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Environmental Monitoring and Mitigation Plan

Activity Type:	Construction and rehabilitation activities will occur in urban, peri-urban areas, and remote locations for select specialized activities. Rehabilitation may include small commercial buildings, market activities, and individual homes. Some activities will involve planning and rehabilitation of more specialized projects, such as botanical gardens, plazas, and other communally designated recreational areas. NOTE: Because of similar impacts and mitigation measures, small-scale new construction and building and infrastructure repair and rehabilitation were consolidated.
Key Components:	The IRP 2 Grants Management Unit (GMU) will work with recipient communities on construction and rehabilitation designs and preparation of Implementation Planning documents, including activity profiles and budgets. The construction work may be conducted by the grantee or implemented via a subcontractor through a competitive bid process and managed by the GMU. The GMU will review and monitor IRP 2 grantees to ensure adherence to environmental compliance requirements and mitigation measurement requirements in the EMMP. Where Implementation Planning and design requires the preparation of site-specific mitigations, sampling or an environmental plan, an IRP 2-approved format will be provided to the grantee. The Program Compliance Officer (PCO) provides oversight for environmental compliance during the full project life-cycle: planning and design (P&D); construction (C), or operations and maintenance (O&M).
Scale:	Activities include construction or rehabilitation of one-story, small and medium sized structures with no complicating factors. Also, repair and rehabilitation of schools, clinics, government buildings, market places, parks, and open-air markets.
Ambient Environment:	Construction and rehabilitation activities will occur primarily in urban and peri-urban areas. Locations are typically office or small commercial buildings, markets, and individual homes. There is minimal natural vegetation in these sites, except for some low grasses and an occasional tree. New construction will not be located on or near sensitive habitats, such as wetlands or undisturbed pristine forests. Community-based construction and rehabilitation includes cultural and archeological sites, marketplaces, urban parks, and other similar structures. The land is not occupied by unauthorized residents or squatters. Legal documentation related to land ownership will be requested from local entities prior to rehabilitation or construction of new structures.

Potential Environmental Impact / Climate Risk	Mitigation Measure(s)	Phase of Mitigation Measure Planning and Design (P&D), Construction (C), Operation and Management (O&M)	Indicator	Responsible Authority	Timing	Priority of Mitigation Measure 1 = High, 2 = Medium, 3 = Low
1: Damage to sensitive ecosystems near construction work site during construction including staging of construction, erosion, grading, borrow pits, storm water, vehicle operation, and waste management.	1.1 IRP 2 GMU will initially screen the grant proposal using the Environmental Review Form (ERF) to identify all activities to be carried out by the grantee. GMU will review the activity site to assess proximity to potentially sensitive ecological areas, potential toxic hot spots, archeological landmarks, incompatible land use, among other factors. Public consultation will be conducted to inform and obtain support for larger construction activities that could impact the local community. ● Where appropriate, the construction design will be reviewed by a certified local engineer and other subject matter experts to ensure that the construction design and implementation conforms with internationally-recognized best management practices (BMPs), Iraqi laws and regulations, and applicable USAID Environmental Sector Guidelines.	P&D	1.1: ERF completed and reviewed by IRP 2 identifies sensitive areas and surrounding land uses. Stakeholder consultation, when needed, documented through community meetings and other methodologies informing the community of the activity and soliciting input. Meeting summaries will be maintained with project files.	IRP 2 GMU, grantee, and Environmental Officer	ERF completed prior to initiating work. Community meetings during design and on-going, as needed.	1
	1.2 New construction will be designed to control run-off and provide adequate site drainage using methodologies appropriate for the site including, physical barriers, permeable ground surfaces, vegetation, among other methodologies, as needed. Local certified engineer used as needed.	P&D, C, O&M	1.2: IRP 2-approved implementation plan documents mitigations for managing run-off. . Site visits confirm plan is accurate and implemented.		Plan developed prior to construction, implemented throughout activity	1
	1.3: Waste management procedures during construction will be documented and follow the IRP 2 guidelines . Documentation is appropriate for the size and type of activity. The Implementation plan will provide site-specific discussion on management of construction waste, recycling (if available), site access and disposal. Construction waste will be securely stored during project construction and removed to an approved final, disposal site at the completion of the activity. Construction waste having potentially hazardous substances such as asbestos, PCBs, or other materials will be disposed in an IRP 2-approved site suitable for receiving the waste. As feasible, promote minimal use of plastic by construction firms by including language in construction procurement documents prioritizing proposals that maximize use of recyclable construction materials and in on-site operations in areas where recycling companies are available (for PVC, glass, metal, and concrete)		1.3: IRP 2-approved waste management plan (WMP) or procedure. Implementation of the waste management process.		Plan prepared prior to beginning the activity	1
	1.4 During construction, measures for erosion control will be taken as needed including the use of physical barriers such as silt fences, revegetation of graded soil and slope stabilization.		1.4: Implementation plan documents site-specific erosion control measures.		Plan completed prior to initiating work.	1
	1.5 Project will conduct equipment and vehicle maintenance off-site, as feasible, to reduce/eliminate release or spills of oil and solvents. Vehicle maintenance shall not be done within 50 meters of water systems. Appropriate for the size and type of construction, the project should have appropriate spill clean up equipment/supplies on site and workers will be trained in their use.		1.5: IRP 2-approved implementation plan documents vehicle maintenance and spill clean-up procedures.		Plan prepared prior to construction and implemented throughout construction period.	2
2. Improperly designed or undersized water and sanitation services , or waste management systems that may result in inadequate services for the number of facility users.	2.1: If construction requires rehabilitation or installation of a potable water system, the grantee will follow Iraqi government standards, or in their absence, World Health Organization standards. For new potable water sources, the grantee will prepare a USAID Water Quality Assurance Monitoring Plan and submit it to GMU for review and approval. Refer to Water systems section for additional mitigations.	P&D, C, O&M	2.1: IRP 2-approved Water Quality Assurance Plan for new water sources. Water sampling of rehabilitated water systems prior to release to public.	IRP 2 GMU, grantee, and Environmental Officer	Plan approved prior to construction of system.	1
	2.2: To control run-off, design adequate drainage, the grantee will develop/plan or procedures for storm water pollution. (appropriate for the size and complexity of the construction activity), which will be provided to IRP 2 for review and approval.		2.2: IRP 2-approved storm water controls documented in Implementation Plan.		Plan prepared prior to construction and implemented throughout construction period.	1
3. Occupational health and safety concerns from improper use of building materials, with health risks; lack of, or inconsistent use of personal protective equipment, and inadequate sanitation.	3.1: Procure building materials that comply with international best management practices and Iraqi country laws and regulations. The activity will not use materials known to cause health impacts, including asbestos-containing materials, lead-based paint, and materials that off-gas unsafe levels of formaldehyde. Include the use of sustainable building materials (e.g. recycled products, renewable materials, etc.) where possible. Design storage areas to ensure hazardous materials are above ground and in leak-proof containments to prevent spills occurring during normal operation or natural disaster events.	P&D, C	3.1: IRP 2-approved implementation plan documents use of appropriate building materials. IRP 2 provides list of materials not to be used by the project.	IRP 2 GMU, grantee, and Environmental Officer	Plan prepared prior to construction and implemented throughout construction period.	1
	3.2: Project will prepare and follow a health and safety plan/procedures that are appropriate for the size and complexity of the construction activity, including personal protective equipment (PPE) for worker safety, training on PPE use and instruction on safe use of equipment. Project drivers will be licensed and instructed on requirements for reporting work-related driving violations.	P&D, C	3.2: Health and Safety plan/procedure and training developed in implementation plan. PPE monitoring log maintained by grantee.		Plan is prepared prior to construction and monitoring occurs throughout project activity.	1
	3.3: Worker sanitation will be managed through provided latrines and water for hygiene. As a best practice, use a ratio of 20 people per one pit latrine. Never exceed a ratio of 50 people per latrine. Source: http://conflict.lshtm.ac.uk/page_161.htm	P&D, C	3.3: Number of temporary latrines in the construction or rehabilitation place		Prior to construction, identify the number of latrines needed. Maintain throughout construction	2
4.: New construction can exceed capacity of local utilities and services.	4.1: As feasible for project scope and size, assess utility and local services demand for new construction. Incorporate energy efficiency measures and use of renewable energy sources to reduce energy use and costs. This may include the use of insulation and reflective building materials to reflect heat, energy efficient fixtures, and high-efficiency heating, cooling, and lighting systems, solar energy. The use of solar systems for residential and commercial projects may realize cost savings through the use of renewable energy. As feasible, IRP 2 will assess and incorporate solar systems, especially in areas where solar system providers are present (Erbil, Duhok, Sulaymaniyah, Baghdad, Mosul, and Kirkuk). To ensure maintenance and safe use of the system, IRP 2 will provide trainings to beneficiaries and/or grantees and subcontractors.	P&D, C	4.1a: Assessment of utility and service demand of new construction and documented in ERF. As feasible for scope of activity, installation of energy efficiency measures or justification for not including. 4.1b: If solar systems are installed, trainings provided to beneficiaries, grantees, and/or subcontractor on maintenance and safe use.	IRP 2 GMU, grantee, and Environmental Officer	4.1a: Review during activity design phase 4.1b: Prior to activity and training logs saved to activity file.	2
5. Construction can result in impacts to the local community including traffic disruption and noise which may result in social tension among stakeholders, local authorities, and construction firm.	5.1: IRP 2 will identify any community outreach requirements in the ERF to inform stakeholders about the project and obtain input and support for project. If required, the grantee will document the type and timing of community outreach activities. The grantee will document communications and complaints, if received, from community stakeholders concerning project activities and maintain in their project file.	P&D, C	5.1: Community outreach process included in implementation. Log with community feedback and complaints about project implementation. Document the response to stakeholders. Designate a point of contact for the activity.	IRP 2 GMU, grantee, and Environmental Officer	Prior to activity and updates as documented in the activity file.	1
	5.2: Construction operations will be managed to reduce noise disturbance to surrounding areas, if applicable, and feasible. In residential areas, larger construction activities will follow a schedule to minimize noise disturbance to the surrounding neighborhood.	P&D,C	5.2: Documented procedures for noise mitigation in implementation plan. Work hours managed to reduce disturbance to surrounding community, to the extent feasible.	IRP 2 GMU, grantee, and Environmental Officer	Throughout the construction activity	2
	5.3: Traffic obstruction resulting from construction work will be managed to reduce disruptions. Signage will advise drivers of any circulation changes and workers will be present to guide traffic, if needed.	P&D,C	5.3: Documented procedures to minimize traffic disruption using signage, traffic circulation workers and work schedule, as needed.	IRP 2 GMU, grantee, and Environmental Officer	As needed during construction	2
	5.4: IRP 2 construction activities will identify a point-of-contact (POC) to conduct outreach to surrounding community and stakeholders. The POC is responsible for documenting and responding to community grievances.	P&D, C	5.4: Documented POC and contact information and record of community contact.	IRP 2 GMU, grantee, and Environmental Officer	Throughout planning and construction	1
6. *Climate risk:* Construction workers may face increased risk of heat exhaustion or impacts of climate-related extreme events	6.1: Require that construction crews receive proper hydration and are not exposed to dangerously high heat levels, in accordance with local and national health and safety requirements.	C	6.1: Implementation plan documents process of providing work breaks	IRP 2 GMU, grantee, and Environmental Officer	Throughout construction period	2

(e.g., heavy rain storms, flooding, dust storms or wildfires)	6.2: Ensure emergency plans are in place (and well-communicated to crews) to respond to climate-related extreme events.		6.2: Documented emergency plans posted at the work site.		Throughout construction period	2
7. *Climate risk* : Climate-related precipitation and storm events (e.g. storms, wildfires, extreme heat, flooding, landslides, erosion) can reduce the durability of project structures and transportation systems necessary to access the project structures.	7.1: To the extent feasible and appropriate, use enhanced construction methodologies, best practices and resilient materials to address specific potential climate stressors and increase construction longevity and durability. Design will be reviewed by local certified engineer, as needed.	P&D	7.1: Documented climate risk considerations in building designs or justification for not including. For construction activities requiring an Engineer of Record, this Engineer will be responsible for reviewing the climate risks prior to the activity and during the planning and design phase. The Engineer will be required to confirm that climate risks have been considered and addressed.	IRP 2 GMU, grantee, and Environmental Officer	Design review prior to construction.	1
	7.2: IRP 2 will consider long-term sea-level rise and potential flooding scenarios as a result of climate change storm events, when siting new construction. New construction will not be undertaken in areas vulnerable to flooding.		7.2: Documented climate risk considerations in construction site selection.		Site review prior to construction	1
8. *Climate risk:* Water scarcity - Declining precipitation rates and changed distribution patterns are causing water stress in Iraq.	8.1: To the extent feasible, design community-based facilities to increase water efficiency to promote resilient communities. Design review by local certified engineer as needed.	P&D, C, O&M	8.1: IRP 2-approved design that enhances water efficiency, to the extent feasible.	IRP 2 GMU, grantee, and Environmental Officer	Prior to construction	2
9. *Climate risk:* Extreme climate-related events (drought, extreme heat waves, wildfires, flooding) can affect the longevity of buildings and infrastructure; these impacts can be worsened or mitigated based on construction design and siting / location	**9.1** Use local knowledge and best practices in designing measures to address specific potential climate stressors (e.g., use more resilient materials or construction methods, design for future upgrades/repairs, promoting smart design for cities and areas of implementation)	P&D	9.1 Indication of climate risk considerations in building designs	IRP 2 GMU, grantee, and Environmental Officer	Prior to construction	1
	9.2 Consider alternative locations if proposed site faces higher climate risks (e.g., floods, wildfires, high winds, or other site-specific threats) than other potential, appropriate locations		9.2 Indication of climate risk considerations in construction site selection		Prior to construction	1

Acronyms

Planning and design:	P&D
Construction	C
Operations and maintenance	O&M
Environmental Review Form	ERF
Implementing partner (grantee)	IP
Project development officer	PDO
Storm water pollution prevention plan	SWPP
Health and safety plan	HASP
Waste management plan	WMP
World Health Organization	WHO
Program Compliance Officer	PCO
Subcontracts and grants manager	SGM

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Environmental Monitoring and Mitigation Plan

Activity Type:	Small scale water system development and improvement including potable water, and sanitation, hygiene.
Key Components:	IRP 2 provides recipient communities support for the planning, construction, and rehabilitation of small-scale water and sanitation projects. The construction work, when needed for the activity, will either be procured competitively or implemented by the grant recipient. The IRP 2 GMU will provide the grant recipient with IRP 2-developed guidelines when needed for environmental compliance and instruct the grantee on how to comply with the EMMP. The IRP 2 GMU will monitor IRP 2-supported activities for environmental compliance. The Environmental Review Form (ERF) will be completed as part of the grant process and will identify environmental impacts, mitigations, and the required planning documents to be completed by the grantee. The Program Compliance Officer (PCO) provides oversight for environmental compliance during the full activity life-cycle: planning and design (P&D), construction (C), or operations and maintenance (O&M).
Scale:	The scale of this activity includes: a. Infrastructure provision consisting of: (i) rehabilitation or establishment of new connections to surface water, wells, and rain water harvest, (ii) construction and rehabilitation of sanitation facilities, such as flush toilets, septic pits, and latrines. b. Community development and capacity building - Water and Sanitation Committees. c. Hygiene education and sanitation promotion, consisting of public health and hygiene education and promotion of improved sanitation, and community awareness- creation and mobilization activities for schools, households and public places.
Ambient Environment:	Small scale water potable and sanitation activities will occur in urban, peri-urban areas, currently highly populated by the presence of local homes and other buildings. The purpose of this activity is to improve the living conditions of beneficiaries through the implementation of small and medium-scale potable water supply and sanitation facilities and structures. Currently, the areas are not located on or near sensitive habitats, such as wetlands or undisturbed vegetation.

Potential Environmental Impact	Mitigation Measure(s)	Phase of Mitigation Measure Planning and Design (P&D), Construction (C), Operation and Management (O&M)	Indicator	Responsible Authority	Timing	Priority of Mitigation Measure 1 = High, 2 = Medium, 3 = Low
1.: Inadequate system sizing for current and forecasted population changes can result in capacity deficiencies for both potable water and sanitation systems.	1.1: Conduct public outreach and consultation to design activity with local stakeholders. Ensure funding and maintenance of the system is secured and supported by users.	P&D	1.1: Documentation of local consultation and outreach to stakeholders. Documented analysis supporting water and/or sanitation system capacity requirements.	IRP 2 GMU, grantee, and Environmental Officer	Consultation prior to construction.	1
	1.2: Implementation plan incorporates operating guidelines appropriate for the size and complexity of the construction that are in conformance with internationally-recognized best management practices, Iraqi laws and regulations and USAID Sector Guidelines for Water and Sanitation, and World Health Organization. Design plan and implementation reviewed by certified local engineer. Factors to be considered in the system planning include: - Size of population to be serviced by potable water or sanitation system - Capacity of drinking water source to be developed. - Potential impacts to water flow and fresh water quality - Presence of naturally-occurring and anthropogenic contaminants in water sources - Proximity of drinking water systems to sanitary systems - Operation and maintenance requirements for drinking water and sanitary system.	P&D, C, O&M	1.2: IRP 2-approved design plan prepared using WHO and USAID policies.		Technical design prior to construction and follow up as needed during construction and O&M.	1
	2.1: Conduct initial water testing in accordance with WHO and Iraqi regulations (where WHO standards for water testing cannot be implemented, conduct testing in line with Iraqi regulations only) to obtain information on the chemical, biological, and physical qualities of the proposed water source. Document water testing requirements and protocols in a Water Quality Assurance Plan (WQAP) for new water sources and if applicable, include approach for ongoing water quality monitoring. Conduct water testing for (1) arsenic, (2) fecal coliforms, (3) fluoride, (4) nitrate, (5) electrical conductivity, (6) TDS, (7) pH, and (8) turbidity, in line with WHO standards for water quality testing and as stated in the USAID cable on arsenic testing (May 12, 1998) that is attached to the Guidelines for Determining the Arsenic Content of Ground Water in USAID-Sponsored Well Programs in Sub-Saharan Africa (December 2003). USAID requires testing for arsenic for all USAID-funded water supply projects. In Iraq, arsenic testing is difficult to conduct as many government and university laboratories do not have the capacity to test water for arsenic. Where arsenic testing is not possible, IRP 2 will procure field water testing kits that include capacity for arsenic testing. Perform additional water quality tests, as appropriate (e.g., if mining, intensive agriculture, or industrial sites are present near the drinking water source).	P&D, C, O&M	2.1: IRP 2-approved WQAP for new water sources. Drinking water sampling as indicated in Iraqi Water Quality standards. In their absence, follow USAID Environmental Sector Guidelines for Water Systems or World Health Organizations Drinking Water Guidelines. Results reviewed by IRP 2 GMU and grantee.	IRP 2 GMU, grantee, and Environmental Officer	Sampling to establish baseline drinking water quality for existing water systems. For new access points, WQAP prepared prior to initiating construction work. Sampling conducted per the approved WQAP.	1

2. Water supply systems may become contaminated during construction, operation, or maintenance activities.	2.2 A Water Quality Assurance Plan (WQAP) is prepared for both existing and new drinking water access points. The WQAP will specific how IRP 2 will assure safe drinking water for the project and conform to applicable USAID/WHO drinking water standards and Iraqi drinking water requirements given project implementation conditions. WQAP will include requirements for initial testing and long-term monitoring with water standards. • WHO guidelines recommend testing eight water quality parameters where water supplies are developed and/or rehabilitated: (1) arsenic, (2) fecal coliforms, (3) fluoride, (4) nitrate, (5) electrical conductivity, (6) TDS, (7) pH, and (8) turbidity. At a minimum, testing for arsenic, fecal coliforms and nitrites must be conducted in accordance with the WQAP before the drinking water source is made available for public use. • Ongoing monitoring of water parameters as outlined in the WQAP is required. IRP 2 will work with the grantee, local authorities, and service providers to promote ongoing water quality monitoring at the conclusion of IRP 2 activity support.	P&D, C, O&M	2.2: WQAP prepared for new drinking water access points. Submitted to DCHA BEO for review.	IRP 2 grantee or community authorities based on maintenance agreement.	WQAP prepared prior to initiating construction work. Sampling conducted per the approved WQAP.	1
	2.3: Clean and disinfect water systems following construction or maintenance activities using chemical disinfectants (e.g. chlorine). Monitor disinfectant residual levels in water source and ensure that levels are in compliance with Iraqi drinking water standards or WHO guidelines.	C, O&M	2.3: Logs of water monitoring and disinfection.		Construction and ongoing during water system use.	1
	2.4: IRP 2 grantee or other designated entity responsible for maintaining the water system implements a water quality monitoring program of the supply system throughout operation. Document water testing requirements, including responsible parties, frequency of testing, and protocols to conform with Iraqi drinking water standards or WHO guidelines.	P&D, C, O&M	2.4: IRP 2-approved and implemented drinking water monitoring program. Records maintained to demonstrate program operation.		Ongoing monitoring throughout water system operation.	1
	2.5: Provide community outreach process, educational materials, and training to users/community on the proper use, operation, and maintenance of the water supply system to ensure the long-term sustainability of the water system.	C, O&M	2.5: IRP 2-approved community outreach process in Implementation Plan. Review of outreach, educational materials, and user training procedures to verify that training was conducted. Conduct site visits to document that users/community are trained and following proper procedures.		Community outreach throughout water system operation.	1
	2.6 Reduce/eliminate sources of livestock contamination at new and rehabilitated community drinking water wells. Prohibit livestock watering at community potable water systems. Control livestock grazing in vicinity of community drinking water wells.	P&D, C, O&M	2.6: IRP 2 guidelines to grantee and education material to the community will instruct them on operation of the water system including livestock contamination at community potable water systems.		IRP 2 water system guidelines and educational material prepared and provided to community before initiating system use.	1
3. Water system design defect or operational failure results in the presence of stagnant water.	3.1 Control potential accumulation of stagnant water from stand pipes ● Install drainage structure to remove water from the containment ● Monitor and infrastructure maintenance to minimize leaks from cracked containment structures, pipes, and damaged valves	P&D, C, O&M	3.1: IRP 2-approved design to reduce potential accumulation of stagnant water from stand pipes. Local certified engineer review of design and construction as needed. IRP 2 guidelines will instruct system operator on maintenance practices.	IRP 2 GMU, grantee, and Environmental Officer	IRP 2 water guidelines and local engineer design, if needed, prior to initiating construction.	1
4. Construction of water and sanitation systems can impact the surrounding environment. Waste can impact the environment and surrounding community.	4.1 Management of construction waste: ● Waste material will not be allowed to accumulate at the construction site and will be disposed at appropriate disposal sites ● Waste material shall be separated into non-hazardous waste and hazardous material	P&D, C	4.1: IRP 2-approved waste management plan/procedure plan for wells and latrines. Conduct site visit(s) to evaluate if design plan was properly implemented.	IRP 2 GMU, grantee, and Environmental Officer	Approve design prior to activity and site inspections during construction.	1
	4.2 Control erosion during system design through design, physical barriers and slope stabilization, as determined appropriate for location. If needed, a certified local engineer will review and approve activity design.	P&D, C	4.2: Preparation of a erosion control plan/procedure following IRP 2 guidelines and appropriate for the activity size. Site visit or other monitoring tools show that erosion control is on plan and effective.		Erosion control plan/procedure in place prior to initiating construction.	1

5. Contamination of surface and groundwater sources by pathogens, if latrine systems are not properly sited, constructed, and maintained.	5.1 Reduce sources of contamination from pit latrines following BMPs including ● Use ventilated improved pit latrine design to trap insects and vectors ● Evaluate water table depth including seasonal fluctuations prior to latrine installation. Pit latrines will not be installed in locations of shallow water table or vulnerable to contamination as determined by field assessment. ● Ensure that there is a system in place for maintaining, emptying, and disposing of waste in an appropriate process.	P&D, C, O&M	5.1 Develop sanitation guidelines for the design, construction and maintenance of the sanitation system. Have plan reviewed by a local certified engineer as needed.	IRP 2 GMU, grantee, and Environmental Officer	IRP 2-approved plan reviewed and approved prior to initiating work.	1
	5.2 Reduce potential groundwater contamination from septic tanks ● Evaluate depth to water table, including seasonal fluctuations, to determine appropriate tank depth. ● Establish a reliable system for removal and disposal of sludge ● In locations of high-water table, modify septic tank installation to prevent leakage.	P&D, C, O&M	5.2 Develop sanitation guidelines for the design, construction and maintenance of the sanitation system. Have plan reviewed by a local certified engineer as needed.		IRP 2-approved plan reviewed and approved prior to initiating work.	1
6. *Climate risk:* Construction workers may face increased risk of heat exhaustion or impacts of climate-related extreme events (e.g., heavy rain storms, flooding, dust storms or wildfires)	6.1 Ensure that health and safety practices are implemented during project installation and operation using the IRP 2 guidelines, as appropriate. Workers will be provided with appropriate PPE and instructed on its user will be instructed on safe use of equipment. Workers will have appropriate licenses and instructed on requirements	P&D, C, O&M	6.1: IRP 2-approved HASP plan/procedure. Workers provided with PPE and instructed on use. Record show workers have appropriate licenses and report work-related violations.	IRP 2 GMU, grantee, and Environmental Officer	IRP 2-approved HASP plan/procedure prior to initiating work. Record show PPE provided and trained on use. Log of work-related	1
	6.2: Incorporate heat stress into Health and Safety Guidelines provided to grantees. Workers on IRP 2 grant projects are provided with a work schedule that allows for breaks and water consumption at regular intervals.	C	6.2: Implementation plan documents process of providing work breaks.		Throughout construction period	2
	6.3: Ensure emergency plans are in place (and well communicated to crews) to respond to climate-related		6.3: Documented emergency plans		Throughout construction period	2
7. *Climate risk* : Increased frequency and/or intensity of extreme precipitation events and flooding, along with sea level risk and storm surge can affect access to, use, and longevity of water and sanitation	7.1: To respond to increased intensity of storm events, use enhanced construction methodologies and resilient materials to maximize project longevity and durability.	P&D	7.1: Indication of climate risk considerations in building designs or justification for not including. For construction activities requiring an	IRP 2 GMU, grantee, and Environmental Officer	Prior to construction	1
	7.2: Consider alternative locations, if proposed site faces high climate risks (e.g., floods, wildfires, high winds)		7.2: Indication of climate risk considerations in construction site		Prior to construction	2
	7.3: Based on climate data and trends, incorporate design	P&D	7.3: IRP 2-approved design that	IRP 2 GMU, grantee,	Prior to construction	1
8. *Climate risk:* Water scarity - Declining precipitation rates and	8.1 Design potable systems to increase efficiency based on anticipated changes in the hydrologic system from long-	P&D	8.1 IRP 2-approved design that incorporates flexibility in the water	IRP 2 GMU, grantee, and Environmental	Prior to construction	1
8. Pit Latrines - Groundwater supply contaminated with pathogens (O&M)	**8.1** Evaluate depth to water table, including seasonal fluctuations and groundwater hydrology, if possible	P&D	8.1 & 8.2 Document water table and retention time studies in ERF, if applicable	IRP 2 GMU, grantee, and Environmental Officer	Prior to construction	1
9. Septic Tanks - Groundwater supply contaminated with nitrogens and pathogens (O&M)	**9.1** Evaluate depth to the water table, including seasonal fluctuations and groundwater hydrology	C	9.1 & 9.2 Document communications on maintenance and handling requirements and/or the delivery of guidelines with beneficiaries in ESRF	IRP 2 GMU, grantee, and Environmental Officer	Prior to construction	1
	9.2 If the water table is high, line the tank with clay, plastic sheeting or some other impermeable material to prevent leakage				Prior to construction (HASP) and monthly (log)	1
10. Septic Tanks - Surface water contaminated with nutrients, biological oxygen demand, suspended solids and pathogens from high concentrations of	10.1 Prohibit direct discharge of effluent to waterways	P&D	10.1 Document proper septic tank	IRP 2 GMU, grantee, and Environmental Officer	As needed	1
	10.2 Provide a reliable system of safely removing sludge	P&D	10.2 Document delivery of ERF			1
	10.3 Consider the use of secondary treatment, such as	C	10.3 Develop and implement water			2
11. All Toilets and Latrines - Unsanitary conditions due to lack of proper cleaning and maintenance by beneficiaries	11.1 Provide training in proper system operations andmaintenance, including the above mitigation measures to minimize disease transmission and groundwater contamination	C	11.1 Document delivery of guidelines to beneficiaries on proper system maintenance on ERF	IRP 2 GMU, grantee, and Environmental Officer	Daily	2
12. All Toilets and Latrines - Women and girls lack of safe and accessible WASH facilities	12.1 Planning and design of latrines (and other WASH systems) ensures equal access for both men and women.	P&D	12.1 Document equal access measures and best practices in ERF and IRP 2-approved implementation plan.	IRP 2 GMU, grantee, and Environmental Officer	Prior to activity	2
13. *Climate risk:* Sewage systems designed based on historic precipitation data may not account for more intense or frequent extreme rainfall events,	**13.1** Consider future climate projections (or if none are available, increase capacity by 25% in the design and sizing of sewage systems	P&D	13.1 Climate projections or estimates of potential increased rainfall included in sewage system designs		Prior to construction	1
14. *Trenches in activities such as pipe replacement are a health and safety risk for workers*	14.1 Follow Occupational Safety and Health Administration guidelines inside the excavation by placing and keeping such materials or equipment at least 2 feet (0.61 meters) from the edge and/or by using a retaining device to keep the materials or equipment from falling or rolling into the excavation. 14. 2 Provide a warning system (such as barricades, hand or mechanical signals, or stop logs) when mobile equipment is operated adjacent to an excavation, or when such equipment must approach the edge of an excavation, and the operator does not have a clear and direct view of the edge. 14.3 Protect workers from loose rock or soil that could fall or roll from an excavation face by scaling to remove loose material, installing protective barricades at appropriate intervals, or using other equivalent forms of protection	P&D	14.1 Document compliance through regular site visits	IRP 2 GMU, grantee, and Environmental Officer	daily	1