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Upper Rio Grande 2023 Regional Flood Plan

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To:
Upper Rio Grande Regional Flood Planning Group (RFPG)

From:
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Memo

Subject: Process for Identification and Evaluation of Potential FMEs and Potentially Feasible FMSs, and FMPs

AECOM is providing engineering services for the Rio Grande Council of Governments (RGCOG) as part of the Region 14 (the Upper Rio Grande region) Regional Flood Plan (RFP), funded through the Texas Water Development Board (TWDB). The Scope of Work (SOW) for the RFP requires documentation to be published for public comment describing the process to be implemented by the Regional Flood Planning Group (RFPG) to identify and select Flood Management Evaluations (FMEs), Flood Management Strategies (FMSs), and Flood Mitigation Projects (FMPs) for evaluation in the RFP. This Technical Memorandum documents the processes agreed upon during subcommitttee meetings held with members of the RFPG to identify and discuss the needs and actions associated with selecting potential FMEs and potentially feasible FMSs and FMPs to be evaluated and considered for recommendations in the RFP.

Definitions and Examples

For reference, definitions of FMEs, FMSs, and FMPs are provided below from Section 2.4.B of "*Exhibit C, Technical Guidelines for Regional Flood Planning" (TWDB, 2021)*, referred to as "Technical Guidelines" throughout the remainder of this Memorandum. In addition, examples of potential actions associated with each flood risk reduction category are listed below, based on guidance provided in Section 3.2 of the Technical Guidelines.

1. Flood Management Evaluation (FME) - a proposed flood study of a specific, flood-prone area that is needed in order to assess flood risk and/or determine whether there are potentially feasible FMSs or FMPs. Examples of FMEs include:
    a. Watershed Planning
        i. Hydrologic and Hydraulic Modeling
        ii. Flood Mapping Updates
        iii. Regional Watershed Studies
    b. Engineering Project Planning
        i. Feasibility Assessments

   ii. Preliminary Engineering (alternative analysis and up to 30 percent design)
   iii. Studies on Flood Preparedness

2. Flood Mitigation Project (FMP) - a proposed project, either structural or non-structural, that has non-zero capital costs or other non-recurring cost and when implemented will reduce flood risk, mitigate flood hazards to life or property.
   a. Structural FMP examples include:
      i. Low Water Crossings or Bridge Improvements
      ii. Infrastructure (channels, ditches, ponds, stormwater pipes, etc.)
      iii. Regional Detention
      iv. Regional Channel Improvements
      v. Storm Drain Improvements
      vi. Reservoirs
      vii. Dam Improvements, Maintenance and Repair
      viii. Flood Walls / Levees
      ix. Coastal Protections
      x. Natural Based Projects – living levees, increasing storage, increasing channel roughness, increasing losses, de-synchronizing peak flows, dune management, river restoration, riparian restoration, run-off pathway management, wetland restoration, low impact development, green Infrastructure
      xi. Comprehensive Regional Project – includes a combination of projects intended to work together
   b. Non-Structural FMP examples include:
      i. Property or easement acquisition
      ii. Elevation of Individual Structures
      iii. Flood Readiness and Resilience
      iv. Flood Early Warning Systems, including stream gauges and monitoring stations
      v. Floodproofing
      vi. Regulatory Requirements for Reduction of Flood Risk
3. Flood Management Strategy (FMS) - a proposed plan to reduce flood risk or mitigate flood hazards to life or property. Examples include:
   a. Any proposed action that the RFPG would like to identify, evaluate, and recommend that does not qualify as either an FME or FMP.
   b. A group of multiple FMPs and/or recurring maintenance activities, which are part of an overall plan to reduce flooding in a general area.
      i. Federal Emergency Management Agency (FEMA) Levee Accreditation
      ii. Recurring channel or dam/basin sediment clearing to maintain flood capacity
      iii. Recurring channel or dam/basin vegetation clearing to maintain flood capacity

c. Coordination with agencies in other states or nations regarding political agreements affecting FMPs, early warning systems, environmental flow programs, and/or flood-related maintenance activities.

Background and Overall Selection Process

All FMPs and FMSs that are identified as potentially feasible flood reduction projects will require the use of detailed hydrologic and hydraulic (H&H) models to quantify flood risk reductions to structures and populations, including residential properties, agricultural land, and critical facilities. Furthermore, FMSs and FMPs must be evaluated to adhere to General Mapping and Modeling Guidelines (defined in Section 3.5 of the Technical Guidelines) and ensure that no negative impacts are received by neighboring areas.

Any FMSs or FMPs which are identified to be potentially feasible through the processes described in this Memorandum will be further evaluated as part of Task 4B to determine whether they have sufficient H&H modeling data to be analyzed for project impacts and benefits. The FMP flow chart from Section 2.4B of the Technical Guidelines will be implemented as part of this screening process. If best available H&H models are deemed insufficient for quantifying project benefits and impacts, or if negative impacts are estimated for neighboring areas, those potentially feasible FMSs and FMPs will be selected as potential FMEs. The general scope associated with those FMEs would include:

- Development of detailed H&H models
- Evaluating alternatives to define flood mitigation projects resulting in no negative impacts
- Quantifying project impacts and benefits
- Estimating project costs

The process described in the following sections would then be re-applied to the potentially feasible FMSs and FMPs to be considered for recommendation in either the amended RFP for this cycle, or for the next RFP cycle.

Status of Detailed H&H Models in the Planning Region

All or portions of the following 23 Texas counties are represented in the Upper Rio Grande Region: Brewster, Crane, Culberson, El Paso, Hudspeth, Jeff Davis, Loving, Pecos, Presidio, Reeves, Terrell, Ward, Andrews, Crockett, Ector, Edwards, Midland, Reagan, Schleicher, Sutton, Upton, Val Verde, and Winkler. Most of the region has relatively older regulatory FEMA floodplain mapping compared to the rest of the state, and 4 counties (Andrew, Winkler, Reeves, and Pecos) do not have regulatory FEMA floodplain maps or models.

At this point in time, El Paso County is the only County in Region 14 identified to have detailed H&H models, which could potentially be used to quantify project impacts and benefits for a prioritized list of projects documented in local Stormwater Master Plans (SWMPs). However, even within El Paso, certain types of FMSs or FMPs may not have sufficently defined project parameters or detailed hydraulic models necessary to be fully evaluated and recommended in this first cycle of the RFP.

Process for Identification of Potential FMEs and Potentially Feasible FMSs

A subcommittee of the RFPG was formed to identify and evaluate potential FMEs and potentially feasible FMSs (Subcommittee 3 for Task 4B, a-b). This subcommittee developed recommendations to define the process for

identification of potential FMEs and potentially feasible FMSs , which were then voted on by the subcommittee, presented to the RFPG, and approved by the RFPG.

Identification via Review of Historic Events

The recommended process for identification of potential FMEs and potentially feasible FMSs includes these steps:

- Selection of recent historic storms that would serve as the basis for identification of needs. Relation of experiences to problems encountered by flood management agencies and the public are a means to ensure identification of major issues. The relation of anecdotal experience would promote committee- and RFPG-wide appreciation of broader issues that could be addressed by an FME or FMS.
- Within a series of subcommittee meetings:
  - Presentation by stakeholders of experience during the selected events that describes flood-related problems
  - In public discussion, develop a short description of each problem that defines a need
  - In public discussion propose FMEs and FMSs to address the need
  - The subcommittee votes on how to proceed with each FMS and FME identified. .

Selection of recent historic storms. Storms are identified either by stakeholders or the public during the General RFPG Meetings, Subcommittee Meetings, or via the public survey process. Storms that have been identified to date include:

- August 2006 storm. This multi-day storm centered over west and northwest El Paso County dropped large volumes of rain, leading to overtopping of Interstate (IH)-10, and sediment/debris flows from Franklin mountain arroyos into the city drainage infrastructure in west/ northwest El Paso and in northeast El Paso. The resulting blockage of drainage infrastructure led to extensive property damage. The high stage in the Rio Grande coupled with limited drainage structure/ pump station capacity led to extensive flood damage in several locations within the flat riverine terrace adjacent to the Rio Grande.
- August 2021 storm. This short, intense, extreme storm overwhelmed drainage infrastructure in east central El Paso. Several small flood control structures had major releases from emergency spillways, IH-10 was overtopped, and numerous neighborhoods and streets experienced short term flooding.
- September-October 2008 storm. This storm, centered over the Rio Conchos watershed in Mexico, sent a massive flood down the Rio Conchos into the Rio Grande. Flooding occurred along the Rio Grande from the confluence with the Rio Conchos to Amistad Reservoir. This flood breached and/or overtopped both US and Mexican levees at locations along the Rio Conchos and the Rio Grande. Flooding in Presidio itself was averted by the levee in the immediate area of the city. This portion of the Rio Grande levee did not overtop and held back the flood.

Presentation by the RFPG members and the public of flood experience. Presenters are briefed at the beginning of Subcommittee 3 meetings to structure their experience of historic flooding as follows. For each storm event discussed, give a tour of the general or specific locations of the experienced damages/ issues. A map is presented during the presentation showing locations as discussed. Notes are taken by RFPG consultant staff

describing in brief terms the flood-related problem(s) experienced for each storm and location. Following the presentation, RFPG consultant staff query the presenter to discuss each of the following broader issues:

- Primary public concerns
- Adequacy of early warning
- Issues with emergency route/ critical facility access
- Post-flood cleanup issues
- Issues with agency coordination

Notes on these specific issues are also taken. As of the publication date of this memorandum, experience in historic floods has been related to the subcommittee by:

- Active stormwater professionals at El Paso Water (EPWater)
- Retired staff from City of El Paso (COEP) and EPWater
- El Paso County Engineer
- Staff at El Paso County Water Improvement District No.1 (EPCWID No. 1)
- Current and formal staff from the US International Boundary and Water Commission (USIBWC)
- Staff at Hudspeth County

In the event that a flood experience or potential need is identified by the general public or a stakeholder within the region who cannot present their experiences or describe their flood-related issue in a subcommittee meeting, AECOM or a subcommittee member will present to the subcommittee on behalf of that person. In addition, any flood damage centers that are identified by AECOM through a desktop analysis, but which have not been identified by the public or by stakeholders, will be presented to the subcommittee by AECOM (see "Secondary Process…" section of this Memorandum below).

Develop a short description of each problem that defines a need. In public discussion, the notes from each presentation are reviewed by the subcommittee and public attending the subcommittee meeting. The noted problems are reformulated as needs relevant to the region.

Propose FMEs and FMSs to address the need. In public discussion, the formulated needs are discussed and potential FMEs and FMSs are identified.

Process for Identification of Potentially Feasible FMPs

A subcommittee was formed to identify and evaluate potentially feasible FMPs (Subcommittee 2 for Task 4B, c). "Potentially feasible FMPs" comprise the subset of the full list of regional FMPs that are to be carried forward for technical evaluation and considered for recommendation in the RFP. This subcommittee proposed a process for identifying and selecting potentially feasible FMPs, which was then voted on by the subcommittee. In the next General RFPG meeting, this process will be presented to the RFPG for voting and approval by the RFPG. A recommended process was developed for each of two scenarios:

1. FMPs that are currently listed in an active SWMP. An active SWMP is defined as current planning for future funding of selected storm water infrastructure projects, where the projects have been identified, planned (i.e. undergone concept design and cost estimation), and prioritized via a public process.
2. Other potential FMPs identified by the RFPG process and the public

Identification of Potentially Feasible FMPs via an active SWMP

To date, the RFPG has identified two SWMPs: a list of 96 storm water mitigation projects developed by El Paso Water for the City of El Paso, and a list of 67 storm water mitigation projects developed by El Paso County. The recommended process for identifying potential FMPs from these two SWMPs is:

- Address all projects within each SWMP as a separate group.
- The subcommittee will review and modify the existing SWMP project ranking system and modify per public discussion within a subcommittee meeting.
- The subcommittee will review the list of projects following re-ranking per the revised ranking system, and choose an option for selecting which projects ("Potentially Feasible FMPs") will undergo further evaluation. It is expected that project scores used in ranking will be used to limit the number of projects carried forward into the evaluation phase.

As of the date of this memorandum, the subcommittee has reviewed and approved, with minor alterations, the ranking systems used in the City of El Paso and El Paso County SWMPs.

Identification of Potentially Feasible FMPs not included in an active SWMP

The recommended process for identifying "potentially feasible FMPs" from the identified full list of projects not included in an active SWMP is:

- Create a list of regional projects not included in an active SWMP.
- Develop FMP scoring method in a subcommittee meeting
- Apply FMP scoring method to score each project in the regional list
- Via subcommittee consensus, select "Potentially Feasible FMPs" from the list using the developed project scores

Create a list of regional projects not included in an active SWMP. To date, the RFPG has identified potential FMPs developed outside of a SWMP process by these entities:

- USIBWC
- EPCWID No. 1
- US Army Corps of Engineers (USACE)
- Texas Department of Transportation (TXDOT)
- Others (3 counties, and a water supply project by El Paso Water)

Develop FMP scoring method in a subcommittee meeting. Subcommittee 2 has voted to recommend to the RFPG the following two lists of project scoring categories, pending a comparison of these lists to the finalized Flood Mitigation and Floodplain Management Goals developed in Tasks 3A and 3B of the RFP. These lists derive from similar lists of categories used in the City of El Paso SWMP, with added categories available through information provided to the RFPG by the TWDB.

The first list, shown below in Table 1, is a list of project benefits to be qualitatively compared between projects. These categories will each be assigned a range of potential scoring points per subcommittee judgement of the relative importance of each category.

Table 1. Proposed Benefit Categories and Data Sources

Source	Benefit Category	Current Data Source
City of El Paso SWMP	Increase Dam Safety	National Inventory of Dams, Chapter 299 TWC
	Reduce Flooding of Real Property	Best available risk maps, TWDB structure inventory
	Remove 100+ Properties from the Flood Zone	Best available risk maps, TWDB structure inventory
	Reduce Flooding of IH-10	FMP location versus IH-10
	Reduce Flooding of Major Arterial Roadways	Road classification database
	Reduce the Risk Associated with Debris Flow	Review of aerial photography to ID mobile bed arroyo
	Reduce Maintenance	Review of aerial photography to ID mobile bed arroyo
	Reduce Nuisance Flooding	Review of likely flat terrain-related routine flooding
TWDB	Reduce # of low water crossings in floodplain	TWDB dataset
	Reduce # of vulnerable buildings in floodplain	TWDB dataset
	Reduce # of critical buildings in floodplain	TWDB dataset

The second list, shown below in Table 2, is of federal, state, and local agencies with potential permit authority. The difficulty of obtaining an agency permit for each project will be qualitatively judged, adding a positive or negative score adjustment to each project.

Table 2. Agencies with Permit Authority

Permit Agency
Railroad Permit
IBWC
TCEQ
USACE
EPCWID #1 / EBID Permit
TXDOT Permit
Fort Bliss Permit
Texas Parks and Wildlife
Historic District / Archaeologic
Land Acquisition
Street, Utility and Amenities Reconstruction
Environmental Impacts
Other Ordinances (Parks, UXO, Ospace)

Apply FMP scoring method to score each project in the regional list. For each project, the scoring method is to consider:

- Total scored benefits from Table 1
- Total score adjustments from Table 2
- The total score when adding the scored benefits from Table 1 to the score adjustments from Table 2

After scoring of each project, the list of projects is sorted in order of descending score value.

Select Potentially Feasible FMPs based on Project Scores. The last step in the process is via subcommittee consensus, select "Potentially Feasible FMPs" from the sorted list using the developed project scores.

Secondary Process for Identification and Selection of Potential FMEs, FMSs, and FMPs

The estimation of region-wide 1% AC flood risk has identified a number of regional locations outside of El Paso County with high numbers of estimated structures-at-risk. In general, the data collection process for the RFP has identified few incorporated and unincorporated areas outside of El Paso County with stakeholders who have presented awareness of or plans for addressing this risk. The more significant areas of risk will be discussed with each appropriate local stakeholder, potentially expanding the list of already-planned regional FMPs.

If no FMP or FMS has been previously identified for areas at risk of 1% AC flooding, or if the best available H&H models lack sufficient detail to allow for evaluations of FMPs or FMSs, then a FME to develop detailed H&H models and evaluate flood mitigation alternatives will be selected for the at-risk areas. Subcommittee 3 for Task 4B, a-b will review the higher risk areas identified by Task 2A and assign FMEs for these areas; so that potentially feasible FMSs and FMPs can be considered for the amended RFP or for future RFP cycles.