City of Corpus Christi Mitigation Actions

Problem Statement: Seawall along Corpus Christi Bay is in need of continuous maintenance and restoration			
	Corpus Christi Action #1		
Proposed Action	Seawall Capital Improvement Projects for routine		
	maintenance and restoration.		
BACKGROUND	INFORMATION		
Site and Location:	Sewall in Corpus Christi		
Risk Reduction Benefit:	Providing routine repairs help to defer major structural reconstruction efforts		
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Structure and Infrastructure		
	MITIGATION ACTION DETAILS		
Hazard(s) Addressed:	Hurricanes, Floods, Dam/Levee Failure.		
Effect on new/existing buildings:	The effect of maintaining and restoring the seawall in Corpus Christi will protect existing buildings along the seawall and any new buildings being built from Hurricanes and Tropical Storms and Floods.		
Priority (High, Moderate, Low):	High		
Estimated Cost:	\$5,500,000		
Potential Funding Sources:	CIP Project Funding and a sales tax adjustment		
Lead Agency/Department Responsible:	Corpus Christi Engineering and Development Services		
Implementation Schedule:	4-10 Years		
INCORPORATION INTO EXISTING PLANS AND PROCEDURES			
Capital Improvements Plan			
ADDITIONAL CONSIDERATIONS:			
The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)			

<u>Problem Statement:</u> Restoration of the bulkhead along the south shoreline between the Corpus Christi Natural History and Science Museum and the USACE property.	
	Corpus Christi Action #2
Proposed Action	Construction of a new bulkhead in Corpus Christi Bay along the south side shoreline of Corpus Christi.
BACKGROUNE	INFORMATION
Site and Location:	South Side Shoreline in Corpus Christi
Risk Reduction Benefit:	Construct a new bulkhead along the south shoreline of the Science and History Museum eastward across the United State Army Corps of Engineers (USACE) property terminating at the northwest corner of the recently constructed bulkhead in front of the South Texas Art Museum. The low-lying areas on the USACE property and the Port of Corpus Christi Authority would be filled to an elevation approximately the same as that in front of the Art Museum. Area paving could be constructed between the new bulkhead and existing floodwall.
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Structure and Infrastructure
MITIGATION A	CTION DETAILS
Hazard(s) Addressed:	Hurricanes, Floods, Dam/Levee Failure, Coastal Erosion
Effect on new/existing buildings:	Deter coastal erosion and mitigation potential flooding of existing properties situation at the northern section of downtown
Priority (High, Moderate, Low):	High
Estimated Cost:	\$10,500,000
Potential Funding Sources:	Sales Tax Proceeds
Lead Agency/Department Responsible:	Corpus Christi Engineering and Development Services

Implementation Schedule:

4-10 Years

INCORPORATION INTO EXISTING PLANS AND PROCEDURES

Capital Improvements Plan

ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: Improvements to the Salt Flats Levee System is needed to avoid a potential total failure doing a catastrophic event.		
	Corpus Christi Action #3	
Proposed Action	Make improvements to the Salt Flat Levee System.	
BACKGROUND	INFORMATION	
Site and Location:	Salt Flat Levee System in Corpus Christi	
Risk Reduction Benefit:	The Salt Flat Levee System is an integral component of the downtown flood protection system. The levee requires improvements and continued maintenance to ensure that the system will function as originally designed. Additional studies are underway and improvements are planned that would be sufficient to be certified by FEMA as a freeboard deficient reach. This means that although the system would not afford the level of protection required to prevent overtopping in a 100-year event, it would not be vulnerable to a catastrophic failure.	
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Structure and Infrastructure	
MITIGATION ACTION DETAILS		
Hazard(s) Addressed:	Hurricanes, Floods, Dam/Levee Failure.	
Effect on new/existing buildings:	Improvements on the Salt Flat Levee system will help mitigate flooding of existing buildings situated in downtown Corpus Christi. Failure to achieve FEMA certification would greatly impact the City of Corpus Christi and downtown business insurance costs.	
Priority (High, Moderate, Low):	High	
Estimated Cost:	\$3,000,000	
Potential Funding Sources:	Certificates of Obligation	
Lead Agency/Department Responsible:	Corpus Christi Engineering and Development Services	
Implementation Schedule:	2-3 Years	
INCORPORATION INTO EXISTING PLANS AND PROCEDURES		

Capital Improvements Plan

ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: Power Street Pump Station needs to updated to handle at least a 100-year storm event.	
	Corpus Christi Action #4
Proposed Action	Make improvements to Power Street Pump Station.
BACKGROUND	INFORMATION
Site and Location:	Power Street Pump Station in Corpus Christi
Risk Reduction Benefit:	The Power Street pump station was originally constructed in 1947 as part of the bay front protection. It has 3 pumps with diesel powered motors. The Kinney Street pump station was also constructed in 1947. The pump station was reconstructed in 2009. It has 5 pumps with electric motors that are dependent on the 3 generators inside. One redundant pump is located on site. The downtown flood protection system relies on these two pump stations to remove all water from the area during a significant storm event. Preliminary studies have indicated that the pumping capacity would not be adequate to handle rainfall, inflow and wave overtopping during a 100-year storm event. Planned 2D modeling will help to better define the demands that would be placed on the system during significant storm events. This project would enhance the reliability and capacity of the downtown storm system.
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Structure and Infrastructure
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricanes, Floods, Dam/Levee Failure.
Effect on new/existing buildings:	This project will improve operational efficiencies, save money on electrical costs, and help keep the downtown area from flooding during heavy rain conditions.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$5,500,000
Potential Funding Sources:	Certificates of Obligations

Lead Agency/Department Responsible:	Corpus Christi Engineering and Development Services
Implementation Schedule:	2-3 Years

Capital Improvements Plan

ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement	Stormwater Masterplan Needs U	pdating
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	Corpus Christi Action # 5	
Proposed Action	Update the Corpus Christi Stormwater Master Plan.	
BACKGROUND INFORMATION		
Site and Location:	City of Corpus Christi	
Risk Reduction Benefit:	The Corpus Christi City Council approved the Storm Water Capital Improvement Program (CIP) for FY99-00 on July 20, 1999 (Ordinance No. 023703). Included were separate projects for drainage studies in specific areas of the City. The need to integrate these individual drainage studies into a consistent, uniform analysis became evident and was approved in Storm Water CIP for FY00- 01, (Ordinance No. 024130). The City's use of master plans that date back to 1946, 1961, 1970, 1982, and 1988 resulted in the use of inconsistent criteria without an adopted level of protection policy. The separate projects are integrated into the FY00-01 Storm Water CIP as a Storm Water Master Plan Project. The Development of a comprehensive, updated, consistent Storm Water Master Plan based on an adopted Storm Water Criteria and Design Manual is necessary to respond to development, environmental issues and to better define and prioritize on going and future drainage capital improvement projects. The purposes of this project is as follows:	
	a. Establish drainage criteria that reflects input from the different segments of the community (elected officials, developers, engineers, citizens, planning and zoning) and in the consensus process identify a "level of protection" for the City to be adopted as a standard for the City	
	b. Adopt a drainage criteria and design procedure for designers to use in capital improvement projects and in the subdivision platting process of residential and commercial development	
	c. Establish policy statements or guidelines that are responsive to storm water quality, storm water pollution prevention requirements, development issues for use in future street and drainage project design	
	d. Develop a master plan to implement the drainage criteria established to include updates of the existing areas and production of new master plan for other areas. The master plan will include the inventory of all outfalls and data necessary for	

	the design process and will utilize criteria and reflects the characteristics of each master plan	
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Local Plans and Regulations	
MITIGATION ACTION DETAILS		
Hazard(s) Addressed:	Hurricanes, Floods	
Effect on new/existing buildings:	Prioritization of major drainage improvements considering level of service and return on investment could greatly impact the operating budget and will help eliminate the flooding that impacts all of Corpus Christi.	
Priority (High, Moderate, Low):	High	
Estimated Cost:	\$4,084,900	
Potential Funding Sources:	Bonds	
Lead Agency/Department Responsible:	Corpus Christi Storm Water Department	
Implementation Schedule:	2-3 Years	
INCORPORATION INTO EXISTING PLANS AND PROCEDURES		

Stormwater Master Plan

ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: Need to Excavate Drainage Master Channel 31		
	Corpus Christi Action #6	
Proposed Action	Excavate silt and debris in Drainage Master Channel 31 caused by the erosion on sides and bottom of the Drainage Master Channel 31.	
BACKGROUND	INFORMATION	
Site and Location:	Drainage Master Channel 31 in Corpus Christi	
Risk Reduction Benefit:	Master Channel 31 was constructed in various phases in conjunction with the development in the area. The side slopes and bottom are severely eroded resulting in poor drainage and encroachment of ditch outside of the City right-of- way. This project will provide critical improvements to restore and improve the drainage profile and include erosion control measures such as side slope stabilization, soil treatment, vegetative cover and other best management practices. This project is planned in multiple phases as funding allows.	
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Structure and Infrastructure	
MITIGATION ACTION DETAILS		
Hazard(s) Addressed:	Hurricanes, Floods	
Effect on new/existing buildings:	The effect of making improvements to Drainage Master Channel 31 will regain the carrying capacity of the channel and help eliminate flooding of existing buildings that occurs in the area of Corpus Christi this channel is supposed to help.	
Priority (High, Moderate, Low):	High	
Estimated Cost:	\$2,819,800	
Potential Funding Sources:	Bonds	

Lead Agency/Department Responsible:	Corpus Christi Engineering and Stormwater Department
Implementation Schedule:	3-4 Years
INCORPORATION INTO EXISTING PLANS AND PROCEDURES	

Capital Improvements Plan

ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: Improvements are needed on the side slopes for Schanen Ditch	
	Corpus Christi Action #7
Proposed Action	Improvements to side slopes on Schanen Ditch to eliminate erosion problems.
BACKGROUND	INFORMATION
Site and Location:	Schanen Drainage Ditch in Corpus Christi
Risk Reduction Benefit:	The existing profile of Schanen Ditch exceeds the recommended slope of 4:1 and maximum of 3:1. This is resulting in major slope stabilization failure in multiple areas near the Yorktown Bridge. Work to improve this ditch will include excavation/backfill to widen and create 3:1 side slopes with stabilization matting, new culvert and outfalls, riprap and ditch bottom improvements, seeding, irrigation adjustments, traffic controls, dewatering and other miscellaneous items. Construction of Phase 1 of this project has been recently completed and future phases will be completed to the extent that funding allows.
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Structure and Infrastructure
MITIGATION A	CTION DETAILS
Hazard(s) Addressed:	Hurricanes, Floods
Effect on new/existing buildings:	Restoration of channels and ditches is critical to avoid potential "washouts" that may result in encroachment, flooding and undermining of adjacent public/private structures including streets, bridges, utility lines, buildings, and homes.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,756,100
Potential Funding Sources:	Bonds
Lead Agency/Department Responsible:	Corpus Christi Engineering and Stormwater Department
Implementation Schedule:	3-4 Years

Capital Improvements Plan

ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: Excavation of La Volla Creek needed to increase the creek's carrying capacity.	
	Corpus Christi Action #8
Proposed Action	La Volla Creek Channel Excavation (Phase 1)
BACKGROUND	
Site and Location:	La Volla Creek in Corpus Christi
Risk Reduction Benefit:	This project will involve the improvement of La Volla Creek that crosses SH 357 (Saratoga Blvd). The project will provide 100-year capacity for conveyance to the Oso Creek. Phase 1 Channel improvements include the removal of vegetation from the channel North of Saratoga Boulevard and channel widening South of Saratoga Boulevard.
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Structure and Infrastructure
MITIGATION A	CTION DETAILS
Hazard(s) Addressed:	Hurricanes, Floods, Dam/Levee Failure.
Effect on new/existing buildings:	Restoration of channels and ditches is critical to avoid potential "washouts" that may result in encroachment, flooding and undermining of adjacent public/private structures including streets, bridges, utility lines, buildings, and homes.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$4,152,800
Potential Funding Sources:	Bonds
Lead Agency/Department Responsible:	Corpus Christi Engineering and Stormwater Department
	1-2 Years
INCORPORATION INTO EXISTING PLANS AND PROCEDURES	

Capital Improvements Plan

ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: Outdated FEMA Flood Insurance Rate Maps		
	Corpus Christi Action #9	
Proposed Action	Participate in the FEMA Flood Map Modernization Process.	
BACKGROUNE	INFORMATION	
Site and Location:	City of Corpus Christi	
Risk Reduction Benefit:	The Federal Emergency Management Agency's Multi-Hazard Flood Map Modernization Program will update and digitize flood hazard maps across the nation. Most the City of Corpus Christi's FIRMs are nearly 20 years old. It is in the interest of the City and its residents for the maps, which determine flood insurance premiums, to be accurate and up-to-date. Other planning and hazard mitigation benefits are expected to accrue as well. The City of Corpus Christi is currently working through the appeals process of the map modernization	
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Local Plans and Regulations	
MITIGATION ACTION DETAILS		
Hazard(s) Addressed:	Floods	
Effect on new/existing buildings:	Increased participation in available flood insurance.	
Priority (High, Moderate, Low):	High	
Estimated Cost:	Low Cost Staff Time	
Potential Funding Sources:	Local Budget	
Lead Agency/Department Responsible:	Corpus Christi Development Services	
	1-2 Years	
INCORPORATION INTO EXISTING PLANS AND PROCEDURES		
Capital Improvements Plan		

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: Improve CRS Rating		
	Corpus Christi Action #10	
Proposed Action	Improve the City's CRS rating from a Class 7 to a Class 5.	
BACKGROUND	INFORMATION	
Site and Location:	City of Corpus Christi	
Risk Reduction Benefit:	Corpus Christi has participated in the CRS program since 1991 and is currently rated as a Class 7 community, entitling its residents to a 15% discount on flood insurance premiums. This project is intended to improve its rating to a Class 5, thereby increasing the premium discount by an additional 10% for Special Flood Hazard Areas (SFHAs).	
	Other actions identified in this Mitigation Plan will have a direct bearing on fulfilling CRS requirements to qualify for the higher classification. This activity includes a comprehensive review of eligible activity requirements, identification of additional potential actions, monitoring completion of previously identified actions, and completing the application process.	
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Local Plans and Regulations	
MITIGATION ACTION DETAILS		
Hazard(s) Addressed:	Floods	
Effect on new/existing buildings:	Increased participation in available flood insurance.	
Priority (High, Moderate, Low):	High	
Estimated Cost:	Low Cost Staff Time	
Potential Funding Sources:	Local Budget	
Lead Agency/Department Responsible:	Corpus Christi Development Services	
	1-2 Years	
INCORPORATION INTO EXISTING PLANS AND PROCEDURES		
CRS Program, Floodplain Regulations, and Stormwater Regulations		

CRS Program, Floodplain Regulations, and Stormwater Regulations

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement:	Surface water reservoir needed in the upper reaches of the Nueces River
	bullace water reservoir needed in the upper reaches of the Nueces River.

	Corpus Christi Action #11
Proposed Action	Build the Catulla Reservoir in the upper reaches of the Nueces River which would include a pipeline to divert water directly into Choke Canyon Reservoir.
BACKGROUND	INFORMATION
Site and Location:	Upper Reaches of Nueces River
Risk Reduction Benefit:	The Corps of Engineers studied the Cotulla Reservoir site, located in the upper Nueces Basin, in the 1960's. The recent Nueces River Basin Reconnaissance Study identified a potentially down-sized version of this project, including a pipeline to divert water directly into Choke Canyon Reservoir. In addition to the flood damage reduction potential for Lake Corpus Christi and the lower river basin, this project would enhance the regional water supply by increasing water storage capacity, and reducing losses associated with downstream evaporation across an 81 mile braided reach. During Phase 1 of the Feasibility Study, existing data will be reviewed to estimate the flood damage reduction potential of the project: a. A preliminary hydrologic analysis to determine the portion of the volume of historical lower- basin floods that originate upstream of Cotulla will be performed. b. A review of existing map information of the Nueces River for a 25-mile reach downstream of the proposed reservoir to identify areas that could benefit from the potential flood damage reduction potential of the reservoir will be performed. c. Data from FEMA and other agencies on historical flood damages will be summarized. (Phase 2) Depending on the findings of the flood damage analyses, a daily flow flood model may need to be developed to evaluate the downstream flood damage reduction potential in terms of magnitude and frequency for the Cotulla Diversion Project.
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Structure and Infrastructure

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Floods, Drought
Effect on new/existing buildings:	Mitigate life-threatening hazards to buildings within the upper reaches of the Nueces River, while providing for a source of surface water to avoid disruption to essential utilities, eliminate the risk of potential economic loses.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$445,000
Potential Funding Sources:	USACE will cover 50% and Non-Federal Sponsors will cover the remaining 50%.
Lead Agency/Department Responsible:	City of Corpus Christi
	Summer of 2018
INCORPORATION INTO EXISTING PLANS AND PROCEDURES	

Nueces River Basin Reconnaissance Study

ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: The is needing a secure, sustainable alternate source of fresh water.

	Corpus Christi Action #12
Proposed Action	Implementation of a Desalination Program
BACKGROUND	
Site and Location:	City of Corpus Christi
Risk Reduction Benefit:	The City of Corpus Christi's Desalination Program is a progressive and proactive step to begin determining the feasibility of developing a drought proof future water supply using brackish groundwater and seawater. The City of Corpus Christi has secured grant funds from the US Bureau of Reclamation (Reclamation) to assist with this project and will have expert technical resources with Reclamation providing their experience and guidance. The City has already secured \$400,000 in grant funding for this project from Reclamation. This program will provide the City with the reliability, security, sustainability and availability of brackish groundwater and seawater as possible future water sources.
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Structure and Infrastructure
MITIGATION A	CTION DETAILS
Hazard(s) Addressed:	Drought
Effect on new/existing buildings:	The desalination program can be a secure source of freshwater to avoid disruption to essential utilities, eliminate the risk of potential economic loses.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$2,859,400
Potential Funding Sources:	Water operation funds, raw water supply fund and bureau of Reclamation grant.
Lead Agency/Department Responsible:	City of Corpus Christi
	1-2 Years

ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: There is a need to secure the integrity of the Wesley Seale Dam system		
	Corpus Christi Action #13	
Proposed Action	Make improvements to the instrumentation system at Wesley Seale Dam.	
BACKGROUND	INFORMATION	
Site and Location:	Wesley Seale Dam in Corpus Christi	
Risk Reduction Benefit:	This project provides for improvements to the original instrumentation system including annual safety inspection, integration with O.N. Stevens WTP process controls, The Howell-Bunger Valve, the downstream sluice gates, and the dewatering system, in response to previous inspections and priority investment recommendations into the system. This project will protect the integrity of the Wesley Seale Dam system (1957), to provide for proper inspection and updated regulatory reports per TCEQ.	
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Structure and Infrastructure	
MITIGATION ACTION DETAILS		
Hazard(s) Addressed:	Floods; Drought	
Effect on new/existing buildings:	This project will ensure the City can provide reservoir supplies to its customers and other downstream water right-holders and will secure the structural integrity of the dam through established dam safety protocols.	
Priority (High, Moderate, Low):	High	
Estimated Cost:	\$5,850,600	
Potential Funding Sources:	Revenue Bond	
Lead Agency/Department Responsible:	City of Corpus Christi Water Department	
	3-4 Years	

ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: Having Up-to-date Building Codes		
	Corpus Christi Action #14	
Proposed Action	Maintain and adopt most current building codes.	
BACKGROUNE	INFORMATION	
Site and Location:	City of Corpus Christi	
Risk Reduction Benefit:	The City of Corpus Christi has adopted, with local amendments, the Building Codes effective September 1, 2016, The International Code Council (ICC), 2015 editions of the International Building Code, Existing Building Code, Energy Conservation Code, Fuel Gas Code, Mechanical Code, Plumbing Code, and Residential Code for One- and Two-Family Dwellings and the National Fire Prevention Association (NFPA) National Electric Code. The International Building Codes are always being updated to provide better protection by utilizing the best construction practices. The City of Corpus Christi will be periodically updating the codes with code cycles that become available.	
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Local Plans Regulations	
MITIGATION ACTION DETAILS		
Hazard(s) Addressed:	Hurricanes, Flood, Windstorm, Coastal Erosion, Hail Storm, Tornado, Expansive Sols, Land Subsidence.	
Effect on new/existing buildings:	By maintaining the most update building codes, the city is requiring that construction adhere to the most stringent codes, thus helping to reduce potential loses if exposed to a hazard.	
Priority (High, Moderate, Low):	High	
Estimated Cost:	Low Cost/ Staff Time	
Potential Funding Sources:	Local Budget	
Lead Agency/Department Responsible:	City of Corpus Christi Water Department	

ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

<u>Problem Statement:</u> Leakage on the side gates of Wesley Seale Dam spillway.

	Corpus Christi Action #15
Proposed Action	Make improvements to the side seals on the Wesley Seale Dam Spillway to maintain the spillway's integrity.
BACKGROUND	INFORMATION
Site and Location:	Wesley Seale Dam in Corpus Christi
Risk Reduction Benefit:	The Wesley Seals Dam has 60 crest gates located in two separate spillways: the south spillway includes 27 gates and the north spillway includes 33 gates. Over the years, leakage from the side seals has increased and it has become significant at several of the gates. The water flow from the excessive leakage damages the concrete and encourages algae and other vegetative growth and leads to corrosion issues on the gates, metal appurtenances and reinforcing steel. This project provides for the necessary improvements including seal replacement, miscellaneous structural repairs and application of a protective coating system for the Dam.
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Structure and Infrastructure
MITIGATION AG	CTION DETAILS
Hazard(s) Addressed:	Floods, Dam Failure
Effect on new/existing buildings:	This project will increase the service life of the structure and prevent future corrosion, subsequent section loss and connection deterioration which will potentially lower the probability of increased flooding.
Priority (High, Moderate, Low):	High
Estimated Cost:	\$22,800,000
Potential Funding Sources:	Revenue Bond
Lead Agency/Department Responsible:	City of Corpus Christi Water Department

4-10 I Cais	4-10) Years
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ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

<u>Problem Statement:</u> Need to build a flood wall along Corpus Christi Bay at the Science and Natural History Museum to help eliminate flooding in the downtown Corpus Christi area.		
	Corpus Christi Action #16	
Proposed Action	Build a floodwall along Corpus Christi Bay at the Science and Natural History Museum.	
BACKGROUND INFORMATION		
Site and Location:	Corpus Christi Bay near the Science and Natural History Museum in Corpus Christi	
Risk Reduction Benefit:	Recommendation to construct a new floodwall (or a coastal structure) that would follow a "hypotenuse" alignment between the existing Promenade and the USACE Bulkhead. The project would also backfill the triangle to make it function more like a coastal structure. This would also provide additional land area for future use.	
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Structure and Infrastructure	
MITIGATION ACTION DETAILS		
Hazard(s) Addressed:	Hurricanes, Floods, Dam/Levee Failure.	
Effect on new/existing buildings:	The effect of building a flood wall will help eliminate flooding of existing buildings that occurs in the downtown area of Corpus Christi.	
Priority (High, Moderate, Low):	Moderate	
	\$3,5000,000	
Potential Funding Sources:	Certificates of Obligation	
Lead Agency/Department Responsible:	Corpus Christi Engineering and Development Services	
Implementation Schedule:	4-5 Years	
INCORPORATION INTO EXISTI	NG PLANS AND PROCEDURES	
Capital Improvements Plan		

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: Erosion of sides and bottom Drainage Master Channel 31	
Proposed Action	Make improvements to the erosion on sides and bottom of Drainage Master Channel 31.
BACKGROUND	INFORMATION
Site and Location:	Drainage Master Channel 31 in Corpus Christi
Risk Reduction Benefit:	Master Channel 31 was constructed in various phases in conjunction with the development in the area. The side slopes and bottom are severely eroded resulting in poor drainage and encroachment of ditch outside of the City right-of- way. This project will provide critical improvements to restore and improve the drainage profile and include erosion control measures such as side slope stabilization, soil treatment, vegetative cover and other best management practices. This project is planned in multiple phases as funding allows.
Type of Action:	Structure and Infrastructure
Local Plans and Regulations Structure and Infrastructure Natural Systems Protection	
MITIGATION A	CTION DETAILS
Hazard(s) Addressed:	Hurricanes, Floods
Effect on new/existing buildings:	The effect of making improvements to Drainage Master Channel 31 will regain the carrying capacity of the channel and help eliminate flooding of existing buildings that occurs in the area of Corpus Christi this channel is supposed to help.
Priority (High, Moderate, Low):	High
	\$3,000,000
Potential Funding Sources:	Certificates of Obligation
Lead Agency/Department Responsible:	Corpus Christi Engineering and Development Services
Implementation Schedule:	2-3 Years

Capital Improvements Plan

ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: Maintaining adequate drainage capacity as new development occurs throughout the city.	
	Corpus Christi Action #18
Proposed Action	Utilize the city adopted "Developer Agreement" that the can use with developers to help cover the cost of installing over-sized stormwater drainage.
BACKGROUND	INFORMATION
Site and Location:	City of Corpus Christi
Risk Reduction Benefit:	Under the platting ordinance, the City of Corpus Christi participates with developers on utility construction for over-sized main stormwater lines. These funds may also be used to address development drainage concerns. This project will provide for the City's share of such projects, as necessary, up to the approved amount.
Type of Action:	Structure and Infrastructure
Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Hurricanes, Floods
Effect on new/existing buildings:	The effect of making improvements to Drainage Master Channel 31 will regain the carrying capacity of the channel and help eliminate flooding of existing buildings that occurs in the area of Corpus Christi this channel is supposed to help.
Priority (High, Moderate, Low):	Moderate
	\$3,100,000
Potential Funding Sources:	Bonds
Lead Agency/Department Responsible:	Corpus Christi Storm Water Department and Development Services
Implementation Schedule:	4-5 Years
INCORPORATION INTO EXISTI	NG PLANS AND PROCEDURES
Stormwater Master Plan and Regulations	

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

<u>Problem Statement:</u> Assessment and Repairs of all stormwater outfalls in Corpus Christi that drain into Corpus Christi Bay.	
	Corpus Christi Action #19
Proposed Action	Complete an assessment of the needed repairs and improvements on all 8 major and 100 minor stormwater outfalls that drain into Corpus Christi Bay.
BACKGROUNE	INFORMATION
Site and Location:	City of Corpus Christi
Risk Reduction Benefit:	There are eight major storm water outfalls and more than 100 other outfalls that allow runoff to drain into Corpus Christi Bay. In 2003, 13.5 miles of these outfall structures were inspected and improvements and repairs were made to four outfalls. The purpose of this current project is to provide an updated assessment, which may include the Brawner/proctor and Gollihar outfalls and other outfalls, pending results of the initial assessment, and providing recommendations for repairs, improvements, and rehabilitation as necessary.
Type of Action:	Structure and Infrastructure
Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	
	CTION DETAILS
Hazard(s) Addressed:	Hurricanes, Floods
Effect on new/existing buildings:	Restoration of the storm water conveyance systems is critical to avoid potential "washouts" that may result in encroachment, flooding and undermining of adjacent public/private structures including streets, bridges, utility lines, buildings, and homes.
Priority (High, Moderate, Low):	Moderate
	\$2,447,200
Potential Funding Sources:	Bonds

Lead Agency/Department Responsible:	Corpus Christi Storm Water Department and Engineering Department
Implementation Schedule:	2-3 Years

Stormwater Master Plan

ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Socially Acceptable = 5; Technically Feasible =5; Administratively Possible =5; Politically Acceptable

=5; Legal =5; Economically Sound =5; and Environmentally Sound =5

<u>Problem Statement:</u> Constrictions along Oso Creek, east of La Volla Creek are causing base flood elevations to increase upstream.	
	Corpus Christi Action #20
Proposed Action	Complete a feasibility study of Oso Creek at the confluence of La Volla Creek to determine if any construction projects will help the creek conveyance capacity during high flow events.
BACKGROUND	INFORMATION
Site and Location:	Oso Creek in Corpus Christi
Risk Reduction Benefit:	The drainage profiles of Oso Creek east of the La Volla Creek confluence show several constrictions that impact the base flood elevations upstream. This project will investigate the feasibility of the construction of additional creek conveyance capacity for high flow events. If the investigation shows a significant potential to impact the base flood elevation, then construction will be completed in those areas.
Type of Action: Local Plans and Regulations Structure and Infrastructure	Structure and Infrastructure
Natural Systems Protection Education and Awareness	
MITIGATION A	CTION DETAILS
Hazard(s) Addressed:	Hurricanes, Floods
Effect on new/existing buildings:	Restoration of the storm water conveyance of Oso Creek is critical to avoid potential rising surface water elevations that would result in encroachment flooding and undermining of adjacent public/private structures including streets, bridges, utility lines, buildings, and homes.
Priority (High, Moderate, Low):	Moderate
	\$4,715,400
Potential Funding Sources:	Bonds
Lead Agency/Department Responsible:	Corpus Christi Storm Water Department and Engineering Department
Implementation Schedule:	4-5 Years

Stormwater Master Plan

ADDITIONAL CONSIDERATIONS:

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: Enhancing BCEGS Rating	
	Cornus Christi Action #21
Proposed Action	Have ISO conduct another assessment to see if the City has done enough improvements to its building department to gain a better BCEGS rating.
BACKGROUND	INFORMATION
Site and Location:	City of Corpus Christi
Risk Reduction Benefit:	Insurance Services Office, Inc. (ISO) is an independent organization that administers the Building Code Effectiveness Grading Schedule (BECGS) to assess "the building codes in effect in a particular community and how the community enforces its building codes, with special emphasis on mitigation of losses from natural hazards." The grading can influence the cost of insurance coverage in the community. Since its last assessment, the City of Corpus Christi has adopted the 2015 International Building Code and the 2016 International Residential Code for One and Two Family Dwellings, among others, and should be eligible for an improved grade. This activity includes scheduling a re-assessment and compiling the necessary documentation.
Type of Action:	Local Plans and Regulations
Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	
MITIGATION AG	CTION DETAILS
Hazard(s) Addressed:	Hurricanes, Flood, Windstorm, Coastal Erosion, Hail Storm, Tornado, Expansive Sols, Land Subsidence.
Effect on new/existing buildings:	Public participation in available insurance discount options on Homeowners insurance policies.
Priority (High, Moderate, Low):	Moderate
	Low Cost/ Staff Time
Potential Funding Sources:	Local Budget
Lead Agency/Department Responsible:	Corpus Christi Development Services

Implementation Schedule:	1-2 Years	
INCORPORATION INTO EXISTING PLANS AND PROCEDURES		
Building Code Regulations; CRS; Floodplain Regulations		
ADDITIONAL CONSIDERATIONS:		
The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)		
Socially Acceptable = 5; Technically Feasible =5; Administratively Possible =5; Politically Acceptable =5; Legal =5; Economically Sound =5; and Environmentally Sound =5		

Problem Statement: Hazard Risk to the General Population of the City of Corpus Christi	
	Corpus Christi Action #22
	1
Proposed Action	Implement a multi-hazard public awareness program.
BACKGROUND	INFORMATION
Site and Location:	City of Corpus Christi
Risk Reduction Benefit:	The City of Corpus Christi has seen multiple hazards occur within the years past. Most residents are heavily informed of what to do during heavy rains, tropical storms and hurricanes. However, there are multiple hazards that are not as frequent. The City will be working towards creating and disseminating a pamphlet(s) that will cover what to do before, during and after the following hazards: Extreme Heat, Lighting, Hailstorm, Hurricane and
	Tropical Storms, Windstorms, Tornados, Drought, Flood, Dam/Levee Failure, Coastal Erosion, Expansive Soils, Land Subsidence and Wildfires
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Education and Awareness
MITIGATION A	CTION DETAILS
Hazard(s) Addressed:	Hurricanes, Flood, Windstorm, Extreme Heat, Lightning, Coastal Erosion, Hail Storm, Tornado, Expansive Sols, Dam Failure, Land Subsidence, Wildfire.
Effect on new/existing buildings:	Homeowners will know what types of mitigations actions they can do to protect their lives and properties from the hazard risks.
Priority (High, Moderate, Low):	Moderate
Estimated Cost:	Low Cost/Staff Time
Potential Funding Sources:	Local Budget
Lead Agency/Department Responsible:	Corpus Christi Development Services and Office of Emergency Management
Implementation Schedule:	Create Year 1, Review and Administer Annually

CRS

ADDITIONAL CONSIDERATIONS: The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

<u>Problem Statement:</u> City needs to have an assessment done of vulnerabilities that include: Coastal Erosion; Expansive Soils; Land Subsidence; Wildfires		
	Corpus Christi Action #23	
Proposed Action	Map and assess the vulnerabilities the city may face for Coastal Erosion, Expansive Soils, Land Subsidence, and Wildfires	
BACKGROUND	INFORMATION	
Site and Location:	City of Corpus Christi	
Risk Reduction Benefit:	Improve data and mapping on specific risks for coastal erosion, expansive soils, land subsidence and wildfires.	
	Use GIS to identify and map erosion areas, riparian landslides, expansive soils and wildfires. Develop and maintain a database to track vulnerability and indicate where critical structures and any development is located in relation to the hazardous areas.	
Type of Action:	Local Plans and Regulations	
Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness		
MITIGATION ACTION DETAILS		
Hazard(s) Addressed:	Coastal Erosion, Expansive Soils, Land Subsidence, Wildfires	
Effect on new/existing buildings:	By identifying the hazards, the city can provide advice as to previous hazards for future construction or preservation purposes.	
Priority (High, Moderate, Low):	Moderate	
	Low Cost/Staff time	
Potential Funding Sources:	Local Budget	
Lead Agency/Department Responsible:	Corpus Christi Development Services and GIS	
Implementation Schedule:	1-2 Years	
INCORPORATION INTO EXISTING PLANS AND PROCEDURES		
Building Codes		

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: Coastal Erosion Cole Park		
	Corpus Christi Action #24	
Proposed Action	Installation of groins and/or breakwaters to the areas behind the bulkhead to retrofit the areas that are eroding.	
BACKGROUND	INFORMATION	
Site and Location:	Cole Park in Corpus Christi	
Risk Reduction Benefit:	Coastal Erosion in Corpus Christi Bay is a serious issue. Prevention of further erosion of the shoreline at Cole Park, which is along Corpus Christi Bay through the installation of groins and/or breakwaters. Cole Park is a high use park with the city. The area behind the bulkhead is eroding and needs to be retrofitted.	
Type of Action:	Natural Systems Protection	
Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness		
MITIGATION ACTION DETAILS		
Hazard(s) Addressed:	Coastal Erosion	
Effect on new/existing buildings:		
Priority (High, Moderate, Low):	Moderate	
	\$500,000 - \$1,000,000	
Potential Funding Sources:	Potential funding from the Coastal Erosion Planning and Response Program (CEPRA) and the Texas Parks and Wildlife Outdoor Recreation Grant Program	
Lead Agency/Department Responsible:	Corpus Christi Parks Department	
Implementation Schedule:	24-30 Months	
INCORPORATION INTO EXISTI	NG PLANS AND PROCEDURES	

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

<u>Problem Statement:</u> Commercial structures within the city that are exposed to the threat of lightning.	
	Corpus Christi Action #25
Proposed Action	Adopt a local lightning ordinance for non-residential structures that are over 50' in height.
BACKGROUND	INFORMATION
Site and Location:	City of Corpus Christi
Risk Reduction Benefit:	Currently, the City of Corpus Christi does not have an ordinance that requires lighting protection for commercial structures; but, instead provides guidelines if property owners choose to add the protection. The City of Corpus Christi will be considering adopting local language that would require commercial structures over 50 feet to have adequate lighting protection.
Type of Action:	Local Plans and Regulations
Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	
MITIGATION A	CTION DETAILS
	Lightning
Hazard(s) Addressed:	
Effect on new/existing buildings:	By adopting this type of higher standard in the city building codes, we are adding additional protection that can possibly reduce the risk for damages.
Priority (High, Moderate, Low):	Moderate
	Low Costs/Staff Time
Potential Funding Sources:	Local Budget
Lead Agency/Department Responsible:	Corpus Christi Development Services
Implementation Schedule:	12-18 Months
INCORPORATION INTO EXISTING PLANS AND PROCEDURES	
Building Codes	

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

<u>Problem Statement:</u> The effects that extreme heat has on people and pets who live in habitable structures that do not have air conditioning.	
	Corpus Christi Action #26
Proposed Action	Adopt a local ordinance requiring all habitable structures to have air conditioning.
BACKGROUND	INFORMATION
Site and Location:	City of Corpus Christi
Risk Reduction Benefit:	The International Building Codes do not require a habitable space to be air conditioned, but instead requires for it to be heated. The City of Corpus Christi will be considering adopting language that would require all habitable spaces to have adequate air condition to reduce the effects that extreme heat has on the city's population.
Type of Action: Local Plans and Regulations Structure and Infrastructure Natural Systems Protection	Local Plans and Regulations
Education and Awareness	
MITIGATION A	
Hazard(s) Addressed:	Extreme Heat
Effect on new/existing buildings:	By requiring habitable spaces to be air conditioned, it will provide for added protection for the building occupant in the event of an extreme heat event.
Priority (High, Moderate, Low):	Moderate
	Low Costs/Staff Time
Potential Funding Sources:	Local Budget
Lead Agency/Department Responsible:	Corpus Christi Development Services
Implementation Schedule:	12-24 Months
INCORPORATION INTO EXISTING PLANS AND PROCEDURES	
Building Codes	

The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)

Problem Statement: Design and implement a dam breach study for dams in Unincorporated	
	Corpus Christi Action # 27
Proposed Action	Design and implement a dam breach study for dams in Corpus Christi.
BACKGROUND INFORMATION	
Site and Location:	Barney M Davis Cooling Reservoir Dam, Calallen Reservoir Dam, Oso Municipal Golf Course Lake Dam
Risk Reduction Benefit:	Better hazard-related information will improve the disaster resilience of the community.
Type of Action:	Local Plans and Regulations
Local Plans and Regulations Structure and Infrastructure Natural Systems Protection Education and Awareness	Natural Systems Protection
MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	Dam Failure
Effect on new/existing buildings:	New and existing buildings will benefit from improved hazard information
Priority (High, Moderate, Low):	Low
Estimated Cost:	\$200,000
Potential Funding Sources:	HMGP
Lead Agency/Department Responsible:	Nueces County Public Works Department
Implementation Schedule:	4 Years
INCORPORATION INTO EXISTING PLANS AND PROCEDURES	
Petronila Creek Water Restoration and Protection Plan	
ADDITIONAL CONSIDERATIONS:	
The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)	
Socially Acceptable = 5; Technically Feasible =5; Administratively Possible =5; Politically Acceptable =5; Legal =5; Economically Sound =5; and Environmentally Sound =5	