U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT:

8-STEP PROCESS - FLOODPLAIN

Project Name: Pasadena Wastewater Treatment Plant Improvements Golden Acres & Vince Bayou WWTP Locations
Responsible Entity: City of Pasadena

Project Location:
All work will occur in the City of Pasadena, Harris County, Texas in the following locations:

Golden Acres Wastewater Treatment Plant (WWTP) Improvements:

- 100 yards South of Spencer Highway and adjacent to the west edge of Trebor Street (29.6642, -95.14252).

Vince Bayou WWTP Improvements:

- 209 N Main Street (29.71545, -95.2084).

Description of the Proposed Project [24 CFR 50.12 & 58.32; 40 CFR 1508.25]:
Sanitary Sewer System Improvements - Golden Acres WWTP
This project includes improvements and modifications to address this critical and urgent need at the GA WWTP. The proposed improvements include modifying the existing solids treatment system such that the waste activated sludge (WAS) pumps transfer WAS to a new sludge holding tank which would be subsequently pumped for dewatering at the existing belt filter presses (BFPs). The improvements will consist of the following:

- Rehabilitation of existing thickener, digester(s), pumps, etc. Additionally, the City is considering replacing the thickener mechanism as well.
- Two (2) new sludge holding basins with coarse bubble diffusers and telescoping valves.
- New sludge transfer pumps to transfer sludge from the new sludge holding tanks to the existing BFPs. Additionally, adding two additional pumps to transfer sludge from gravity thickener to sludge holding tanks.
- New blowers dedicated to the sludge holding tanks.
- Associated yard piping, air piping, site work, electrical and controls improvements.

All proposed equipment and critical mechanical/electrical components will be either elevated 1-ft above the Hurricane Harvey flood elevation for the site or otherwise protected from flooding damage via flood protection means.

Sanitary Sewer System Improvements - Vince Bayou
The sludge dewatering process reduces the volume of solids being hauled off-site for disposal. The proposed improvements will include replacing the old and non-functional infrastructure with new equipment and restoring the sludge dewatering treatment capacity at VB WWTP so solids generated in the process can be removed as designed and not impact compliance. Specifically, the proposed improvements will include:

- Demolition and replacement of two (2) filter belt presses.
- Two (2) new sludge pumps replacing existing non-operational pump and providing operational redundancies. Piping and valving modifications will be made to allow two pumps to feed a single belt filter press.
- Replacing the existing piping and valves between the three belt wash pumps and belt filter presses as well as polymer system to injection points.
- Replacing the existing polymer feed system, including a new neat polymer bulk storage tank, mixing assembly, and polymer pump skids. A shelf spare mixer will be included for redundancy.
- Associated electrical and controls improvements

The existing sludge dewatering system lacks redundancy and cannot handle permitted flows due to aging and non-operational equipment. All proposed equipment and critical mechanical/electrical components will be either elevated 1-ft above the Hurricane Harvey flood elevation for the site or otherwise protected from flooding damage via flood protection means.

Step 1: ***Determine whether the action is located in a Federal Flood Risk Management Standard (FFRMS) floodplain.***

Exemptions to Part 55:
Actions listed in the revised 24 CFR 55.12 that are exempt from the floodplain management requirements of Part 55 include:

- *Exempt activities and actions that are Categorically Excluded Not Subject to 50.4 or 58.5*
- *Restoration or preservation of floodplains, acquisition of floodplains property provided the site is used for flood control or open space but only if structures are cleared and improvements are specifically limited*
- *Receivership or foreclosure and related actions*
- *Policy-level actions not involving site-based work*
- *Issuance of non-project-based housing vouchers*
- *A minor amendment to a previously approved action*

The project is subject to Part 55 because it meets the criteria for none of the exemptions.

Critical Actions:
Critical action means any activity for which even a slight chance of flooding would be too great because such flooding might result in loss of life, injury to persons, or damage to property. Critical actions include activities that create, maintain, or extend the useful life of those structures or facilities that:

- *Produce, use, or store highly volatile, flammable, explosive, toxic, or water-reactive materials*
- *Provide essential and irreplaceable records or utility or emergency services that may become lost or inoperative during flood and storm events (e.g., community stormwater management infrastructure, water treatment plants, data storage centers, generating plants, principal utility lines, emergency operations centers including fire and police stations, and roadways providing sole egress from flood-prone areas)*
- *Are likely to contain occupants who may not be sufficiently mobile to avoid loss of life or injury during flood or storm events, e.g., persons who reside in hospitals, nursing homes, convalescent homes, intermediate care facilities, board and care facilities, and retirement service centers; housing for independent living for the elderly is not considered a critical action*

Because the project meets the above criteria, it is considered a critical action.

How FFRMS was determined:
The FFRMS is determined by utilizing a tiered approach:

- *Climate-Informed Science Approach (CISA) -* ***Preferred Method***
- *0.2-Percent-Annual Chance Floodplain Approach (0.2PFA)*
- *Freeboard Value Approach (FVA)*

Climate-Informed Science Approach (CISA)

- *Federal CISA data must be equal to or greater than base flood elevation (BFE) to be used.*

After discovering that the Federal Flood Standard Support Tool (FFSST) is no longer in service and after consulting Harris County, it was determined that CISA data is available for the project area. As such, this approach could not provide a determination as to whether the project was in the FFRMS floodplain. The next tiered approach, 0.2PFA (500-year floodplain method), was therefore considered.

FEMA 0.2PFA (500-year floodplain)

- *FEMA maps must show a 500-year floodplain to be used*
- *Critical Actions require both the 0.2PFA and the Freeboard Value Approach (FVA) be used to determine which elevation is higher, the 0.2PFA or FVA.*

According to FEMA floodplain map #48201C0905N (Effective Date 5/12/2019) and #48201C0920M, the project is located in Zone AE (100-year floodplain, a 500-year floodplain, both of which are considered FFRMS floodplains. Because both floodplains are considered FFRMS floodplains and the 500-year floodplain was shown on the maps, it was determined that this method could be used to determine FFRMS status and the 8-step process is required.

Golden Acres WWTP (critical action)

- Area of Disturbance: 10.4 acres
- Base Flood Elevation (BFE): 26.97 feet

Vince Bayou WWTP (critical action)

- Area of Disturbance: 10.25 acres
- Base Flood Elevation (BFE): 17.4 feet

Further review of the FEMA maps indicated that a Letter of Map Revision (LOMR) was issued for the Golden Acres WWTP which stated:

This Letter of Map Revision (LOMR) from FEMA is a reissuance of a previous LOMR (Case No. 14-06-4559P) that became effective on October 16, 2015. The original LOMR revised the Special Flood Hazard Area (SFHA), Base Flood Elevations (BFEs), and the Flood Insurance Study (FIS) report for areas along B113-00-00 (Tributary 10.46 to Armand Bayou), and for the City of Pasadena, it also included B100-00-00 (Armand Bayou) and B115-00-00 (Tributary 12.18 to Armand Bayou).

The reissuance is necessary because a new countywide study became effective on January 6,

2017, but the original LOMR data for Case No. 14-06-4559P was not fully incorporated into this new study. Specifically, the SFHA and BFEs were not correctly incorporated on the new Flood Insurance Rate Maps (FIRMs). Therefore, this LOMR incorporates the SFHA and BFEs along the revised reaches as per the October 16, 2015, LOMR. However, the Summary of Discharge Table 18 and Floodway Data Table 8 for B113-00-00 (and for Pasadena, Flood Profiles B03P and B23P for B100-00-00, B113-00-00 and B115-00-00) in the FIS Report dated January 6, 2017, were incorporated correctly.
This document serves as FEMA's determination that a revision to the flood hazards depicted in the FIS report and/or National Flood Insurance Program (NFIP) map is warranted. The effective NFIP map is revised by this document. The LOMR is effective as of January 9, 2017.

Affected communities include the City of Houston (Community No. 480296) and the City of Pasadena, Texas (Community No. 480307). The affected FIRM panels are 48201C0920M and 48201C0940M, both dated January 6, 2017.

FEMA will not physically revise and republish the FIRM and FIS report at this time; the modifications will be incorporated when future changes warrant physical revision and republication. The community is responsible for disseminating this information.

Because the FEMA map is not being republished, no changes to the FFRMS determination are affected by the LOMR.

Additional Mapping Considered
In order to ensure that all appropriate FEMA floodplain data was considered and the most stringent data source was used for the comparable flood data, all a vailable effective, preliminary and pending FIRMS were reviewed:

Effective Maps - 77
Preliminary Maps - 0
Pending Maps - 0

Upon completion of this review, it was concluded that no additional information exists which would change the FFRMS determination.

Because the project is a Critical Action, the Freeboard Value Approach (FVA) was also considered to determine which elevation is higher, the 0.2PFA or FVA, as the higher must be utilized.

Freeboard Value Approach (FVA):
FVA defines the FFRMS floodplain as the elevation and flood hazard area that results from:

1. *Adding two (2) feet to the base flood elevation (BFE) for non-critical actions or*
2. *Adding three (3) feet to the BFE for critical actions.*

This approach is used for noncritical actions if neither CISA data nor FEMA-mapped 0.2-percent-annual-chance floodplain data is available or actionable. For critical actions, the higher of 0.2PFA or FVA must be used.

Since the BFE is a critical action, the FFRMS is equal to the BFE + 3 feet:

Golden Acres WWTP

- FVA FFRMS Floodplain: 26.97 feet (BFE) + 3 feet (critical actions) = 29.97 feet.

Vince Bayou WWTP

- FVA FFRMS Floodplain: 17.4 feet (BFE) + 3 feet (critical actions) = 20.4 feet.

Since the FVA elevations were higher than the 0.2PFA elevations, the FFRMS elevations which must be used for this project are:

Golden Acres WWTP

- **FFRMS Elevation = 29.97 feet.**

Vince Bayou WWTP

- **FFRMS Elevation = 20.4 feet**.

Step 2: ***Notify the public for early review of the proposal and involve the affected and interested public in the decision-making process.***

There are designated floodplains associated with the proposed project sites. An early floodplain notice was posted regarding the project, affording the opportunity for public input. No comments were received.

Posting Date: 8/8/25

Step 3: ***Identify and evaluate practicable alternatives.***

The City project site selection criteria are:

(a) The project cannot cause current residents to become displaced;
(b) The project must be within the City in order for grant proceeds to be used;
(c) The project must address infrastructure that is vulnerable to recent flooding.

The City considered several alternative sites and actions:

1. **Elevate or Floodproof structures and machinery.** - Floodproof or elevate all structures and machinery included in this project.

2. **Do work only outside the floodplain.** It is not possible to complete work without disturbing the floodplain.

3. **Obtain a Letter of Map Amendment (LOMA) or Letter of Map Revision (LOMR**). - The City also considered applying for a LOMA Map Amendment or Letter of Map Revision but it was determined that this site would not be a good candidate for such action and the time required to request such action could not be justified.

4. **Other infrastructure considered. -** Other infrastructure projects were also considered within the City Jurisdictional limits. However, the City concluded that this project was the highest priority of any eligible projects.

5. **No Action or Alternative Actions that Serve the Same Purpose. -** A no-action alternative was considered but critical equipment would remain vulnerable to future flooding, increasing the risk of operational failures, environmental noncompliance, and potential public health hazards. This alternative would not enhance system reliability, efficiency, or flood resilience, and therefore does not meet the project's purpose of protecting infrastructure, maintaining regulatory compliance, and safeguarding public health.

Step 4: ***Identify Potential Direct and Indirect Impacts of Associated with Floodplain Development.***

1. Preventing loss of life and property as a result of flooding is the highest priority. Another flood could damage the new infrastructure.
2. In addition to concerns for life and property, the City has considered the natural values of the floodplain. The natural resources of the floodplain include water, biological, and societal resources. The proposed project will have minimal impacts to the floodplain because necessary mitigation measures will be incorporated into the project.
3. The project is designed to avoid any measurable negative effects on local flora and fauna, thanks to the inclusion of specific protective measures. A key aspect of this commitment is that all planting within the floodplain and on the project site will exclusively use native species.
4. Societal resources should also be considered during the design process. The designs are meant to complement the natural features of the area and to offer an aesthetically pleasing structure. The site will not have an effect on agricultural lands.

Step 5: ***Where practicable, design or modify the proposed action to minimize the potential adverse impacts to lives, property, and natural values within the floodplain/ and to restore, and preserve the values of the floodplain.***

Mitigation Requirements:
CFR 55.20 (e)(1):
For actions in the FFRMS floodplain, the required elevation described in this section must be documented on an Elevation Certificate or a Floodproofing Certificate in the Environmental Review Record prior to construction, or by such other means as HUD may from time to time direct, provided that notwithstanding any language to the contrary, the minimum elevation or floodproofing requirement for new construction or substantial improvement actions shall be the elevation of the FFRMS floodplain as defined in this section.

Non-Critical Actions
CFR 55.7(d)(1):

- The FFRMS floodplain includes those areas that result from adding an additional two feet to the base flood elevation based on best available information.

Critical Actions
CFR 55.7(d)(2):

- The FFRMS floodplain includes those areas that result from adding an additional three feet to the base flood elevation based on best available information.

Applicable Projects
According to the HUD Exchange on Floodplain Management (Complying with 24 CFR Part 55 (2)), if a project involves new construction or substantial improvement, elevation requirements apply.

Substantial Improvement:
A substantial improvement is any repair, reconstruction, modernization or improvement of a structure, including one of the following:

1. The cost of which equals or exceeds 50 percent of the market value of the structure either before the improvement or repair is started, or, if the structure has been damaged and is being restored, before the damage occurred
2. That results in an increase of more than 20 percent in the number of dwelling units in a residential project or in the average peak number of customers and employees likely to be on-site at any one time for a commercial or industrial project

Certain types of projects are specifically not considered substantial improvement under Part 55.

- Any project solely for improvement of a structure to comply with existing state or local health, sanitary or safety code specifications that is solely necessary to assure safe living conditions
- Any alteration of a structure listed on the National Register of Historical Places or on a State Inventory of Historic Places
- Structural repairs, reconstruction, or improvements not meeting the definition for substantial improvement are considered "minor improvements."

Because this project is considered a structure and a Critical Action, **mitigation, including elevation or floodproofing, is required.**

.Golden Acres WWTP
Structure Elevation = 21.6 feet.

Vince Bayou WWTP
Structure Elevation = 21.2 feet.

Mitigation Measures:

1. Preserving Property: Project designs should, to the best extent possible, incorporate measures to reduce the risk of damage to the new infrastructure via a flood.
2. Preserving Natural Values and Minimizing Impacts: After construction is completed, the disturbed area will need to be immediately re-vegetated with native grasses. Only native plants are to be used in the floodplain, and on the site.
3. Deposition and excavation of materials will need to be performed in such a manner that erosion and sedimentation will be controlled.
4. Precautions will need to be taken in the handling of fuels or other hazardous materials to prevent discharge or spillage resulting in lower groundwater quality.
5. Erosion control measures such as hay bales or silt screen barriers will need to be implemented and maintained during construction as required.
6. The project engineer will need to incorporate best management practices into the specifications and plans.
7. **All structures and machinery addressed in this project at the Golden Acres WWTP must either be floodproofed or elevated to at least 29.97 feet (FFRMS floodplain elevation)**
8. **All structures and machinery addressed in this project at the Vince Bayou WWTP must either be floodproofed or elevated to at least 20.40 feet (FFRMS floodplain elevation)**
9. Prior to the start of construction, **an elevation and/or floodproofing certificate must be obtained for any structures or machinery elevated or floodproofed as a result of the requirements of this project and added to the Environmental Review Record (ERR).**

Step 6: ***Reevaluate the Alternatives.***

1. **Elevate or Floodproof structures and machinery.** - Ensure that all machinery and structures included in this project are elevated or floodproofed. (viable)
2. **Do work only outside the floodplains.** Completing the project without disturbing any floodplain is not possible. (Not Viable)
3. **Obtain a Letter of Map Amendment (LOMA) or Letter of Map Revision (LOMR**). - It was determined that neither a LOMA nor a LOMR was likely nor practical for the project area. (Not Viable)
4. **Other infrastructure considered. -** After considering other potential projects in the City, it was determined that of the eligible projects, this project was of the highest priority. (Not Viable)
5. **No Action or Alternative Actions that Serve the Same Purpose. -** The WWTP's area is inadequate and must be addressed to prevent public health hazards. (Not Viable)

Step 7: ***Determination of No Practicable Alternative***

It is our determination that there are practical alternatives for locating the project in the floodplain:

- Elevate and/or Floodproof all equipment and Machinery pertaining to this project as prescribed in the 8-step process

A final notice was posted detailing the reasons why the project must be located in the floodplain, a list of *alternatives* considered, and all mitigation measures taken to minimize adverse impacts and preserve natural and beneficial floodplain values. No concerns were expressed by the public concerning this notice.

Posting Date: September 26, 2025

Step 8: ***Implement the Proposed Action***

The City will assure that this plan, as modified and described above, is executed and necessary language will be included in all agreements with participating parties. The City will also take an active role in monitoring the construction process to ensure no unnecessary impacts occur nor unnecessary risks are taken.