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**ANE 07-08 Iraq SO1 RWS PEA – Mitigation Table
PROGRAMMATIC ENVIRONMENTAL
ASSESSMENT (PEA)
OF
RURAL WATER SUPPLY PROJECT
(JO-04-509)
IN COOPERATION WITH
THE GOVERNMENT OF IRAQ**

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Table 1. Mitigation and Monitoring Measures Associated with Iraq Rural Water Supply Project Construction and Operation

Project Activity	Environmental Impact	Mitigation Measures	Monitoring Requirements
1. Planning and Design Phase			
<p>Design and assessment of selected rural water supply locations by the structure engineering design consultants.</p>	<p>Environmental sensitivities may not be considered at this stage, but it is important to ensure that the recommended mitigation and monitoring measures are budgeted for.</p> <p>Human health and safety impacts during the field survey for removal of UXO.</p>	<p>Ensure good collaboration with MPW so that activities can be coordinated. Encourage understanding of the affected areas of ecological sensitivity. Rural water supply structures rehabilitation and new construction will require having an “Environmental Checklist” for use by those assessing construction needs for chosen water supply locations. . Costs of environmental protection and management becomes an explicit part of the BOQ.</p> <p>Ensure that field surveys are carried out for removal of live UXO before water supply structure construction starts. Ensure that the personnel doing the survey and removal of UXO are well trained and fully equipped for detection, removal and safe handling of UXO and storage.</p>	<p>Government of Iraq MMPW review completed checklist and verify that it has been adequately completed Possible field visit by MEO to selected water supply construction sites to assess status of environmental parameters, and implementation of mitigation and monitoring measures.</p> <p>Carry out regular checks to ensure that field equipment for removal of UXO is working well, and that the removed UXO is safely stored, including safe storage facilities for hazardous waste.</p>

2. Construction Phase

<p>Soil surface disturbance from bush clearing, ground excavations and leveling for installation of water supply structures and digging of wells and boreholes, requiring operation of heavy construction machinery.</p>	<p>Soil erosion impact leading to soil loss, clogging of drainage ways and sedimentation in watercourses or surface water bodies.</p> <p>Air pollution impact due to generation of dust during ground surface excavations and leveling.</p> <p>Noise pollution impact during the operation of heavy machinery.</p> <p>Historical and cultural resources impact, causing possible damage to the present resources.</p>	<p>Plant grass or other ground cover local plants to anchor and stabilize the soil. Spreading and, or compaction of disturbed soils incorporated into BOQ.</p> <p>Ensure that the field crew has breathing equipment to prevent health hazards due to dust.</p> <p>Ensure that machinery operators have personal hearing protection equipment</p> <p>Ensure that the field crew has breathing equipment to prevent health hazards due to dust.</p> <p>Ensure that field surveys are carried out for detection of presence of historical and cultural resources of importance before water supply structures construction starts.</p>	<p>Monitor soil sediment and debris buildup in selected water supply locations and assess the suitability of handling and disposal measures.</p> <p>Measure stream flow, local hydrology so as to increase the understanding of local conditions, and impact cause and effect.</p> <p>Check breathing equipment to ensure that it is working well.</p> <p>Ensure that the personal hearing protection equipment is working well.</p> <p>Carry out regular field checks to ensure that the necessary field surveys are done in every site before construction activities are started.</p>
	<p>Human health and safety impacts during the field survey for removal of UXO and safe handling of hazardous waste.</p>	<p>Ensure that the personnel involved in project construction are well trained and fully equipped for safe detection, removal and safe handling of UXO and storage, including safe handling of hazardous waste</p>	<p>Carry out regular checks to ensure that the field equipment for removal of UXO is working well, and that the removed UXO is safely stored, including safe handling.</p>

	<p>Clearing of bushes and ground excavations for construction of water supply structures could cause Biodiversity (flora and fauna) impacts, leading to possible loss of flora and fauna species</p>	<p>Avoid areas sensitive for nature conservation, e.g. wetlands.</p> <p>Ensure that removed soil is well kept and returned after the ground excavations are completed.</p> <p>Replant original vegetation in affected areas so that the original environmental condition can be restored.</p> <p>Engage local community and authorities to take responsibility for long-term maintenance of affected areas to ensure proper re-growth of planted vegetation.</p>	<p>Verify that subsequent use of affected areas, whether for maintenance or other needs meets the mitigation standards.</p> <p>Verify natural plant regeneration on restored areas and if necessary, replant.</p> <p>Verify conformance with affected areas recommended management plan.</p>
<p>Management and disposal of accumulated solid and liquid waste in field crew camps and along the route during water supply structures construction.</p>	<p>Site Pollution Impact due to generation of hazardous waste from garbage or fuel, used oil and other lubricants from motorized equipment.</p>	<p>Ensure project personnel training on specified site pollution safeguards.</p> <p>Provide equipment for storage of used oil and other lubricants.</p> <p>Incorporated full field cleanup costs well into BOQ.</p> <p>Ensure that the field crew is well trained in safe handling and disposal of hazardous waste.</p>	<p>Ensure that the hazardous waste is properly stored and regularly disposed off in a safe manner, and that training courses on safe handling are conducted.</p>

3. Operations Phase			
Water treatment using gaseous chlorine in the water treatment process.	Chlorine gas is poisonous, and improper storage and handling of the gas containers could cause human health and safety impacts.	<p>Provide training on safe storage, handling and application of the gas in the water treatment process.</p> <p>Ensure that the people handling the gas are provided with gas masks during the application of the gas.</p>	Monitor the status of storage, handling and use practices for chlorine gas containers and application equipment, and the frequency of training on safe handling for ensuring human health and safety.
Improved access to potable water supply to the rural communities will attract the establishment of human settlements and increased livestock populations close to the watering points.	Establishment of human settlements and livestock populations concentrations close to watering points will contribute to soil erosion occurrence and loss of agricultural land impacts.	<p>Initiate community-based natural resources management training programs in the affected areas.</p> <p>Sensitize and train the communities on proper regulation of grazing.</p> <p>Formulate and enforce effective land-use management policies.</p>	<p>Monitoring routine reports of water supply structure operations and maintenance efforts by staff charged with managing and maintaining the structures.</p> <p>Monitor changes in land use around the watering points.</p>
Water supply abstraction rates.	Possible incursion of sea water in wells close to the coastlines, causing hydrological and water quality impacts.	Ensure that water abstraction rates from wells and boreholes are properly regulated to prevent sea water incursion into the wells close to the coastlines.	Monitor changes in water quality, using the WHO Water Quality Guidelines (including testing against arsenic poisoning)