

JOB AID: FLOOD DIVERSION AND STORAGE



Flood Diversion and Storage (FDS) projects often are used to reduce flood risk, but also can be used to mitigate drought and improve ecosystem services. These projects involve diverting floodwaters from a stream, river, or other body of water into a conduit such as a canal, pipe, or wetland and storing them in an above-ground storage facility. Water is then slowly released, reducing flood risk as well as facilitating groundwater recharge/seepage.

The purpose of this Job Aid is to help communities applying for Hazard Mitigation Assistance (HMA) grants to comply with the technical feasibility and effectiveness, and environmental and historic preservation (EHP) requirements of the application. This Job Aid provides a checklist of information required by FEMA to determine grant eligibility and to complete a thorough review of the application. FEMA must review all applications to ensure that proposed activities comply with all applicable statutory, regulatory, and programmatic requirements. Therefore, certain information must be provided with the grant application for FEMA to make an eligibility determination. Early submission of accurate and complete information by the applicant will facilitate FEMA's review process and the release of HMA funds.

For more information, Applicants and Subapplicants are encouraged to refer to the Job Aid Supplements and FEMA's HMA Guidance.



PROPERTY INFORMATION

	with App. Submittal	Pre-Award
<input type="checkbox"/> Provide a vicinity map with address and project boundaries	X	
<input type="checkbox"/> Identify project location by latitude and longitude in decimal degrees	X	
<input type="checkbox"/> Provide site photographs	X	
<input type="checkbox"/> Provide current property ownership information, including any easements or covenants	X	
<input type="checkbox"/> Discuss watershed development plans/future land use plans	X	
<input type="checkbox"/> Provide a copy of the flood insurance rate map (FIRM) showing project location	X	
<input type="checkbox"/> Include geologic and hydrogeologic information (e.g., aquifer types, aquifer and vadose zone characteristics, subsurface homogeneity/heterogeneity, hydrologic conductivity, transmission rates, storage coefficients, water temperatures). Include copies of investigation reports.	X	
<input type="checkbox"/> Indicate current land use types (e.g., residential, commercial, etc.) on and near the project site	X	
<input type="checkbox"/> Show on a map all existing surface water bodies, stormwater structures, floodplains, wetlands, woodlands, and riparian habitat information. Indicate which bodies of water (e.g., river, stream, wetland, or pond) are located within 200 feet of the project.	X	
<input type="checkbox"/> Provide historic stream flow, stage, and water quality data (for subsurface, surface, reclaimed water). Discuss the potential ecologic effects due to water quality and provide documentation from completed studies.	X	
<input type="checkbox"/> Include a state or local topographic map where available, otherwise provide a USGS topographic map of the project site		X
<input type="checkbox"/> Include the National Resources Conservation Service soil map for the project site		X
<input type="checkbox"/> Identify permitting requirements, relevant federal and local ordinances. Include status of permit applications, copies of permits obtained.		X
<input type="checkbox"/> Include an underground utilities map or show locations of underground utilities on the project site map		X



SCOPE OF WORK

	with App. Submittal	Pre-Award
<input type="checkbox"/> Provide a narrative description of the project scope of work	X	
<input type="checkbox"/> Indicate if any property will be acquired, modified, and/or demolished for the project and show the locations on a map	X	



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SCOPE OF WORK CONT.

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<ul style="list-style-type: none"> Describe the amount and depth of ground disturbance associated with this project (e.g., grading; digging for buried utility lines; new, temporary, or permanent access roads or staging areas; installation of canals, channels, spillways, etc.; use of geotextiles, floodwalls, levees; all associated pipe routing; installation of pumps) 	X	
<ul style="list-style-type: none"> Provide characteristics (e.g., size and geographic area) of population that would benefit from flood risk reduction and that would use the retained water. Note any potential users of large volumes of water, such as agricultural, commercial, or industrial users. Explain how the project would affect the quality or volume of water supplied to these users. 	X	
<ul style="list-style-type: none"> Identify and show on a map the current water sources, conditions, and capacities that serve the communities that would be impacted by the project 	X	
<ul style="list-style-type: none"> Describe the effects on nearby infrastructure, including the expected change in capacity, if any, of nearby stormwater management facilities and reservoirs, after the project is completed 	X	
<ul style="list-style-type: none"> Attach hydrology and hydraulics (H&H) and other engineering studies, calculations, and/or models; geotechnical studies; and stream flow and rainfall records. H&H analysis should demonstrate any downstream impacts (positive or negative) and any changes in base flood elevation and discharge rates in the immediate vicinity and downstream of the project. 	X	
<ul style="list-style-type: none"> If the project is being used for drought mitigation: <ul style="list-style-type: none"> Describe usage of stored water (e.g., annual water supply strategy, stored for use during periods of extreme drought, etc.) State the length of time that the project area experiences a measurable water shortage (due to drought) Provide estimates for groundwater recharge and withdrawal rates, design storm frequency and precipitation rate, and include outputs from associated calculations/models 	X	
<ul style="list-style-type: none"> Include conceptual plans, designs, and specifications, including proposed storage type (e.g., online, offline, wet, dry, or wet/dry) and method of groundwater recharge 		X
<ul style="list-style-type: none"> Describe debris or other materials that will be removed and disposed of off-site. Provide estimates of types and quantities of materials to be disposed and those that could be suitable for re-use. Include information about where debris will be disposed (including temporary staging areas) in accordance with local and State requirements. 		X
<ul style="list-style-type: none"> Describe and/or show on a map the type and location of any vegetation that will be affected by implementation of the project 		X
<ul style="list-style-type: none"> Describe the type and source of any fill that will be imported to the project area from any off-site source (e.g., existing borrow pit) 		X
<ul style="list-style-type: none"> If new structures will be constructed, describe the type of structure and materials to be used 		X
<ul style="list-style-type: none"> If pumps will be installed as part of the project, describe pump sizes and capacities 		X
<ul style="list-style-type: none"> If a reservoir is part of the project, include a copy of a dam failure risk assessment 		X
<ul style="list-style-type: none"> State the volume of water that will be redirected, current and expected (post-project) flow rates and surface water elevations, anticipated impacts on water quality, and potential need for treatment. Include peak flood stage information for existing conditions as well as projected conditions with and without project implementation. 		X
<ul style="list-style-type: none"> Discuss potential impacts on any existing wells, water quality, and flow within the aquifer 		X



SCHEDULE, COST ESTIMATES, AND BENEFIT-COST ANALYSIS

	with App. Submittal	Pre-Award
<ul style="list-style-type: none"> Include a project schedule showing start and end dates, milestones, activities, and deliverables. The schedule should be no longer than 3 years. 	X	
<ul style="list-style-type: none"> Provide cost information for: <ul style="list-style-type: none"> Project development, including site selection, field testing, engineering, public outreach Land acquisition, including site access, permitting, and source water availability Construction, including labor, materials, equipment, and testing Operations and maintenance, including pre-treatment and post-treatment requirements and post-project monitoring, labor, electricity, consulting services, regulatory testing, treatment, and other miscellaneous costs 	X	



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 SCHEDULE, COST ESTIMATES, AND BENEFIT-COST ANALYSIS	with App. Submittal	Pre-Award
<ul style="list-style-type: none"> ■ If the project is being used for drought mitigation, determine the recurrence interval associated with the severity of the scenario drought events through best available data and methodology deemed appropriate by a licensed professional 	X	
<ul style="list-style-type: none"> ■ Determine type of damages and losses to be mitigated and choose the appropriate module in the FEMA Benefit-Cost Analysis toolkit 	X	
<ul style="list-style-type: none"> ■ The project useful life is 30 years unless the user provides justification for using a different value 	X	
<ul style="list-style-type: none"> ■ If the benefit-cost ratio is greater or equal to 0.75, then environmental benefits can be included in the analysis using the Ecosystems Benefits Calculator available from your FEMA Region. Identify anticipated land use after the project is completed and the number of acres of restored ecosystem. 	X	
<ul style="list-style-type: none"> ■ Additional benefits may be available depending on the project's design: 		
<ul style="list-style-type: none"> <ul style="list-style-type: none"> • Reduced agricultural/crop losses: provide documentation of past losses or number of acres impacted, yield per acre and market price of crop 	X	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> • Reduced loss of function of roadways: provide traffic counts and detour times 	X	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> • Avoided costs of stormwater conveyance and treatment infrastructure: provide the amount in millions of gallons of water to be stored by the project 	X	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> • Avoided costs of providing alternative drinking water source: provide the amount in millions of gallons of avoided alternative public drinking water supplies 	X	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> • Reduced damages due to subsidence: provide documentation of quantified reduction in structural damage to facilities in vicinity of project 	X	
<ul style="list-style-type: none"> <ul style="list-style-type: none"> • Avoided costs associated with loss of business for water-dependent sectors: provide documentation of the reduction in loss for businesses in water-dependent sectors 	X	

 ADDITIONAL INFORMATION	with App. Submittal	Pre-Award
<ul style="list-style-type: none"> ■ Identify at least 2 alternatives, including the Do-Nothing case, and explain why the proposed approach is the preferred option 	X	
<ul style="list-style-type: none"> ■ Describe the property history and any studies, investigations, or enforcement actions (such as pending/current litigation) related to the property. Provide details or copies of the documents. 		X
<ul style="list-style-type: none"> ■ If a building(s) or outbuilding(s) is within sight of the project, provide the data when the oldest structure was originally constructed. Please note a current aerial photograph or map the year of construction of buildings and structures within sight of the project. Note FEMA is concerned with buildings and structures 50 years of age or older, not more recent ones. 		X
<ul style="list-style-type: none"> ■ Identify if the project is located within a designated coastal zone or coastal barrier resource system under the State's Coastal Management Program 		X
<ul style="list-style-type: none"> ■ Identify any known contaminated materials located on-site (e.g., asbestos, lead-based paint, underground storage tanks, chemical storage containers) that will require removal prior to construction 		X
<ul style="list-style-type: none"> ■ Identify if the project site is located on or within one mile of a site on the Federal National Priorities List or State Hazardous Waste Site list. If a Phase I Environmental Site Assessment has been completed, include a copy. 		X
<ul style="list-style-type: none"> ■ Identify any soil or groundwater contamination known to exist within a one-mile radius of the project site. Include any naturally-occurring contaminants (e.g., arsenic, selenium, brackish water) that could adversely affect the regional groundwater after the project is implemented. 		X
<ul style="list-style-type: none"> ■ Describe any known Federally- or State-listed threatened/endangered species or species of concern and their critical habitat within the project area and any special provisions or measures required to avoid, minimize, or mitigate direct and indirect species impacts 		X
<ul style="list-style-type: none"> ■ Describe any anadromous or migratory fish species present in the waters, known fish passages located within the project area, and required special provisions 		X



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ADDITIONAL INFORMATION CONT.

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<ul style="list-style-type: none"> For work on the water side of ordinary high water indicate the time of year work will be performed, and measures to protect, enhance or improved fish habitat 		X
<ul style="list-style-type: none"> Identify if any buildings on the property have been listed or have been determined to be eligible for listing in any local, state, or national historic registers, or if the property is located within 0.5 mile radius of a local, state, or national historic district 		X
<ul style="list-style-type: none"> Describe any known archaeological artifacts, cultural resources, or human remains on or located within a 0.5 mile radius of the property 		X
<ul style="list-style-type: none"> Identify any Native American Tribal lands, Traditional Cultural Properties, or other Native American resources (e.g., traditional fishing areas) that are located on or adjacent to the project 		X
<ul style="list-style-type: none"> Describe any public outreach that has occurred related to the project (e.g., public notices issued, notifications published in newspapers, public meetings held, public comments solicited) 		X
<ul style="list-style-type: none"> Enclose copies of any previous coordination, correspondence, or consultation with Federal, State, Tribal, and local resource agencies (e.g., U.S. Fish and Wildlife Service, State/Tribal Historic Preservation Office, U.S. Army Corps of Engineers, State agencies) 		X
<ul style="list-style-type: none"> Describe any other environmental and historic preservation requirements that the project is or will be subject to, such as State/Tribal or local environmental reviews, other agency reviews, etc. 		X

