Orange County Drainage District
Master Drainage Plan

March 10, 2020

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List of Acronyms

FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
HMP	Hazard Mitigation Plan
NOAA	National Oceanic and Atmospheric Administration
USACE	U.S. Army Corps of Engineers

Executive Summary

The Orange County Drainage District (the "District") developed this Master Drainage Plan (the "Plan") in order to better understand drainage challenges and to identify and prioritize short-term and long-term actions required to maintain an effective and resilient drainage system.

The District was created pursuant to Section 59 of Article XVI, Constitution of Texas, as a governmental agency for the purpose of reclamation and drainage of its overflowed lands and other lands needing drainage in Orange County. The District's mission and jurisdictional authority is focused almost exclusively on activities related to drainage within the geographical boundaries of the District, which includes all of the property and territory situated in Orange County. The development of this Plan aligns with the District's purpose and mission statement:

> *"The Orange County Drainage District is committed to maintaining and improving drainage within Orange County, thereby enhancing the quality of life and safety of the residents of Orange County. The District is further committed to developing and managing a drainage system which will meet the present and long term residential, municipal, commercial, agricultural and industrial drainage needs within the District's boundaries, thereby enhancing economic development throughout the County. Importantly, the District is committed to maintaining fiscal responsibility, and to allocating resources in a fair and equitable manner throughout the District."*

The District's drainage facilities are natural waterways, or man-made channels which drain into natural waterways, which are maintained, and/or have been improved by the District. Due to the significant residential and commercial development that has occurred within Orange County, as well as the updated rainfall data made available by NOAA Atlas 14, many of the District's drainage facilities (natural or man-made) are at maximum capacity, if not undersized compared to currently desired and needed criteria / level of service, which is evidenced by the seemingly more frequent flooding which has occurred across the County. Orange County is uniquely bordered on the east by the Sabine River, on the west by the Neches River, and on the south by Lake Sabine. As a coastal county which primarily drains to major river systems and/or the marsh, riverine and tidal conditions can significantly and negatively affect drainage within Orange County.

Given the geographic location and other factors and conditions referenced herein, policies and regulations are necessary to more strictly manage new development, re-development, and drainage system improvements in order to preserve and improve the drainage provided by the District's drainage system. By developing and adopting this Plan, in accordance with Texas Water Code Section 49.211, and the subsequent adoption of a Drainage Criteria Manual, the District is authorized to more rigorously manage and regulate development, and plan for the creation and/or improvement of drainage facilities, thereby achieving the goals set forth herein.

1 Introduction

The Orange County Drainage District (the "District") is tasked with managing the drainage needs, short-term and long-term, within the District. The development of this Master Drainage Plan (the "Plan") is a key element to maintaining and improving drainage across the County. Due to the significant residential and commercial development that has occurred within Orange County, as well as the updated rainfall data made available by NOAA Atlas 14, many of the District's drainage facilities (natural or man-made) are at maximum capacity, if not undersized, compared to currently desired and needed criteria / level of service, which is evidenced by the seemingly more frequent flooding which has occurred across the county. As a coastal county which primarily drains to major river systems and to the marsh, riverine and tidal conditions can significantly and negatively affect drainage within Orange County. Given the geographic location and other factors and conditions referenced herein, policies and regulations are necessary to more strictly manage new development, re-development, and drainage system improvements in order to preserve and improve the drainage provided by the District's drainage system. By developing and adopting this Plan, in accordance with Texas Water Code Section 49.211 (see **Appendix 1**), the District is authorized to more rigorously manage and regulate development, as it pertains to the drainage and flood control within Orange County.

Figure 1 shows the boundaries of the District, and therefore the planning area for this Master Drainage Plan.

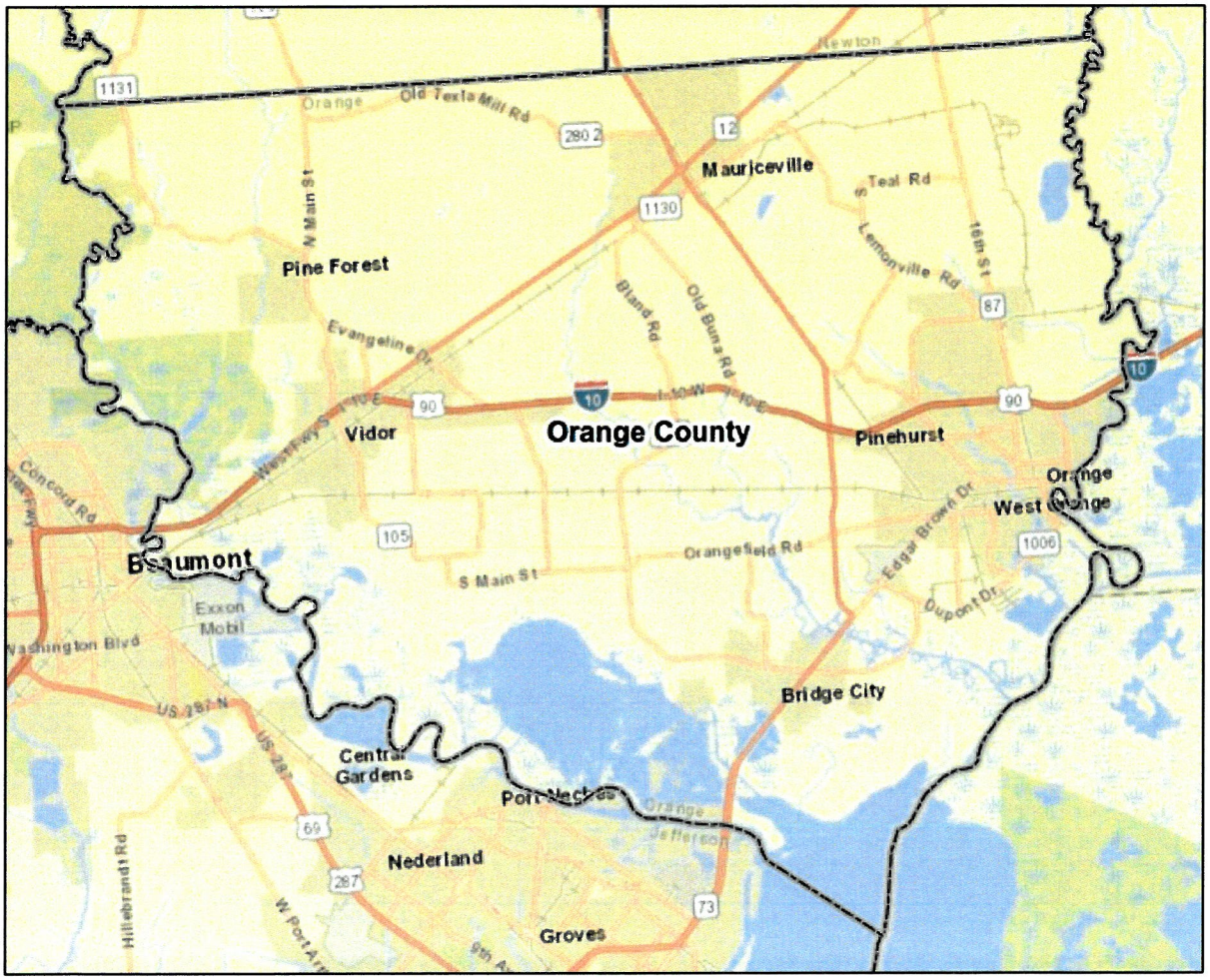

Figure 1 – Plan Area, Orange County

1.1 Statutory Authority & Capabilities

The District is located in Southeast Texas and has coterminous boundaries with Orange County. The District was created under the provisions of Section 59 of Article XVI, Constitution of Texas, as a governmental agency for the purpose of reclamation and drainage of its overflowed lands and other lands needing drainage in Orange County. The District is governed by an elected five-member Board of Directors. The Board selects and employs a General Manager who is responsible for managing the District consistent with the plans and goals of the Board, and for implementing the policies of the Board. Authority for the development and implementation of a Master Drainage Plan is derived from Texas Water Code Section 49.211, subsection (c).

In general, the District is responsible for providing and maintaining drainage of the developed areas of the County. Drainage within the County is largely achieved through drainage ditches and channels that flow into the rivers, bayous, creeks, gullies and man-made ditches that span large portions of Orange County. The District's drainage infrastructure consists almost exclusively of earthen drainage ditches and channels, both natural and man-made. On a day-to-day basis, the District is engaged in the maintenance of these earthen ditches, which regularly consists of mowing and/or removal of silt. The District also reviews and provides input on development proposals which impact the District's drainage system. The District also has the authority to plan and construct new drainage facilities, both in and outside of Orange County, that are determined to provide drainage improvements which lessen flooding within the County.

It should be noted that other entities also play a critical role in providing drainage within Orange County. As examples, the cities and the County generally have responsibility for the internal drainage within subdivisions, and the Texas Department of Transportation has responsibility for the drainage along state highways. These other entities may have and enforce their own drainage criteria and drainage regulations. Also, floodplain ordinances are adopted and enforced either by Orange County or the individual municipalities within Orange County. Furthermore, other State and/or Federal agencies, such as the U.S. Army Corps of Engineers, may also be involved in the planning, design, and construction of drainage improvements within the County.

1.2 District Goals

The District's primary goal is to protect human life and property from the adverse impacts of flooding or excessive runoff through competent and forward thinking management of drainage throughout Orange County. In accordance with a holistic approach to risk management, the District developed a *Hazard Mitigation Plan (the "HMP")* in 2012, which was subsequently updated in 2017 (the full HMP can be found on the District's website). The HMP outlines hazard mitigation goals, including:

1) To protect public health, safety, and welfare;
2) To reduce losses due to hazards by identifying hazards, minimizing exposure of citizens and property to hazards, and increasing public awareness and involvement;
3) To facilitate the development, review and approval process to accommodate growth in a practical way that recognizes existing storm water and floodplain problems while avoiding creating new problems or worsening existing problems; and
4) To seek solutions to existing flooding problems.

One priority action item (Action No. 3) identified in the 2017 HMP is to develop and adopt a Master Drainage Plan, in order for the District to fully exercise the authority granted to drainage districts under Chapter 49.211 of the Texas Water Code. Specifically, adoption of this Plan, and subsequent adoption of a Drainage Criteria Manual, allows the District to more rigorously manage and regulate development, as it pertains to drainage and flood control within Orange County, including the review and approval of proposed development and drainage plans.

2 Geography and District Overview

The District is located in Southeast Texas and consists of approximately 380 square miles which lies entirely within Orange County. ***Figure 2*** is a map identifying the boundary area for the District, which has coterminous boundaries with Orange County, along with the general jurisdictional boundaries of the municipalities within Orange County, including the cities of Orange, West Orange, Vidor, Pinehurst, Bridge City, Rose City and Pine Forest. Orange County is located in the Texas Coastal Plain and is bordered on its east by the Sabine River, on its south by Sabine Lake, and on the west by the Neches River. Ground surface elevations across Orange County are generally very low and have relatively little variance, ranging from sea level to approximately 30 feet above sea level (using the North American Vertical Datum). The flat, low-lying coastal terrain presents many challenges for drainage. Average annual rainfall in the county totals approximately 60 inches.

Development and subsequent population growth in the County is an important consideration when managing drainage throughout the County. Significant growth has been seen in certain areas of the County during the last few years, and further and potentially aggressive growth is projected over the next 10 years, necessitating an increased urgency to develop and adopt more forward thinking policies and regulations related to drainage and flood risk management.

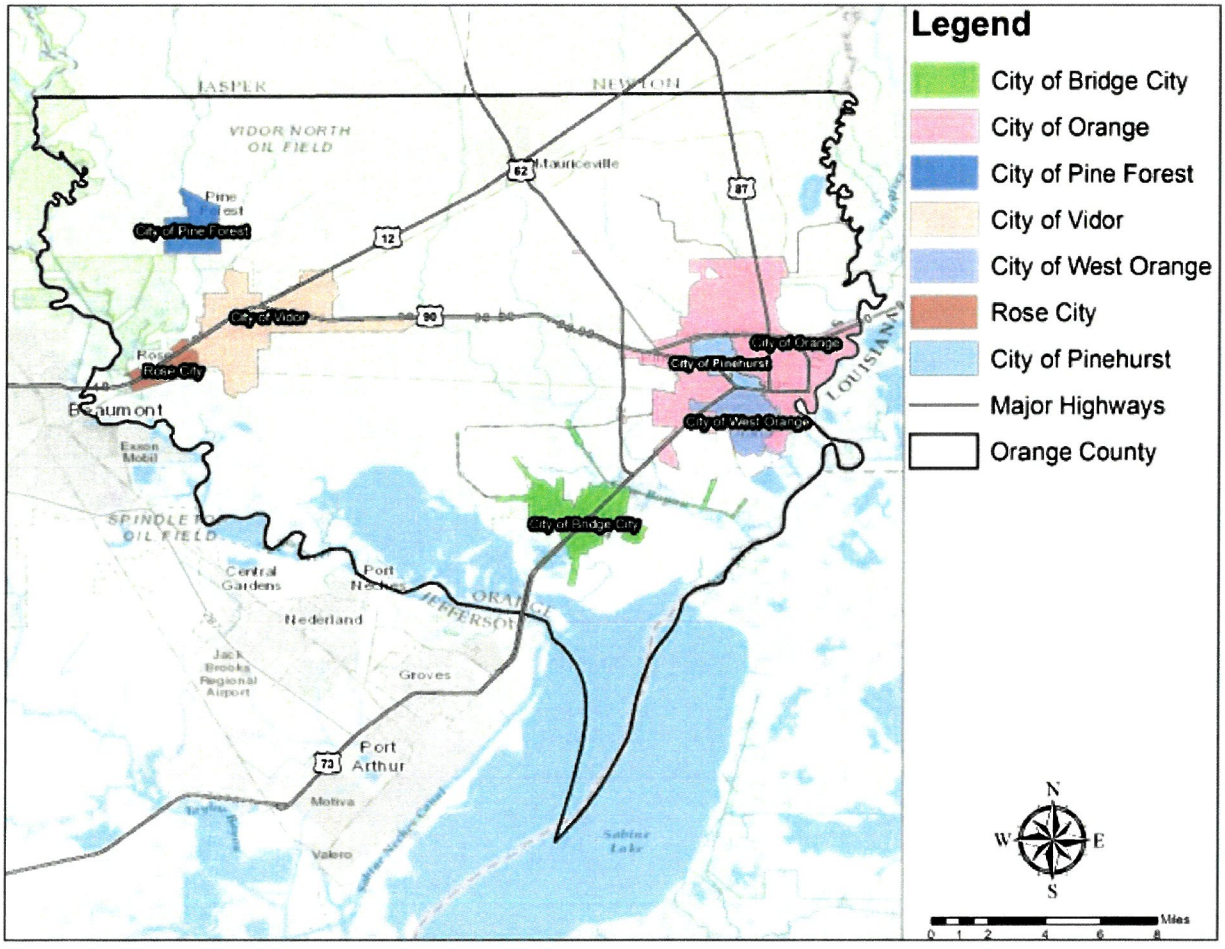

Figure 2 – District Boundaries and Political Jurisdictions

Figure 3 shows the major waterways and watersheds within, or which impact Orange County. Of most significance, the east side of the county is bordered by the Sabine River, and the west side of the County is

bordered by the Neches River. Adams Bayou, Cow Bayou, Little Cypress Bayou and numerous gullies and creeks constitute tributaries, directly or indirectly, to the adjacent major rivers and provide drainage for the majority of the developed areas within the County. The southern portion of the County is bordered by Sabine Lake, and is subject to coastal surges from tropical storms, as well as tidal influences.

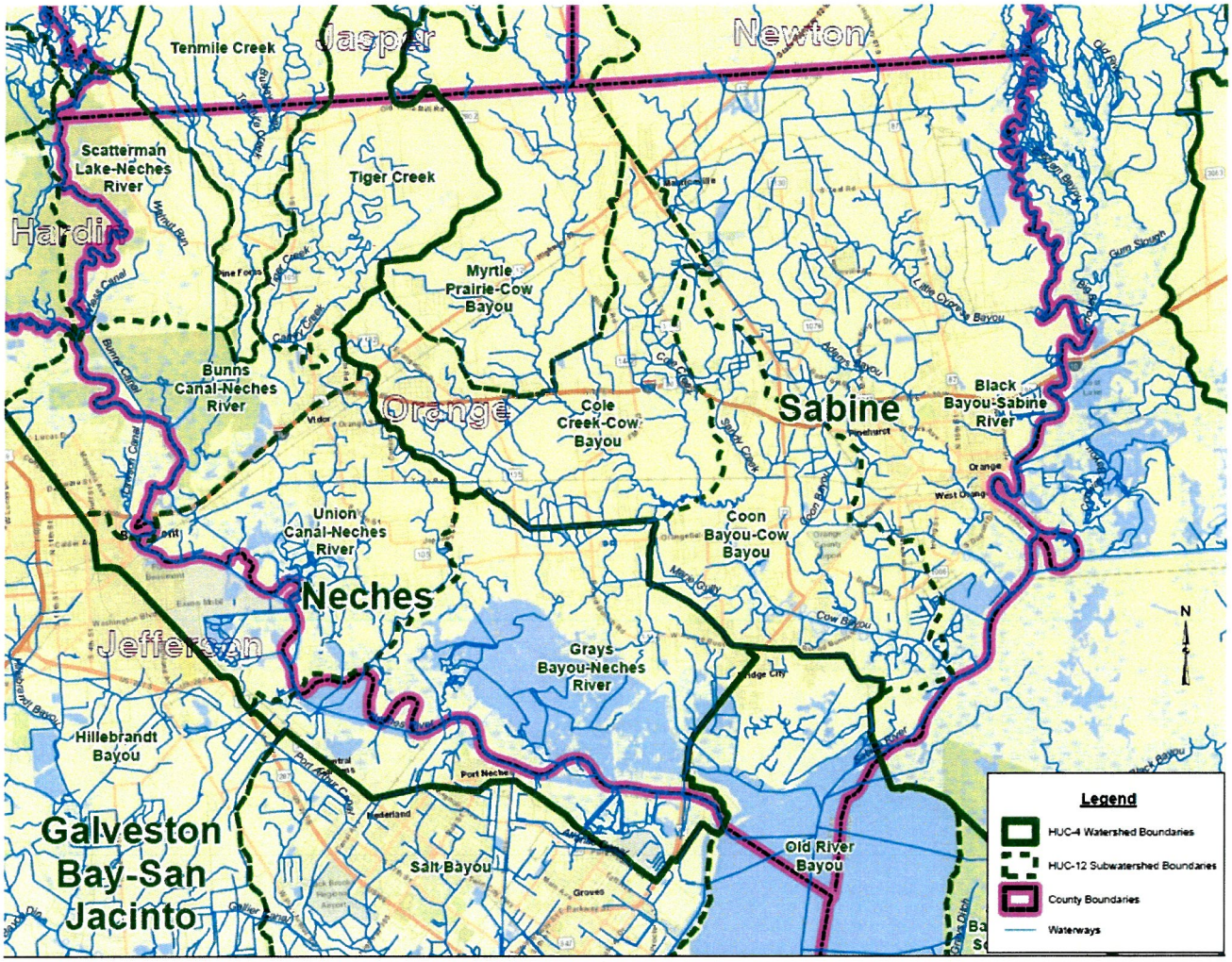

Figure 3 – Major Waterways and Watersheds

3 Planning Process

Development of this Master Drainage Plan was led by staff members of the District and a specialized consulting team. This effort builds upon prior planning efforts supporting development of the 2017 HMP Update, including the public outreach and consensus building which was performed. This Plan was developed in an incremental process. After development of a Draft Plan by the District and its consultant team, the Draft Plan was then posted to the District's website (https://www.orangecountydrainage.com) on or about October 8, 2019 for public review prior to adoption of the Plan by the District's Board of Directors. This Plan was adopted on March 10, 2020. The resolution adopting the Plan is provided in ***Appendix 2***.

4 Data Collection and Review

In preparing this Plan, an extensive review of existing information and studies related to drainage conditions in Orange County was conducted. The following sections document applicable historic information and relevant studies which contribute to our understanding of drainage challenges and goals within the District.

4.1 Historic Events

Flooding across the District occurs not only from major tropical storms, but also from localized heavy rainfall which can surcharge portions of the District's drainage system. In any given year, there are typically multiple flood events of sufficient severity that could result in damages to homes or property. The FEMA Flood Insurance Study (FIS), dated August 30, 2012, notes and describes several significant flood events from 1913 through 2012. Some of those events, along with recent major flood events occurring during the period of 2012 to 2019 include the following:

- **September 17-20, 2019, Tropical Storm Imelda –** Tropical Storm Imelda followed Hurricane Harvey by less than 25 months, and constituted another historic rainfall event that decimated Orange County. Like Hurricane Harvey, Tropical Storm Imelda resulted in the flooding of homes and businesses across the county, including many of the same homes that were flooded as a result of Hurricane Harvey.

- **August 26, 2017, Hurricane Harvey** - Hurricane Harvey was a Category 4 storm with estimated sustained winds of 130 mph at landfall. Over sixty inches of rain were recorded in the cities of Groves and Nederland, Texas, which are less than five miles from Orange County, and this rainfall measurement is recognized by the National Weather Service as the largest recorded rainfall event in the continental United States. Hurricane Harvey ravaged the residents of Orange County, destroying homes and businesses, and wreaking havoc on the entirety of the County.
- **June 29, 2017** – Heavy rains caused significant flooding across Orange County and caused many roads to be covered in flood waters. It was estimated that some areas received well in excess of 8 inches of rain over the day.
- **March 14-15, 2016** – A mandatory evacuation was ordered for thousands of people along the Sabine River. Emergency management officials estimated the amount of water flowing south from the Toledo Bend Dam was the most recorded in their history. The event was later declared a state of disaster by the Texas Governor.
- **September 12-13, 2008**, **Hurricane Ike** - In Orange County, Bridge City had nearly all of their homes flooded (over 3,000), and flooding extended northwest to Rose City, and northeast to the city of Orange, where water overtopped the levee on the east side of town. Over 3,000 homes were also flooded in Orange. Maximum storm total rainfall was between 5 and 8 inches across Orange and surrounding counties. One fatality occurred during Hurricane Ike due to a vehicle being swept off Highway 73 near the Rainbow Bridge by the large storm surge and waves. Total damages were estimated to be at least $1.3 billion across southeast Texas.
- **October 16-21, 2006** – Two-day rain totals of 12 to 16 inches resulted in long duration flooding across portions of Orange County. The hardest hit areas were near Mauriceville, and along the Neches River near Lakeview. Cow Bayou reached an overflow elevation of 22.53 feet near Mauriceville. At least 40 homes were destroyed, and another 60 were damaged. An abundance of moisture and high wind shear resulted in several tornadoes and flash floods across southeast Texas. Total estimated damage was $4.0 million.
- **September 23-24, 2005**, **Hurricane Rita** – Hurricane Rita made landfall just east of the Texas-Louisiana border, it moved northwest and moved across southeast Texas in the morning hours of September 24th as a dangerous Category 3 hurricane with sustained winds of 120 mph. South of Orange County, storm surges near 10 feet occurred near Sabine Pass, where over 90 percent of the homes were severely

damaged or destroyed. The storm surge backed up the Sabine River, and flooded a small section of downtown Orange with around 4 to 5 feet of storm surge.

- **October 29, 2002** – Excessive rainfall in a short period of time impacted portions of Orange County on October 29, 2002. Over 600 homes across Orange County had water damage after 6 to 8 inches of rain fell in less than 6 hours. Of the 600 damaged homes, approximately 300 were located in Orange, and 150 in Vidor. Damages were estimated at approximately $3,000,000.
- **June 7, 2001** – Tropical Storm Allison resulted in extensive flooding and property damage across Southeast Texas. Nearly 20 homes were damaged in rural sections of Orange County mainly north of Vidor, after 10 inches of rain fell in less than six hours. Some roads and bridges were also damaged.

4.2 FEMA Flood Insurance Studies

Recent and relevant FEMA studies related to Orange County include:

- **Preliminary Orange County Flood Insurance Study (FIS) / Rate Map (FIRM).** A new/revised flood insurance study was initiated for Orange County in the 2010 timeframe, with draft products issued in the 2012 timeframe, including coastal products. This study and its associated FIRMs have not been made effective yet. Preliminary (not-yet effective) FIRMs are shown in **Figure 4**. These can be accessed at the FEMA Map Service Center.
- **Effective Orange County Flood Insurance Study (FIS) / Rate Map (FIRM).** The most recent FIS revised study is dated June 5, 1997. Effective FIRMs across the county are dated 1983 and 1997. These can be accessed at the FEMA Map Service Center.
- **2015 Flood Risk Report** – Lower Sabine Watershed – This FEMA report covers only a portion of Orange County but was reviewed for current flood risk data as well as flood reduction activities relevant to Orange County.
- **2014 Flood Risk Report** – Orange County Coastal Project Area – This FEMA report was reviewed for current flood risk data as well as flood reduction activities within portions of Orange County.

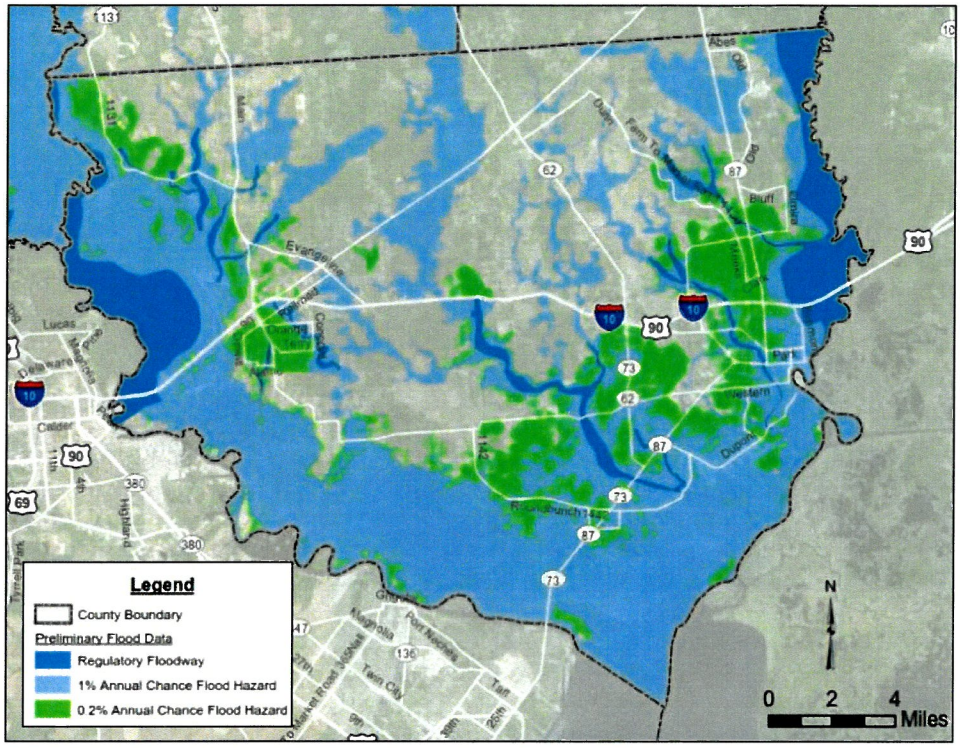

Figure 4 – Preliminary FEMA Floodplains

4.3 Other Previous Studies

Other applicable plans, studies, and reports that were reviewed included:

- **Orange County Drainage District Hazard Mitigation Plan Update 2017 ("HMP").** The District's current HMP includes information specific to the hazards faced by the District as well as its authority to maintain and improve drainage within the County. The HMP further includes multiple mitigation actions that can potentially reduce the risk of flooding and resulting property damage.
- **Sabine to Galveston Integrated Feasibility Study and Environmental Impact Study 2017.** USACE study related to coastal flood risk management improvements proposed for Orange County and Port Arthur.
- **Orange County Hazard Mitigation Plan, November 2016**. The County HMP was reviewed for historical, hazard and mitigation information relevant for this Plan.
- **2015 Cow Bayou and Adams Bayou Flood Protection Study.** This study focused on the Cow Bayou and Adams Bayou watersheds, the two largest internal watersheds within Orange County. This study, the purpose of which was to identify structural and non-structural alternatives that would mitigate flooding impacts from significant rainfall events in Orange County, was reviewed for the purpose of identifying potential mitigation actions.
- **2012 Flood Protection Planning Study** – Hurricane Flood Protection System – The purpose of this study was to investigate how to reduce the risk of harm to residents, damage to property and infrastructure, and economic losses from hurricanes in Orange County.
- **2002 Cow Bayou Watershed Study.** The Study, which focused on the Cow Bayou watershed, was reviewed to identify projects that could help mitigate flooding in that watershed.

4.4 Existing Infrastructure

In general, the District's drainage system consists of earthen drainage ditches which direct storm water to the natural bayous, creeks, gullies, rivers and coastal outfalls. The District currently maintains over 600 miles of earthen ditches and drainage facilities. **Figure 5** generally depicts the major bayous, creeks and gullies, along with connected laterals and tributaries that comprise a significant portion of the internal drainage system within Orange County. Throughout various areas within the County, the District's drainage system receives storm water runoff from subdivision drainage systems, and from drainage systems maintained by other private, municipal, County, or State drainage systems (either ditches or storm sewers).

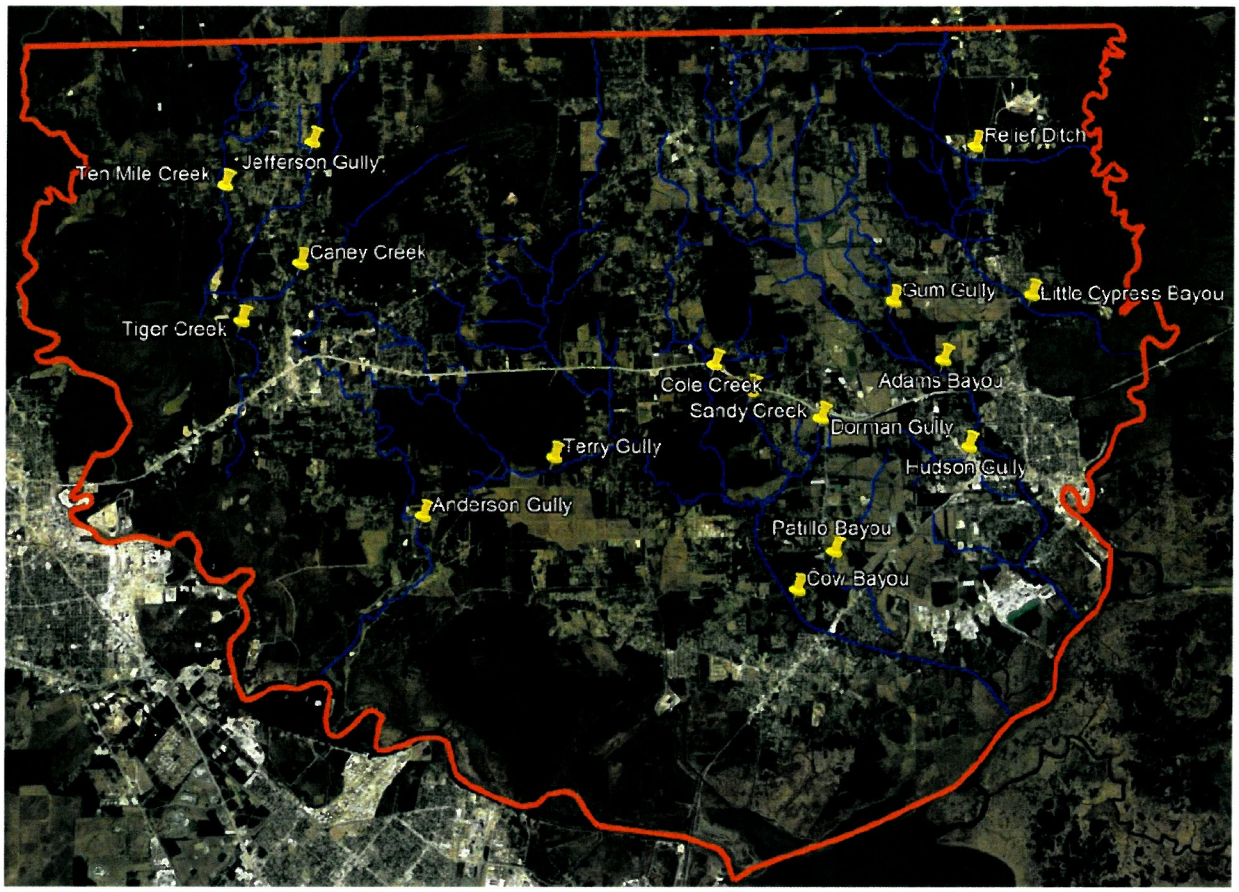

Figure 5 – Major Bayous, Creeks and Gullies within Orange County

4.5 Existing Maintenance Activities

In general, the District's drainage system consists of earthen drainage ditches and culverts, along with natural bayous, creeks, and gullies. The District is responsible for maintaining these drainage facilities, which usually consists of regular mowing, herbicidal spraying, and removal of silt, or debris. The District currently employs over fifty employees, and owns various heavy equipment all of which collectively allow the District to not only perform usual and routine maintenance of the drainage infrastructure for which it is responsible, but also allows the District to perform drainage improvement/mitigation activities with in-house resources. The District is also able to procure engineers and/or contractors to design and/or construct proposed capital improvement projects. In addition to an annual budget funded by ad valorem taxation, the District has already, and will in the future seek funding from FEMA, the Natural Resources Conservation Service, Texas Water Development Board, U.S. Army Corps of Engineers (USACE), and other sources to assist the District financially and to help achieve short and long-term goals.

5 Summary of Drainage & Flooding Issues

Flooding occurs throughout the District, but is mostly concentrated around the rivers, bayous, creeks, and ditches which traverse the county, and along the marsh that is generally located in the southern portion of Orange County. Water bodies that pose a significant risk of flooding in the District include the Neches River (the western boundary of the county), the Sabine River (the eastern boundary of the county and the border between Texas and Louisiana), Cow Bayou (that generally flows though the center of the county), and Adams Bayou (which flows through the City of Orange in the eastern part of the County). However, localized flooding can occur at any location within the County due to the high intensity rainfall which is common to the area and the flat terrain which limits the effective conveyance of storm water runoff.

NOAA Atlas 14, Volume 11, is a statistical analysis of past rainfall in Texas, including Orange County, which is used to determine the anticipated amount of rainfall for storm events of different frequencies and durations. This information, released in 2018, reveals a significant increase in anticipated design rainfall depths compared to previous analyses. The commonly used 100-year storm event (or 1% Annual Exceedance Probability) for a 24-hour time period, according to NOAA Atlas 14 is approximately 17.2 inches in Orange County. NOAA Atlas 14 precipitation frequency estimates can be found at the following website: https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html.

Different types of flooding which occur in Orange County are presented below.

5.1 Riverine Flooding

Riverine flooding occurs when water rises out of the banks of a major waterway, which is a common cause of flooding in Orange County. Flooding along waterways is a function of both precipitation intensity and volume. In the District's jurisdiction, the larger riverine systems can experience long duration flood crests caused by either intense rainfall (due to tropical storms and/or frontal systems) or releases from upstream dams.

Locations of riverine flood zones in Orange County, based on the Preliminary Flood Insurance Rate Map (FIRM) from FEMA are illustrated in **Figure 4** above. It should be noted that these maps are Preliminary, not yet Effective.

5.2 Localized Flooding

Separate from riverine flooding, localized flooding can occur when local drainage systems are unable to effectively convey runoff from developed areas. Because of the flatness of the terrain, and intensity of typical rain events, when water collects faster than it can drain away or infiltrate the ground, localized ponding or flooding occurs. This flooding is not typically reflected on FEMA FIRMs, but poses a significant risk to property owners across Orange County. This type of flooding can occur from localized or smaller rain events as well as larger county-wide storm events, such as a hurricane or tropical storm. Localized flooding can also be significantly impacted by development, which can increase the volume of stormwater runoff (by reducing the amount of water infiltrated into the soils) and accelerate the collection and conveyance of runoff.

5.3 Coastal Flooding

The District is located along the Gulf Coast in an area vulnerable to coastal flooding and storm surges caused by Hurricanes and Tropical Storms. Storm surges occur when the water level of a tidally-influenced body of water increases above the normal high tide. Storm surge can impact riverine systems as well and cause increased water elevations as the storm forces water inland. Storm surges are particularly damaging when they occur at the time of a high tide, combining the effects of the surge and the tide and can reach further inland than typical coastal flooding. In Orange County, storm surges, and even simply high tides occurring for a significant period of time, may limit drainage that normally occurs through the rivers, bayous, gullies and other natural drainage systems.

Coastal flooding is expected to occur more frequently, driven by higher sea levels, land subsidence, erosion, wetland loss, development in low lying areas, higher tide events, and storm surges. The vulnerability is due to the District's proximity to the coast, low ground elevation relative to Sea Level, and relatively high number of low gradient river/drainage systems whose drainage efficiency can be significantly impacted by higher water surface elevations at the system's outfall into a coastal environment. Coastal flood risk is illustrated on the Preliminary FIRM issued by FEMA.

5.4 Relative Sea Level Rise

When planning for future development, it is important to consider the anticipated rise in sea level, which is occurring globally. NOAA predicts that the global mean sea level will continue to rise over the coming years, with increases potentially exceeding 5 feet by the year 2100. Impacts of relative sea level rise should be considered when evaluating development and when planning and permitting drainage improvements. Impacts of relative sea level rise would be most heavily felt in the most low-lying areas of the County, which would slowly become inundated by the rising seas, and which would correspondingly become more susceptible to other sources of coastal flooding.

6 Current Development Procedures

6.1 Land Use and Development Trends

There are a wide variety of land uses within Orange County, including residential, mixed-use, commercial, industrial, and agricultural. Across the County, significant development has occurred in recent years. This includes developments of all sizes and types, ranging from new single family homes, to several acre residential or mixed-use developments, to large industrial facilities. Building permit data indicates a surge in development activity in the 2016/2017 timeframe, compared to previous years, which has persisted or increased in the years since and is anticipated to continue for the foreseeable future. This increased development pressure further justifies the need to establish and implement more rigorous development controls related to drainage and flood control, as un-mitigated development can significantly impact adjacent neighborhoods and the ability of existing drainage systems to perform as designed or intended.

6.2 New Development and Infrastructure

New development within Orange County creates additional stress on existing drainage infrastructure by increasing impervious cover and accelerating the collection and conveyance of runoff. While the effects of a single development may be minimal, the cumulative effect of new development across the County has the potential to significantly impact the ability of existing drainage systems to perform as designed or intended.

Furthermore, due to recently revised rainfall data noted herein and expected future updates to FEMA flood insurance maps, proper siting of new development will be critical to ensure such development is not located in an area of inherent high risk. Establishment of formal drainage criteria, including the stipulation of the definition of "no adverse impact", and the implementation of a formal drainage review and approval process, is critical to ensure that future development is constructed in a responsible manner which provides a minimum level of flood protection for its occupants, and which does not result in adverse impacts which could impact the level of flood protection currently being provided to existing neighborhoods or developments.

6.3 Development Management

Currently, development is permitted by the County or individual municipality, in accordance with their floodplain ordinance, development standards, and building codes. In cooperation with the County and Cities, the District currently reviews and approves drainage plans, and communicates such approval (or objections thereto) to these entities. The District intends, as a future component of this Plan, to create and implement a Drainage Criteria Manual pursuant to Section 49.211 of the Texas Water Code, for the purpose of managing and regulating development, as it pertains to the drainage and flood control within Orange County. The

implementation of a Drainage Criteria Manual, along with stricter enforcement of floodplain ordinances, is anticipated to provide for improved flood protection and increased resiliency.

7 Master Drainage Plan

7.1 District Goals Related to Drainage and Flood Control

The District has identified the following specific goals related to improved management of drainage and flood control within the County:

1) Consistent with the funding available to the District, properly maintain and improve, where feasible, existing drainage facilities and structures.
2) Regulate new development (including re-development) to insure no adverse impact to adjacent neighborhoods and to the District's drainage system. This includes working with Orange County and the cities within Orange County to provide a more integrated approach to flood risk management and the implementation and enforcement of drainage criteria.
3) Pursue additional funding sources or partnerships to support drainage improvements.
4) Implement capital improvement projects to address priority drainage challenges and improve drainage within the County.
5) Implement new communication measures to better inform residents and other stakeholders of flood risk and ways to manage flood risk.

7.2 District Priorities related to Future Capital Improvements

The District has identified the following priorities for capital improvement projects over the short and long term, as funding is identified or made available, to improve drainage and reduce flood risk across the County:

1) Remove and manage debris in ditches, bayous, creeks and gullies to ensure proper functioning of the drainage system.
2) Implement select drainage improvements:
    a. Detention/retention facilities
    b. Culvert/ditch/channel Improvements
    c. Local drainage improvements.
3) Participation, with the Federal and State Government, along with other local entities, in achieving coastal storm surge protection.

7.3 Development of District's Drainage Criteria Manual

The District is in the process of developing a formal Drainage Criteria Manual pursuant to the authority granted by Section 49.211 of the Texas Water Code. This manual will establish an overarching drainage policy, promulgate specific drainage criteria, and lay out a formal process for the review and approval of proposed development drainage plans. This manual will be subject to public review and comment prior to adoption.

7.4 GIS Capabilities and Enhanced Risk Communication

The District intends to expand its GIS Capabilities, in partnership with other governmental agencies and entities, to facilitate improved understanding of risk among key stakeholders, developers, and the general public. By creating static maps, or other interactive tools, it will be easier to convey flood risk information and easier to track and manage impacts or improvements to the District's drainage infrastructure.

APPENDIX 1

Texas Water Code, Section 49.211

WATER CODE

TITLE 4. GENERAL LAW DISTRICTS

CHAPTER 49. PROVISIONS APPLICABLE TO ALL DISTRICTS

SUBCHAPTER H. POWERS AND DUTIES

Sec. 49.211. POWERS. (a) A district shall have the functions, powers, authority, rights, and duties that will permit accomplishment of the purposes for which it was created or the purposes authorized by the constitution, this code, or any other law.

(b) A district is authorized to purchase, construct, acquire, own, operate, maintain, repair, improve, or extend inside and outside its boundaries any and all land, works, improvements, facilities, plants, equipment, and appliances necessary to accomplish the purposes of its creation or the purposes authorized by this code or any other law.

(c) A district that is authorized by law to engage in drainage or flood control activities may adopt:

(1) a master drainage plan, including rules relating to the plan and design criteria for drainage channels, facilities, and flood control improvements;

(2) rules for construction activity to be conducted within the district that:

(A) reasonably relate to providing adequate drainage or flood control; and

(B) use generally accepted engineering criteria; and

(3) reasonable procedures to enforce rules adopted by the district under this subsection.

(d) If a district adopts a master drainage plan under Subsection (c)(1), the district may adopt rules relating to review and approval of proposed drainage plans submitted by property developers. The district, by rule, may require that a

property developer who proposes to subdivide land located in the district, and who is otherwise required to obtain approval of the plat of the proposed subdivision from a municipality or county, submit for district approval a drainage report for the subdivision. The drainage report must include a map containing a description of the land to be subdivided. The map must show an accurate representation of:

(1) any existing drainage features, including drainage channels, streams, flood control improvements, and other facilities;

(2) any additional drainage facilities or connections to existing drainage facilities proposed by the property developer's plan for the subdivision; and

(3) any other parts of the property developer's plan for the subdivision that may affect drainage.

(e) The district shall review each drainage report submitted to the district under this section and shall approve a report if it shows compliance with:

(1) the requirements of this section;

(2) the district's master drainage plan adopted under Subsection (c)(1); and

(3) the rules adopted by the district under Subsections (c)(2) and (d).

(f) On or before the 30th day after the date a drainage report is received, the district shall send notice of the district's approval or disapproval of the drainage report to:

(1) the property developer; and

(2) each municipal or county authority with responsibility for approving the plat of the proposed subdivision.

(g) If the district disapproves a drainage report, the district shall include in the notice of disapproval a written statement:

(1) explaining the reasons for the rejection; and

(2) recommending changes, if possible, that would make a revised version of the drainage report acceptable for approval.

Added by Acts 1995, 74th Leg., ch. 715, Sec. 2, eff. Sept. 1, 1995. Amended by Acts 1997, 75th Leg., ch. 1070, Sec. 11, eff. Sept. 1, 1997; Acts 2003, 78th Leg., ch. 486, Sec. 1, eff. June 20, 2003.

APPENDIX 2

Resolution Adopting Master Drainage Plan

RESOLUTION NO. 2020-18

RESOLUTION OF THE ORANGE COUNTY DRAINAGE DISTRICT BOARD OF DIRECTORS ADOPTING THE MASTER DRAINAGE PLAN AND DECLARING THE DISTRICT'S INTENT TO EXERCISE THE AUTHORITY GRANTED TO DRAINAGE DISTRICTS PURSUANT TO SECTION 49.211 (TEXAS WATER CODE)

WHEREAS, the Orange County Drainage District (hereinafter, the "District") was created pursuant to Section 59, Article XVI of the Constitution of the State of Texas, and its enabling statute, Article 8280-292 (Tex. Rev. Civ. Statutes – Title 128. Water Auxiliary Laws), and is a political subdivision of the state of Texas, created for the purposes of reclamation and drainage of its overflowed lands and other lands needing drainage in Orange County; and

WHEREAS, the District was granted specific powers enumerated in the enabling statute and as well, general powers to do all things necessary or proper to carry out and accomplish the purposes for which the District was created; and

WHEREAS, Section 49.211 (Texas Water Code) restated and expanded the District's authority for the purpose of allowing the District to more rigorously manage and regulate land and property development as such activities may impact drainage and mitigate flooding within its jurisdiction, as necessary; and

WHEREAS, the Board of Directors of the District (hereinafter, the "Board") approved and adopted the Orange County Drainage District's Hazard Mitigation Plan, Update Rev. 2017 (hereinafter, the "2017 HMP"), on February 13, 2018 pursuant to the Flood Mitigation Assistance Program (44 CFR 78.6), the Hazard Mitigation and Pre-Disaster Mitigation Programs (44 CFR Parts 201 and 206) and as set forth in guidance documents prepared by the Federal Emergency Management Agency (FEMA) and pursuant to Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as Amended; the National Flood Insurance Act of 1968 (NFIA), as Amended; and Title 44 CFR, Section 201.6, requiring state and local governments to develop and formally adopt hazard mitigation plans in order to be eligible for certain disaster/flood mitigation assistance funds from the federal government; and

WHEREAS, because of limited available resources it is vitally important for the District to seek to obtain federal and/or state disaster/flood mitigation assistance funds, particularly to accomplish new flood mitigation projects which are urgently needed; and

WHEREAS, in the 2017 HMP the District's staff and a specialized consulting term extensively analyzed drainage and flood control needs in light of historical and current storm events and other factors and identified the need to develop and adopt a master drainage plan to allow the District to fully exercise the scope of authority granted to drainage districts pursuant to Section 49.211 (Texas Water Code); and, thus to further the District's purposes set forth in the enabling statute; and

WHEREAS, the District's staff with assistance of a specialized consulting team also developed a draft of the Orange County Drainage District Master Drainage Plan (October 8, 2019) (the "Master Drainage Plan"), and as well, the Drainage Criteria Manual & Regulations (February 10, 2020, Rev.) (hereinafter, the "Drainage Regulations Manual" or "Manual"), pursuant to the provisions of Section 49.211 (Texas Water Code) and in order to fully exercise the powers granted for the purposes therein stated; and

WHEREAS, development of the Master Drainage Plan builds upon prior planning efforts supporting development of the 2017 HMP including the public outreach and consensus building which was performed. The draft Master Drainage Plan was posted to the District's website on or about October 8, 2019, prior to the consideration for adoption by the Board, and will be an underlying component of the Drainage Regulations Manual which pursuant to Section 49.211 (Texas Water Code) is for the purpose of more rigorously managing and regulating development, as it pertains to the District's efforts regarding drainage and flood mitigation within Orange County; and

WHEREAS, the Board has duly considered the facts regarding the apparent increasing reoccurrence of major storm events which have caused catastrophic flooding and damage in Orange County and are therefore a continuing threat to human life and property, as documented and evaluated in the 2017 HMP and the Board hereby makes the following determinations:

1. by developing and adopting the Master Drainage Plan, in accordance with Section 49.211 (Texas Water Code), and the subsequent adoption of the Drainage Regulations Manual, the District is authorized to more rigorously manage and regulate development, and plan for the creation and/or improvement of drainage facilities and flood mitigation, thereby promoting the purposes for which the District was created as set forth in its enabling statute, and

2. the adoption of the Master Drainage Plan and the criteria/requirements set forth in the Drainage Regulations Manual is a necessary and reasonable action to fulfill obligations required pursuant to Section 49.211 (Texas Water Code) and as well, obligations required by federal law which will allow the District to become eligible to seek federal disaster/flood mitigation funding assistance which is urgently needed by the District, and

3. the Master Drainage Plan is a reasonable and practical means to accomplish the District's purposes in accordance with its enabling statute, Section 49.211 (Texas Water Code) and federal laws and regulations.

NOW, THEREFORE, BE IT RESOLVED, in consideration of the matters set forth herein the Board, hereby adopts the Master Drainage Plan.

PASSED AND APPROVED this the 10th day of March, 2020 in a Regular Meeting of the Board of Directors of the Orange County Drainage District pursuant to notice as provided by law.

ORANGE COUNTY DRAINAGE DISTRICT

By: _____
Brent Peveto, President and Presiding Officer

ATTEST:

By: _____
Hal LaPray, Vice-President