

## EXECUTIVE SUMMARY

### ES-1 BACKGROUND

The rapid pace of urbanization in India has led to the generation of large quantities of solid and hazardous waste in many cities in India. The Government recognizes that promoting cleaner production and minimizing waste is important to sustain industrial growth. A particularly serious problem is associated with hazardous wastes related to the unknown quantities of hazardous wastes illegally dumped outside industrial estates, on abandoned public lands, and within privately owned lands. Few Indian States appear to have any mechanism for the monitoring or even listing of such hazardous wastes dump sites. There are no estimates available with the State Pollution Control Boards regarding the quantities and nature of hazardous wastes in such dumps.

The **Capacity Building for Industrial Pollution Management Project** will support the implementation of the new Government policies that emphasize enforcement, integration of pollution prevention efforts and community participation in monitoring polluting industries. The project is designed as a pilot in response to the need to address the issues associated with contaminated orphan sites in two States and the limitations of the institutional base to tackle the problem in a comprehensive manner. The implicit logic of the project approach is to expand the institutional capacity at the State level, ease the regulatory gaps, and demonstrate appropriate clean up/remediation techniques of legacy hazardous waste sites and thus facilitate scaling up of the remediation effort in other States in future

### ES-2 PROJECT DESCRIPTION

The project targets the pollution associated with hazardous and solid waste in four specific sites in Andhra Pradesh and West Bengal, and the impacts on land and water and human health hazards. The project also places great importance on investments in institutional development of environmental authorities to stave off secondary pollution from ongoing industrial operations in the project area. It also provides a comprehensive framework for investments in remediation of legacy pollution sites which pose significant hazard to communities and meet the criteria of a “public good”.

The development objective of the project is two fold: (i) to support the institutional and methodological framework for development and implementation of national and State plans for clean up/rehabilitation of highly polluted sites resulting from rapid industrialization; and (ii) to build tangible capacity of State and national institutions for reducing the risks to public health, livelihoods and ecosystem integrity. More broadly, the project will provide a ‘blueprint’ for handling environmental issues related to ‘legacy’ pollution in the context of environmental and social sustainability.

The project promotes an integrated “area-wide” approach to pollution management which is based on inclusion of key stakeholders in planning and implementation of project investments, and partnerships for improved environmental conditions of community neighbourhoods around the polluted sites. The project will support measures for public awareness and community engagement to prevent secondary contamination of the sites and behavioural changes. The project has the following components:

**Component 1: Strengthening of Environmental Institutions: Building Capacity for addressing pollution remediation at State level (US\$14.77million).** This includes technical assistance for strengthening the planning, monitoring and enforcement capacity of State Pollution Control Boards in several States, including those where demonstration investments will be carried out. At the State level the project will promote regulatory incentives for improved environmental performance and corporate

compliance through support to the establishment of Environmental Compliance Assistance Center in West Bengal. The project will also support through technical assistance the development of the *National Plan for Rehabilitation of Polluted Sites (NPRPS)*. In this regard, high priority will be given to support the development of a methodological framework for assessment, prioritization, clean up/remediation standards, and financing modalities for implementation of the NPRPS. This will ensure the sustainability of project outcomes through enabling the replication of ‘good practices’.

**Component 2:** *Investments in Priority Remediation and Environmental Improvements: Rehabilitation of the orphan hazardous waste sites (US\$56.07million)*. The objectives of this component is to remediate or minimize to acceptable and safe levels the environment and health risks by containing the migration of the heavy metal and chemical bearing of contaminated soil and groundwater. Typically, in most polluted sites the generation and discharge of industrial waste; domestic discharge of sewer water, as well as discharge of toxic chemicals from abandoned industrial facilities and the municipal dump site have contributed directly or indirectly to the overall degradation of environmental quality of soil, surface and groundwater in the area, thus posing significant human health risks. Specifically, the high concentration levels of heavy metals, exceeding the maximum permissible concentration limits, create a major risk to the quality of the total surface and groundwater system, which is also used by both animals and humans as a source of drinking water. This component will develop a risk based<sup>1</sup> technical solutions to implement measures for intercepting, containing or treating as well as monitoring the environment and health impacts in the project area and prevent further migration of unacceptable contamination levels to sensitive areas and groundwater users.

This component will assist Andhra Pradesh and West Bengal to develop and implement *area-based plans* which include remediation of orphan<sup>2</sup> polluted sites and rehabilitation of old municipal dumps, and measures for overall environmental improvements in the area and better compliance of the nearby industrial units. Specifically, this component will provide technical assistance for detailed engineering design of site remediation plans, additional sampling and validation of pollution impacts, development of post-remediation monitoring and after-care plans for the project sites and training. The component will also finance remediation works, equipment and up-gradation of existing disposal and treatment infrastructure in the area, operational and maintenance cost of facilities during project life, and a campaign for community awareness and communication. The selected sites are located in urban or peri-urban areas which continue to grow.

The choice of sites for pilot demonstration investments is based on: severity of environmental impacts, size of population directly exposed to pollution hazards, including upstream-downstream impact of pollution, current and planned land use; applicable choice of technology and potential for

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<sup>1</sup> Risk-Based Approach is designed to prevent unacceptable exposure risks. A cleanup solution uses risk-assessment tools to develop site-specific cleanup levels. These levels depend on the nature and extent of contamination, current and reasonably likely future uses of land and water, and related factors.(USEPA)

<sup>2</sup> The term ‘orphan site’ is used in the international practice for a site which is contaminated by a release of hazardous substances that poses serious threats to human health or the environment, where the parties responsible for the contamination are either unknown - or unable or unwilling - to pay for needed remedial actions. A typical orphan site is a property with soil and/or groundwater contamination, where the party responsible for the contamination has gone out of business, and may also have left behind hazardous substances in tanks or drums. Sometimes a company is still operating, but is too small to afford the cleanup. Another type of orphan project is an area-wide site where drinking-water wells have been contaminated, but the source of the contamination is unknown. Failure to clean up Orphan Sites may endanger public health and the environment (including groundwater and municipal drinking water sources). Contamination will continue to spread, affecting water, soil, people, and adjacent properties. Costs will increase with time, because the more contamination spreads, the more expensive it becomes to clean up. Conversely, a viable Orphan and Enforcement program encourages careful handling of hazardous substances, and removes any competitive advantage for businesses engaged in sloppy waste-management practices. Finally, contaminated property is economically unproductive land. Contamination that remains will continue to devalue building, land, and water assets on the affected and neighboring properties.(USEPA).

meeting cleanup standards within the life of the project, community buy-in, support of local government, and sustainability of the investments.

For all pilot sites baseline information on the key parameters regarding level and type of contaminant, geographic location and acreage, and health impacts have been collected. The pre-feasibility study carried out during project preparation provides the background on the socio-economic, technical, financial and environmental impacts of the proposed site remediation. It also makes recommendations about the integrated approach to address other environmental problems in the area.

### **ES-3 DESCRIPTION OF THE PILOT SITES AND ENVIRONMENTAL ISSUES:**

Two States, Andhra Pradesh (AP) and West Bengal (WB), have been selected for piloting the remediation program, based on a set of selection criteria designed to ensure that integrated pollution management approaches covering both hazardous and solid waste management can be piloted. The sites that have been designated for the pilot program in each State are as follows:

**(a) Noor Mohammad Kunta (Lake), Katedan Industrial Area (KIE) in Rangareddy District, Andhra Pradesh.** The area is located in Rajendranagar municipality adjoining Hyderabad city. The Noor Mohamemed Kunta has an independent catchment and owing to the area topography of the Lake does not receive water from any upstream water body. The Lake has natural slope in northeast direction, and is interconnected through the Shivarampalli tank and Voora Cheruvu into the Mir Alam tank. Mir Alam tank is a large water body and is the principle water sources of Hyderabad City. The site is heavily polluted by heavy metals and identified as a 'hot spot' due to the 10- 40 times higher concentration of cadmium, manganese, lead, zinc, nickel, copper, chlorides and sulphites in the lake water, sediments and soil.

After remediation, the site will be used for public recreation. Under the public pressure of concerned residents relating to ground water and surface water contamination, the government has decided to remediate the site and reclaim the lake. Site remediation will include three sub-components: i) terminate the primary source of contamination, which is from illegal discharge of industrial effluents, and secondary sources, which is from random dumping of municipal wastes and industrial hazardous wastes; ii) pump and treat surface and groundwater (as feasible) to a level that is safe to drain into an effluent treatment plant, and pilot remediation measures like excavation, replanting, slope stabilization and remediation of bottom sludge, soil and sediments, build a drainage collection, inlet and outlet structure; iii) establishing a monitoring system to measure effectiveness of remediation system, and (iv) preparation of an 'after-care plan' for prevention of secondary pollution. Finally, the project will help establish support of the neighbourhood community to project measures, by helping them to understand the health impacts of pollution and change behaviour.

**(b) Kadapa Municipal Solid Waste Dump site in Andhra Pradesh. Ukkayapalli Municipal Solid Waste site** is located in Kadapa where 10.8 acres of land have been used for open dumping since 1988. The estimated volume of waste disposed at the site for closure is 162,500 tonnes. The dump site contains large quantities of organic waste from household and businesses. Water quality related health problems have been reported in the nearby habitations. Surface runoffs and percolation of leachate from the dumpsite is contaminated by toxic chemicals. Beyond the dump site boundaries many small water bodies were found to be polluted, as well. Pollution effects are intensified during the monsoon season when public concerns are reported frequently. It is less than 0.5 km or less away from the human habitations in the Masapet, Sankarapuram and Ukkayapalli villages. Rehabilitation after closure is considered necessary in view of the new urban developments proposed by the Municipality in the area.

The proposed plan to close and reclaim the waste dump site will result in significant reduction of pollution in soil; lower incidence of environment-related disease as well reduction in deleterious health effects on the rag-pickers who derive their livelihoods from the dump site. The remediation

plan which includes converting the area into a public park will significantly reduce health risks to the surrounding and help increase the livability of this urban area.

(c) **Hooghly Hazardous Waste Sites, in West Bengal**, are located in the district of Hooghly along the Delhi road which demarcates the site boundary on the eastern side. Seven spots contaminated with hazardous materials, mostly with chromium and ceramics waste, steel and alloy waste have been identified. Most of the hazardous material on the sites is used for building approach roads which are occasionally inundated during the monsoon. Specifically, these sites are located, near Badwa, Bangihatti, Baidyapati and Bodogorji villages, small business setup like Dhaba and shops were located near the sites. The sites' specific physical characteristics relevant to safeguard analysis have been determined in the Environmental and Social Assessment (ESA). The soil, groundwater and surface water media in Hooghly are contaminated. The ground and surface water is used by local residents for washing and other purposes as not all have access to clean, piped water. The water is also being used for agricultural purposes and thus poses a severe risk to human health. The livestock in the area such as cattle and other animals also drink the contaminated water. The waste present at the sites contains leachable constituents as identified in the TCLP (Chromatographic test) test and continues to contaminate both ground and surface water. The risk to the community and ecology is evident. In-situ remediation technologies for chromium wastes are not proven, therefore excavation and off-site disposal to a secure landfill is the only practical remediation technology for the proposed sites. All sites have medium to high hazard potential based on soil and groundwater analyses and assessment of health and environmental risks considering on existence of water body in the area, population density, likely impact on human health, existence of water supply source in the area, ground water table, contamination in soil and contamination in ground water. A number of remediation options were considered including recovery trenches or wells, soil venting, bio-treatment and immobilization. The proposed remediation may include the following steps: i) containment of spread of pollution using a permanent concrete capping design and reclamation of site using clean soil and lining where necessary; and ii) dismantling of existing permanent contaminated structures, excavation, transportation and disposal into secured landfill for all sites. The access roads comprising of contaminated fill will be excavated up to 4 m depth. The excavated material will be transferred to the authorised hazardous waste landfill site. Verification sampling will be carried out during the course of excavation to re-establish that the material being removed is contaminated and no underlying material that is contaminated is left behind.

In addition to removal of the contaminated fill comprising the access roads, the ponds will be drained and sediments will be excavated at the base of the ponds. The remediation plan envisions that all access roads will be developed using clean fill material meeting appropriate environmental and construction standards. The fill material will be made available from local sources such as fly ash from thermal power plants such as Bandel Power plant or sediments received from annual dredging of Damodar Valley Corporation's canal.

(d) **Dhapa waste landfill site in West Bengal** is a dumping site adjacent to the south-eastern wetlands of Kolkata located around 10 km from the city centre. The East Kolkata Wetlands is a man made wetland covering an area of 12,500 ha consisting of intertidal wetlands such as saltings and salt meadows. It has been registered as a Ramsar Convention site. The disposal site is shaped long and thin from west to east with a size approximately of 150 m by 2,000 m. The area is divided by an asphalt access road and agricultural land in two plots of 23 acres (site A), and 47 acres (site B) respectively. In compliance with the East Kolkata Wetland Management Plan first the smaller site is identified for closure and rehabilitation. The post rehabilitation land use has been defined by the East Kolkata Wetland Act which prohibits any commercial developments. The site contains unsegregated waste, including organic waste, debris and some recyclable refuse. Surface and ground water is polluted by the leachate from the dump site reaching the nearby water bodies. Significant noise and air pollution is attributed to the waste dumping site. All parameters for air pollutants (SO<sub>x</sub>, NO<sub>x</sub>, SMP, RSPM) in the areas significantly exceed the permissible levels.

The remediation plan for this site will close and remediate site A within the next two years, while the site B will remain active for another five years and then closed and remediated. The remediation plan envisages capping of the disposal site and capture of land fill gas. The site remediation/rehabilitation plan is designed to mitigate health hazards from toxic pollution, which poses risks to community and ecology (especially humans and animals that come into direct contact with the waste); reduce water and soil contamination in the land surrounding the site, which is used for small farming. Remediation also would improve the aesthetic appearance of the natural area, help eliminated the nuisance of flies and other insects that breed intensively on the site, and very likely lower the incidence of environment-related disease. The proposed plan to close and reclaim the waste dump site is also expected to result in potential cost-savings with decreased levels of pollution in soil, potential cost savings with decreased health budget from lower incidence of environment-related disease. Improvement/better management of the site would make it easier to set up transportation facilities and roadside amenities, which would generate income.

#### **ES-4 APPLICATION OF SAFEGUARDS POLICIES**

In accordance with World Bank policies, the following social and environmental safeguards apply: Environmental Assessment (OP/BP 4.01); Natural Habitats (OP/BP 4.04); Involuntary Resettlement (OP/BP 4.12); and Physical Cultural Resources (OP/BP 4.11). The project also adheres to the Public Consultation and Information policy. Regarding the presence of indigenous peoples in the area, after careful analysis and screening, no indigenous peoples were found to be residing in the project area.

OP 4.01 – Environmental Assessment. The Project is classified as Category A. An Environmental and Social Assessment (ESA) to identify this Project’s potential environmental and social impacts has been completed in accordance with the Bank’s environmental policies applicable to Category A projects. The ESA report provides an overview of the challenges India faces in addressing the large quantities of municipal solid waste and hazardous waste that have accrued in its urban and peri-urban areas—the result of the country’s rapid pace of urbanization—to an extent that exceeds the capacity of civic agencies responsible for collection and disposal of such waste. The ESA report also reviews India’s policy and regulatory framework regarding management of hazardous and municipal solid waste and related environmental issues, evaluates the positive and negative impacts and strategic environmental priorities. The Environmental and Social Management Plan (ESMP) comprises: (i) an Impact Matrix during Site Remediation of project activities, direct and indirect impacts and their positive and negative effects; (ii) a plan that details, for each site being remediated, the specific environmental and social impacts and related mitigation measures for these site-specific impacts—including a Resettlement/Rehabilitation Action Plan (RAP) to fully address any resettlement needs and the considerable issues regarding restoration of income at a few of the sites; (iii) an itemized budget that indicates costs for each mitigation measure at each site; (iv) and guidelines that identify the agent/s that is/are institutionally responsible for implementation as well as supervision of each measure to address the various environmental and social impacts.

OP 4.04 – Natural Habitats. The policy on natural habitats may be triggered specifically with regard to the closure and rehabilitation of Dhapa old municipal waste dump site, which is in the vicinity of the East Kolkata wetlands. The remediation measures at Dhapa are designed to mitigate impacts of toxic run-offs from the site, which pose risks to the community and area ecology. The closure and reclaiming of the site is expected to result in decreased levels of pollution in the water and soil and thus will have significant positive impacts. Any temporary impacts as a result of the remediation works will be mitigated following the recommendations of the ESMP.

OP 4.12 – Involuntary Resettlement. The physical activities envisaged under the project are unlikely to have significantly adverse social safeguard impacts. A majority of the sites are ‘orphan’ sites located on public land. The ESA has confirmed the absence of any legal disputes for each of the four sites under the project. No land acquisition is expected under the project; however, the project has triggered the policy on involuntary resettlement due to the likelihood that income streams will be interrupted by project activities and will need to be restored. Rag-pickers on the two dump sites will

require income restoration as well as rehabilitation (including training in safer methods of rag-picking and training to acquire alternative livelihoods). The possibility of encroachers on public lands or vendors/traders who use the undeveloped spaces also cannot be ruled out, and such groups have been accounted for in the ESMP developed by the ESA. In these cases, people affected by project activities in terms of loss of income or loss of housing/shelter have already been identified (through the ESA) in advance of project appraisal through extensive preliminary consultations with all stakeholders in project sites. Consultations have been supplemented with data collection in the form of household surveys and appropriate qualitative methods of data collection to ensure that all potentially affected peoples are recognized, and all ways in which they may be affected are specified. For events in which people incur loss of income and/or housing/shelter due to project activities, the ESMP is prepared to ensure equitable income restoration and any restoration of housing or shelter for affected people. The detailed site-specific entitlement matrices and Resettlement/Rehabilitation Action Plans (RAPs) have been developed as a part of the ESA. Due to the fluid nature of the directly affected population, additional field work to determine final list of people/households eligible for compensation will be undertaken well before rehabilitation commences. Given that physical interventions are planned only for urban and peri-urban locations, interventions are unlikely to affect indigenous peoples (IPs) dwelling in tribal/ancestral lands, for example, and thus are unlikely to involve IPs and would not require preparation of a separate IP Development Plan. Because the selected sites are likely to be host to poor and vulnerable populations, however, implementation of remedial actions would ensure that project interventions do not obstruct the livelihoods and access of these populations or incur other adverse impacts, but also make the appropriate provisions to ensure that people are not exposed to health hazards while site remediation works take place.

OP 4.11 – Physical Cultural Resources. The ESA report has identified a number of religious structures (temples, mosques, darghas) and graveyards in close proximity to intervention sites that might affect worship and rituals. Whereas the most likely impact will consist of disrupting access to the physical cultural resources, the possibility of encountering chance finds during foreseen excavations has also been taken into consideration. In view of the above, the ESA has addressed these issues in a section of the ESMP dedicated to the specific measures to be taken in order to mitigate and manage such impacts. Additionally, a chance finds procedure has been developed in compliance with the Treasure Trove Act

## **ES-5 FINDINGS OF THE SOCIAL AND ENVIRONMENTAL ASSESSMENTS**

### **Main Social Issues**

A social assessment, conducted as part of the ESA, has identified some of the major social issues in the areas surrounding the sites to be remediated. These are, among others: dangers posed to public safety from toxic waste at the polluted sites, including health hazards due to open dumps and unmanaged/inadequate solid waste collection, dumping, and treatment services (consulted peoples in the project influence area perceive these to be the cause of myriad health problems such as skin disease, diarrhea, asthma and other respiratory disease, and diseases like malaria and dengue, transmitted by mosquitoes that breed on the open dumps and hazardous waste sites); low literacy rates and average skill levels of the local labor force; few opportunities to access safe and sustainable livelihoods (e.g., a collective 700 rag-pickers—most of whom come from scheduled castes or other backward castes, derive their livelihoods collecting waste at the Dhapa and UKKayapalli MSW sites and will lose their income upon closure of the sites); pollution of the ambient environment due to burning of solid waste (air pollution) and contamination of water sources; degradation of natural and cultural resources and lack of attention to their preservation; and child labor, particularly at the dumpsites.

The ESA conducted analysis of each proposed remediation investment from the point of view of current needs and project social impacts. The proposed investments would provide services improvements for local population and training for people deriving their livelihoods from the sites, to increase opportunities for jobs that are more sustainable and less hazardous than their current

activities. As the directly affected population is of low income status, the targeted actions will benefit the socially vulnerable segments of the population in the vicinity of each remediation site. Some of the specific social impacts include: increased public safety due to reduction of health hazards upon remediation of polluted sites; better overall economic conditions through the improvement of livelihoods options; increase natural and cultural value of the area through improved ambient environment; reductions in child labor through integrated assistance to minors and their families (e.g., whole families, including children, deriving incomes from rag-picking). Resettlement of the small number—approximately 15—rag-pickers residing near one of the dumpsites is aimed at improving the living conditions and quality of life for these people. The resettlement will follow the Bank's safeguards policies and ensure full consultations with the affected persons. A resettlement and income restoration framework following the Bank's safeguards policies has been prepared which ensures that full consultations with the affected persons will be conducted.

### *Social Impacts*

The project will bring myriad social benefits to communities on and around remediation sites. These benefits include improved ambient environment, improved community perceptions of government responsiveness to their concerns about pollution, improved socio-economic conditions for PAPs (as restoration of income streams interrupted by project activities will provide more sustainable income earning opportunities), and increased community awareness of/involvement in local environmental issues—not to mention potentially improved health outcomes once pollution sources are removed. During preliminary consultations at all four pilot sites, community members expressed concern about pollution effects on their water sources and air quality, and in some sites, NGOs also have been very active in representing these community concerns. The project is innovative in its strong emphasis on mobilizing communities for greater environmental awareness and involvement in monitoring of polluting industries in the area, in part by incorporating communities into a multi-stakeholder monitoring mechanism that helps enforce local polluting industries' compliance with environmental policy. Social issues also are addressed in terms of mitigating negative social impacts as remediation activities occur on project sites—both for PAPs whose incomes require restoration or who need to be resettled, and for those in the broader affected area surrounding the anchor legacy site.

Some interventions may result in interruption of incomes on a large scale and, on a lesser scale, involuntary resettlement of 15-20 people. Alternative measures are being analyzed and a resettlement and income restoration framework has been devised to minimize the associated impacts.

### **Main Environmental Issues**

The project is expected to produce significant environmental improvements and social benefits due to the nature of project intervention to reduce environment and health risks in specific legacy pollution sites. However, because of its complex nature and remediation works associated with project sites the overall project qualifies for Category 'A', in accordance with the Bank's Operational Policy Guidelines.

According to Ministry of Environment and Forest's Environmental Impact Assessment regulations all common hazardous waste treatment, storage and disposal facilities fall under category A, while solid waste management facilities fall under category B. Furthermore any project activity specified in category B will be treated as category A if it is located in part or within 10 km from the boundary of a protected areas, critically polluted areas as notified by the CPCB, and notified eco-sensitive areas.

The project interventions are not likely to cause any adverse, large-scale, significant and/or irreversible impacts. Any adverse impacts identified in the EMPs are of temporary nature and construction-related and can be mitigated following good construction management practices. Specifically, potential impacts of project actions for remediation and rehabilitation of the pilot sites may have impact on the physical, biological and social environments during the closure and rehabilitation works. Analysis of environmental impacts has been carried out based on the proposed

activities, scenarios and applicable time horizons. The impacts related to site remediation may be regarded as both temporary and permanent with various levels of significance and generally negative, whereas post remediation impacts are more likely to be permanent and positive. Evaluation of sites has been carried out in the context of location, activities and affected people. The EMP defines the procedures related to specific impacts associated with handling and disposal of hazardous waste from contaminated sites, which will be mitigated by using international best practices. The EMP requirements will be integrated in the technical specifications and bidding document for remediation works and monitored as part of the contractual requirements in the civil works.

The main environmental problems associated with the site remediation are categorized as: (i) Direct and induced; (ii) Low significance, medium significance and high significance, (iii) Negative and positive, and (iv) Permanent and temporary.

- *Direct and Induced impacts* include effects on air quality, soil, water, flora and fauna, wildlife, habitation, livelihoods, existing infrastructure from dust, odour, dust emissions, contamination by leachate, solid waste, debris, water percolation, annoyance from increased traffic, temporary buildings during construction, visual/aural aesthetic loss etc.
- *Low /Medium/ high significance effects* on air quality, soil, water, flora and fauna, wildlife, habitation, livelihoods, existing infrastructure are rated according to site impacts from activities which include movement of vehicles, excavation, backfilling, land preparation, transportation and operation of machinery, construction of office camp, closure of dump sites and containment construction measures.
- *Negative and Positive* effects are related to bio-accumulation of pollutants in plants, animals/humans, and resulting health issues, increased pressure on site natural resources, traffic congestion, impact on property values etc.
- Categorizing effects as of *permanent or temporary* nature is done with regard to the effect of project activities on infrastructure and livelihoods.

Table A (below) provides an impact matrix of site remediation works.

**Table A: Impact Matrix during Site Remediation**

Component affected	Activity	Direct Impacts	Induced Impacts	Positive/Negative	Significance	Permanent/Temporary
Air	Movement of Vehicles, Excavation activities, Filling activities, transportation of waste. Land preparation, Operation of DG set and other machinery etc	Dust, Odor and gas emissions	Health issues for residents and workers, offsite contamination	Negative	Medium	Temporary
Soil	Excavation, Filling	Contamination by leaked pollutants, solid wastes, debris	Bioaccumulation of pollutants in plants/animals/humans, wider contamination from dust and soil movement during remediation.	Negative	Low	Temporary
Groundwater	Leachate from site	Drawdown effects from water percolation.	Bioaccumulation of pollutants in plants/animals/humans	Negative	Low	Temporary
Noise	Movement of Vehicles, Excavation, Land preparation, Operation of DG set and other machinery etc	Annoyance, irritation.	None	Negative	Low	Temporary
Flora and fauna	Construction of office and labor camp etc.	Loss of flora and fauna	None	Negative	Small	Temporary
Wildlife	Construction of office and labor camp etc.	Chances of Migration of wild animals	Increased pressure on resources by wildlife at some other location	Negative	Small	Temporary
Aesthetics	Excavation of waste, site preparation, associated construction activities.	Visual and noise aesthetics loss	None	Negative	High	Temporary

Component affected	Activity	Direct Impacts	Induced Impacts	Positive/Negative	Significance	Permanent/Temporary
Traffic	Movement of Vehicles, Excavating activities, Filling activities, transportation of waste. Land preparation and construction activities	Increased traffic movements, dust	Traffic congestion, health impacts, littering	Negative	Medium	Temporary
Livelihood	Closure of MSW site	Income of Rag-pickers and small business holders.	Income of traders associated with rag pickers	Negative	High	Permanent
Agriculture activities	Closure of MSW site	Loss of agriculture production	Shortage of agriculture goods in Market	Negative	Small	Temporary
Habitation	Closure of MSW site	Rag Pickers may migrate to other site	None	Negative	Small	Permanent
Employment	Closure of MSW site	Some Employment will Generate	Improved socio-economic conditions	Positive	Small	Temporary
Infrastructure	Closure of MSW site	Development of Infrastructure	Appreciation of property value	Positive	Small	Permanent
Religious and Socio-Cultural sites	Construction of contractor's office and labour camp, etc. Movement of vehicles, excavation, filling activities, waste transportation. Land preparation and construction activities	None	Worshippers and Visitors may avoid their routine visits to these places as a result of pollution or disturbance.	Negative	Small	Temporary

## **ES-6 PUBLIC CONSULTATIONS**

In accordance with the World Bank's Information Disclosure Policy (BP 17.50) a process of disclosure and public consultations as a part of the ESA has been conducted. Numerous consultations and stakeholder interviews have conducted throughout the project identification and preparation process. Open consultation meetings near the remediation sites discussed the background and initial proposed actions for the Project. Consultations have ensured disclosure of socio-environmental studies, identified partners in the process, and invited public involvement in and response to the process involving experience exchange and suggestions to be incorporated into the Project. The ESA report, which includes the Environmental and Social Management Plan (ESMP) and associated site-specific frameworks for income restoration and minimal resettlement, has been disclosed both in-country and to the World Bank Infoshop at least 120 days prior to the Project's Board date, in keeping with policy requirements. The ESA report was submitted to the Infoshop on November 26, 2008; and was published on the Ministry of Environment and Forests (MoEF) and Andhra Pradesh Pollution Control Board public websites on November 28, 2008 and on the West Bengal Pollution Control Board public website on November 29, 2008.

## **ES-7 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)**

The Environmental and Social Assessment report includes the following: a Social and Environmental Framework; an ESMP comprised of action plans for each site, including site plans for rehabilitation/ resettlement of directly affected peoples; a table that defines institutional roles and cost for safeguards. The framework, which informs the specific environmental and social management plans for each site (which can be found in the full ESA report), is displayed below, in Table B.

**Table B: Environmental and Social Management Planning Framework**

Environmental Issue/Component	Remedial Measure	Approximate Location	Time frame	Mitigation Cost	Institutional Responsibility	
					Implementation	Supervision
a. Soil erosion	The depths in borrow pits will be regulated so that the sides will not be steeper than 25%, from the edge of the final section of bank.  Soil erosion will be checked by measures such as the formation of sediment basins and slope drains.	All selected borrow pits and quarries.	During Remediation	Engineering cost	Contractor	SC, PIU,
b. Loss of topsoil	Agricultural areas will not be used for borrowing of materials, unless requested by the landowner for making ponds or for lowering the land for making it irrigable.	All selected borrow pits and quarries	During Remediation	Engineering cost	Contractor	SC, PIU,
c. Compaction of soil	Construction vehicles, machinery, and equipment will move, or be stationed in the designated ROW, to avoid unnecessary compaction of soil.	All MSW and HW sites and surrounding area	During Remediation	Engineering cost	Contractor	SC, PIU,
d. Contamination	Construction vehicles and equipment will be maintained and refueled so that spillage does not contaminate the soil.  Fuel storage and refueling sites will be kept away from drainage channels and important water bodies.	Throughout project corridor and borrow areas	During Remediation	Soil Monitoring Cost	Contractor	SC, PIU, NHAI
a. Water	Any community water source, such as wells, tube-wells, etc., lost incidentally will be replaced with alternate sources.	All MSW, and HW sites and surrounding area	During Remediation	Engineering cost plus relocation cost	Contractor	SC, PIU,

Environmental Issue/Component	Remedial Measure	Approximate Location	Time frame	Mitigation Cost	Institutional Responsibility	
					Implementation	Supervision
b. Contamination	Any work close to streams or other water bodies will be avoided, especially during the monsoon period. All necessary precautions will be taken to construct temporary or permanent devices to prevent water pollution due to increased siltation and turbidity.	All MSW and HW sites and surrounding area	During Remediation	Water Monitoring cost	Contractor	SC, PIU,
c. Sanitation	Construction camps will be located away from the habitation. The sewage system for such camps will be properly designed and built so that no water pollution takes place. If necessary, temporary effluent treatment plants will be installed in the construction camps. The workplace will have proper medical facilities.	At camp locations, wherever located along project corridor	During Remediation	Engineering cost	Contractor	SC, PIU,
d. Use of water	The contractor will arrange for water required for construction so that nearby communities remain unaffected.	All MSW and HW sites and surrounding area	During Remediation	Engineering cost	Contractor	SC, PIU,
a. Emission from	All machinery and plants will be downwind of human settlements. The pollution emission levels of all vehicles, equipment and machinery used for construction will conform to the standards prescribed in India Central Motor Vehicles Rules, 1989. Air pollutant parameters will be monitored regularly during construction, as envisaged in the EMP.	All MSW and HW sites and surrounding area	During Remediation	Air Monitoring Cost	Contractor	SC, PIU,

Environmental Issue/ Component	Remedial Measure	Approximate Location	Time frame	Mitigation Cost	Institutional Responsibility	
					Implementation	Supervision
a. Noise	<p>Vehicles and equipment used will be fitted with silencer and maintained accordingly.</p> <p>Noise standards for industrial enterprises will be strictly enforced to protect construction workers from severe noise impacts. Workers will be provided with appropriate ear muffs/plugs. The noise level will be monitored during the construction, as per the EMP.</p>	All MSW, HW sites and surrounding area	During Remediation	Noise Monitoring Cost	Contractor	SC, PIU,
a. Health issues	<p>Adequate drainage, sanitation, and waste disposal facilities will be provided at work places. Proper drainage will be maintained around sites to avoid water logging leading to disease. Adequate sanitation and waste disposal facilities will be provided at camps by means of septic tanks, soakage pits, etc. At every workplace, good and sufficient water supply will be maintained to avoid water-related diseases and secure the health of workers. Adequate drainage, sanitation, and waste disposal provided at workplaces. Preventive medical care will be provided to workers.</p>	Construction camps	During Remediation	Engineering cost	Contractor	SC, PIU,
	<p>A health care system will be maintained at camps for routine check up of workers and avoidance of communicable disease.</p>					

Environmental Issue/Component	Remedial Measure	Approximate Location	Time frame	Mitigation Cost	Institutional Responsibility	
					Implementation	Supervision
a. Livelihood	All persons likely to be impacted will be properly compensated and also will be considered for alternative earning options. As per the RandR 2007 and bank Policy 4.12. Also Social development of the affected persons will be carried out in order to alternative earning options and better living conditions.	All MSW and HW sites and surrounding area	During the design and remediation stage	R&R Cost	PIU, concerned government departments	PIU
b. Community properties	All community properties likely to be impacted will be relocated with prior approval of the concerned agencies	To be identified based on community needs	During the design and remediation stage	R&R Cost	PIU, concerned government depts..	PIU
c. Cultural and Religious properties.	Public consultation has been carried out to obtain opinions about shifting of religious structures if required. Also Bank policy 4.11 will be followed in these cases	Locations of cultural properties likely impacted during proj. implementation.	During the design stage	R&R Cost	PIU, NGOs and R and R unit	PIU
d. Archaeological Properties.	If there is any archaeological site in direct and indirect influence zone of project area then archaeological site prevention acts will be followed to mitigate the impacts.	Location of archaeological properties likely to be impacted during implementation.		R&R Cost	PIU, concerned govt. depts, R&R unit	PIU

**Table C: Main Steps of the Environmental and Social Plan for CBIPMP<sup>3</sup>**

Technical Stage	Social-Environmental Management Measures
Project Effectiveness	ESMP already developed, references in project legal document regarding ESMP implementation responsibility
Project Implementation	Issuance of RFP for works incorporates ESMP requirements
	Review bidding documents to verify compliance with ESMP requirements for implementation, including cost provisions
	Signing of contract with legal provisions for implementation
	Validation of list of people to be rehabilitated/compensated
	Carry out all SMP requirements, including rehabilitation/compensation
	Prepare sites with EMP measures to start remediation works
	Independent supervision consultant verifies contracts have provisions
	Identify local community groups to participate in monitoring
Implementation of site works commences	Supervision consultant conducts random field checks throughout
	PIU verifies there are no complaints filed in grievance redressal mechanism or fully addresses any complaints
Remediation works completion	Verify absence of complaints filed in grievance redressal mechanism, discuss with communities

**Table D: Cost Estimate of Proposed Safeguards Action Plans for CBIPMP**

Proposed Action Plans for CBIPMP Remediation Sites	Cost Estimate (US\$)
1. Noor Mohammad Kunta, AP	
Environmental Management Plan	17,000
Workshops for Communities re: Environmental Awareness	20,000
Compensation/Income Restoration for 10 Rag-pickers	7,300
<b>SUBTOTAL</b>	<b>44,300</b>
2. Ukkaypalli Landfill Site at Kadapa, AP	
Environmental Management Plan	13,000
Workshops for Communities re: Environmental Awareness	20,000
<i>Improving Safety, Livelihoods Options for 200 Rag-pickers</i>	
Awareness program	4,000
Skills training	8,400
Health protection material (gum boot, gloves, mask)	5,000
Compensation for relocation and/or income restoration	13,300
<b>SUBTOTAL</b>	<b>63,700</b>
3. Hooghly Sites, West Bengal	
Environmental Management Plan	25,000
Workshops for Communities re: Environmental Awareness	25,000
Compensation for relocation and/or income restoration	33,300
<b>SUBTOTAL</b>	<b>83,300</b>
4. Dhapa dumpsite, West Bengal	
Environmental Management Plan	17,000
Workshops for Communities re: Environmental Awareness	25,000

<sup>3</sup> Detailed timeline provided in complete ESA Report.

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<i>Improving Safety, Livelihoods Options for 500 Rag-pickers</i>	
Awareness program	60,000
Skills training	100,000
Health protection material (gum boot, gloves, mask)	73,300
Compensation for income restoration	138,000
<b>SUBTOTAL</b>	<b>413,300</b>
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Procurement of agencies for training, monitoring of site ESMPs	301,100
<b>TOTAL RESOURCES</b>	<b>905,900</b>

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