensation, at the full liability of the contractor who caused the problem • If temporary disruption is unavoidable, develop a plan in collaboration with relevant local authorities such as power company, water supply company and communication company to minimize the disruption and communicate the dates and duration in advance to affected communities / persons / businesses
		Information disclosure	H	Direct/Local		x	x		• Conduct meaningful consultations to inform nearby

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									residents and businesses in advance of the construction activities, given the dates and duration of expected disruption and make aware of the subproject GRM entry points • Erect construction billboards, which include construction contents, schedule, responsible person and complaint phone number, at the entry to each construction site and construction staging area • Place clear signs at construction sites in view of the public, warning people of potential dangers such as moving vehicles, hazardous materials, etc. and raising awareness on safety issues
4	Socio-economics	Beneficial impacts / job opportunities Influx of migrant workers	H	Direct/ Regional			x	X	• Hiring for temporary construction jobs; emphasis to local hiring to avoid social conflict • Overall economic growth of the region
	New Buildings for Housing and Other Uses								
1	Topography (Land and Vegetation)	Lack of sufficient design and planning to ensure long	L	Direct/Local / Reversible		X	x	x	• Implement mitigation measures for potential environmental impacts on Topography as listed under “All Subproject Components” sub-heading; and

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
		term sustainability of subproject and protection of assets created							the following: • New housing development located on vacant land • Detailed design to integrate Bureau of Indian Standards (BIS) code for buildings • Design an energy efficient layout • Allocation of open space reservation (OSR) equivalent to 10 percent of total area at a resettlement site; and additional 15 percent of green belt area for subprojects that require Environmental Clearance (EC); these will either retained and/or maintained to improve aesthetics • Existing trees to be retained, plant new trees and re-vegetate site immediately after completion of construction / civil works • Operation & Maintenance (O&M) manuals for buildings as per recommendations of SH architects / engineers
2	Air Quality	Impact on air quality during general construction activities due to increase in dust emissions	H	Direct/Local / Reversible		x	x	X	• Implement mitigation measures for potential environmental impacts on Air Quality as listed under “All Subproject Components” sub-heading; and the following:

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	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
		and vehicular emissions							• Mitigate fumes and particulate matter from concrete batching units as follows: o Locations for hot mix/concrete batching stations must be at least 300 m downwind of the nearest existing household o Confined within work sites that are enclosed and barricaded o Equip hot mix/ concrete batching stations with fabric filters and/or wet scrubbers to reduce the level of dust emissions
3	Noise	Noise / vibration due to general construction activities	H	Direct/Local / Reversible		x	x		• Implement mitigation measures for potential environmental impacts for Noise as listed under “All Subproject Components” sub-heading; and the following: • Placement of hot mix / batching units confined within work sites that are enclosed and barricaded
4	Surface and Ground Water Quality	Pollution due to runoff from general construction and operation activities	H	Direct/Local / Reversible		x	x	X	• Implement mitigation measures for potential environmental impacts on Surface and Ground Water Quality as listed under “All Subproject Components” sub-heading; and the following:

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
		Siltation of water sources / water bodies due to spillage of construction wastes / slurry							• All buildings for housing and other uses shall be connected to a trunk sewer that will connect to onsite Sewage Treatment Plant (STP); no direct discharge to drainage, water bodies or water sources or nearby community resources • Kitchen wastewater from housing will be treated onsite in a Wastewater Treatment Plant (WWTP), recycled and reused for watering of plants, trees, etc.; no direct discharge to drainage, water bodies or water sources or nearby community resources • All housing units will have connection to water supply that shall meet the designated standards; refer to details in "Water Supply" section of Table A3.1 .
5	Soil and Geology	Soil erosion; Pollution due to oil / lubricant / fuel spillage	M	Direct/Local / Reversible		x	x		• Implement mitigation measures for potential environmental impacts on Soil and Geology as listed under "All Subproject Components" sub-heading
	Access Roads within New Housing Development / Upgrade of Approach Roads to New Housing Development								
1	Topography (Land and Vegetation)	Lack of sufficient design and	L	Direct/Local / Reversible		x	x	X	• Implement mitigation measures for potential environmental impacts on Topography as

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
		planning to ensure long term sustainability of subproject and protection of assets created							listed under "All Subproject Components" sub-heading; and the following: • Detailed design to integrate recommendations as per geo-tech / topo investigations such as for: road alignment, road surface • Design to maximize the re-use of earth-cut materials (if any), spoils, and construction & demolition debris/ wastes, including the re-use of old asphalt or concrete road pavements for subgrade materials • Minimize temporary land take for road works • All temporary land-take resorted to pre-construction conditions • Develop and Implement - o Site Restoration Plan (after completion of civil works) o New Housing Development Standard Operation & Maintenance Plan (during operation stage) • Regularly inspect and maintain the road surface
2	Air Quality	Impact on air quality during	H	Direct/Local / Reversible		x	x	X	• Implement mitigation measures for potential environmental

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
		general construction activities due to increase in dust emissions and vehicular emissions							impacts on Air Quality as listed under "All Subproject Components" sub-heading; and the following: • Mitigate fumes and particulate matter from asphalt mixing stations as follows: o Locations for asphalt mixing stations must be at least 300 m downwind of the nearest existing household o Confined within work sites that are enclosed and barricaded o Equip asphalt mixing stations with fabric filters and/or wet scrubbers to reduce the level of dust emissions
3	Noise	Noise / vibration due to general construction activities	H	Direct/Local / Reversible		x	x		• Implement mitigation measures for potential environmental impacts for Noise as listed under "All Subproject Components" sub-heading; and the following: • Placement of asphalt mixing units confined within enclosed and barricaded spaces
4	Surface and Ground Water Quality	Pollution due to runoff from general	H	Direct/Local / Reversible		X	x	x	• Implement mitigation measures for potential environmental impacts on Surface and Ground

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
		construction activities Siltation of water sources / water bodies due to spillage of construction wastes / slurry							Water Quality as listed under "All Subproject Components" sub-heading; and the following: • Design of access roads / upgrade of approach roads to ensure no alteration of natural drainage pattern • Maintain a buffer from any water bodies / water sources such that it does not lead to an alteration of surface water hydrology due to increase in sediment load due to construction waste run-off
5	Soil and Geology	Soil erosion; Pollution due to oil / lubricant / fuel spillage	M	Direct/Local / Reversible		X	x	X	• Implement mitigation measures for potential environmental impacts on Topography as listed under "All Subproject Components" sub-heading
	Stormwater Drainage								
1	Topography (Land and Vegetation)	Lack of sufficient design and planning to ensure long term sustainability of subproject and protection of assets created	L	Direct/Local / Reversible		x	x	x	• Implement mitigation measures for potential environmental impacts on Topography as listed under "All Subproject Components" sub-heading; and the following: • Detailed design to integrate recommendations as per geo-tech / topo investigations such as for: drainage alignment and depth

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								

									• Drainage works confined to work sites within new housing development and barricaded and enclosed
									• Drainage works designed to utilize and maintain natural drainage patterns and to blend in the environment
									• Minimize permanent and temporary land take for civil works
									• All temporary land-take resorted to pre-construction conditions
									• Develop and implement
									  ○ Site Restoration Plan (after completion of civil works)
									  ○ New Housing Development Standard Operation & Maintenance Plan (during operation stage)
									• Regularly inspect (frequency - once per week) and maintain stormwater drainage system, e.g. silt accumulation, odor, obstruction, livestock discharge

2	Air Quality	Impact on air quality during general construction activities due to increase in dust emissions	H	Direct/Local / Reversible		x	x		• Implement mitigation measures for potential environmental impacts on Air Quality as listed under “All Subproject Components” sub-heading

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
		and vehicular emissions							
3	Noise	Noise / vibration due to general construction activities	H	Direct/Local / Reversible		X	x		• Implement mitigation measures for potential environmental impacts for Noise as listed under “All Subproject Components” sub-heading
4	Surface and Ground Water Quality	Pollution due to runoff from general construction activities; siltation of water sources due to spillage of construction wastes and run-off during operation stage	H	Direct/Local / Reversible		X	x	X	• Implement mitigation measures for potential environmental impacts on Surface and Ground Water Quality as listed under “All Subproject Components” sub-heading; and the following: • Run-off during operation stage to adequate receiving body e.g. rainwater harvesting pits / tanks, without causing on-site / off-site adverse environmental impacts
5	Soil and Geology	Soil erosion; Pollution due to oil / lubricant / fuel spillage	M	Direct/Local / Reversible		X	x	X	• Implement mitigation measures for potential environmental impacts on Soil and Geology as listed under “All Subproject Components” sub-heading; and the following: • Run-off during operation stage to adequate receiving body e.g. rainwater harvesting pits / tanks, without causing on-site / off-site adverse environmental impacts

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
	Sanitation System – Sewage Treatment Plant - STP / Wastewater Treatment Plant - WWWTP								
1	Topography (Land and Vegetation)	Lack of sufficient design and planning to ensure long term sustainability of subproject and protection of assets created	L	Direct/Local / Reversible		x	x	x	• Implement mitigation measures for potential environmental impacts on Topography as listed under “All Subproject Components” sub-heading; and the following: • Design a STP / WWWTP of appropriate capacity, technology corresponding to the number of buildings for housing and other uses to capture sewage and wastewater discharge (e.g. from kitchens) • Detailed design to integrate recommendations as per geo-tech / topo investigations such as for: site preparation, laying of sewer lines, wastewater pipe lines, manholes, etc. • Siting of STP/ WWWTP away from new buildings for housing; at least 100 m distance • Underground sewer lines to carry sewage from households to trunk sewers and further to STP; therefore sewer line placement away from water supply lines / wastewater pipe lines and drainage; at least 1 m depth below water supply lines / wastewater pipe lines • Minimize permanent and

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								

									temporary land take for civil works
									• All temporary land-take resorted to pre-construction conditions
									• Develop and implement
									  ○ Site Restoration Plan (after completion of civil works)
									  ○ New Housing Development Standard Operation & Maintenance Plan (during operation stage)
									• Develop and Implement – Sludge Management and Disposal / Re-use Plan
									  ○ Treated sludge to meet applicable discharge standards as set by TNPCB [6] and should be disposed at authorised landfills/ disposed with municipal organic waste [7]
									• Treated wastewater to meet effluent discharge standards; refer to Appendix 13
									• Regularly inspect and maintain STP, WWTP, sewer lines, wastewater pipe lines for silt

[6] The STP shall be designed to meet the latest standards defined in Appendix 12.
[7] Treated effluent and sludge shall be reuse as per guidelines of Central Public Health and Environmental Engineering Organization (CPHEEO), Appendix 13.

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									accumulation, overflows, blockages, H_2S buildup, etc.
2	Air Quality	Impact on air quality during general construction activities due to increase in dust emissions, vehicular emissions and operation activities such as foul smell and odour	H	Direct/Local / Reversible			x	X	• Implement mitigation measures for potential environmental impacts on Air Quality as listed under “All Subproject Components” sub-heading; and the following: • Dense plantation in the periphery of STP/ WWTP to avoid adverse impacts on aesthetics and reduce odour / foul smell • Install odor collection and treatment devices, if necessary
3	Noise	Noise / vibration due to general construction & operation activities	H	Direct/Local / Reversible			x	X	• Implement mitigation measures for potential environmental impacts for Noise as listed under “All Subproject Components” sub-heading; and the following: • Deploy low noise pumps or other equipment with sound insulation including enclose pumps with a sound proof structure. • Pump station located at least 100 m from the nearest new building for housing
4	Surface and Ground Water Quality	Pollution due to runoff from general	H	Direct/Local / Reversible		x	x		• Implement mitigation measures for potential environmental impacts on Surface and Ground

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
		construction activities and operation Siltation of water bodies / sources due to spillage of construction wastes							Water Quality as listed under "All Subproject Components" sub-heading and the following: • No direct discharge to drainage, water bodies or water sources or nearby community
		Domestic wastewater / sewage from sanitary facilities at new housing development (new buildings for housing)	M				x	x	• Construction / workers camps provided with portable toilets/ and or septic tanks • Discharge construction/ workers camp sewage / wastewater into onsite septic tanks or connect to local public sewer system • Develop and Implement – Sludge Management and Disposal / Re-use Plan o Treated sludge to meet applicable discharge standards as set by TNPCB[8] and / disposed at authorized landfill / disposed with municipal organic waste [9] • Treated wastewater to meet effluent discharge standards;

[8] The STP shall be designed to meet the latest standards defined in Appendix 12.
[9] Treated effluent and sludge shall be reuse as per guidelines of Central Public Health and Environmental Engineering Organization (CPHEEO), Appendix 13.

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									refer to Appendix 13 of the EARF. • Conduct effluent monitoring (at inlet and at outlet of STP) once a month • Conduct effluent monitoring at WWTP outlet once a month
5	Soil and Geology	Soil erosion; Pollution due to oil / lubricant / fuel spillage	M	Direct/Local / Reversible		x	x	X	• Implement mitigation measures for potential environmental impacts on Topography as listed under "All Subproject Components" sub-heading
	Waste Management[10]								
1	Topography (Land and Vegetation)	Waste generation (including construction & demolition debris / waste) and improper disposal	H	Direct/Local / Reversible		x	x	X	• Develop and Implement - Waste Management Plan for construction stage and operation stage in consultation with ULBs / PWDs • Construction stage: o Provide multiple waste containers at construction / workers camps o Transport of recyclables /scrap/ discarded equipment to identified depots o Maximize the re-use of earth cut materials,

[10] The project will not support new construction of landfills.

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									spoils, and construction & demolition debris / waste to minimize waste disposal o For unused construction & demolition debris / waste, contractors will collect, transport and dispose of debris / wastes at licensed dump facilities[11] and / or used for site reclamation or backfilling o Store all refuse and construction & demolition debris / waste generated on construction sites and construction staging areas away from water bodies / water sources / drainage and in designated areas and remove them from these locations for disposal to approved disposal sites or reuse regularly o Biodegradable waste such as cleared

[11]TNSCB shall ensure that this condition is stipulated in the contractor bid document.

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									vegetation may be provided to local communities for use o Waste burning will be prohibited • Operation stage: o Use of pre-defined areas within the new housing development for temporary safe repository of solid waste o Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas o Locate pre-defined areas away from new buildings for housing, at least 100 m o Ensure SWM area is lined with bunds to prevent liquid waste run-off; run-off to feed into onsite STP o Provide bovine permanent concrete trays for organic waste collection to be used for livestock feed; at least 100 m from new buildings for housing

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									○ Provide an open area for collection, airing, drying of manure; at least 100 m from new buildings for housing and/or stormwater drainage within new housing development ○ No final waste disposal on site / off-site unless in approved landfills ○ Regularly monitor SWM area for pest incidences and reduce numbers if necessary
		Hazardous materials	H	Direct/Local / Reversible		x	x	x	• Implement mitigation measures for potential environmental impacts on Hazardous materials as listed under “All Subproject Components” sub-heading • Prohibit burning of solid / hazardous waste
2	Air Quality	Impact on air quality during general construction activities due to increase in dust emissions, vehicular emissions and during	H	Direct/Local / Reversible			x	X	• Implement mitigation measures for potential environmental impacts on Air Quality as listed under “All Subproject components” sub-heading; and the following: • Dense plantation in the periphery of SWM site to avoid adverse impacts on aesthetics and reduce odor / foul smell

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
		operation activities such as foul smell /odour							
3	Noise	Noise / vibration due to general construction activities	H	Direct/Local / Reversible			x		• Implement mitigation measures for potential environmental impacts for Noise as listed under “All Subproject Components” sub-heading
4	Surface and Ground Water Quality	Pollution due to runoff from general construction activities Siltation of water sources / water bodies due to spillage of construction debris / wastes Runoff from temporary solid waste disposal onsite	H	Direct/Local / Reversible		x	x	x	• Implement mitigation measures for potential environmental impacts on Surface and Ground Water Quality as listed under “All Subproject Components” sub-heading
5	Soil and Geology	Soil erosion; Pollution due to oil / lubricant / fuel spillage	M	Direct/Local / Reversible		x	x	X	• Implement mitigation measures for potential environmental impacts on Soil and Geology as listed under “All Subproject Components” sub-heading
	Water Supply								

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
1	Topography (Land and Vegetation)	Lack of sufficient design and planning to ensure long term sustainability of subproject and protection of assets created	L	Direct/Local / Reversible		x	x	x	• Implement mitigation measures for potential environmental impacts on Topography as listed under "All Subproject Components" sub-heading; and the following: Within New Housing Development • Detailed design to integrate recommendations from geo-tech / topo investigations • All activities confined to work sites within new housing development; to be barricaded and enclosed • Water supply line works designed to blend in the environment • Minimize permanent and temporary land take for civil works • All temporary land-take resorted to pre-construction conditions • Develop and implement - o Site Restoration Plan (after completion of civil works) o New Housing Development Standard Operation & Maintenance Plan (during operation stage)

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									• Regularly inspect and maintain water supply line, bulk valves, pump equipment for silt accumulation, obstruction, etc. Outside new housing development • Conduct detailed survey after finalization of alignment from bulk water source to new housing development to access the feasibility of the alignment for need of any tree cutting, demolition of any structure, road and railway crossings, pipe laying in any private land, presence of any sensitive receptor along alignment, disturbance to public or business etc. • Obtain prior consent from land owners (if pipe laying is required in private land) and No Objection Certificate (NOC) from concerned departments (for pipe laying in roads, road/railway crossings etc.,) prior to start of construction works, is required
		Hazard related to ground subsidence caused by excessive	M	Direct/Local / Reversible		x	x	x	• Bulk water to be drawn from existing water supply source • In consultation with water supply regulatory authority, undertake environmental flow assessment to determine

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
		groundwater pumping							acceptable sustainable bulk water withdrawal rates for construction and operation stage at new housing development or water supply authority to furnish subproject specific commitment letter that relays the above or equivalent information • Avoidance of groundwater abstraction • In case of groundwater abstraction from new borewells or new surface water source abstraction, develop and implement - Water Use Sustainability study / hydro-geological study specific to each subproject site[12] and at minimum to include estimation of sustainable yield, necessary modification to abstraction rates and/or locations to prevent adverse current and future impacts to downstream users or the relevant water agency to furnish subproject specific

[12] The water use sustainability / hydro-geological study for each new water source development is typically studied and monitored by the concerned water supply agency. The TNSCB will obtain a commitment letter and regulatory approvals from the relevant government agency / water supply agency affirming that any new water source development shall utilize water sources at sustainable levels of abstraction only (i.e. without significant reductions in the quantity or quality of the source overall), avoid polluted water sources, avoid water use conflicts by not abstracting water that is used for other purposes and ensure water quality provided complies with national drinking water standards at all times through regular monitoring. This requires identification of all users of the water source and that the water source can be appropriately recharged. Any subsequent water source sustainability study conducted should be incorporated into the relevant IEE and EMP.

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									commitment letter that relays the above or equivalent information. • Groundwater abstraction to be undertaken in line with due permission obtained from the relevant ground water authority prior to any subproject activity .
2	Air Quality	Impact on air quality during general construction activities due to increase in dust emissions, vehicular emissions	H	Direct/Local / Reversible		x	x		• Implement mitigation measures for potential environmental impacts on Air Quality as listed under “All Subproject Components” sub-heading
3	Noise	Noise / vibration due to general construction and operation activities	H	Direct/Local / Reversible			x	X	• Implement mitigation measures for potential environmental impacts for Noise as listed under “All Subproject Components” sub-heading; and the following: • Deploy low noise pumps or other equipment with sound insulation including enclosing pumps with a sound proof structure. • Pump station located at least 100 m from the nearest new building for housing

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
4	Surface and Ground Water Quality	Pollution due to runoff from general construction activities Siltation of water sources / water bodies due to spillage of construction debris / wastes	H	Direct/Local / Reversible		x	x		Implement mitigation measures for potential environmental impacts on Surface and Ground Water Quality as listed under "All Subproject Components" sub-heading
		Abstraction of water affecting downstream users / conflicts with other beneficial uses (groundwater / surface water)	H	Direct/Local / Reversible		x	X	x	• Bulk water to be drawn from existing water supply source • No water to be drawn from polluted sources or from a water source that is being used for other purposes to avoid water conflicts. • In consultation with water supply regulatory authority, undertake environmental flow assessment to determine acceptable bulk water withdrawal rates for construction and operation stage at new housing development or water supply authority to furnish subproject specific commitment letter that relays the above or equivalent information • Avoidance of groundwater abstraction

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									• In case of groundwater abstraction from new borewells, develop and Implement - Water Use Sustainability study / hydro-geological study that is specific to each subproject site[13] and will at minimum include estimation of sustainable yield, necessary modification to abstraction rates and/or locations to prevent adverse current and future impacts to downstream users or the relevant ground water agency to furnish subproject specific commitment letter that relays the above or equivalent information. • Groundwater abstraction to be undertaken in line with due permission obtained from the relevant authority prior to any subproject activity
		Inadequate water supply or poor water	L	Direct/Local / Reversible		x	x	x	• Provision of portable water and water for other uses at construction / workers camps

[13] The water use sustainability / hydro-geological study for each new water source development is typically studied and monitored by the concerned water supply agency. The TNSCB will obtain a commitment letter and regulatory approvals from the relevant government agency / water supply agency affirming that any new water source development shall utilize water sources at sustainable levels of abstraction only (i.e. without significant reductions in the quantity or quality of the source overall), avoid polluted water sources, avoid water use conflicts by not abstracting water that is used for other purposes and ensure water quality provided complies with national drinking water standards at all times through regular monitoring. This requires identification of all users of the water source and that the water source can be appropriately recharged. Any subsequent water source sustainability study conducted should be incorporated into the relevant IEE and EMP.

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
		quality for drinking and other household purposes							• Construction of adequate water supply infrastructure (temporary / permanent) to new housing development including distribution mains, bulk valves, and flow meters to supply portable water and water for other household uses • Ensure municipal water supply complies with designated drinking water quality standards, refer to Section 2 of EARF • Ensure 'water for other household uses' meets applicable standards[14]
5	Soil and Geology	Soil erosion; Pollution due to oil / lubricant / fuel spillage	M	Direct/Local / Reversible		x	x	x	• Implement mitigation measures for potential environmental impacts on Soil and Geology as listed under "All Subproject Components" sub-heading
	Electricity Supply[15]								
1	Topography (Land and Vegetation)	Lack of sufficient design and planning to ensure long	L	Direct/Local / Reversible		x	x	x	• Implement mitigation measures for potential environmental impacts on Topography as listed under "All Subproject components" sub-heading; and

[14] In India, the Central Pollution Control Board has identified water quality requirements in terms of a few chemical characteristics, known as primary water quality criteria. Further, Bureau of Indian Standards has also recommended water quality parameters for different uses in the standard IS 2296:1992.

[15] No new electricity generation source unless rooftop solar panels on new buildings for housing.

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
		term sustainability of subproject and protection of assets created							the following: Within new housing development • All activities confined to work sites within new housing development i.e. erecting distribution poles, street lights, placement of step-down transformer, CNG/ LPG / D gensets[16] of appropriate capacity and stack height for dedicated supply to new buildings for housing and other uses, STP/WWTP operation, etc.); rooftop solar panels; • All works within barricaded and enclosed area • Minimize permanent and temporary land take for civil works • All temporary land-take resorted to pre-construction conditions • Develop and implement - o Site Restoration Plan (after completion of civil works) o New Housing Development Standard Operation & Maintenance Plan (during operation stage)

[16] CNG = Compressed natural gas; LPG = Liquified Petroleum Gas; D = Diesel.

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									• Regularly inspect and maintain electricity poles, e.g. conductors, maintenance of minimum sag, transformer, CNG / LPG / Diesel gensets, etc. Outside new housing development • Conduct detailed survey after finalization of distribution line alignment (from tap off point from main line) to access the feasibility of the alignment for need of any tree cutting, maintaining distance from existing structures, PCRs, road and railway crossings, pole placement in any private land, presence of any sensitive receptor along alignment, disturbance to public or business etc. • Obtain prior consent from land owners (if erection of poles is required in private land) and NOC from concerned departments (for erecting pole along roads, road/railway crossings etc.,) prior to start of construction works, is required
		Hazardous materials	H	Direct/Local / Reversible		X	x	x	• Implement mitigation measures for potential environmental impacts on Hazardous Materials as listed under “All Subproject

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									Components" sub-heading • Ensure trained staff in receiving, handling and storage of LPG/ CNG and Diesel; to store in a shaded and enclosed area at least 100 m from the nearest new building for housing
2	Air Quality	Impact on air quality during general construction activities due to increase in dust emissions, operation of CNG / LPG / Diesel Gensets	H	Direct/Local / Reversible		X	x	x	• Implement mitigation measures for potential environmental impacts on Air Quality as listed under "All Subproject Components" sub-heading; and the following: • Ensure operation of CNG / LPG / Diesel gensets comply with the emissions standards prescribed by the CPCB; weblink: https://cpcb.nic.in/genset-notifications/
3	Noise	Noise / vibration due to general construction and operation activities	H	Direct/Local / Reversible			x	x	• Implement mitigation measures for potential environmental impacts for Noise as listed under "All Subproject Components" sub-heading; and the following: • Place CNG / LPG / Diesel gensets in an acoustic enclosure, other sound insulation • CNG / LPG / Diesel genset located at least 100 m from the nearest new building for

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [2]	Nature of impact		Project Stage			Mitigation measures [1]
						Design & Pre-construction	Construction	Operation	
	NEW HOUSING DEVELOPMENT (RESETTLEMENT SITE) AND SUPPORTING SERVICES								
									housing and ensure CNG / LPG / Diesel gensets comply with the noise standards prescribed by the CPSB, weblink: https://cpcb.nic.in/genset-notifications/
4	Surface and Ground Water Quality	Pollution due to runoff from general construction activities Siltation of water sources / water bodies due to spillage of construction debris/ wastes Pollution due to oil / lubricant / fuel spillage	H	Direct/Local / Reversible		x	x		• Implement mitigation measures for potential environmental impacts on Surface and Ground Water Quality as listed under "All Subproject Components" sub-heading
5	Soil and Geology	Soil erosion; Pollution due to oil / lubricant / fuel spillage	M	Direct/Local/ Reversible		x	x	x	• Implement mitigation measures for potential environmental impacts on Soil and Geology as listed under "All Subproject components" sub-heading

Table A3.2. GENERAL ANTICIPATED ENVIRONMENTAL IMPACTS – DEMOLITION WORKS

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
	All selected encroachments for rehabilitation								
	A. Physical Resources								
1	Topography (Land and Vegetation)	Potential adverse impact on sensitive receptors[20]	L	Direct/Local / Irreversible		x	x		• Demolition works to avoid sensitive receptors such as Physical Cultural Resources (PCRs) and will exclude: ○ Religious structures e.g., chapels, temples, mosques, etc. and if cannot exclude, then the religious structures in consultation with the relevant local stakeholders

[17] In their bids, all contractors will be required to respond to the subproject specific IEE and EMP requirements, which shall take reference of the mitigation measures described in these Tables A3.1, A3.2 and A3.3 at a minimum. All contractors will be required to prepare a site-specific Demolition Environmental Management Plan (D-EMP) including sub-plans as described in Table A3.2. These plans will be prepared under the supervision of the TNSCB PIDs and in consultation and support of Urban Local Bodies (ULBs), Public Works Departments (PWDs) as required. The plans will be reviewed and cleared by TNSCB PMU prior to any subproject activity. Each contractor will be required to assign a person responsible for environment, health and safety (Contractor-EHS) and grievance redress mechanism (Contractor-GRM) as well as for Asbestos Containing Materials (Contractor-ACM).

[18] With Category A excluded, the magnitude of impacts is predictable and will be relatively low for all subprojects; however to maintain the integrity of the assessment process, the "Potential Impact" has been categorised as Low, Medium, High (L/M/H) while nature of impact is described as Direct / Indirect, Local/Regional, Reversible / Irreversible.

[19] The works will include a) Demolition works - of existing encroachments, clearance and fencing.

[20] "Receptor": the resource (human / natural environment / economic / social) that is potentially going to receive and have to cope with an impact; "Sensitivity": ability to cope with an impact and/or its importance to India. It is generally accepted that human health is always a high sensitivity receptor, however in terms of environmental/natural resources, the sensitivity varies according to the receptor e.g. scrubland with no significant biodiversity is considered less sensitive than a water body which may support aquatic ecosystems, local biodiversity and/or livelihoods through fishing or marine tourism. "Magnitude": the size of the potential impact. Impacts may be short term and considered low magnitude (e.g. noise, dust or vibration) or high magnitude and long term (e.g. global impacts due to the project).

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
									○ Avoid cutting trees
		Lack of sufficient design and planning to ensure long term sustainability of subproject and protection of assets created	L	Direct/Local / Irreversible		x	x		• Undertake a detailed walk over survey prior to any subproject activity: ○ Delineating and mapping of catchment areas of encroached water bodies / areas vulnerable to flooding hazards ○ Delineating and mapping Right of Way (ROW) for water canals / channels ○ Delineating and mapping fencing lines / perimeters ○ Ascertaining the location of any Asbestos Containing Materials (ACM) prior to any demolition activity on all site maps and in GIS system; activity undertaken by ACM expert (refer to details below) ○ Conducting situation analysis in the subproject area of influence for current solid waste and hazardous waste disposal, collection and transport, sewerage discharge, drainage, structural integrity of

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
									nearby building that may be affected by vibration during demolition works, etc.
		Change in the natural physical features and current aesthetics due to demolition works	H	Direct/Local / Reversible		x	x	x	• Demolition works strictly restricted to the works sites • Regeneration works to take place at the end of demolition works as per Table A3.3
		Stockpiling of demolition debris / waste	H	Direct/Local / Reversible			x		• Temporary storage of demolition debris / waste (concrete rubble, etc.) confined to work sites, such as there is no obstruction to natural drainage pattern at site • Debris / waste stockpile covered to reduce dust generation
		Spoils re-use / disposal	H	Direct/Local / Reversible			x	x	• Maximize the re-use spoils if any as much as possible for backfilling and site reclamation • Spoils disposal sites identified and utilized as per pre-approved sites and plans from the ULBs / PWDs • Temporary storage to be located within demolition sites and at least 100 m from existing residential areas to reduce dust emissions • Vehicles covered during transportation to avoid spillage • Develop and Implement –

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
									○ Spoils Re-use / Disposal Plan
		Waste generation (including demolition debris/ waste) and improper disposal	H	Direct/Local / Reversible		x	x		• Develop and Implement - Waste Management Plan for demolition works in consultation with ULBs / PWDs • Demolition stage: ○ Transport of recyclables /scrap/ discarded equipment either to identified depots or to be handed over to subproject beneficiaries for use or re-sale ○ Store all refuse and construction & demolition debris / waste generated on demolition sites away from water bodies / water sources / drainage and in designated areas and remove them from these locations for disposal to approved disposal sites or re-use for backfilling / site reclamation ○ Maximize the re-use of spoils, construction & demolition debris / wastes to minimize waste disposal ○ For construction & demolition debris / waste, the contactor(s) will

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
									collect, transport and dispose of wastes at licensed dump facilities that should be clearly identified prior to start of any works[21] ○ Biodegradable waste such as cleared vegetation may be provided to local communities for use ○ Waste burning will be prohibited ○ No final waste disposal on site / off-site unless in approved disposal facilities / landfills
		Hazardous waste materials	H	Direct/Local / Reversible		x	x		• Temporary secured area set up for handling hazardous and polluting materials e.g. polychlorinated biphenyl-free (PCB) in discarded electrical wiring • Licensed vendors/ companies to collect transport and dispose used / unused hazardous materials / hazardous wastes in approved disposal facilities • Develop and Implement – ○ Hazardous Materials Control Plan (including hazardous waste)

[21] TNSCB shall ensure that this condition is stipulated in the contractor bid document.

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
		Asbestos containing materials (ACM)	H			x	x		• Hire an Asbestos Expert to undertake training of all workers / contractors as well as PMU, PIDs in identifying existing ACM and on Occupational Environment, Health and Safety related to potential hazardous material exposure (refer to TOR included as Appendix 11 of EARF) • Conduct detailed walk over survey by ACM expert to ascertain the location of any ACM prior to any demolition activity • Demolition works conducted to avoid disturbing any ACM • Support contractor assigned person (Contractor -ACM) in conducting site assessment (across selected encroachments), developing inventory of existing ACM including tagging and marking locations of existing ACM in all site maps and GIS system • Develop ACM management plan /protocol for compliance with asbestos policies of major international agencies[22] and /or

[22] In the USA, standards and approaches for handling asbestos are prescribed by the Occupational Health and Safety Administration (OHSA) and the Environmental Protection Agency (EPA) and can be found at http://www.osha.gov/SLTC/asbestos

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
									national requirements • Submission of site assessment, inventory, and ACM management plan to TNSCB PMU for review and approval • Contractor-ACM to carry out general awareness campaigns on ACM exposure for field staff and community • Conduct training of workers on ACM during orientation / induction
2	Physical Cultural Resources (PCRs)	Potential impact on archaeological, historical or cultural important sites	L	Direct/Local / Reversible		x	x		• Detailed walk over survey / and buffer selection to avoid PCRs • Establish “Chance Find Procedures’ • Consult with local Archaeology Survey of India (ASI) office if any demolition activities in close proximity to World Heritage Sites, Local Heritage Sites, etc., and obtain prior permission (requires prior permission of ASI for undertaking works within 100-300 m of the boundary of the protected/heritage monuments) • If required, develop and implement Heritage Impact Assessment and Management Plan in close consultation and support of ASI • Conduct training of workers on PCRs and Chance Find Procedures during orientation / induction

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
	B. Environmental Resources								
1	Air Quality	Impact on air quality during demolition activities due to increase in dust emissions and vehicular movement	H	Direct/Local / Reversible		x	x		• Work sites to be enclosed / barricaded • Structures to be demolished should be wetted through water sprinkling to reduce dust • Air quality monitoring once before the start of demolition works to establish the baseline; and once after completion of the demolition work • Periodic watering at demolition sites e.g. at exposed dust prone demolition debris / waste/ stockpiles until final disposal • Vehicles with an open load-carrying case, which transport potentially dust-producing demolition debris/ waste materials / stockpiles, shall have proper fitting sides and tail boards. Dust-prone materials shall not be loaded to a level higher than the side and tail boards, and shall always be covered with a strong tarpaulin • Use of Personal Protective Equipment (PPE); refer to details under Occupational Environment, Health and Safety
2	Noise	Noise/ vibration due to general	H			x	x		• Conduct situation analysis in the subproject area of influence for checking structural integrity of

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
		demolition activities and vehicular movement							nearby building that may be affected by vibration during demolition works, etc. • Noise level measurements once before the start of the demolition works to establish the baseline; and once after completion of the demolition works • Proper maintenance of vehicles / equipment/ machineries so that the ambient noise standards are met; also refer to Section 2 of the EARF • No demolition works at night time; restrictions on the movement of heavy vehicles • Use of Personal Protective Equipment (PPE) like ear plugs, mufflers etc.; refer to details under Occupational Environment, Health and Safety • Develop and implement o Noise and Dust Control Plan
3	Surface and Ground Water Quality	Pollution due to runoff from general demolition activities Siltation of water sources / water bodies due to spillage	H	Direct/Local / Reversible		x	x	x	• No anticipated impact on ground water quality • Stockpiles of demolition debris, waste, materials, etc., located away from water bodies / water sources / drainage leading to water bodies / water sources • No disposal of demolition debris, wastes, etc., into water bodies /

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
		of demolition debris / wastes							water sources / drainage in and around the work sites • Note: water quality monitoring with be conducted prior to start of Regeneration works, refer to details in Table A3.3
		Pollution due to oil / lubricant / fuel spillage	M	Direct/Local / Reversible		x	x		• Temporary secured area set up for storage and handling of hazardous and polluting materials with a containment tray or provided with bunds • Develop and implement – Spill Response Plan o Provide with cleanup kits o Keep a stock of absorbent materials (e.g. sand, earth or commercial products) on site to deal with spillages and train staff in their use o Final disposal at an approved waste disposal facility • If refueling in the field is required, it shall be done from road-licensed fuel trucks away from water bodies / water sources / drainage and/or other sensitive natural receptors
4	Soil and Geology	Soil erosion	M	Direct/Local / Reversible			x	x	• After demolition works, conduct proper land leveling, backfilling, and grading for stabilization, and permanent stabilization measures at the end of demolition works

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
									• Close attention to drainage provision; maintain natural drainage patterns • Restore vegetation cover on any backfilled areas to prevent soil erosion • Note: the site will be restored via Regeneration Works of demolished sites, refer to details in Table A3.3.
		Pollution due to oil / lubricant / fuel spillage	M	Direct/Local / Reversible		x	x		• Temporary secured area set up for storage and handling of hazardous and polluting materials with a containment tray or provided with bunds • Develop and implement – Spill Response Plan • If refueling in the field is required, it shall be done from road-licensed fuel trucks away from water bodies / water sources / drainage and/or other sensitive natural receptors
	C. **Ecological Resources**								
1	Terrestrial Ecology	Loss of ecology	L	Direct/Local / Irreversible		x	x	x	• Avoidance of tree cutting at existing encroachments / demolition sites • Develop and implement - Regeneration Works Standard Operation and Maintenance Plan (SOMP) (also see Table A3.3)

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
2	Terrestrial Fauna	Species vulnerability to anticipated change in habitat	L	Direct/Local / Irreversible		x			• None expected since existing encroachments are located in urban and peri-urban areas with access to economic services / activities
3	Avifauna	Disturbance to the local avifauna	L	Direct/Local / Irreversible		x			• None expected since existing encroachments are located in urban and peri-urban areas with access to economic services / activities
4	Aquatic Ecology	Disturbance to the local aquatic ecology	L	Direct/Local / Irreversible		x			• Stockpiles of debris, waste, materials, etc., located away from water bodies / water sources / drainage leading to water bodies or water sources • No disposal of demolition debris, wastes into water bodies / water sources / drainage in and around the work sites
	D. **Human Environment**								
1	Occupational Health and Safety	Exposure to hazards for workers working on demolition works	H	Direct/Local / Reversible		x	x		• Develop and implement – Occupational Environment, Health and Safety (EHS) Plan and Emergency Response Plan (ERPs) at work sites ○ E.g. IFC (WB) EHS Guidelines on occupational health and safety; Good Practice Note – Asbestos Occupational and

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
									Community Health Issues[23] ○ Strictly enforce the use of PPE during demolition works such as goggles, gloves, noise reducing mufflers, and respirators to workers to minimize inhalation of fumes and dust • Create awareness of health & safety risks of transmittable diseases (HIV/AIDs / COVID-19), child labor, bonded labor or forced labor
		Fires, explosion and other accidents	H	Direct / Local / Irreversible			x		• Strictly enforce the use of PPE during demolition works • Implement Occupational EHS Plan and ERP • Regular inspection of equipment / machineries for faults • Log accidents
2	Community Health and Safety	Excessive disturbance to communities due to demolition works	H	Direct/Local / Reversible		x	x		• Meaningful consultations with communities to keep them informed of anticipated activities, in particular those that may result in disruption of access, utilities, noisy or dust-generating activities that are likely to result in significant disturbance

[23] https://siteresources.worldbank.org/EXTPOPS/Resources/AsbestosGuidanceNoteFinal.pdf

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
									• Identify and adhere to strict demolition schedule, avoid prolonged demolition and disturbance • Ensure alternative access is provided for community facilities. • Liaise with schools that are in close proximity to demolition sites on examination periods and scale down activities during such periods if necessary • Ensure communities are aware of Grievance Redress Mechanism (GRM) entry points • Create awareness of health & safety risks of transmittable diseases (HIV/AIDs / COVID-19), child labor, bonded labor or forced labor • Develop and implement – ○ Community Health and Safety Plan
		Temporary traffic management	M	Direct/Local / Reversible		x	x		• Develop and implement - Traffic Control Plan together with the local traffic police prior to any demolition activities • Proper traffic signs at the demolition sites with information on nature and duration of work for public safety • Schedule transport routes and activities during non-peak hours;

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
									in case of lane closures, deploy workers to direct traffic • Erect signs and barricades
		Access to demolition sites	M	Direct/Local / Reversible			x		• Make all sites secure, and discourage access by members of the public through appropriate barricades, signage and/or security personnel, as appropriate • Ensure alternative access is provided for community facilities
		Utility services interruptions	H	Direct/Local / Reversible		x	x		• Assess demolition sites in advance and identify potential for disruption to services and risks before commencing demolition activities • Any damage or hindrance/disadvantage to local businesses caused by the premature removal or insufficient replacement of public utilities is subject to full compensation, at the full liability of the contractor who caused the problem • If temporary disruption is unavoidable, develop a plan in collaboration with relevant local authorities such as power company, water supply company and communication company to minimize the disruption and communicate the dates and duration in advance to affected communities / persons

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [18]	Nature of impact		Project Stage			Mitigation measures [17]
						Design & Pre-demolition	Demolition	Operation	
	DEMOLITION WORKS[19]								
		Information disclosure	H	Direct/Local		x	x		• Conduct meaningful consultations to inform subproject affected persons / beneficiaries, nearby residents and businesses in advance of the demolition activities, give the dates and duration of expected disruption and make aware of the subproject GRM entry points • Erect billboards, which include schedule, responsible person and complaint phone number, at the entry to each demolition site • Place clear signs at demolition sites in view of the public, warning people of potential dangers such as moving vehicles, hazardous materials, demolition schedule, etc. and raising awareness on safety issues
4	Socio-economics	Beneficial impacts / job opportunities Influx of migrant workers	H	Direct/ Regional			X		• Hiring for temporary jobs / emphasis to local hiring to avoid social conflicts

Table A4.3. GENERAL ANTICIPATED ENVIROMENTAL IMPACTS – REGENERATION WORKS

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [25]	Nature of impact		Project Stage			Minimum Mitigation measures [24]
						Design & Pre-regeneration	Regeneration works	Operation	
	RE-GENERATION WORKS [26]								
	All selected encroachments after completion of demolition works.								
	A. Physical Resources								
1	Climate Risks	Subproject vulnerability due to climate risks	M	Indirect/ Irreversible		x	X	x	• Specifications for use of materials with the lowest embedded Greenhouse gases (GHG) • Specify local materials from licensed and /or local providers that minimize transport distance for re-generation works. • Specify materials that are recycled, have recycled content or are from sustainable sources
2	Topography (Land and	Potential impact on sensitive receptors[27]	L	Direct/Local/ Irreversible		x	X	x	• Regeneration works to include preservation of Physical Cultural Resources (PCRs)

[24] All Contractors in close coordination with the TNSCB PMU and PIDs will be responsible for developing and implementing a site-specific Regeneration Works Environmental Management Plan (R-EMP) including sub-plans as described in Table A3.3; this will be done in consultation and with support of the ULBs /PWDs.

[25] With Category A excluded, the magnitude of impacts is predictable and will be relatively low for all subprojects; still to maintain the integrity of the assessment process, the "Potential Impact" has been categorised as Low, Medium, High (L.M/H) while nature of impact is descried as Direct / Indirect, Local/Regional, Reversible / Irreversible.

[26] The works will include a) Regeneration works - will include at minimum re-greening/re-vegetation of banks along water bodies and channels, clearing and preventing new solid waste disposal and/or sewage disposal in water bodies and channels.

[27] "Receptor": the resource (human / natural environment / economic / social) that is potentially going to receive and have to cope with an impact; "Sensitivity": ability to cope with an impact and/or its importance to India. It is generally accepted that human health is always a high sensitivity receptor, however in terms of environmental/natural resources, the sensitivity varies according to the receptor e.g., scrubland with no significant biodiversity is considered less sensitive than a water body which may support aquatic ecosystems, local biodiversity and/or livelihoods through fishing or marine tourism. "Magnitude": the size of the potential impact. Impacts may be short term and considered low magnitude (e.g., noise, dust or vibration) or high magnitude and long term (e.g. global impacts due to the project).

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [25]	Nature of impact		Project Stage			Minimum Mitigation measures [24]
						Design & Pre-regeneration	Regeneration works	Operation	
	RE-GENERATION WORKS [26]								
	Vegetation)								• Trees to be retained
		Lack of sufficient design and planning to ensure long term sustainability of subproject and protection of assets created	L	Direct/Local/ Irreversible		x	x	x	• Undertake a detailed walk over survey prior to any subproject activity: ○ Conducting situation analysis in the subproject area of influence for current solid waste disposal, sewerage, drainage, etc. (also included in Table 3.2). ○ Based on outcome of situational analysis, develop – site specific plans in close coordination with ULBs / PWDs e.g., waste management plan, sewerage collection and management plan • Develop and Implement - Regeneration Works Standard Operation & Maintenance Plan (SOMP), including at minimum: ○ Re-greening / re-vegetation of banks / land along water bodies and channels ○ New plantations with native species ○ Implement – site specific plans in close coordination with ULBs / PWDs e.g., waste management plan, sewerage collection and management plan, etc. • Regeneration works to commence at the end of demolition works to prevent further

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [25]	Nature of impact		Project Stage			Minimum Mitigation measures [24]
						Design & Pre-regeneration	Regeneration works	Operation	
	RE-GENERATION WORKS [26]								
									encroachments
		Change in the natural physical features and current aesthetics due to regeneration works	H	Direct/Local/ Reversible		x	x	x	• Minimize temporary land take for regeneration works • All temporary land-take resorted to original conditions • Develop and Implement - Regeneration Works Standard Operation & Maintenance Plan (SOMP) • Regeneration works to commence at the end of demolition works to prevent further encroachments
		Stockpiling of materials	M	Direct/Local/ Reversible			x		• Storage of materials for regeneration works confined to work sites, such as there is no obstruction to natural drainage pattern at site; covered to reduce dust generation
		Spoils re-use / disposal	L	Direct/Local/ Reversible		x	x		• Maximize the re-use of spoils and demolition debris / wastes to minimize waste disposal • Spoils disposal sites identified and utilized as per pre-approved plans from the relevant authority • To be located within work sites and at least 100 m from existing residential areas and/or water bodies / water sources • Vehicles covered during transportation to avoid spillage • Develop and implement – o Spoils Re-use / Disposal Plan

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [25]	Nature of impact		Project Stage			Minimum Mitigation measures [24]
						Design & Pre-regeneration	Regeneration works	Operation	
	RE-GENERATION WORKS [26]								
		Sources of materials	H	Direct/Local/ Reversible		x	x		• Maximize the re-use of spoils, demolition debris / wastes • Specify materials that are recycled, have recycled content or are from sustainable sources • In case required, use sources licensed by the relevant authorities if the re-use options are not feasible
		Waste generation (including construction and demolition waste)	L			x	x	x	• Implement site specific Waste Management Plan in close coordination with ULBs / PWDs as part of SOMP • Provide waste containers for public use at regenerated sites • Collaborate with ULBs/ PWDs for collection and disposal • No final waste disposal on site / off-site unless in approved landfills • Regularly monitor regenerated area
	B. Environmental Resources								
1	Air Quality	Impact on air quality during general regeneration work activities due to increase in dust emissions and /or vehicular movement	H	Direct/Local/ Reversible		x	x		• Re-generation sites to be enclosed / barricaded during works • Periodic watering at works sites, work staging areas, unpaved areas, exposed dust prone stockpiles • Store dust-prone materials in areas with shelters on four sides and on top. If such materials have to be stored in open area, cover with strong tarpaulin • Vehicles with an open load-carrying case, which transport potentially dust-producing

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [25]	Nature of impact		Project Stage			Minimum Mitigation measures [24]
						Design & Pre-regeneration	Regeneration works	Operation	
	RE-GENERATION WORKS [26]								
									materials, shall have proper fitting sides and tail boards. Dust-prone materials shall not be loaded to a level higher than the side and tail boards, and shall always be covered with a strong tarpaulin
2	Noise	Noise/ vibration due to general regeneration work activities and /or vehicular movement	H			x	x		• Proper maintenance of vehicles / equipment/ machineries so that the ambient noise standards are met; refer to Section 2 of EARF • Restriction of noise generating activities at night • Use of Personal Protective Equipment (PPE) like ear plugs, mufflers etc.
3	Surface and Ground Water Quality	Pollution due to runoff from general regeneration work activities Siltation of water sources / water bodies due to spillage of wastes	L	Direct/Local/ Reversible		x	x	x	• No anticipated impact on ground water quality • Surface quality monitoring once before start of regeneration works to establish the baseline; once during regeneration works and once after completion of regeneration works[28] • Construction / workers camps (portable toilets, stockpiles of materials, etc.) located away from water bodies / water sources / drainage leading to water bodies or water sources • No disposal of wastes into water bodies / water sources / drainage • Install and operate temporary silt traps along existing drainage (if any) on work

[28] Mitigation of water quality impact during regeneration works shall be based on site specific water quality monitoring results conducted once before start of regeneration works to establish baseline.

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [25]	Nature of impact		Project Stage			Minimum Mitigation measures [24]
						Design & Pre-regeneration	Regeneration works	Operation	
	RE-GENERATION WORKS [26]								
									sites to treat and process water and muddy runoff with high concentrations of suspended solids prior to final discharge • No vehicle / equipment / machinery maintenance activity close to water bodies / water sources / drainage
		Pollution due to oil / lubricant / fuel spillage	L	Direct/Local/ Reversible		x	x		• Temporary secured area set up for storage and handling of hazardous and polluting materials with a containment tray or provided with bunds • Develop and implement – Spill Response Plan o Provide with cleanup kits o Keep a stock of absorbent materials (e.g. sand, earth or commercial products) on site to deal with spillages and train staff in their use o Protocol for immediate action utilizing absorbents (final disposal at an approved waste disposal facility) • If refueling in the field is required, it shall be done from road-licensed fuel trucks away from water bodies / water sources / drainage
4	Soil and Geology	Soil erosion	L	Direct/Local/ Reversible		x	x	X	• Proper land leveling and grading for stabilization and other erosion-prone working areas, and permanent stabilization measures at the end of demolition period / start of regeneration works

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [25]	Nature of impact		Project Stage			Minimum Mitigation measures [24]
						Design & Pre-regeneration	Regeneration works	Operation	
	RE-GENERATION WORKS [26]								
									• Close attention to drainage provision; maintain natural drainage patterns • Restore vegetation cover to prevent soil erosion; If restoration is carried out during periods of hot or extreme weather, ensure adequate aftercare to maximize survival
		Pollution due to oil / lubricant / fuel spillage	L	Direct/Local/ Reversible		x	x		• Temporary secured area set up for storage and handling of hazardous and polluting materials with a containment tray or provided with bunds • Develop and implement – Spill Response Plan • If refueling in the field is required, it shall be done from road-licensed fuel trucks away from water bodies / water sources / drainage and/or other sensitive natural receptors
	A. Ecological Resources								
1	Terrestrial Ecology	Loss of ecology	L	Direct/Local/ Irreversible		x	x	X	• Avoidance of tree cutting (at demolition sites / regeneration sites) • No use of chemicals (pesticides / herbicides) • Positive impact anticipated after regeneration of cleared water bodies / channels and surrounding land areas • Develop and implement – Regeneration Works Standard Operation & Maintenance Plan (SOMP)
2	Terrestrial Fauna	Species vulnerability	L	Direct/Local/		x			• None expected since regeneration works will take place after demolition of existing

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [25]	Nature of impact		Project Stage			Minimum Mitigation measures [24]
						Design & Pre-regeneration	Regeneration works	Operation	
	RE-GENERATION WORKS [26]								
		to anticipated change in habitat		Irreversible					encroachments that are located in urban and peri-urban areas with access to economic services / activities
3	Avifauna	Disturbance to the local avifauna	L	Direct/Local/ Irreversible				X	• Positive impact anticipated after regeneration of cleared water bodies / channels and surrounding areas /land
4	Aquatic Ecology	Not anticipated	L	Direct/Local/ Irreversible			x	X	• Store all refuse and waste generated during regeneration works away from water bodies / water sources / drainage and in designated areas and remove them from these locations for disposal to approved disposal facilities or re-cycle and re-use • Positive impact anticipated after regeneration of water bodies / channels
D. Human Environment									
1	Occupational Health and Safety	Exposure to hazards for workers working on asphalt mixing, concrete mixing, cement, etc.	M	Direct/Local/ Continuous		x	x		• Develop and implement – Occupational Environment, Health and Safety (EHS) Plan and Emergency Response Plan (ERPs) at work sites ○ E.g. IFC (WB) EHS Guidelines on Occupational Environment, Health and Safety ○ Strictly enforce the use of PPE during works such as goggles, gloves, noise reducing mufflers to workers to minimize inhalation of fumes and dust, head-lamps, high visibility vests, stand-alone outdoor lighting, etc.

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [25]	Nature of impact		Project Stage			Minimum Mitigation measures [24]
						Design & Pre-regeneration	Regeneration works	Operation	
	RE-GENERATION WORKS [26]								
									• Create awareness of health & safety risks of transmittable diseases (HIV/AIDs / COVID-19), child labor, bonded labor or forced labor
		Provision of workers camp / accommodation	H	Direct/Local/ Reversible			x		• Provide adequate workers accommodation in line with IFC (WBG) guidelines[29]
		Unhygienic conditions at workers camp / accommodation	H	Direct/Local/ Reversible			x		• Provide water and sanitation facilities (situated separately for men and women); regular cleaning and disinfection of site • Provide adequate electricity / lighting • Provide portable water / storage tanks • Conduct regular health checkup / provide access to medical care • Provide solid waste bins and collection; no final disposal on-site • Discharge construction / workers camp sewage / wastewater into onsite septic tanks or connect to local public sewer system
2	Community Health and Safety	Excessive disturbance to communities due to	L	Direct/Local/ Reversible		x	x		• Meaningful consultations with communities to keep them informed of anticipated activities, in particular those that may result in disruption of access, utilities, noisy or dust-generating activities that are likely to result in significant disturbance

[29] IFC Guidance Note on Workers Accommodation

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [25]	Nature of impact		Project Stage			Minimum Mitigation measures [24]
						Design & Pre-regeneration	Regeneration works	Operation	
	RE-GENERATION WORKS [26]								
		prolonged construction							• Identify and adhere to strict work schedule • Restriction of all night time activities • Liaise with schools that are in close proximity to work sites on school examination periods and scale down work activities during such periods, if necessary, to reduce disturbance • Ensure communities are aware of Grievance Redress Mechanism (GRM) entry points • Create awareness of health & safety risks of transmittable diseases (HIV/AIDs / COVID-19), child labor, bonded labor or forced labor • Develop and implement – o Community Health and Safety Plan
		Temporary traffic management	M	Direct/Local/ Reversible		x	x		• Develop and implement - Traffic Control Plan together with the local traffic police prior to any regeneration activities • Proper traffic signs at the work sites with information on nature and duration of work for public safety • Schedule transport routes and activities during non-peak hours; in case of lane closures, deploy workers to direct traffic • Erect speed limit signs of 8 km/h on all unpaved approach roads and unpaved work sites as a means of controlling fugitive dust emission in unpaved areas
		Access to work sites	M	Direct/Local/			x	x	• Make all sites secure and discourage access by members of the public through

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [25]	Nature of impact		Project Stage			Minimum Mitigation measures [24]
						Design & Pre-regeneration	Regeneration works	Operation	
	RE-GENERATION WORKS [26]								
				Reversible					appropriate fencing, signage and/or security personnel, as appropriate during regeneration works • Ensure alternative access is provided for community facilities
		Utility services interruptions	L	Direct/Local/ Reversible		x	x		• Assess sites in advance and identify potential for disruption to services and risks before starting of any activities • Any damage or hindrance/disadvantage to local businesses caused by the premature removal or insufficient replacement of public utilities is subject to full compensation, at the full liability of the contractor who caused the problem • If temporary disruption is unavoidable, develop a plan in collaboration with relevant local authorities such as power company, water supply company and communication company to minimize the disruption and communicate the dates and duration in advance to affected communities / persons
		Information disclosure	H	Direct/Local		x	x		• Conduct meaningful consultations to inform nearby residents and businesses in advance of the work activities, given the dates and duration of expected disruption and make aware of the subproject GRM entry points • Erect billboards, which include work contents, schedule, responsible person and complaint phone number, at the entry to each work site and/ or staging area

S. No	Environmental Parameter	Potential Environmental Impacts	Level of Impact L/M/H [25]	Nature of impact		Project Stage			Minimum Mitigation measures [24]
						Design & Pre-regeneration	Regeneration works	Operation	
	RE-GENERATION WORKS [26]								
									• Place clear signs at work sites in view of the public, warning people of potential dangers such as moving vehicles, etc. and raising awareness on safety issues
4	Socio-economics	Beneficial impacts / job opportunities Influx of migrant workers	H	Direct/ Regional			x	x	• Hiring for temporary construction / demolition jobs • Emphasis given to local hiring • Overall economic growth of the region

RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

Instructions: 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.

Package Number: _____
Package Title: _____
Components: _____

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area…			
▪ Densely populated?			
▪ Heavy with development activities?			
▪ Adjacent to or within any environmentally sensitive areas?			
• Cultural heritage site			
• Protected Area			
• Wetland			
• Mangrove			
• Estuarine			
• Buffer zone of protected area			
• Special area for protecting biodiversity			
• Bay			
B. Potential Environmental Impacts Will the Project cause…			
▪ impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services.			
▪ deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are			

Screening Questions	Yes	No	Remarks
overloaded and the capacities to manage these systems are overwhelmed?			
▪ degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)?			
▪ dislocation or involuntary resettlement of people?			
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable group?			
▪ degradation of cultural property, and loss of cultural heritage and tourism revenues?			
▪ occupation of low-lying lands, floodplains and steep hillsides by squatters and low-income groups, and their exposure to increased health hazards and risks due to pollutive industries?			
▪ water resource problems (e.g. depletion/degradation of available water supply, deterioration for surface and ground water quality , and pollution of receiving waters?			
▪ air pollution due to urban emissions?			
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical and biological hazards during project construction and operation?			
▪ road blocking and temporary flooding due to land excavation during rainy season?			
▪ noise and dust from construction activities?			
▪ traffic disturbances due to construction material transport and wastes?			
▪ temporary silt runoff due to construction?			

Screening Questions	Yes	No	Remarks
▪ hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation?			
▪ water depletion and/or degradation?			
▪ overpaying of ground water, leading to land subsidence, lowered ground water table, and salinization?			
▪ contamination of surface and ground waters due to improper waste disposal?			
▪ pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems?			
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?			
▪ social conflicts if workers from other regions or countries are hired?			
▪ 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 operation and construction?			
▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?			

A Checklist for Preliminary Climate Risk Screening

Screening Questions		Score	Remarks[1]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?		
	Would the project design (e.g., the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?		
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?		
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?		
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g., annual power production) of project output(s) (e.g., hydro-power generation facilities) throughout their design lifetime?		

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High):_____

Other Comments: _____

_____

_____

_____

Prepared by: _____

[1] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

No Mitigation Scenario (Scoping Checklist)

Instructions: Answer the questions based on subproject/package information. Discuss/consult design engineers, social safeguards team and other technical experts to ensure most recent information is used. The answers will be used in the preparation of EIA/IEE and EMP. If subproject/package will involve rehabilitation/expansion of existing facility, specify in the checklist (audit is required as part of the EIA/IEE).

PART 1: Project Characteristics

No.	Questions to be considered in Scoping	Yes No n/a Not Sure	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why? (See last page for Questions to Guide Assessing Significance of Impacts)
1. Will construction, operation or decommissioning of the Project involve actions which will cause physical changes in the locality (topography, land use, changes in waterbodies, etc.)?				
1.1	Permanent or temporary change in land use, land cover or topography including increases in intensity of land use?			
1.2	Clearance of existing land, vegetation and buildings?			
1.3	Creation of new land uses?			
1.4	Pre-construction investigations e.g., boreholes, soil testing?			
1.5	Construction works?			
1.6	Demolition works?			
1.7	Temporary sites used for construction works or housing of construction workers?			
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations?			

No.	Questions to be considered in Scoping	Yes No n/a Not Sure	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why? (See last page for Questions to Guide Assessing Significance of Impacts)
1.9	Underground works including mining or tunnelling?			
1.10	Reclamation works?			
1.11	Dredging?			
1.12	Coastal structures e.g., seawalls, piers?			
1.13	Offshore structures?			
1.14	Production and manufacturing processes?			
1.15	Facilities for storage of goods or materials?			
1.16	Facilities for treatment or disposal of solid wastes or liquid effluents?			
1.17	Facilities for long term housing of operational workers?			
1.18	New road, rail or sea traffic during construction or operation?	No		
1.19	New road, rail, air, waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	No		
1.20	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?			

No.	Questions to be considered in Scoping	Yes No n/a Not Sure	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why? (See last page for Questions to Guide Assessing Significance of Impacts)
1.21	New or diverted transmission lines or pipelines?			
1.22	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?			
1.23	Stream crossings?			
1.24	Abstraction or transfers of water from ground or surface waters?			
1.25	Changes in water bodies or the land surface affecting drainage or run-off?			
1.26	Transport of personnel or materials for construction, operation or decommissioning?			
1.27	Long term dismantling or decommissioning or restoration works?			
1.28	Ongoing activity during decommissioning which could have an impact on the environment?			
1.29	Influx of people to an area in either temporarily or permanently?			
1.30	Introduction of alien species?			

No.	Questions to be considered in Scoping	Yes No n/a Not Sure	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why? (See last page for Questions to Guide Assessing Significance of Impacts)
1.31	Loss of native species or genetic diversity?			
1.32	Any other actions?			
2. Will construction or operation of the Project use natural resources such as land, water, materials or energy, especially any resources which are non-renewable or in short supply?				
2.1	Land especially undeveloped or agricultural land?			
2.2	Water?			
2.3	Minerals?			
2.4	Aggregates?			
2.5	Forests and timber?			
2.6	Energy including electricity and fuels?			
2.7	Any other resources?			
3. Will the Project involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?				
3.1	Will the project involve use of substances or materials which are hazardous or toxic to human health or the environment (flora, fauna, water supplies)?			
3.2	Will the project result in changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)?			
3.3	Will the project affect the welfare of people			

No.	Questions to be considered in Scoping	Yes No n/a Not Sure	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why? (See last page for Questions to Guide Assessing Significance of Impacts)
	e.g. by changing living conditions?			
3.4	Are there especially vulnerable groups of people who could be affected by the project e.g. hospital patients, the elderly? (check this with the Social Safeguards Team)			
3.5	Any other causes?			
4. Will the Project produce solid wastes during construction or operation or decommissioning?				
4.1	Spoil, overburden or mine wastes?			
4.2	Municipal waste (household and or commercial wastes)?			
4.3	Hazardous or toxic wastes (including radioactive wastes)?			
4.4	Other industrial process wastes?			
4.5	Surplus product?			
4.6	Sewage sludge or other sludge from effluent treatment?			
4.7	Construction or demolition wastes?			
4.8	Redundant machinery or equipment?			
4.9	Contaminated soils or other material?			
4.10	Agricultural wastes?			

No.	Questions to be considered in Scoping	Yes No n/a Not Sure	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why? (See last page for Questions to Guide Assessing Significance of Impacts)
4.11	Any other solid wastes?			
5. Will the Project release pollutants or any hazardous, toxic or noxious substances to air?				
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources (vehicles and/or heavy equipment)?			
5.2	Emissions from production processes?			
5.3	Emissions from materials handling including storage or transport?			
5.4	Emissions from construction activities including plant and equipment?			
5.5	Dust or odours from handling of materials including construction materials, sewage and waste?			
5.6	Emissions from incineration of waste?			
5.7	Emissions from burning of waste in open air (eg slash material, construction debris)?			
5.8	Emissions from any other sources?			
6. Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?				
6.1	From operation of equipment eg engines,			

No.	Questions to be considered in Scoping	Yes No n/a Not Sure	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why? (See last page for Questions to Guide Assessing Significance of Impacts)
	ventilation plant, crushers?			
6.2	From industrial or similar processes?			
6.3	From construction or demolition?			
6.4	From blasting or piling?			
6.5	From construction or operational traffic?			
6.6	From lighting or cooling systems?			
6.7	From sources of electromagnetic radiation (consider effects on nearby sensitive equipment as well as people)?			
6.8	From any other sources?			
7. Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into sewers, surface waters, groundwater, coastal waters or the sea?				
7.1	From handling, storage, use or spillage of hazardous or toxic materials?			
7.2	From discharge of sewage or other effluents (whether treated or untreated) to water or the land?			
7.3	By deposition of pollutants emitted to air, onto the land or into water?			

No.	Questions to be considered in Scoping	Yes No n/a Not Sure	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why? (See last page for Questions to Guide Assessing Significance of Impacts)
7.4	From any other sources?			
7.5	Is there a risk of long term build-up of pollutants in the environment from these sources?			
8. Will there be any risk of accidents during construction or operation of the Project which could affect human health or the environment?				
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous or toxic substances?			
8.2	From events beyond the limits of normal environmental protection e.g., failure of pollution control systems?			
8.3	From any other causes?			
8.4	Could the project be affected by natural disasters causing environmental damage (e.g., floods, earthquakes, landslip, etc.)?			
9. Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?				
9.1	Changes in population size, age, structure, social groups etc.?			

No.	Questions to be considered in Scoping	Yes No n/a Not Sure	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why? (See last page for Questions to Guide Assessing Significance of Impacts)
9.2	By resettlement of people or demolition of homes or communities or community facilities e.g., schools, hospitals, social facilities?			
9.3	Through in-migration of new residents or creation of new communities?			
9.4	By placing increased demands on local facilities or services eg housing, education, health?			
9.5	By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?			
9.6	Any other causes?			
10. Are there any other factors which should be considered such as consequential development which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality?				
10.1	Will the project lead to pressure for consequential development which could have significant impact on the environment e.g., more housing, new roads,			

No.	Questions to be considered in Scoping	Yes No n/a Not Sure	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why? (See last page for Questions to Guide Assessing Significance of Impacts)
	new supporting industries or utilities, etc.?			
10.2	Will the project lead to development of supporting facilities, ancillary development or development stimulated by the project which could have impact on the environment e.g. supporting infrastructure (roads, power supply, waste or wastewater treatment, etc.) housing development extractive industries supply industries other?			
10.3	Will the project lead to after-use of the site which could have an impact on the environment?			
10.4	Will the project set a precedent for later developments?			
10.5	Will the project have cumulative effects due to proximity to other existing or planned projects with similar effects?			

Part 2 - Characteristics of the Project Environment (Environmental Sensitivity)

Question	Remarks

Are there features of the local environment on or around the Project location which could be affected by the Project?
• Areas which are protected under international or national or local legislation for their ecological, landscape, cultural or other value, which could be affected by the project?
• Other areas which are important or sensitive for reasons of their ecology e.g.
  ○ Wetlands,
  ○ Watercourses or other waterbodies,
  ○ the coastal zone,
  ○ mountains,
  ○ forests or woodlands
• Areas used by protected, important or sensitive species of fauna or flora e.g., for breeding, nesting, foraging, resting, overwintering, migration, which could be affected by the project?
• Inland, coastal, marine or underground waters?
• Areas or features of high landscape or scenic value?
• Routes or facilities used by the public for access to recreation or other facilities?
• Transport routes which are susceptible to congestion or which cause environmental problems?
• Areas or features of historic or cultural importance?	

Is the Project in a location where it is likely to be highly visible to many people?	
Is the Project located in a previously undeveloped area where there will be loss of greenfield land?	

Question	Remarks
Are there existing land uses on or around the Project location which could be affected by the Project? For example: • homes, gardens, other private property, • industry, • commerce, • recreation, • public open space, • community facilities, • agriculture, • forestry, • tourism, • mining or quarrying	
Are there any plans for future land uses on or around the location which could be affected by the Project?	
Are there any areas on or around the location which are densely populated or built-up, which could be affected by the Project?	
Are there any areas on or around the location which are occupied by sensitive land uses which could be affected by the Project? • hospitals, • schools, • places of worship, • community facilities	
Are there any areas on or around the location which contain important, high quality or scarce resources which could be affected by the Project? For example: • groundwater resources, • surface waters, • forestry, • agriculture, • fisheries, • tourism,	

Question	Remarks
• minerals.	
Are there any areas on or around the location of the Project which are already subject to pollution or environmental damage? For example: • where existing legal environmental standards are exceeded, which could be affected by the Project	
Is the Project location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions? For example: • temperature inversions, fogs, severe winds, which could cause the Project to present environmental problems?	
Is the Project likely to affect the physical condition of any environmental media? • The atmospheric environment including microclimate and local and larger scale climatic conditions? • Water – e.g., quantities, flows or levels of rivers, lakes, groundwater. Estuaries, coastal waters or the sea? • Soils – e.g., quantities, depths, humidity, stability or erodibility of soils? • Geological and ground conditions?	
Are releases from the Project likely to have effects on the <u>quality</u> of any environmental media? • local air quality • global air quality including climate change and ozone depletion • water quality – rivers, lakes, groundwater. estuaries, coastal waters or the sea • nutrient status and eutrophication of waters • acidification of soils or waters	

Question	Remarks
• soils • noise • temperature, light or electromagnetic radiation including electrical interference • productivity of natural or agricultural systems	
Is the Project likely to affect the availability or scarcity of any resources either locally or globally? • fossil fuels • water • minerals and aggregates • timber • other non-renewable resources • infrastructure capacity in the locality - water, sewerage, power generation and transmission, telecommunications • waste disposal roads, rail	
Is the Project likely to affect human or community health or welfare? • The quality or toxicity of air, water, foodstuffs and other products consumed by humans? • Morbidity or mortality of individuals, communities or populations by exposure to pollution? • Occurrence or distribution of disease vectors including insects? • Vulnerability of individuals, communities or populations to disease? • Individuals' sense of personal security? • Community cohesion and identity? • Cultural identity and associations? • Minority rights? • Housing conditions? • Employment and quality of employment? • Economic conditions? • Social institutions?	

Questions to Guide Significance of Impacts

1. Will there be a large change in environmental conditions?
2. Will new features be out-of-scale with the existing environment?
3. Will the effect be unusual in the area or particularly complex?
4. Will the effect extend over a large area?
5. Will there be any potential for trans boundary impact?
6. Will many people be affected?
7. Will many receptors of other types (fauna and flora, businesses, facilities) be affected?
8. Will valuable or scarce features or resources be affected?
9. Is there a risk that environmental standards will be breached?
10. Is there a risk that protected sites, areas, features will be affected?
11. Is there a high probability of the effect occurring?
12. Will the effect continue for a long time?
13. Will the effect be permanent rather than temporary?
14. Will the impact be continuous rather than intermittent?
15. If it is intermittent will it be frequent rather than rare?
16. Will the impact be irreversible?
17. Will it be difficult to avoid, or reduce or repair or compensate for the effect?

Prepared by:	
Designation and Office:	
Date:	

OUTLINE OF INITIAL ENVIRONMENTAL EXAMINATION REPORT

1. An initial environmental examination (IEE) report is required for all environment B projects. Its level of detail and comprehensiveness is commensurate with the significance of potential environmental impacts and risks. An IEE report will follow the outline below. The substantive aspects of this outline will guide the preparation of environmental impact assessment reports, although not necessarily in the order shown. Sample IEEs have been prepared during loan processing, which will serve as actual reference for the preparation of IEE reports of future subprojects.

2. **Executive Summary**. Describe concisely the critical facts, significant findings, and recommended actions.

3. **Policy, Legal, and Administrative Framework.** Discuss the national and local legal and institutional framework within which the environmental assessment is carried out. Identify project-relevant international environmental agreements to which Government of Bangladesh is a party.

4. **Description of the Project.** Describe the project, its major components, and its geographic, ecological, social, and temporal context, including any associated facility required by and for the subproject/package (for example, access roads, power plants, water supply, quarries and borrow pits, and spoil disposal). Include drawings and maps showing the project's layout and components, the subproject site, and the subproject's area of influence.

5. **Description of the Environment (Baseline Data).** Describe relevant physical, biological, and socioeconomic conditions within the subproject area. Include any known current and proposed development activities within the subproject's area of influence, including those not directly connected to the subproject. Indicate the accuracy, reliability, and sources of the data.

6. **Anticipated Environmental Impacts and Mitigation Measures.** Predict and assess the subproject's likely positive and negative direct and indirect impacts to physical, biological, socioeconomic (including occupational health and safety, community health and safety, vulnerable groups and gender issues, and impacts on livelihoods through environmental media and physical cultural resources in the subproject's area of influence, in quantitative terms to the extent possible; identify mitigation measures and any residual negative impacts that cannot be mitigated; explore opportunities for enhancement; identify and estimate the extent and quality of available data, key data gaps, and uncertainties associated with predictions and specify topics that do not require further attention; and examine global, trans boundary, and cumulative impacts as appropriate.

7. **Analysis of Alternatives.** Examine alternatives to subproject or subproject component site, technology, design, and operation—including the no project alternative—in terms of their potential environmental impacts; the feasibility of mitigating these impacts; their capital and recurrent costs; their suitability under local conditions; and their institutional, training, and monitoring requirements. State the basis for selecting the particular subproject design proposed and, justify recommended emission levels and approaches to pollution prevention and abatement.

8. **Information Disclosure, Consultation, and Participation.** (i) Describe the process undertaken during subproject design and preparation for engaging stakeholders, including information disclosure and consultation with affected people and other stakeholders; (ii) Summarize comments and concerns received from affected people and other stakeholders and how these comments have been addressed in subproject design and mitigation measures, with

special attention paid to the needs and concerns of vulnerable groups, including women, the poor, and Indigenous Peoples; and (iii) Describe the planned information disclosure measures (including the type of information to be disseminated and the method of dissemination) and the process for carrying out consultation with affected people and facilitating their participation during subproject implementation.

9. **Grievance Redress Mechanism.** Describe the grievance redress framework (both informal and formal channels), setting out the time frame and mechanisms for resolving complaints about environmental performance.

10. **Environmental Management Plan.** Describe and discuss the set of mitigation and management measures to be taken during subproject implementation to avoid, reduce, mitigate, or compensate for adverse environmental impacts (in that order of priority). Include multiple management plans and actions, if necessary. Include the following key components (with the level of detail commensurate with the subproject's impacts and risks):

(i) **Mitigation.** Identify and summarize anticipated significant adverse environmental impacts and risks; describe each mitigation measure with technical details, including the type of impact to which it relates and the conditions under which it is required (for instance, continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate; and provide links to any other mitigation plans (for example, for involuntary resettlement, Indigenous Peoples, or emergency response) required for the subproject.

(ii) **Monitoring.** Describe the monitoring measures with technical details, including parameters to be measured, methods to be used, sampling locations frequency of measurements, detection limits and definition of thresholds that will signal the need for corrective actions; and describe monitoring and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures and document the progress and results of mitigation.

(iii) **Implementation arrangements.** Specify the implementation schedule showing phasing and coordination with overall project implementation; describe institutional or organizational arrangements, namely, who is responsible for carrying out the mitigation and monitoring measures, which may include one or more of the following additional topics to strengthen environmental management capability: technical assistance programs, training programs, procurement of equipment and supplies related to environmental management and monitoring, and organizational changes; and estimate capital and recurrent costs and describe sources of funds for implementing the environmental management plan.

(iv) **Performance indicators.** Describe the desired outcomes as measurable events to the extent possible, such as performance indicators, targets, or acceptance criteria that can be tracked over defined time periods.

11. **Conclusion and Recommendation.** Provide the conclusions drawn from the assessment and provide recommendations.

SUBPROJECT DATA SHEET / INFORMATION DISCLOSURE

Subproject Information	**Description**
Name of the subproject, executing agency/implementing agency and town	
Proposed subproject technical details and project benefits	
Summary of subproject impacts	• Environment • Social
Compensation and entitlements	
Environmental management plan budget	
Resettlement plan budget	
Environmental management plan implementation schedule	
Resettlement plan implementation schedule	
Consultation and information disclosure requirements	
Implementation structure and grievance redress mechanism (GRM) information	
Contact numbers of PIDs, PMU	

Reviewed by: Name of Affected Person
Place:
Date:
Issues:

SAMPLE GRIEVANCE FORM

(To be available in Tamil)

The Proposed Inclusive, Resilient and Sustainable Housing for the Urban Poor Project welcomes complaints, suggestions, queries, and comments regarding program implementation. We encourage persons with a grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

In case you want to include your personal details but want information to remain confidential, please type CONFIDENTIAL above your name.

Date		**Place of Registration**	
Contact Information/Personal Details			
Name:		**Gender:** Male Female	**Age:**
Home Address			
Village/Town			
District			
Phone no.			
E-mail			
Complaint/Suggestion/Comment/Question Please provide the details (who, what, where and how) of your Grievance below:			
How do you want us to reach you for feedback on your comment/grievance?			
FOROFFICIALUSE ONLY			
Registered by: (Name of Official registering grievance)			
Verified through:	Note/Letter	E-mail	Verbal/Telephonic
Reviewed by: (Names/Position of Official(s)reviewing grievance)			
Action Taken:			
Whether Action Taken Disclosed:		Yes	No
Means of Disclosure:			

OUTLINE of DAILY MONITORING SHEET FOR CONTRACTORS

Contractor Monitoring Sheet

Name of Subproject: _____
Location of Subproject: _____
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 PIU for Approval)**	
Construction EMP (C-EMP)		
Corrective Action Plan, if any		
3. Compliance with C-EMP		
Construction Site	**(Satisfactory / Needs Improvement / Not Implemented)**	
- 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		
- 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)**	
- Quarters for male and female workers		

Monitoring Item	**Status**	**Remarks**
- 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

QUARTERLY ENVIRONMENTAL MONITORING TEMPLATE

Introduction

- Overall project description and objectives
- Environmental categorization of each subproject as per ADB Safeguard Policy Statement, (SPS 2009)

Project Safeguards Team

- Identify the role/s of Safeguards Team including schedule of on-site verification of reports submitted by consultants and contractors.

Name	Designation/Office	Email Address	Contact Number	Roles
1. PMU				
2. PIUs				
3. Consultants				

Overall project and subproject/package progress and status

- Description of Subprojects and Indicate.
    - Status of design – preliminary design or final design,
    - Status of implementation - under bidding, contract awarded but no works yet, contract awarded with works (on-going construction), civil works completed, and/or Operation & Maintenance (O&M)

Package Number	Subproject Name / List of Works	Type of Contract (specify if DBO, DB or civil works)	Status of Design (specify if Preliminary Design, Final Detailed Design	Contract Status (specify if under bidding or contract awarded)	Status of Implementation (specify if Contract awarded with works (On-going Construction), Completed	If On-going Construction	
						%Physical Progress	Expected Completion Date

					Works, or O&M phase)[1]		

- For package with "Contract Awarded", provide name/s and contact details of contractor/s' nodal person/s for environmental safeguards.

Package-wise Contractor/s' Nodal Persons for Environmental Safeguards

Package Name	IEE Cleared by ADB (provide date)	Contractor	EHS Nodal Person	Email Address	Contact Number

STATUS OF IEE PER SUBPROJECT/PACKAGE

- Provide status of updated/final IEE[2] per package.

Package-wise Implementation Status

Package Number	Final IEE based on Detailed Design				Site-specific EMP or Construction (C-EMP) approved by Chief Engineer [3] (Yes/No)	Remarks
	Not yet due (detailed design not yet completed)	Submitted to ADB (provide date of submission)	Disclosed on project website (provide link)	Final IEE provided to Contractor/s (Yes/No)		

Compliance status with National/State/Local statutory environmental requirements[4]

Package Number	Statutory Environmental Requirements[5]	Status of Compliance	Validity Date(s)	Action Required	Specific Conditions that will

[1] If on-going construction, include %physical progress and expected date of completion.
[2] IEE prepared based on preliminary design and cleared by ADB with condition that updated/Final IEE based on detailed design will be submitted.
[3] Works will not be allowed until site specific EMP is approved by the PMU and/or PIU.
[4] All statutory clearance/s, no-objection certificates, permit/s, etc. should be obtained prior to award of contract/s. Attach as Appendix all clearances obtained during the reporting period. If already reported, specify in the "remarks" column.
[5] Specify statutory requirements: environmental clearance? Permit/consent to establish? Forest clearance?

		(Specify if obtained, submitted and awaiting approval, application not yet submitted)	(if already obtained)		require environmental monitoring as per environmental clearance, consent / permit to establish[6]

Compliance status with environmental loan covenants

Schedule No. and Item (see Project Loan Agreement and list provisions / paragraph relevant to environmental safeguards, core labor standards, occupational EHS, community health and safety)	Covenant	Status of Compliance	Action Required

Compliance status with the environmental management plan (refer to EMP tables in approved IEE/s)

- Confirm in IEE/s if contractors are required to submit construction EMPs (C-EMP). If not, describe the methodology of monitoring each package under implementation.

- Provide over-all compliance of the contractors with C-EMP. This should be supported by contractors' monthly monitoring reports to PIU(s) and/or verification reports of PIU(s) or project consultants. Include as an Appendix supporting documents such as **signed** monthly environmental site inspection reports prepared by consultants and/or contractors.

Overall Compliance with C-EMP

Package Number	Status of C-EMP Implementation *(Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)*	Action Proposed and Additional Measures Required

Workers/Labor permit, etc.

[6] *Example: Environmental Clearance requires ambient air quality monitoring, Forest Clearance/Tree-cutting Permit requires 2 trees for every tree, etc.*

- Provide description based on site observations and records:
  - Confirm if any dust was noted to escape the site boundaries and identify dust suppression techniques followed for site/s.
  - Identify muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads.
  - Identify type of erosion and sediment control measures installed on site/s, condition of erosion and sediment control measures including if these were intact following heavy rain.
  - Identify designated areas for concrete works, chemical storage, construction materials, and re-fueling. Attach photographs of each area.
  - Confirm spill kits on site and site procedure for handling emergencies.
  - Identify any chemical stored on site and provide information on storage condition. Attach photograph.
  - Describe management of stockpiles in each work site (construction materials, excavated soils, spoils, etc.). Provide photographs.
  - Describe management of solid and liquid wastes on-site (quantity generated, transport, storage and disposal). Provide photographs.
  - Provide information on barricades, signages, and on-site boards. Provide photographs.
  - Provide information on construction / workers camp(s). Provide photographs.
  - Provide information on work-related accidents and incidents. Describe actions implemented.
  - Provide information on if there are any activities being undertaken out of working hours and how that is being managed.

- Provide list of trainings on environmental safeguards, core labor standards, and Occupational environment, health and safety conducted during the reporting period. Include ADB-organized workshop, trainings, seminars, etc)

Trainings, Workshops and Seminars Conducted

Date	Topic	Conducted by	No. of Participants (Total)	No. of Participants (Female)	Remarks

- Provide the monitoring results as per the parameters outlined in the approved EMP (or C-EMP when applicable).

Summary of Environmental Monitoring Activities (for the Reporting Period)[7]

[7] Attach Laboratory Results and Sampling Map/Locations

Impacts (List from C-EMP)	Mitigation Measures (List from C-EMP)	Parameters Monitored (As identified in the C-EMP)	Method of Monitoring (Visual, Actual Sampling, etc.)	Location of Monitoring (Provide GPS Coordinates) [8]	Date of Monitoring Conducted	Person Who Conducted the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						
Operational Phase						

Monitoring of environmental IMPACTS on PROJECT SURROUNDINGS

- Confirm records of pre-work condition of roads, agricultural land or other infrastructure prior to starting to transport materials and construction.

Package Number.	Status of Pre-Work Conditions (Recorded / Not Recorded)	Baseline Environmental Conditions (air, water, noise) Documented. (Yes / No)	Action Proposed and Additional Measures Required

- Provide information on monitoring activities conducted during reporting period. If not conducted, provide justification. Compare results with baseline and internationally recognized standards.[9]

Air Quality Monitoring Results

[8] If GPS coordinate is not available, provide landmark(s) and/or chainage.

[9] ADB Safeguard Policy Statement (SPS) Appendix 1, para 33: During the design, construction, and operation of the project the borrower/client will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When host country regulations differ from these levels and measures, the borrower/client will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the borrower/client will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in the SPS.

Site No.	Date of Testing	Site Location (Provide GPS Coordinates)[10]	Parameters (as required by statutory clearances or as mentioned in the IEE)			Remarks
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3	

Water Quality Monitoring Results

Site No.	Date of Sampling	Site Location	Parameters (as required by statutory clearances or as mentioned in the IEE)						Remarks
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L	

Noise Quality Monitoring Results

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (as required by statutory clearances or as mentioned in the IEE)		Remarks
			Day Time	Night Time	

INFORMATION DISCLOSURE, PARTICIPATION AND CONSULTATIONS

- Confirm PMU/PIU/contractors provide project-related information to stakeholders, communities and/or affected people before and during construction works.[11]
- Provide information on consultations conducted during reporting period such dates, topics discussed, type of consultation, issues/concerns raised, safeguards team member present. Attach minutes of meetings (ensure English translation is provided), attendance sheet, and photos.

Date of Consultation	Location	Number of Participants (specify total, male and female)	Issues/Concerns Raised	Response to issues/concerns

[10] If GPS coordinate is not available, provide landmark(s) and/or chainage.

[11] Check EMP requirement on information disclosure. At a minimum, PIU through the contractor should notify communities/affected persons/sensitive receptors 7 days and again 1 day before start of works.

Grievance Redress Mechanism

- **Grievance Redress Mechanism.** Provide information on establishment of grievance redress mechanism and capacity of grievance redress committee to address project-related issues/complaints. Include as an Appendix - Notification of the GRM (package-wise if applicable).
- **Complaints Received during the Reporting Period.** Provide information on number, nature, and resolution of complaints received during reporting period. Attach records as per GRM in the approved IEE. Identify safeguards team member/s involved in the GRM process. Attach minutes of meetings (ensure English translation is provided).

Summary of key issues/concerns identified during the reporting period and remedial actions.

- Provide corrective action plan which should include all issues/concerns, actions required to be implemented, responsible entities, and target dates.

Status of corrective actions from previous monitoring report(s)

- Provide information on corrective actions to be implemented as reported in the previous monitoring report(s). Include status of implementation of feedbacks/comments/suggestions as provided by ADB, if any.

Corrective Action Plan Status

Issues/Concerns	Corrective Action	Status	Remarks

APPENDIXES

- Photos
- Records of consultations
- Copies of environmental clearances and permits (if not provided in the previous monitoring report)
- Environmental site inspection report (if not provided in the previous monitoring report)
- Other

Appendix 11

TERMS OF REFERENCE
SAFEGUARDS IMPLEMENTATION
ENVIRONMENTAL CONSULTANT AT PMU AND ENVIRONMENTAL SPECIALIST AT PIDS

A. OBJECTIVE

To ensure effective implementation and monitoring of environmental safeguards policies and procedures and to support the PMU team, one (1) environmental consultant will be assigned to the PMU Environmental Team.

The PMU will be supported by a total of three (3) Project Implementation Divisions (PIDs). Each PID will have one (1) environmental specialist assigned to the PID Environmental Cell.

B. SCOPE OF WORK

The environmental consultant / specialist will be responsible for safeguards implementation and monitoring in line with requirements of ADB Safeguards Policy Statement (SPS) 2009 and national regulatory framework for subprojects under output 1 of the Inclusive, Resilient and Sustainable Housing for the Urban Poor Project in Tamil Nadu (IRSHUPP) project financed by ADB. They may also support work on safeguard requirements for World Bank funder projects and streamline safeguards implementation for other housing development projects. The PMU environmental consultant will work in close coordination with PID environmental specialist, and other staff of the Environmental Cell, line departments of TNSCB, and under the overall direction of the Joint Managing Director, TNSCB. Their primary role will be to support the implementation and monitoring of safeguards for IRSHUPP.

The environmental consultant / specialist will ensure environmental safeguards consideration in project design, construction and operation of the IRSHUPP project, to avoid/minimize adverse environmental impacts and meet internationally accepted performance indicators. They shall review, strengthen/update all environmental documents, such as initial environmental examination, environment impact assessments, environmental assessment and review frameworks, environmental management plans in accordance with the Government's and ADB's relevant policies and procedures. They will review and track submission of safeguard monitoring reports and compliance with disclosure requirements. They will also be responsible to ensure health and safety considerations including issues related to COVID 19 pandemic, are adequately covered and costed.

The environmental consultant / specialist will assist in capacity development and institutional training relevant to ADB SPS 2009 and compliance with its requirements. The environmental consultant / specialist will also conduct field verifications and consultations as part of project due diligence and monitoring.

The environmental consultant / specialist will work in close coordination with the PMU staff, social cell, line departments of TNSCB and under the overall direction of the Joint Managing Director, TNSCB. Detailed tasks and responsibilities are listed below.

C. DETAILED TASKS

The following are the detailed tasks for the PMU (Environment Team) - Environment Consultant:

4.1 GENERAL

- Provide information and advice to other PMU Teams and PIDs on the environmental safeguard implementation for housing development projects such as:
  - International Finance Corporation (World Bank Group) Environment, Health and Safety or IFC (WBG) EHS Guidelines and Guidance Notes
  - World Bank's Operational Policies and Guidelines
  - Best practices in green building and urban greening concepts in the planning / design, implementation and operational stages of housing projects
- Participate in external meetings, seminars, conferences and other events on behalf of TNSCB to (a) present's TNSCB's work and (b) obtain up- to-date information on best-in-class technologies and approaches relevant to safeguards and EHS management
- Liaise with other Government agencies such as the Chennai Rivers Restoration Trust (CRRT) and Chennai Corporation (particularly, the Smart City initiatives) and other implementing partners on an ongoing basis
- Liaise closely, via the TNSCB, where technical guidance is required, with the Environmental Specialists of the World Bank and/or Asian Development Bank task team
- Coordinate and support the staff of the PID Environmental Cell in coordinating with the World Bank and Asian Development Bank as may be required in terms of planning missions / site visits, furnishing documents and responding to other requests
- Assist and facilitate the development and implementation of the EHS management systems within TNSCB for housing development projects including IRSHUPP / TNHHP

4.2 TASKS SPECIFIC TO OUTPUT 1 UNDER IRSHUPP

- Ensure subproject compliance to GOI statutory and legal environmental requirements, ADB SPS 2009, the project EARF, and loan covenants across the project cycle
- Ensure subprojects conforms to exclusion criteria and subproject selection guidelines as stipulated in the EARF
- Review and approve subproject category for environment
- Review and approve subproject IEE studies and reports and EMPs and submit to ADB for approval
- Ensure that updated subproject IEEs and EMPs reflect final subproject detailed design and submit to ADB for approval
- Check whether all relevant permits / environment clearances/approvals are obtained in a timely manner
- Ensure that EMPs are included in bidding documents and civil works contracts
- Ensure an efficient subproject implementation in line with IEE studies and reports and EMPs with adequate budget
- Review and approve quarterly environmental monitoring reports submitted by PIDs (Environment / Social Cell)
- Prepare quarterly monitoring reports and submit to ADB

- Ensure effective GRM set up and monitor grievances redress process and ensure timely redress by PIDs and contractors and other parties
- Ensure adequate awareness campaigns, information disclosure etc., are held within affected communities to minimize resistance and ensure hassle free transition for the project beneficiaries to new settlement sites
- Promote community participation in planning and design process
- Periodical review of safeguards related loan covenants, and the compliance in project implementation
- Organize periodic capacity building and training programs for subproject staff in safeguards
- Ensure timely compensation as per ADB Entitlement matrix and GOI norms
- Ensuring availability of budget for safeguards activities
- Ensuring disclosure of EARF, IEEs and EMPs, and monitoring documents

4.3 ADDITIONAL TASKS DURING PLANNING AND DESIGN STAGE

- Prepare terms of references (TOR) / requests for proposal for conducting environmental assessments for proposed housing development projects including the GOI Environmental Impact Assessment (EIA) in accordance with National environmental regulatory framework and in line with ADB SPS 2009 / World Bank's safeguard policies
- Review proposals received from individual consultants and/or consulting firms and advise in the decision-making among the various Request for Proposals responses received
- Coordinate works for the GOI EIA with the selected EIA consultants, and provide the required information and site-level decisions that may be required of the TNSCB officials
- Support the selected EIA consultants in conducting stakeholder / public consultations that is required as a part of the EIA process, and assist with meetings with other Government departments / agencies
- Review and approve GOI EIA studies and reports
- Ensure that updated GOI EIA studies and reports reflect final subproject detailed design
- Submit draft GOI EIA studies and reports to the World Bank for obtaining their clearance as required by the World Bank's operational policies
- Facilitate the translation of the Executive Summary of the GOI EIA studies nd reports to local languages
- Disclose the draft GOI EIA studies reports and translated Executive Summary on TNSCB website and support PIDs in information disclosure at physical locations on the ground
- Review and approve inputs by the selected EIA consultants in bidding documents and civil works contracts
- Review and approve contractor's bid evaluation process and provide inputs relevant to environmental performance that may be important in the decision-making
- Ensure that IEE studies and GOI EIA studies for a subproject is prepared concurrently to avoid any inconsistencies and ensure robust environmental assessment is undertaken
- Disseminate information on the good practices under the IRSHUPP / TNHHP housing development projects to other TNSCB projects wherever relevant

The following are the detailed tasks for the PID (Environmental Cell) - Environment Specialist:

5.1 TASKS SPECIFIC TO OUTPUT 1 UNDER IRSHUPP

- Support the PMU in preparing and/or updating, reviewing, and finalizing safeguard

documents (including but not limited to) environmental assessment and review framework (EARF), environmental impact assessment (EIA), initial environmental examination (IEE), environmental management plans (EMP) safeguards compliance report, time bound environmental safeguards corrective action plans and environmental audits of the proposed project in line with ADB requirements.

- Identify, select and screen subprojects in compliance with the key exclusion criteria and subproject selection guidelines stipulated in the environmental assessment and review framework (EARF) and relevant screening checklists. Conduct regular site visits for overseeing compliance with safeguards
- Prepare screening checklists and conduct classification of the sub-projects and submit to PMU for confirmation; update checklist and category as and when required to reflect subproject changes, and report to PMU
- Work closely with design teams to include environmental considerations in subproject location, design and technical specifications.
- Identify and obtain statutory environmental clearance/permissions/approvals required for subproject
- Include standards/conditions, if any, stipulated in regulatory clearances, consents in the subproject detailed design
- Conduct environmental baseline surveys including assessment of hazards and risks the projects may pose to the environment and people Prepare IEE or environmental due diligence report (DDR), and/or environmental management plans (EMPs) as required by country's environmental legal frameworks and ADB SPS 2009, and submit to PMU for approval Update subproject IEE studies and reports and EMPs to reflect any changes in subproject during detail design / implementation; IEE shall reflect the final subproject design; IEE shall also be updated in case of any unanticipated impacts
- Calculate and provide to relevant team members the indicative costs to implement package-wise EMPs, environmental monitoring programs, awareness programs, etc.
- Conduct adequate awareness campaigns are held with affected persons and within the host communities to minimize resistance and ensure hassle free transition for the affected persons / resettled households to new locations
- Conduct and document meaningful consultation in compliance with the EARF and IEEs; disclose relevant information on safeguards to stakeholders, affected people etc. reflect inputs from public consultation in subproject IEE studies and reports and EMPs
- Ensure that relevant provisions of the EMP are fully included in bid and contract documents (for all contracts, include full IEE studies and EMP in bids and relevant costs and clauses are included in the contract and bill of quantities)
- Review and approval of contractor site specific C-EMP / D-EMP
- Ensure implementation and compliance of subproject C-EMP / D-EMP by contractors
- Establish project GRM acceptable to ADB at divisional level; coordinate grievance redress process, ensure registration, record-keeping/ documentation, information dissemination, etc., and ensure timely actions by all parties; report to PMU
- Conduct training and capacity building activities (workshops, hands-on trainings, visits etc.) to contractors and field level staff in subproject IEEs and EMPs implementation
- Undertake internal monitoring and supervision and record observations throughout the subproject preparation and implementation period; identify issues that require intervention of senior TNSCB management in consultation with the PMU
- Ensure contractors follow their obligations as prescribed in the EARF and subproject specific IEEs and EMPs

- Review and approval of contractor's monthly report, consolidation into quarterly progress reports and submission to PMU
- Submit periodic monitoring reports[1] to the PMU, who will then submit these to the ADB

5.2 ADDITIONAL TASKS DURING IMPLEMENTATION / OPERATION STAGE

- Ensure adherence to GOI environmental assessment requirements for subprojects in line with the national regulatory requirements and other safeguard requirements as per ADB SPS 2009 policies and site specific IEE and EMPs
- Conduct training and capacity building activities (workshops, hands-on trainings, visits etc.) to contractors and field level staff in safeguards implementation for housing development projects
- Conduct regular site visits for overseeing compliance with safeguards and prepare regular monitoring reports
- Prepare monthly implementation performance monitoring reports for TNSCB internal management and quarterly progress / monitoring reports for the ADB; reports should clearly identify deviations in environmental performance, if any, and corrective and preventive actions taken or being taken , and relevant loan covenants

REQUIRED QUALIFICATIONS AND EXPERIENCE AT MINIMUM

- A minimum of five years' work experience in environmental management, environmental safeguards, environment, health and safety in project implementation
- A M.Sc./M.Plan/M.E/M.Tech in a relevant technical field such as environmental management, environmental science, environment planning, civil engineering, environmental engineering from a reputed university
- Prior experience working in the housing/urban development sector will be an advantage
- Prior experience in World Bank and/or ADB funded projects will be an advantage

Professional Competencies Required at Minimum:

- Ability to read and write excellent Tamil and English and produce project reports in Tamil and English for regular and continuous presentations to World Bank and ADB staff.
- Ability to guide and deliver the range of safeguards management activities required by the project throughout design, construction and operations of a project
- Ability to interact with staff in the relevant implementing agencies and in-line departments
- Effectiveness in analyzing and resolving project implementation issues
- Familiarity with the relevant Government procedures and regulations
- High level of computer literacy, including Word, Excel, email and the internet
- Strong communication skills and good interpersonal relations

[1] The monitoring report will focus on the progress of implementation of the safeguard, issues encountered and measures adopted, follow-up actions required, if any, as well as the status of compliance with subprojects election criteria and relevant loan covenants.

TERMS OF REFERENCE
SAFEGUARDS IMPLEMENTATION
ASBESTOS / HAZARDOUS WASTE MANAGEMENT CONSULTANT

A. OBJECTIVE

1. To ensure effective implementation of environmental safeguards procedures, one (1) asbestos / hazardous waste management expert (consultant) will be hired to assist the PMU (Environmental Team) and PIDs (Environment Cell).

2. The objective of the consulting service is to improve asbestos / hazardous waste management capacity for subprojects under output 1

3. The consultant will also provide training and capacity building to strengthen the capacity of PMU and PIDs to systematically design, implement and monitor asbestos and hazardous waste management and assessment processes, and its implementation to ensure compliance with ADB SPS requirements on environment.

B. SCOPE OF WORK

4. The consultant will assist in subproject implementation activities to ensure compliance with international and national / state standards on asbestos / hazardous waste management and ADB SPS (2009)

5. Assist in monitoring environmental compliance / performance of asbestos and hazardous waste issues in subprojects under output 1

6. Assist in establishing good documentation on asbestos and hazardous waste management, including screening, protocols and site specific management plans

7. Conduct training to PMU, PIDs, contractors etc., to understand asbestos and hazardous waste management processes in subproject design, implementation and monitoring of subproject activities under output 1.

8. The consultant will work in close coordination with PMU (Environment Team) and PID (Environment Cell), line departments of TNSCB, on-site contractors and under the overall direction of the TNSCB PMU.

C. DETAILED TASKS

9. **The following are the detailed tasks:**

- Conduct site visits to subproject sites to meet with relevant government counterparts and undertake field investigations / surveys to ascertain locations of Asbestos Containing Materials (ACM)
- Prepare an asbestos register, mark ACM locations on site-maps and in GIS system;
- Develop a hazardous waste register, mark temporary waste disposal area on site maps

- Prepare asbestos and hazardous waste investigation reports and risk assessment, for all subprojects under output 1 to confirm the extent or lack of ACM

- Compile and report the results to PMU (Environment Team) and ADB

- Prepare an overall asbestos and hazardous waste management guidance, checklists and/or protocols and asbestos and hazardous waste management plan for all subprojects under output 1 in line with international and/or national and state standards that sets out steps on how asbestos and hazardous waste will be managed throughout the project cycle including temporary placement/ siting, removal, transport and disposal. For Asbestos: the guidance, checklist / protocol should also include relevant mitigation measures if it is not feasible for asbestos to be physically removed.

- Prepare monitoring and reporting requirements; this will include preparing a monitoring and reporting template report with relevant indicators for IA to monitor compliance with the asbestos management and hazardous waste management plan and report to ADB.

- Incorporate comments and feedback on the reports from the IA and ADB

- Prepare and conduct capacity building training workshops on asbestos and hazardous waste management and monitoring requirements (including type of monitoring methods / equipment) to comply with international best practices as well as national and state standards and ADB SPS requirements for PMU, PIDs, contractors and other stakeholders (local municipalities / ULB / PWD)[1] involved in subproject implementation under output 1

- Prepare a repository of reference materials on asbestos and hazardous waste management for PMU and PIDs.

MINIMUM REQUIRED QUALIFICATIONS

- The Consultant shall have a Bachelor's degree in environmental management, environmental sciences, civil engineering or any related field with at least 10 years' work experience.
- Master's degree will be an advantage
- Past experience in safeguards work in India, urban development sector and specifically on asbestos and hazardous waste management projects supported by multilateral agencies, international organizations or multinational firms is required.

MINIMUM EXPERIENCE

Minimum General Experience	**10 Years**
Minimum Specific Experience (relevant to assignment)	**10 Years**

[1] ULB = Urban Local Body; PWD = Public Work Departments

Standards for Sewage Treatment Plants (STPs)
(Source: NGT (PB) Order dated 30.04.2019 in O.A. No. 1069/2018) [157]

Parameters	Standards (Applicable to all mode of disposal)			
	Mega and Metropolitan Cities	Class I Cities	Others	Deep Marine Outfall
pH	5.5 - 9.0	5.5 - 9.0	5.5 - 9.0	5.5 - 9.0
Bio-chemical Oxygen Demand (BOD)	10	20	30	30
Total Suspended Solids (TSS)	20	30	50	50
Chemical Oxygen Demand (COD)	50	100	150	150
Nitrogen-Total	10	15	-	-
Phosphorus-Total (For Discharge into Ponds, Lakes)	1.0	1.0	1.0	-
Fecal Coliform (FC) (Most Probable Number per 100 mililiter, MPN/100)	Desirable-100 Permissible-230	Desirable-230 Permissible-1000	Desirable-1000 Permissible-10,000	Desirable-1000 Permissible-10,000

Note:

(i). Mega-Metropolitan Cities have population more than 1 crore, Metropolitan Cities-Population more than 10 Lakhs and Class-1 Population more than 1 Lakh.

(ii). All value in mg/l except for pH and Fecal Coliform.

(iii). These standards will be applicable for discharge into water bodies as well as for land disposal/applications.

(iv). These Standards shall apply to all new STPs for which construction is yet to be initiated.

(v). The existing/under construction STPs shall achieve these standards within 07 years from the date of notification.

(vi). In case where the marine outfall provides a minimum initial dilution of 150 times at the point of discharge and a minimum dilution of 1500 times at a point 100m away from discharge point, then norms for deep sea marine discharge shall be applied.

(vii). Reuse/Recycling of treated effluent shall be encouraged.

(viii). State Pollution Control Boards/Pollution Control Committees may make these norms more stringent taking into account the local conditions

[157] Reference: 2.1.6 Standards for Sewage Treatment Plants (STPs) from https://tnpcb.gov.in/pdf/TNPCB&You2020.pdf

GUIDELINES FOR REUSE OF TREATED EFFLUENT AND SLUDGE FROM STP FOR BENEFICIAL PURPOSES

(Source: Manual on Sewerage and Sewage Treatment Systems, CPHEEO, Ministry of Urban Development, Govt. of India)

Health Hazards during Sewage Operations

Labourers working on the sewage treatment and operations may suffer from a number of aliments directly attributed to handling of sewage. In view of this it is desirable to disinfect sewage and where feasible mechanize sewage operations.

The staff of sewage operations must be well educated in the sanitary rules on the utilization of sewage for irrigation as well as with personal hygiene. All persons working in sewage farms must undergo preventive vaccination against enteric infections and annual medical examination for helminthiases and be provided treatment if necessary.

Sewage treatment plants should be provided with adequate space for canteens with proper sanitation, wash-stands and lockers for irrigation implements and protective clothing. Safe drinking water must be provided for the workers and for population residing within the effective range of the sewage treatment plants.

All workers should be provided with gum boots and rubber gloves, which must compulsorily be worn while at work. They should be forced to observe personal hygiene such as washing after work as well as washing before taking food. The use of antiseptics in the water used for washing should be emphasized. The farm worker should be examined medically at regular intervals and necessary curative measures enforced.

Mitigation measures to avoid Health Hazards

Personal Hygiene against Pathogen

The worker should take precautions because a large number of coliform groups, various kinds of micro-organisms, and egg parasites exist in sewage. The workers should strive to maintain good health by taking care of the following points:

- Wear clean uniform, work boots, etc.
- After work and before having a meal, always wash hands and disinfect them.
- After work, take a shower if possible.
- Do not enter the offices and lounges wearing dirty clothes.
- If necessary, take vaccinations against tetanus, leptospirosis fever and so on

Maintaining Cleanliness The worker should maintain each facility in a clean and neat condition.

- The floors of workrooms, stairs and corridors should be cleaned at the appropriate frequency to maintain them in a clean condition
- Disinfection of relevant locations is to be carried out periodically.

Health Check Workers should receive health check once a year to maintain their health, and prevent illnesses or detect them at an early stage. The results of the health check should be maintained as records. Recommended items to be inspected during the health check are as given below.

- Examine medical history.
- Examine subjective symptoms and other objective symptoms.
- Check height, weight, vision and hearing ability.

• Chest X-ray examination.
• Blood pressure measurement.
• Check for anaemia.
• Check for liver functions.
• Check for lipids in blood.
• Check blood sugar level
• Urine analysis.
• Electrocardiogram analysis

Welfare Measures The Sanitation Workers (Regulation of Employment and Conditions of Service) Act 2012 proposes constitution of a Sanitation Workers State Welfare Board to exercise powers conferred on it and to perform welfare functions such as the following for sanitation workers:
•Provide immediate assistance to a beneficiary in case of an accident
•Sanction of loan and advances.
• Medical expenses for treatment of major ailments
• Financial assistance for education of children
• Payment of maternity benefits
• Make provision and improvement of welfare measures and facilities as may be prescribed

Corrective Measures When a worker has symptoms of an illness listed above, the plant engineer should ensure that the worker is checked-up by a specialist doctor and receives proper treatment and care and should take the following actions considering the content of work done by the worker:
• Change the workplace if necessary
• Change the content of the work
• Shorten the working hours
• Perform relevant measurements of the working environment
• Maintain the facility or equipment

Risks in use of treated effluent and sludge in agriculture practices

Cultivation of crops that are eaten raw should be banned. Cultivation of paddy in bunded fields is likely to give rise to sanitation problems and hence is undesirable. Growing of non-edible commercial crops like cotton, jute, fodder, milling varieties of sugarcane and tobacco would be suitable. Cultivation of grasses and fodder legumes, medicinal and essential oil yielding plants like menthol and citronella may be allowed. Cultivation of cereals, pulses, potatoes and other crops that are cooked before consumption may be permitted, if sewage is treated and care is taken in handling the harvests to ensure that they are not contaminated. Cultivation of crop exclusively under seed multiplication programmes would be advantageous as these are not consumed. As an additional safeguard, sewage irrigation should be discontinued at least two months in advance of harvesting of fruits and berries, one month for all kinds of vegetables and a fortnight for all other crops. Direct grazing on sewage irrigated farms should be prohibited.

Risks of Nutrient Loading in Agriculture

Crops receiving excessive dosage of nitrogen show superfluous vegetative growth and decrease in grain or fruit yield. The phosphate deficit of sewage, therefore, should be made good by supplementing with phosphate fertilizers, the extent of phosphate fortification depending upon the nature of crop and its phosphate requirements. As the availability of phosphate is low in the irrigation water it would be desirable to apply the required quantity of phosphatic fertilizer at the

time or even (about a fortnight) before the sowing or planting of the crop. Even when sewage nutrients are balanced by fortification, irrigation with such sewage may supply excessive amount of nutrients resulting in waste or unbalanced growth of plants with adverse effects on yields. It may therefore be necessary to dilute the sewage. Dilution also helps in reducing the concentration of dissolved salts and decomposable organic matter in the sewage thus, decreasing hazards to the fertility of the soil. It is desirable to limit the BOD and total suspended solids of sewage to be disposed on land for irrigation, as per relevant standards. There is a need to take caution on describing nutrient supply capacity of sewage particularly in the case of availability of phosphorus because there is a possible conversion of available phosphorus in unavailable mode in the presence of heavy metals present in the sewerage. This happens commonly in high as well as low pH soils.

Alternative Arrangement during Non-irrigating Periods

During rainy and non-irrigating seasons, agricultural practices may not need any water for irrigation. Even during irrigating season, the water requirement fluctuates significantly. Hence, satisfactory alternative arrangements have to be made for the disposal of sewage on such occasions either by storing the excess sewage or discharging it elsewhere without creating environmental hazards. The following alternatives are generally considered: a) Provision of holding lagoons for off-season storage. They enable irrigation of a fied area of land to varying rates of crop demand. They may also serve as treatment units such as aerated or stabilization lagoons, provided the minimum volume required for treatment is provided beyond the flow-balancing requirement. b) Provision of additional land where treated sewage is not required on the main plot of land c) Discharge of surplus treated sewage to river or into sea with or without additional treatment. Combining surface discharge facilities with irrigation system is quite common and often quite compatible. d) Resorting to artificial recharge in combination with an irrigation system where feasible.

Treated Sewage into Perennial Rivers

When sewage is treated and discharged into perennial flowing rivers and the blended river water is drawn downstream of the point of such blending as raw water for treatment in public water supply schemes. This is indirect potable use after blending. This is historical and ongoing all around. However, of late, the organic load due to the discharged treated, partially treated and non-point sewage becomes in excess of the self-purifying capacity of the river. Thus, the river water is not actually fresh water. The water quality of Yamuna river for Agra water supply scheme requires to be fist treated in MBBR to purify the river water to a level as raw water for the downstream WTP. When it passes through flowing surface water it has the potential disadvantages of contamination by human and animal activities adding organic matter and waterborne pathogens unless the river stretch is protected from such activities. The guiding principle in such cases for the ULBs will be to at least intercept the sewage outfalls and provide adequate STPs and follow the recommended quality criteria for the treated sewage.

Treated Sewage into Non-Perennial / Dry River Courses

There are locations where the rivers are not perennial or almost dry throughout the year except some monsoon runoff. In this case the discharged treated sewage sinks into the aquifer zone and is extracted by infiltration wells or galleries. The advantage of direct dilution from surface water is lost, but the additional purification in the soil and dilution from the aquifer water are happening. An example is the case of the Palar river course in Tamilnadu. The surface water flow in this occurs only for about a week if the monsoon is normal and if the water spills beyond the upstream

impoundments. The aquifer however supports the public water supply of over 30 habitations along its dry tract of nearly 80 km before the sea. The partly treated sewage of the en-route habitations does reach this river course as intervals. So far, no epidemics have been met with. This may be due to the above said additional purification in the soil and dilution by aquifer water. However, if these are exceeded by the contamination load, there can be immediate health problems. The guiding principle in such cases for the ULBs will be (a) to keep a check on the raw water quality from the infiltration wells to detect sudden increase in contaminants and (b) at least intercept the sewage outfalls and provide adequate STPs.

ENVIRONMENT, HEALTH AND SAFETY AUDIT CHECKLIST AND SITE INVESTIGATION PROCEDURE - Template

1. BASIC INFORMATION

SUBSTATION DATA		List Responses Here	
1.1	Location / Address	District / Township:	Village:
1.2	Geographic coordinates		
1.3	Substation Plot (acres / hectares)		
1.4	Date substation was constructed / commissioned (year)		
1.5	List of major equipment / components at the substation Type of Substation (e.g. Hybrid, AIS, GIS) Capacity (MVA)	e.g. number of transformers; switch bay sets, etc	
1.6	Number of workers	Permanent:	Temporary:

2. OBSERVATIONS

SITE OBSERVATIONS		List Reponses Here
2.1	Description of substation within fenced boundary	
2.1 (a)	Adequate to undertake upgrade / extension / renovation works?	
2.2	Description of neighboring area / type of land use of surrounding area (outside the substation boundary) e.g. households, farm, warehouse yard, government building, barren / dense vegetation, vacant plot, agricultural fields, trees / forests, etc.	
2.3	List any sensitive natural and/or human receptors in close	

	proximity with distance in meters / km e.g. households, religious sites (pagodas, temples), schools, clinics, ponds, rivers, streams, trees / forests (including protected areas), etc.	
2.4	Any observed water logging at substation facility and/or surrounding areas	
2.5	Evidence of adequate fencing and other means of keeping the public and unauthorized persons away from the substation facility	
2.6	Evidence of leaks from existing transformers or other equipment / provision of oil pits	
2.7	Evidence of emergency planning e.g. Standard Operating Procedures (SOP) / Manual on Emergency Response Plan (ERP) on-site	
2.8	Evidence of safety signs , warning signs on-site.	
2.9	Evidence of fire-fighting equipment e.g. fire extinguishers, sand buckets, etc., (List numbers)	
2.10	Evidence of solid waste / hazardous waste management on-site	
2.11	Evidence of adequately sized drainage canals at the existing substation (This is to determine whether the drainage canals drain towards the road canal and/or towards adjoining areas and agricultural fields / vacant plots.)	
2.12	Evidence of adequate temporary storage space for new equipment /old and damaged equipment, materials on-site. (Also determine the condition of storage area e.g. permanent ('bunded') impermeable surface or temporary area)or directly on ground	

2.13	Condition of approach road to substation facility, e.g. paved, unpaved, dusty, etc	

3. ISSUES INVESTIGATED DURING THE SITE VISITS

QUESTIONS FOR SITE ENGINEER		List responses here and ->		Remarks
	When was the substation first constructed / commissioned (year)? In general, check if substation facility was constructed prior to the Environmental Impact Assessment or equivalent regulations or after the regulations came into effect.)	Prior to EIA or equivalent regulations came into effect:	After EIA or equivalent regulations came into effect:	
	Was an environmental clearance obtained at the time of the initial planning of the substation facility?	Yes	No	Document available on site / to be requested from Regional office, date of effect:
	Was resettlement or compensation required at the time of the initial planning of the substation facility?	Yes	No	If Yes, describe procedures If No, describe why
	Were any external donors involved in the financing of the substation facility? (This is to determine if there were environmental assessment requirements from the donors.)	Yes	No	If Yes, documentation of requirements to be requested from Regional office, date of effect:
	Provide a layout plan of the substation facility, with dimensions (This is to determine the area of the substations and check for environmental issues such as drainage.)			Documentation of layout to be requested from Regional office

	What is the age of the transformers? How many transformers? (Answer will be used to judge the general condition of the substation facility, evidence of maintenance, and likelihood of the presence of older transformers containing PCBs1 or other hazardous chemicals.)			
	What are your procedures for servicing of the transformers? When was the transformer last serviced? What do you do with the used transformer oil?			
	What type of circuit breakers do you use? (This is to determine if there are still sulphur hexafluoride (SF_6) circuit breakers with ceramic insulators at the substation which are more prone to breaking and explosion and release of SF_6 gas or with composite / rubber).	Ceramic insulators:	Composite / rubber insulators:	
	Is there a written Environment, Health and Safety (EHS) plan on-site?	Yes	No	Or where is it?
	Is there a written Emergency Response Plan (ERP) on-site?	Yes	No	Or Where is it?
	Is training on Electrical works / Environment, Health and Safety / Emergency Response Plan done regularly? Is it quarterly, bi-annually or annually? (Please list type of training and number of times)	Yes	No	If Yes, type of training and number of times:

[1] PCB - Polychlorinated Biphenyl

	Did you or do you regularly consultant with nearby communities on Environment, Health and Safety risks / Emergency Response Plan?	Yes	No	If Yes, type of consultation (formal / informal), when was it last done and number of times
	Do you conduct monitoring for Electro-magnetic fields (EMF)?	Yes	No	
	Describe your hazardous waste management procedures on-site. (This is to determine the measures on disposal of old batteries, transformers discarded / broken circuit breakers and other equipment)			
	Describe your solid waste management procedures on-site.			
	How do you handle any community complaints received?			
QUESTIONS FOR SITE STAFF / WORKERS				
	Have you participated in the Environment, Health and Safety training / Emergency Response Plan training? Aware you aware of the Standard Operating Procedures for the substation?	Yes	No	IF Yes, when
	Do you have adequate Personal Protective Equipment (PPE) such as helmets, gloves, boots, and eye and ear protection? Do you use them on daily basis?	Yes	No	
	Have there been any accidents in the substation facility that involved workers?	Yes	No	If Yes, when and details
	Have there been any accidents in the facility that involved the nearby community?	Yes	No	If Yes, when and details

	Are there wild animals which enter or live in the substation facility? Do you have any issues with birds?			
	Are you aware of the grievance redress mechanism to address community complaints?	Yes	No	

SUMMARY OF FINDINGS:_____
_____
_____
_____

CORRECTIVE ACTION PLAN:_____
_____
_____
_____
_____
_____