

Village of Palisades Mitigation Action Plan

Village of Palisades



**DEVELOPED BY THE VILLAGE OF PALISADES
HAZARD MITIGATION ACTION TEAM
JANUARY 2020**

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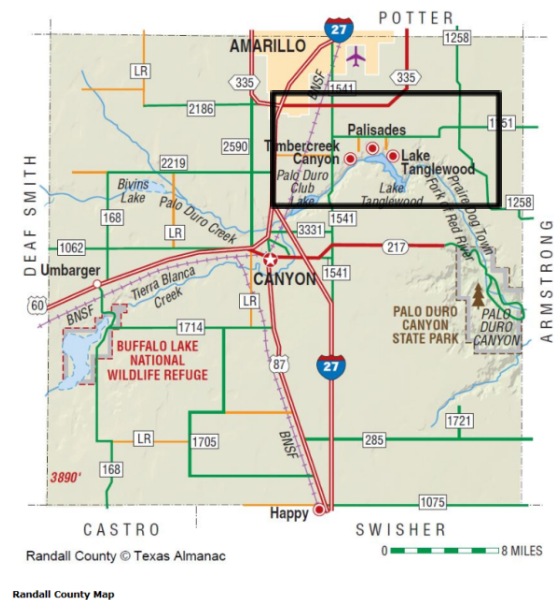
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Overview and Demographics Overview:

VILLAGE OF PALISADES, TEXAS. The Village of Palisades, which was impounded by a dam on Palo Duro Creek in northeastern Randall County. The private, residential, year-round resort began in the early 1960s as part of a restricted land development corporation, the Village of Palisades, Incorporated, which leased land from the Curry Ranch properties.

The community incorporated in June 1971, perhaps spurred by talk of a trailer park to be developed there. Aldermen, a town marshal, and a constable were elected, and a volunteer fire department was started. In 1974 a nondenominational community church was completed. The town hall and clubhouse had previously been used for Sunday services.



By 1984 the Village of Palisades had a population of 485 and was the third largest town in Randall County. In 1990 the population was 637. The population grew to 796 in 2010 with the highest population of 825 in 2000.

Document Organization

Provided below is brief explanation on the lay-out and content of this document. The sections included in this plan are:

Adoption

This plan was formally adopted by the Village of Palisades. The document has been reviewed by both the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) to ensure it met current state and federal guidelines governing local MAPs.

Authorities

This section provides a description of the legal authorities under which this plan was developed.

Purpose

This section explains why the plan was written and identifies the benefits to the participating jurisdiction of having a current Hazard Mitigation Plan.

Element A – The Planning Process

This section explains how the plan was organized and the process followed in developing this document, including:

- Establishing the Mitigation Action Team: Identifies the process the jurisdiction followed in establishing their mitigation action team.
- Establishing an Open Public Process: Identifies MAT took to encourage public participation during the development of this plan.

Element B– Hazard Identification and Risk Assessment

This section identifies and analyzes the hazards that affect the jurisdiction and their impact.

Hazards – Describes the hazards that impact jurisdiction.

History of Local Hazards – Provides historical and statistical data related to the specific hazards that have impacted the jurisdiction.

Risk Summary – Community priorities on specific hazards.

Vulnerability Worksheets – Provides a graphical representation of the jurisdiction’s vulnerability to the identified hazards.

Loss Estimates – Provides an estimate of the impact each hazard would have on the critical infrastructure located within the jurisdiction.

Past Mitigation – Provides a summary view of previous mitigation efforts undertaken by the jurisdiction.

Development Trends – Provides an analysis of a growth trends within the jurisdiction which were considered in developing the mitigation strategies discussed in Element C.

Element C– Mitigation Strategies

- Mitigation Goals and Objectives – Provides the framework for the development of the long-term and short-term strategies identified with the Mitigation Actions.
- Mitigation Actions – Describes the actions that each participating jurisdictions proposes to undertake in order to mitigate the impact of future hazard events.

Element D – Plan Review, Evaluation and Implementation

- Utilizing development patterns and new hazard or risk information; jurisdictions will evaluate progress on the action items and make changes based on new findings.
- Jurisdiction will resubmit plan for approval within 5 years.

Element E– Plan Adoption

- Plans will be adopted by the jurisdiction through its appropriate governing body. This adoption takes place after plan draft has been approved by state and FEMA for applicable content

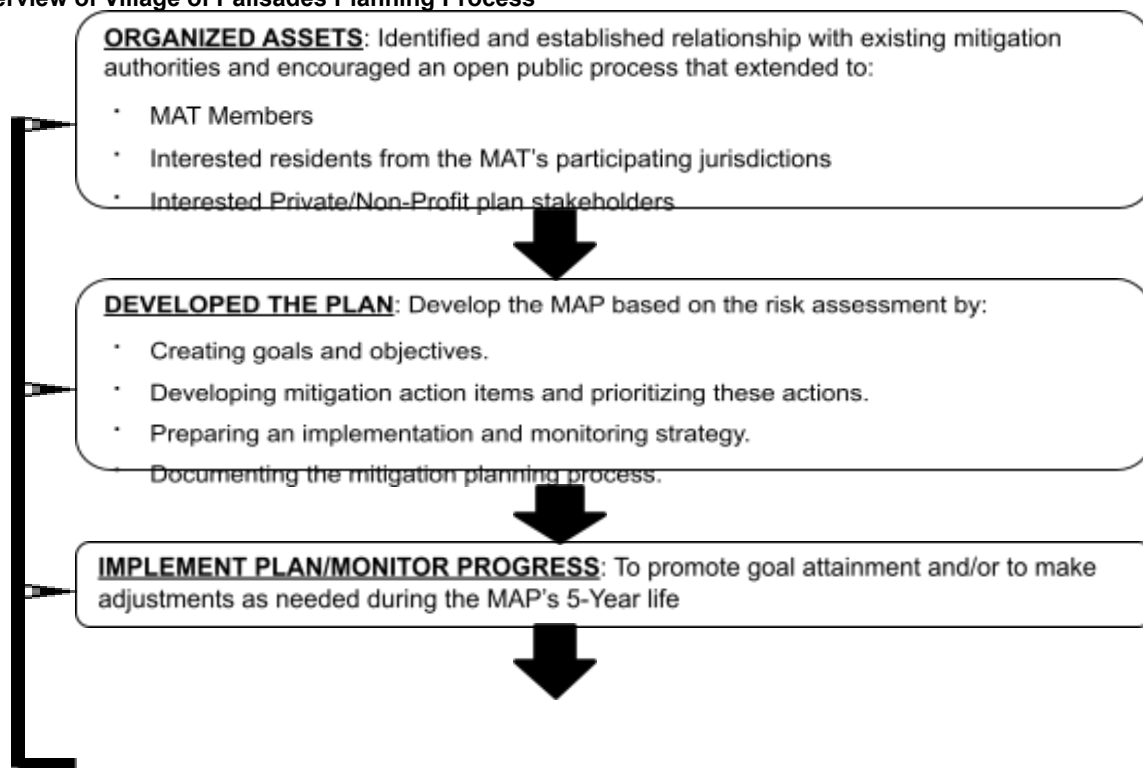
Element A - Planning Process

Plan Preparation (A1)

The Hazard Mitigation Plan was developed through the active participation of representatives of the Village of Palisades. Through their expertise in emergency management, engineering, administrative, public works, building and road maintenance, their contributions were critical in the plan development. The team also included stakeholders such as: local business owners, industry representatives, neighboring jurisdictions, regional and state partners.

This graphic below illustrates the steps taken by the Village of Palisades MAT in developing this document.

Overview of Village of Palisades Planning Process



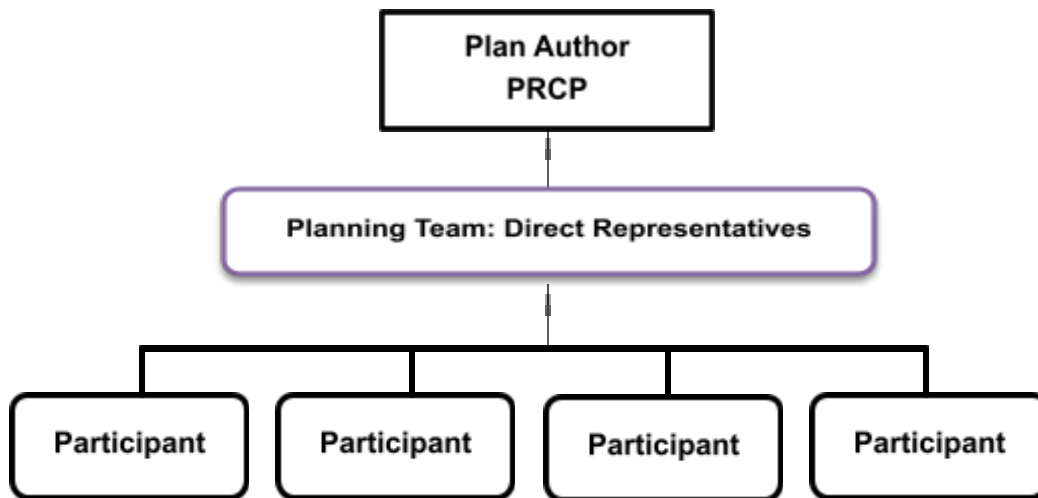
Planning Process

Date	Activity Description	Invitee/Attendees
2/12/2019	Hazard Mitigation planning at the Village of Palisades Council Meeting	Local government leaders, responder group leadership and local residents
3/7/2019	Hazard Mitigation with Potter & Randall County planning partners	Local government leaders, Municipal department heads, Responder group leaders, Stake Holders, Regional and State Partners & neighboring communities
4/23/2019	Hazard Mitigation planning with Lake Tanglewood and Timbercreek Canyon	Local government leaders, Responder group leaders, Stake Holders, Regional partners and neighboring communities.
12/10/2019	Hazard Mitigation planning at the Village of Palisades Council Meeting	Local government leaders, responder group leadership and local residents
12/11/2019	Hazard Mitigation planning with Lake Tanglewood and Timbercreek Canyon	Local government leaders, Responder group leaders, Stake Holders, Regional partners and neighboring communities.
<p><i>Every meeting was posted 72 hour in advanced at the Fire Station. Invitations were sent out via email. The public was invited to attend through the Palisades message alert system. Sign-in sheets were utilized and agendas were available at each meeting.</i></p>		

Establishing the Mitigation Action Team (A2)

This will be the first Hazard Mitigation Plan for the Village of Palisades. In January 2018, the mitigation team chairman began the process of developing the plan. This process included reviewing mitigation strategies that would be appropriate for the Village and defining its vulnerabilities.

Mitigation Action Team Hierarchy



At the outset of the planning process, the HMT chairman emailed a solicitation to the other jurisdictions and plan stakeholder groups in the Village; inviting their participation on the Village of Palisades Mitigation Action Team (MAT). In addition, the MAT meetings were all well-advertised and the meeting postings encouraged and welcomed the public's participation.

Overall, the list of agencies / organizations thought to have a direct stake or interest in this MAP update process or that could somehow inform the planning process included:

Mitigation Action Team Members		
	Agency and Position	Potential Stake, Interest or Contribution
V i l l a g e o f P a l i s a d e s	Elected Officials <i>Mayor</i>	City Officials would have a stake in any mitigation actions undertaken by the City and would ultimately be responsible for recommending the update's adoption by the City Council
	City Administration <i>City Secretary/Manager</i>	City Administration would have a stake in any mitigation actions undertaken by the City and would ultimately be responsible for recommending the update's adoption by the City Council
	Flood Plain Administrator	Could provide detail on how hazards and proposed mitigation actions could impact the Villages Flood plain management
	Fire Department <i>Fire Chief</i>	The Department could both inform and have a direct interest in the MAP's mitigation measures, particularly those that apply to wildfires
	Office of Emergency Mgmt. <i>EMC</i>	The OEM could provide mitigation ideas and presumably, would be charged with carrying a number of the mitigation actions out
Stakeholders		
	Agency and Position	Potential Stake, Interest or Contribution
L o c a l P a r t n e r s	THE PUBLIC	The residents of the planning area would have a direct stake and interest in the outcome of this planning process
	Neighboring Communities Village of Timbercreek Lake Tanglewood City of Amarillo Randall County	Jurisdictions that border the planning area have an interest in the outcome of this planning process and could contribute to the development of hazard profiling.
	Panhandle Regional Planning Commission (PRPC) <i>Regional Serv. Director</i>	Aside from assisting the MAT in writing this update, PRPC could provide data that would inform the actions/decisions of the MAT
R e g i o n a l ,	Amarillo Office of the National Weather Service (NWS) <i>Warning Coordinator Meteorologist</i>	The NWS could provide regionalized data with regard to past/forecasted weather trends that could inform the formation of mitigation actions
	Texas Forest Service (TFS) <i>Regional Fire Coord.</i>	TFS resources could inform the MAT's development of wildfire mitigation actions
	Army Corps of Engineers (ACE) <i>SW Div., Fort Worth</i>	ACE resources could inform local flood control efforts with streambed/wetland data
	Texas State Data Center (TSDC) <i>On-line Resources</i>	TSDC resources could provide data to forecast future population growth in the APR Planning area

State & Federal Partners	Texas Water Development Board (TWDB) <i>On-line Resources</i>	TWDB resources could provide the City with severe repetitive loss data and inform actions focused on drought contingencies
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In some form or fashion, all the participating jurisdictions/stakeholders listed above played a part in the MAP update process. State and federal agency participation was primarily obtained through the use of their websites. Information was gleaned from their sites to develop the hazard profiles found later in this document, to estimate future hazard impacts, for projecting future growth and development and for identifying potential actions that could be employed in mitigating the impacts of future hazard events in the planning area.

The MAT planning process was open throughout and with active participation from the public in all the meetings. Over 23 participated from the planning area in the Household Natural/Hazards Preparedness Survey and the attitudes and opinions reflected by the resident responses were considered as the mitigation actions in this MAP update were being developed. Each participant was able to enter their zip code to separate results by jurisdiction.

In following FEMA's Local Mitigation Planning Handbook suggestions, the individuals invited to participate on the MAT brought certain skill sets or experiences to the process that helped to ensure the overall relevance of the plan. The types of MAT member contributions included:

- Emergency managers/first responders – had direct experience with past hazard events and existing preparedness measures, and/or had a direct line of communication with the State emergency management agency.
- Local community planners – were able to assist the planning team in understanding current, and future community development trends, the policies or activities that affect development, and the relationship between hazards and development.
- Mapping specialists – were able to analyze and interpret map data to support the planning process and communicate complex information, such as the locations of assets at risk in threat- or hazard-prone areas and estimates of damage for a particular disaster scenario.

- Public works/engineering staff – were able to identify current or projected problems for the community’s infrastructure that could be addressed through capital improvements supported by the mitigation plan.
- Elected and executive officials – were familiar with the total needs of their jurisdiction and were able to communicate how the mitigation plan could support other social, economic, or environmental goals locally.
- Floodplain administrators – were able to provide information on local flood hazard maps, floodplain ordinance and actions that could be undertaken to support the goals of the National Flood Insurance Program and help reduce flood losses.
- Code Enforcement Officials – were able to help the team understand how local codes can be used in support of the Village’s plan mitigation goals.
- State/Federal Partners – were able to serve as a data resource; providing the MAT with relevant statistics, historical account, etc. that could be used to inform the planning process.

The table below lists the current membership of the MAT and describes the contributions each member made with the development of this document.

Village of Palisades Mitigation Action Team and Contributions			
NAME	TITLE	JURISDICTION	CONTRIBUTION
Brad Kiewiet	Mayor	Village of Palisades	<i>Elected official; assisted with the development of mitigation actions for the City and presented the MAP to the Council for adoption</i>
Dale Conner	EMC/Team Coordinator	Village of Palisades	<i>Emergency Manager, coordinated the MAT meetings, obtained data to profile hazards, provided background on past mitigation actions in the planning area; identified potential mitigation actions</i>
Dennis Massey	Chief Palisades Fire	Village of Palisades	<i>First responder, assisted with gathering wildfire data and identification of potential wildfire mitigation actions</i>
David La Rue	Flood Plain Manager	Village of Palisades	The FPM could inform the MAT on matters related to SFHAs in Palisades and have an interest in flood mitigation actions proposed for the community.
Mike Gittinger	Warning Coord. Meteorologist	Amarillo Office of the NWS	<i>State/Federal Partner, providing data critical to the identification of hazards and their impacts</i>
Emily Nolte	Emergency Planner	PRPC	<i>Local community planner, assisted the MAT Team leader with public communications; served as an interface with TDEM/FEMA as the MAP was being reviewed</i>

Establishing an Open Public Process (A3)

As previously noted, the development of this plan followed the requirements set out by FEMA under 44 CFR §201.6. One of the foundational pieces of those requirements calls for the public to be given ample opportunity to observe, if not participate, in the planning process. §201.6(b)(1) required the County to provide, “(1) *An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval,*”.

To that end, whenever a MAT meeting was scheduled, postings to announce public meetings were placed at the community building, at least 72 hours prior to the meeting. The following information is an excerpt from the invitation:

NOTICE TO THE PUBLIC

The Village of Palisades Mitigation Action Team has scheduled a meeting on (date), at (time), in the (meeting room) of the Village of Palisades Community Center located at the 110 Brentwood Rd, Amarillo, TX 79118. The Village of Palisade’s Hazard Mitigation Plan is being developed. When completed, it will serve as a guide for implementing mitigation strategies which are intended to help reduce the human, economic, and environmental costs of natural disasters. The public is invited to attend. For more information, please contact (plan scribe), with the PRPC, at (806) 372-3381.

In addition, the MAT took advantage of another regional project funded by FEMA that allowed residents the opportunity to review the draft plan. The Panhandle Area Regional Information System (PARIS) is a virtual communications tool that serves the entire Panhandle region. Over the past four years, public mass notification tools have been added to PARIS courtesy of FEMA. These tools allow residents to subscribe to receive emergency alerts and information from their local jurisdictions.

In this instance, PARIS was used to send out notices to subscribed residents in planning area to inform them of the plan update process. The message contained a link to the draft version of the Village’s plan. Residents were then invited to read the plan and provide their comments and suggestions back to the MAT through the Team Coordinator Dale Conner.

The draft was made available for public comment both electronically, through PARIS and physically at the Palisades Community Center and at PRPC, 72 hours in advance of the governing bodies, meetings. The final draft was discussed in open session during those meetings, with a call for public comment, before the adopting resolutions were considered and passed.

These adoption meetings were preceded with a different Notice to the Public which generally read as follows:

**NOTICE OF A PUBLIC HEARING ON THE ADOPTION OF THE
VILLAGE OF PALISADES HAZARD MITIGATION PLAN**

Village of Palisades Board of Aldermen will conduct a public hearing before considering final adoption of the recently completed 2019 Village of Palisades Hazard Mitigation Plan Update on (date), at (time), in the (meeting room) of the Village of Palisades Community Center located at the 110 Brentwood, Palisades, TX 79118. This plan incorporates mitigation actions intended to minimize the impacts of certain natural hazards on the residents of the planning area.

A copy of the plan is now available for review in the Village of Palisades Community Center during normal business hours or may be reviewed online at:

<https://prod.i-info.com/document/Home.aspx?pid=002Y>

The meeting is open to the public and interested residents are encouraged to attend to offer feedback and comment.

Palisades posted their own customized notice; giving their residents the date/time on which their governing body would consider the plan adoption along with a location at which the plan could be physically reviewed locally. In addition, notices will be posted to the Palisades social media platforms and via email notification on their mass notification system.

The Village of Palisades Hazard Mitigation Plan will remain available to the public on PARIS until it's replaced by the next 5-year update. The public will also be notified of and invited to the meetings when the MAT gathers to conduct its annual review of the MAP.

Existing Document Reviewed for Plan Development (A4)

Documents and Databases	Information Retrieved
State of Texas Hazard Mitigation Plan	Help in identifying specific hazards for the participants
APR EOP 2018	Mitigation and recovery operations for the participants
Regional Economic Recovery Plan 2016	Recovery Ordinances, business
Texas A&M Forest Service Fire Reports	Fire reports for the county and Fire behavior maps
Panhandle Nation – County Roads	Maps identifying county and state roads
NOAA Storm Event Database	Data to populate storm history for the last 10 years
FEMA Flood Map Center	Details on the county and city's involvement in NFIP
Texas Water Development Board	Data regarding the participants existing water sources
Natural Disasters & Weather Extremes	Data to populate storm history for the last 10 years
FEMA Disaster Declarations	Data to expand on historical weather disasters
US Census American Fact Finder	Data regarding county and city census
Texas Association of Counties Profiles	Detailed information on the county's history

Continued Public Participation Process (A5)

The MAT will conduct annual public mitigation action strategy update presentations during the 5 year period. Each participating jurisdiction will host a local workshop and invite the public residing in their jurisdiction. Invitations will be included in internal newsletters, email lists and social media within the Village. Annual meetings held locally will ensure public participation with the focus being on their own strategies. Village residents will be given a forum to submit any additional identified areas of concern to possibly vet out action items in the future. Two years prior to the expiration; the mitigation team will convene to update the existing plan with actions gleaned from the local meetings.

The MAP will be posted on regional shared portal, which will allow the public to access the document at any time. A point of contact is provided for every plan in the portal; the PRPC will be responsible for ensuring the contact list stays current. As an alternate, the PRPC'S contact information will also be provided to ensure that public inquiries and comments are properly channeled for processing to the appropriate Village point of contact on a timely basis.

Monitoring (A6)

MAT participants will be responsible for evaluating the plan annually for updates to jurisdictional goals, objectives, and action items. If needed, these participants will coordinate through the MAT Chairperson to integrate these updates into the Plan. A record of those changes will be maintained in the plan. The MAT Chairman will be responsible for monitoring the overall plan for updates on an annual basis.

Monitoring and evaluation involves the ongoing process of compiling information on the outcomes from the implementation of the hazard mitigation objectives. The goal is to determine whether the planning area's vulnerability has decreased as a result of the plan. When vulnerability has decreased as a result of identified mitigation actions, the plan participants will determine why and will implement successful mitigation actions in other locations. Where vulnerability has increased, or remained constant, the plan participants will identify if other potential mitigation strategies may be more successful.

Method and Schedule for Keeping Plan Current

Method and Schedule for Keeping Plan Current			
	How	When	By Whom
M o n i t o r i n g/ E v a l u a t e	<p>The plan and action items will be evaluated on an annual basis to determine effectiveness of the programs.</p> <p>Element A: Continue to recruit members for the mitigation team members. Evaluate public satisfaction with the outreach method and level of input they were allowed to provide through an annual survey.</p> <p>Element B: Participants will provide any new development of hazard history that may impact changes in priorities. Monitor new information from the NWS and TFS Wildfire Risk for new maps and history. Monitor new versions of CHAMPS for new data.</p> <p>Element C: Existing strategies will be evaluated and priorities adjusted based on hazard history. Lead agency/departments will continually monitor action items as they are implemented. Through the Mitigation Action Item Monitoring Form, they will inform the MAT of the status of the action and target completion date.</p> <p>Element D: Monitor the status for existing strategies. Identify how the plan was utilized to recognize new projects or to re-prioritize existing strategies. As development changes occur they will be incorporated in to the plan and strategies can be adjusted according to the increase or decrease in growth.</p> <p>Review of the overall goals and using the scoring criteria – will provide clear measurement of the actions.</p>	Quarterly updates and upon completion	Responsible Departments identified for each action for each jurisdiction. Participating Jurisdictions, Responsible Departments, MAT Members
U p d a t e	<p>The MAT will update this plan every 5 years. However, through the annual evaluation, each participating jurisdiction will provide any changes to the existing plan to the MAT Chairmen. Two years prior to the expiration, all participating jurisdictions will begin the formal update process. The Formal process will begin with a Village meeting which will include all participating jurisdictions. Tasks will be established for each jurisdiction: 1) to review prior mitigation action items and 2) document hazards that have occurred in the last several years. The participating jurisdiction will hold “jurisdictional” meetings to solicit feedback from the public during this process. Surveys will be extended to the entire county to determine changes in mitigation planning at the resident level. This process will culminate in the several meetings to review the information gleaned and to formally update plan. Plan will be submitted to the State for review and to FEMA for approval.</p>	Every 5 years	Participating Jurisdictions, Responsible Departments, MAT Members

The MAT will conduct an annual meeting intended for all plan participants for the purpose of monitoring and evaluating the progress being made in fulfilling the MAP’s goals, objectives, and Mitigation Actions. The objectives of the annual MAT review will be:

- to identify mitigation activities that are in progress, have been deferred or been completed;
- to assess whether the MAP’s current mitigations goals and objectives continue to address existing (at the time of the review) and expected conditions;
- to determine whether or not the nature and/or magnitude of each plan participant’s risks have changed; and
- to determine, by plan participant, if resources are available and appropriate for implementing prioritized actions in the coming year.

Any changes made during the annual review process(es) will be noted on the Record of Changes found page vi of this document. As part of the monitoring of the mitigation actions, responsible parties will be provided the form below to update the MAT on the progress of strategies that have been implemented.

Sample Mitigation Action Item Monitor Form

Mitigation Action Item Monitoring Form (Sample)	
Date Submitted	Dept. Responsible
Mitigation Action	Installation of Additional Early Warning Sirens
Objectives	Provide early warning sirens to warn citizens of approaching weather dangers.
Target	Erect 2 multidirectional sirens within the city limits
Progress	1 multidirectional siren has been erected and tested in SW Palisades at the corner of 11 th and Bell. The second siren is delayed due to a lack of funding source

Element B – Hazard Identification and Risk Assessment

The purpose of hazard mitigation is to reduce potential losses from future natural disasters. The intent of mitigation planning, therefore, is to maintain a process that leads to hazard mitigation actions. This mitigation plan will identify only natural hazards that impact our community and identify actions to reduce losses from those hazards and establish a coordinated process to implement the plan.

Hazards Analysis

Early in the update process, the committee completed an analysis of the plan and decided that much of the contents on hazard analysis remained relevant. As with the original plan, the committee for this update found the following natural hazards continue to be present and could have an effect to the planning area.

Natural Hazards			
Drought	Hail Storms	Flooding	Lightning
Tornado	Wildfire	Windstorms	Winter Storms

The mitigation team studied the entire list of possible natural hazards that could affect the jurisdiction and found that while some hazards could be considered, historical data did not support the need to include the following hazards. Data of the following hazards found that the possibility of a future event would have less than a 1.5% chance of occurring in the next 65 years, therefore, the risk is negligible, or that history has never recorded any such event for the jurisdiction and the event is not likely to occur in the next 5 years.

- Earthquake-1.5% chance of occurring in next 65 years.
- Dam/Levee Failure (Earthen Dams in the planning area have historically posed no risk to the county and will not be profiled in for this planning period)

Palisades is located in the Texas Panhandle the possibility of the following hazards occurring in the city are highly unlikely and were not considered to pose a risk to the jurisdictions.

- Hurricanes/Tropical Storms
- Coastal Erosion
- Expansive Soils
- Land subsidence

There is no history of impacts from these hazards and therefore the MAP doesn't expect impacts in the future.

Some of these hazards are interconnected (e.g., droughts create more fuel for wildfires) while some hazards could be characterized as elements of a broader hazard agent. For example, hail and severe winds can be produced by thunderstorms and they may all occur during a single thunderstorm event. It should also be noted that some hazards, such as severe winter storms, may impact a large area and cause little damage, while other hazards, such as a tornadoes, may impact a small area but cause extensive damage.

The Authors of this plan recognize the significance of industrial, technological, and man-made hazards that pose a threat to both residents and property. Specific plans that address the recognition and response procedures of those hazards can be found in the following documents:

- Potter/Randall/Amarillo/Canyon 2018 Emergency Operations Plan
- LEPC – Community Emergency Response Plan
- Pipeline Emergency Response Guidelines

The following man-made hazards can be found in the planning area:

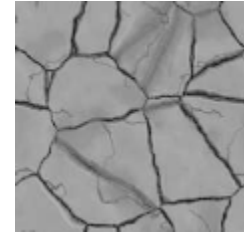
Industrial/Technological/Man-made Hazards				
Hazard	Frequency of Occurrence	Warning Time	Geographic Extent	Potential Impact
Hazardous Materials Release	Likely	None	Localized	Major
Pipeline Explosion	Likely	None	Localized	Major
Potable Water Failure	Unlikely	None	Multi-county	Major
Aircraft Accident	Unlikely	None	Multi-county	Major

Natural Hazard Profile (B1, B2, B3)

Drought

Description

A **Drought** is, “a period of unusually dry weather that persists long enough to cause environmental or economic problems, such as crop damage and water supply shortages.” Extreme weather such as heat waves, heavy downpours and droughts are expected to accompany climate change.



Droughts are frequently classified as one of following four types:

Meteorological – Drought defined by the level of “dryness” when compared to an average, or normal amount of precipitation over a given period of time.

Agricultural - Agricultural droughts relate common characteristics of drought to their specific agricultural-related impacts. Emphasis tends to be placed on factors such as soil water deficits, water needs based on differing stages of crop development, and water reservoir levels.

Anticipating the range of future droughts that could impact the entire planning area, the MAT then considered the effects those events might have. The table below describes the impacts the various stages of drought could potentially have on the planning area.

Drought Severity Classification

Category	Description	Possible Impacts	Ranges				
			Palmer Drought Index	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Short & Long-term Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered	-1.0 to -1.9	21-30	21-30	-0.5 to -0.7	21-30
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested	-2.0 to -2.9	11-20	11-20	-0.8 to -1.2	11-20
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed	-3.0 to -3.9	6-10	6-10	-1.3 to -1.5	6-10
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions	-4.0 to -4.9	3-5	3-5	-1.6 to -1.9	3-5
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0-2	0-2	-2.0 or less	0-2

		Ranges					
Category	Description	Possible Impacts	Palmer Drought Index	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Short & Long-term Drought Indicator Blends (Percentiles)
<p>Short-term drought indicator blends focus on 1-3 month precipitation. Long-term blends focus on 6-60 months. Additional indices used, mainly during the growing season, include the USDA/NASS Topsoil Moisture, Keetch-Byram Drought Index (KBDI), and NOAA/NESDIS satellite Vegetation Health Indices. Indices used primarily during the snow season and in the West include snow water content, river basin precipitation, and the Surface Water Supply Index (SWSI). Other indicators include groundwater levels, reservoir storage, and pasture/range conditions.</p>							

Source: <http://droughtmonitor.unl.edu/classify.htm>

Drought Impacts for the State of Texas

Category	Impact
D0	Producers begin supplemental feeding for livestock
	Planting is postponed; forage germination is stunted; hay cutting is reduced
	Grass fires increase
	Surface water levels decline
D1	Dryland crops are stunted
	Early cattle sales begin
	Wildfire frequency increases
	Stock tanks, creeks, streams are low; voluntary water restrictions are requested
D2	Pasture conditions are very poor
	Soil is hard, hindering planting; crop yields decrease
	Wildfire danger is severe; burn bans are implemented
	Wildlife moves into populated areas
	Hydroelectric power is compromised; well water use increases; mandatory water restrictions are implemented
D3	Soil has large cracks; soil moisture is very low; dust and sand storms occur
	Row and forage crops fail to germinate; decreased yields for irrigated crops and very large yield reduction for dryland crops are reported
	Need for supplemental feed, nutrients, protein, and water for livestock increases; herds are sold
	Increased risk of large wildfires is noted
	Many sectors experience financial burden
	Severe fish, plant, and wildlife loss reported
	Water sanitation is a concern; reservoir levels drop significantly; surface water is nearly dry; river flow is very low; salinity increases in bays and estuaries
D4	Exceptional and widespread crop loss is reported; rangeland is dead; producers are not planting fields
	Culling continues; producers wean calves early and liquidate herds due to importation of hay and water expenses
	Seafood, forestry, tourism, and agriculture sectors report significant financial loss
	Extreme sensitivity to fire danger; firework restrictions are implemented
	Widespread tree mortality is reported; most wildlife species' health and population are suffering
	Devastating algae blooms occur; water quality is very poor
	Exceptional water shortages are noted across surface water sources; water table is declining
	Boat ramps are closed; obstacles are exposed in water bodies; water levels are at or near historic lows

Location

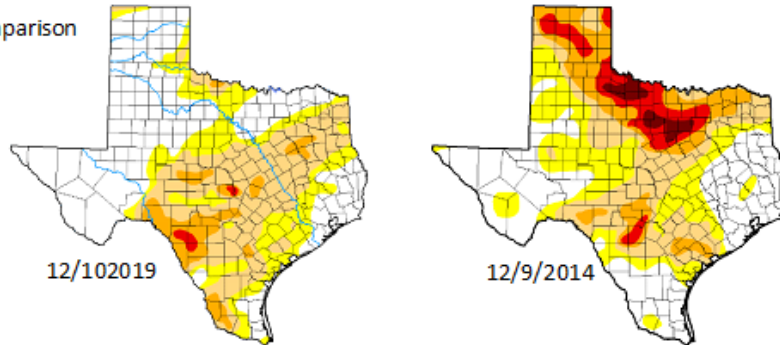
This graphic depicts drought conditions comparison across Texas. Most of the Panhandle region, including the Village of Palisades, had shown significant improvement in the last five years, but lack of

moisture has the Village returning to slight drought conditions D2-Severe Drought. The colors are

Drought Classification

None D0 (Abnormally Dry) D1 (Moderate Drought) D2 (Severe Drought) D3 (Extreme Drought) D4 (Exceptional Drought)

Five Year Comparison



Statistics Comparison

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
2019-02-26	73.33	26.67	11.92	3.85	0.55	0.04	43
2018-02-13	39.50	60.50	36.34	18.04	2.96	0.00	118
Change	-33.83	33.83	24.42	14.19	2.41	-0.04	75

measured by the Drought Severity Classification Chart below.

Extent and Previous Occurrences

The Village along with the rest of Randall County, experienced exceptional D2-D4 drought conditions (D4) in 2011 (24 consecutive weeks), 2014 (5) consecutive weeks) and 2018 (11 consecutive weeks) due to the limited amount of rainfall and mild winters. Therefore, the entire planning area can experience up to a D4.

Vulnerabilities

- Vegetation – Landscape/lawn at the Community Center, Fire Department, Washington Park and La Driver Park do not have drought resistant vegetation. Impact would be an increase of water usage, increased cost of maintenance and decrease of available water for other purposes.
- During periods of drought the water table can drop dramatically because the aquifer is not being recharged. Palisades residents totally rely on water wells which are fed by this aquifer.
- Settling concrete damage for the Fire Department & Community Center due to extended drought conditions.

Probability of Future Events

Historical patterns are assumed to be a dominant factor in determining future drought events. Based upon the historical instances of drought events which have occurred in the area during the last 10 years, droughts occurred in all of those years, therefore there is a 100% probability for drought.

Report Year	Number of Weeks County was in drought conditions for the year				
	DO	D1	D2	D3	D4
2009	44	8			
2010	44	8			
2011	12	4	5	7	24
2012		10	20	18	4
2013		17	19	11	5
2014		37	18	9	5
2015		37	8	7	
2016	34	17	1		
2017	46	4	2		
2018	9	7	12	13	11
2019	41	5	6		

Flooding

Description

According to the NFIP, a **Flood** is defined as “A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties from: 1) Overflow of inland or tidal waters; 2) Unusual and rapid accumulation or runoff of surface waters from any source; or, 3) Mudflow
There are two types of floods which could *potentially* impact the MAT planning area. Those are described below.



Riverine Floods:

Riverine floods are caused by precipitation over large areas and differ from flash floods in their extent and duration. Riverine floods take place in river systems whose tributaries may drain large geographic areas and encompass many independent river basins. Floods in large river systems may continue for periods ranging from a few hours to many days. Flood flows in large river systems are influenced primarily by variations in the intensity, amount, and distribution of precipitation.

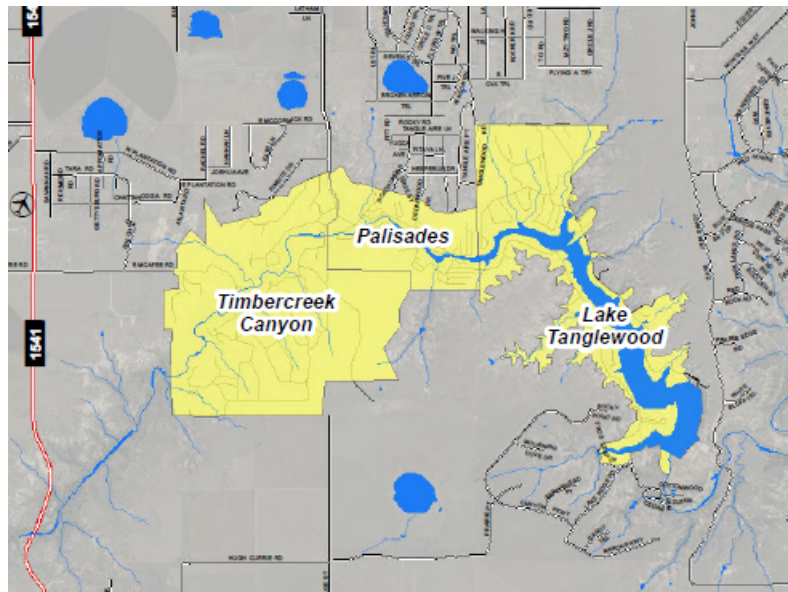
Flash Floods:

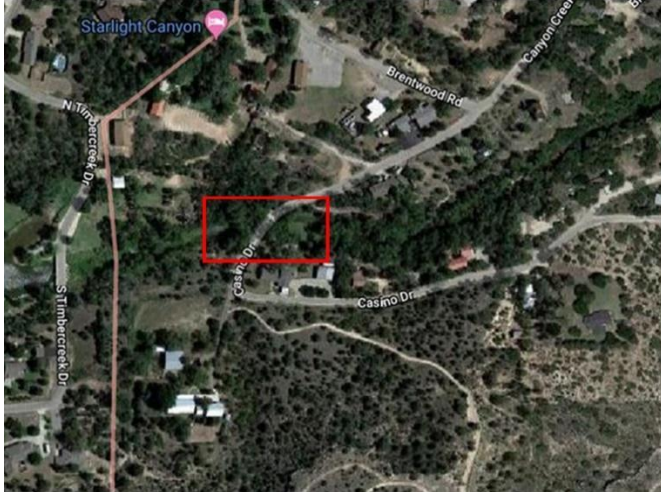
A flash flood generally results from a torrential rain on a relatively small drainage area. Runoff from these intense rainfalls results in high flood waters that can destroy roads, bridges, homes, buildings and other community developments. Discharges quickly reach a maximum and diminish almost as rapidly.

Flash floods are a potential source of destruction and a threat to public safety in areas where the terrain is steep, surface runoff rates are high, streams flow in narrow canyons and gullies, or severe thunderstorms stall over an area. The historical instances of flooding that have occurred within the planning area are all flash flood types of events. Therefore, flash flooding will be addressed within this plan.

Location

Flash flooding event can impact all low lying areas within the planning area. The Village has many creeks and streams that remain dry until there is a heavy rain. The runoff can then create flash flooding conditions in low lying areas. The bridge connecting Canyon Creek Drive and Casino Drive is vulnerable to flash flooding which can force debris in the drive creek bed to accumulate at the bridge and overflow water onto bridge.





Extent

Following excessive rainfall; the entire planning area can frequently experience flash flooding. The planning area can experience flash flooding resulting in 24” of water due to runoff that exceeds the drainage system capacities in lower elevations. In 1978 a flashflood completely washed the primary bridge out. Flood waters were 96” above normal and caused the deaths of 4 people. More recently in 2017 flood water inundated the low water crossing with depths over 30”. The low water crossing at Casino Dr. and Canyon Creek Dr.

will be blocked when depth exceeds 6”. Blocking this location delays responder services as the seek alternate routes to respond to other parts of the village.

Impact

In the planning area, the depth of any flooding event will be dependent upon factors such as the location, intensity and duration of the rainfall event, the steepness/imperviousness of the effected watershed(s), the gradients of the jurisdiction’s SFHAs, the condition of the local drainage system, weather events that precede the rainfall event and other such variables. Several of the narrative descriptions in the “Previous Occurrences” section demonstrate how flood depth can be affected by these variables.

Road surface and bridge damage is possible during heavy rain events.

Vulnerabilities
<ul style="list-style-type: none"> • Bridges and road damage due to flash flooding and movement of accumulated debris in the creek bed. • Damage to residential property, water wells, and septic systems. • Vehicle entrapment due to rushing water can contribute to injury or death to occupants or rescuers.

Vulnerable properties/facilities could sustain repeated damage in these cities due to rainfall that exceeds the drainage system capabilities or due to runoff. Flash flooding could also be a contributing factor to accidents on vulnerable roads, resident injuries, and exposure to unsanitary health conditions due ineffective drainage system.

Probability of Future Events

Historical patterns are assumed to be a dominant factor in determining future flooding events. Based upon the historical instances of flooding events that have occurred in the area during the last 10 years, the Village has experienced at least one flooding event in the 5 of the 10 years. Based on this data, the MAT estimates that in any given year, there is a 50% chance that the Village of Palisades will experience one or more flooding events each year.

Probability of Future Events	Years in Record Span 2009-2019	No. of Events in the Span	Computation	Future Probability of 1 or more events year
Village of Palisades	10	11	$(10/11) * 100 =$	110.00%

Previous Occurrences

Significant rain events that lead to flash flooding in Village of Palisades

Date	Dth	Inj	PrD	CrD	Damage Impact Narrative
7/28/2009	0	0	0.00K	0.00K	
7/3/2010	0	0	0.00K	0.00K	
7/7/2010	0	0	0.00K	0.00K	
8/13/2010	0	0	0.00K	0.00K	
4/11/2012	0	0	0.00K	0.00K	
8/20/2012	0	0	0.00K	0.00K	Low water crossing blocked due to >6" of running water.
6/8/2014	0	0	0.00K	0.00K	
6/24/2014	0	0	0.00K	0.00K	
7/16/2014	0	0	0.00K	0.00K	Low water crossing blocked due to >6" of running water
9/24/2014	0	0	0.00K	0.00K	
6/2/2017	0	0	0.00K	0.00K	Flash flood as creek overflowed the banks. Homeowners reported over 6" of water in they yards.

On May 26, 1978 the Palo Duro creek crested initiating a flash flood down the Prairie Dog Fork of the Red River killing 4 people. Four vehicles and a pickup camper were lost in the flood with personal property losses over



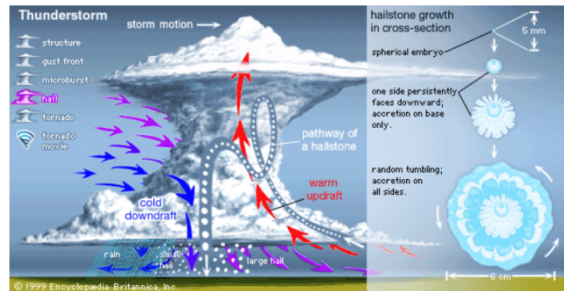
Hail

Description



Hail is a form of solid precipitation. It consists of balls or irregular lumps of ice, each of which is called a hailstone. A **Hailstorm** is, “any storm that produces hailstones that reach the ground.” Hail is produced by ice crystals that form in a low pressure front due to the rapid rising of warm air into the upper atmosphere and subsequent cooling of the air mass. Hail usually falls as shaped masses of ice greater than 0.25 inches in diameter. The size of the hail can be directly correlated with the size of the thunderstorm.

Hailstorms are an outgrowth of severe thunderstorms. People outdoors would be the most likely victims during a hailstorm, but the biggest threat would come from large hailstones and damage they would cause to property.



The table below provides definition to the various sizes or categories of hail and the potential damage that can be caused by hail of that size.

NWS/TORRO Hail Scale

Combined NOAA/TORRO Hailstorm Intensity Scales				
Size Code	Intensity Category	Typical Hail Diameter (inches)	Approximate Size	Typical Damage Impacts
H0	Hard Hail	up to 0.33	Pea	No damage
H1	Potentially Damaging	0.33-0.60	Marble or Mothball	Slight damage to plants, crops
H2	Potentially Damaging	0.60-0.80	Dime or grape	Significant damage to fruit, crops, vegetation
H3	Severe	0.80-1.20	Nickel to Quarter	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	1.2-1.6	Half Dollar to Ping Pong Ball	Widespread glass damage, vehicle bodywork damage
H5	Destructive	1.6-2.0	Silver dollar to Golf Ball	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	2.0-2.4	Lime or Egg	Aircraft bodywork dented, brick walls pitted
H7	Very destructive	2.4-3.0	Tennis ball	Severe roof damage, risk of serious injuries
H8	Very destructive	3.0-3.5	Baseball to Orange	Severe damage to aircraft bodywork
H9	Super Hailstorms	3.5-4.0	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	4+	Softball and up	Extensive structural damage. Risk of severe/fatal injuries to persons in the open

Source: www.noaa.gov and www.torro.org

Location

The entire planning area can anticipate frequent hailstorms that can contribute to property and crop damage.

Extent

Year	No. of Events	Average Hail Size
2009	4	1.18"
2010	3	1.03"
2011	1	1.25"
2012	2	1.25
2013	1	1.25
2014	1	1.58"
2015	2	1.42"
2016	4	1.5"
2017	2	.87"
2018	3	1.17"
2019	4	1.07"

While the average size of hail encountered throughout the planning area, measured by the diameter, is 1.35 In., there have been many occurrences when the diameter measured 1.25" and as high as 2.50" a range of H4-H7 on the combined NOAA/TORRO Hailstorm Intensity Scale. In previous years the Village has seen hail up to 2.50", therefore, the entire planning area can experience up to a H7, with typical hail diameter of 1.0-1.25 inches

Hail of this size can decimate crops, roofs, and injure people who are not inside. No matter the size of the hail – the largest losses seen through any size of hail is vehicular damage, amounting to hundreds of thousands of dollars in claims, many times what could be considered repetitive loss depending on the age and repair history.

Impact

Hail can cause considerable damage to crops and property. Injuries and deaths can occur as direct result both to people and to livestock who are not under shelter. Hail damage to both vehicles and buildings (glass) can minimize work for government. Repairs cause can cause a significant reduction in workforce as employees are without transportation to go to work due to reparation of vehicles or waiting for contractors to conduct home repairs.

Vulnerabilities

- 1 Radio/communications tower unshielded - impact could cause loss/interruption of communications
- Vehicle body and glass Windows: Specifically damage to emergency response vehicles required to still be out on the roads responding to calls during hailstorm events.
- Damage to the Community building and Fire Station to include roof, windows and HVAC systems.
- Damage to the Pavilion at the park.

Probability of Future Events

Specific damage loss numbers as reported by NOAA Storm Events Database were used to produce the data for the estimation of future loss. It is important to understand that the true financial impact due to hailstorms are difficult to state. Property damage information for residents who make insurance claims to home insurance or vehicle insurance are typically not included in the Storm Event data. Therefore, you can make the conclusion that the property damage is probably double the reported range.

Probability of Future Events	Years in Record Span 2009-2019	No. of Events in the Span	Computation	Future Probability of 1 or more events year
Village of Palisades Located in Randall County	10	27	$(10/27) * 100 =$	270%

Previous Occurrences

Date	Mag	Dth	Inj	PrD	CrD
4/29/2009	1.00 in.	0	0	0.00K	0.00K
6/17/2009	1.00 in.	0	0	0.00K	0.00K
7/16/2009	1.00 in.	0	0	0.00K	0.00K
7/28/2009	1.75 in.	0	0	3.00K	0.00K
5/24/2010	1.00 in.	0	0	0.00K	0.00K
9/16/2010	1.00 in.	0	0	0.00K	0.00K
9/16/2010	1.25 in.	0	0	0.00K	0.00K
11/7/2011	1.25 in.	0	0	0.00K	0.00K
4/26/2012	1.50 in.	0	0	0.00K	0.00K
4/30/2012	1.25 in.	0	0	0.00K	0.00K
6/20/2013	1.00 in.	0	0	0.00K	0.00K
6/6/2014	2.00 in.	0	0	0.00K	0.00K
4/16/2015	1.75 in.	0	0	0.00K	0.00K
5/27/2015	1.50 in.	0	0	0.00K	0.00K
6/13/2016	1.75 in.	0	0	0.00K	0.00K
7/14/2016	1.25 in.	0	0	0.00K	0.00K
6/13/2016	1.75 in.	0	0	0.00K	0.00K
7/14/2016	1.25 in.	0	0	0.00K	0.00K
6/8/2017	1.00 in.	0	0	0.00K	0.00K
7/2/2017	0.75 in.	0	0	0.00K	0.00K
5/19/2018	0.88 in.	0	0	0.00K	0.00K
6/12/2018	0.88 in.	0	0	0.00K	0.00K
9/1/2018	1.75 in.	0	0	0.00K	0.00K
3/22/2019	1.25 in.	0	0	0.00K	0.00K
4/17/2019	1.00 in.	0	0	0.00K	0.00K
4/27/2019	0.75 in.	0	0	0.00K	0.00K
5/6/2019	1.25 in.	0	0	0.00K	0.00K
5/20/2019	1.27 in.	0	0	0.00K	0.00K
5/23/2019	1.00 in.	0	0	0.00K	0.00K

Lightning

Description



Lightning events are generated by atmospheric imbalance and turbulence due to the combination of the following conditions: unstable warm air rising rapidly into the atmosphere; sufficient moisture to form clouds and rain; and upward lift of air currents caused by colliding cold and warm weather fronts, sea breezes or mountains. Lightning is generated by the buildup of charged ions in a thundercloud, and the discharge of a lightning bolt interacts with the best conducting object or surface on the ground. The air channel of a lightning strike reaches temperatures higher than 50,000 degrees Fahrenheit.

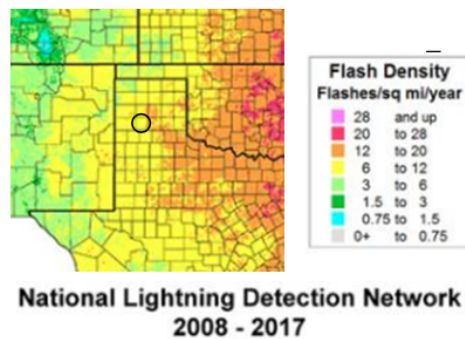
Dry lightning is lightning that occurs without rain nearby. The NOAA Storm Prediction Center routinely forecasts dry lightning because this kind is more likely to cause wildfires.

Location

The entire planning area is uniformly exposed to lightning which strikes in very small, specific geographic areas.

Extent

Lightning affects the entire county and can occur anywhere. Historical data from the National lightning Detection Network for the years 2007-2017 shows 6-12 strikes per year. Based on the frequency of lightning in the planning area, it falls under a scale of LAL3 in the Lightning Activity Level scale, meaning it is anticipated to experience greater than 6 cloud to ground strikes in a 5-minute period.



Lightning Activity Level (LAL)	
Is a scale which describes lightning activity. Values are labeled 1-6:	
LAL 1	No thunderstorms
LAL 2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground strikes in a five minute period.
LAL 3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a 5 minute period.
LAL 4	Scattered thunderstorms. Moderate rain is commonly produced. Lightning is frequent, 11 to 15 cloud to ground strikes in a 5 minute period.
LAL 5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a 5 minute period.
LAL 6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag Warning.

Impact

Lightning strike can ignite wildfires, direct strikes on water wells can put utilities out of commission for a significant period of time. Electronic equipment including communications, critical hospital equipment can be disabled if the building suffers a direct strike.

Due to the contours of the land in the creek running SW and NE – a natural wind tunnel is created. Even 25 MPH winds can quickly spread any sparks created from ground strike or transformer hit. Wildfire occurring more than 8 miles away can contribute to smoke that will run along the creek contour and raise concern among residents that the fire is closer than it is.

Vulnerabilities

- Power line and transformers, to include power surges generated by a lightning strike, resulting in loss of electricity for critical systems such as the Fire Department
- Communication Tower strike can disrupt of emergency 911 systems and responder radio communications
- Wildfire potential should a power line or transformer get hit and cause a wildfire. Limited ingress and egress for evacuation from a fast moving fire.

Previous Occurrences

A lightning strike impacting one of the participants has occurred in every jurisdiction at least each year to date. While computer systems are very vulnerable – the majority of large wildfires within this county are caused by lightning strikes.

Probability of Future Events

Statewide Texas has a significant exposure to thunderstorms and lightning. Overall, lightning is the most constant and widespread threat to people and property during the thunderstorm season. The recurrence of lightning is high. Dry lightning has the likelihood of being the spark for large fires in the county. Reporting of lightning strikes to the weather service is very limited. A history based on repairs to government systems was used to develop the probability of future events and to also populate the previous occurrences.

Probability of a lightning event occurring anywhere in the planning area is 100% probable in the next 5 years.

Tornado

Description



A **tornado** appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 300 miles per hour. Damage paths can be in excess of one mile wide and 50 miles long. Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others. Occasionally, tornadoes develop so rapidly that little, if any, advance warning is possible.

Each year, an average of over 1,000 tornadoes are reported nationwide, resulting in an average of 80 deaths and 1,500 injuries. They are more likely to occur during the spring and early summer months of March through June and can occur at any time of day, but are likely to form in the late afternoon and early evening.

Quick Tornado Facts

Signs of Danger

- Dark, often greenish sky
- Large hail
- A large, dark, low-lying cloud (particularly if rotating)
- Loud roar, similar to a freight train

The Enhanced Fujita (EF) Scale for tornadoes was developed to measure tornado strength and associated damages; it is divided into six categories from zero to five representing increasing degrees of damage. Overall, most tornadoes (around 77 percent) in the U.S. are considered weak (EF0 or EF1) and about 95 percent of all U.S. tornadoes are below EF3 intensity. The remaining small percentage of tornadoes are categorized as violent (EF3 and above).

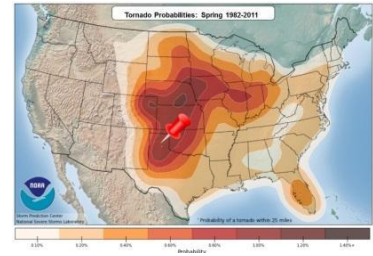
Enhanced Fujita (EF) Scale

Enhanced Fujita (EF) Scale		
Enhanced Fujita Category	Wind Speed (mph)	Potential Damage
EF0	65-85	Light damage Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	86-110	Moderate damage Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	Considerable damage Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165	Severe damage Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200	Devastating damage Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200	Incredible damage Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yd.);

Enhanced Fujita (EF) Scale		
Enhanced Fujita Category	Wind Speed (mph)	Potential Damage
		high-rise buildings have significant structural deformation; incredible phenomena will occur.

Location

The **entire** planning area is located in the middle of “Tornado Alley” making it highly susceptible to tornados. Since 1990 the planning area has experiences nearly one F0-F1 tornado every 3-4 years.



Extent

Although we have only experience F0-F1 tornados in the unincorporated area the entire planning area may experience up to an EF5.

Impact

Recorded EF1 tornados have destroyed mobile homes, heavily damaged vehicles, fences and power poles; while the EF2 tornados have snapped power poles, lifted vehicles, moved large fuel tanks and stripped trees.

Tornado impacts on basic services can be devastating. Damage to businesses and residents can be immense, but a significant vulnerability can be the loss of basic services and a safe environment following a tornado.

Examples of potential losses are:

- Damage to infrastructure (e.g., storage tanks, hydrants, residential plumbing fixtures, distribution system) from a tornadic event can result in loss of service and/or reduced pressure throughout the system
- Restricted access to the facility due to debris and damaged roads
- Loss of power and communication lines
- Potential contamination due to chemical leaks from ruptured containers
- Severe water and pressure loss due to ruptured service lines in damaged buildings and broken fire hydrants from airborne debris

Vulnerabilities
<ul style="list-style-type: none">• 1 Radio/communications tower unshielded - impact could cause loss/interruption of communications• Vehicle body and glass Windows: Specifically damage to emergency response vehicles required to still be out on the roads responding to calls during tornadic events.• Damage to the Community building and Fire Station to include roof, windows and HVAC systems.• Excessive debris in primary roads contributing a delay in emergency response and the village does not have debris removal equipment and must reach out via mutual aid or vendors.• Damage to the Pavilion at the park.• Lack of community safe shelter or short term shelter for residents following a tornado strike.

Probability of Future Events

Historical patterns are assumed to be a dominant factor in determining future tornado events. Based upon the historical instances of tornado events that have occurred with the planning area during the last 10 years, the annual probability of occurrence for these events and vulnerability are depicted below. The entire planning area lies in a high risk zone for tornados. By adding tornados that have occurred within a 25 mi radius to the Village the probability increases to over 100%.

Probability of Future Events	Years in Record Span 2009-2019	No. of Events in the Span	Computation	Future Probability of 1 or more events year
Village of Palisades within Randall County	10	0	$(10/0) * 100 =$	00.00%

Tornadoes Occurring Within a 25 Mile Radius						
Date	Mag	Dt h	Inj	PrD	CrD	Damage Impact Narrative
6/4/2009	EF0	0	0	0.00 K	0.00K	A tornado touched down about seven miles west of Canyon around 1740 CST and tracked northeast where it lifted about four and a half miles east northeast of Umbarger just west of the intersection of Farm to Market Road 1062 and City Lake Road. The tornado remained over open country and was on the ground for about two minutes. No damage or injuries were reported.
4/20/2010	EF0	0	0	0.00 K	0.00K	The tornado touched down at 1847 CST approximately three miles northeast of Umbarger. The tornado was on the ground for approximately one mile or less with a path width of fifty yards. The tornado dissipated at approximately 1849 CST approximately four miles northeast of Umbarger. The tornado remained over open country and no damage or injuries were reported directly from the tornado. However...several homes received damage from wind blown hail associated with the rear flank downdraft. Several north facing windows were blown out and hundreds of acres of crops were destroyed.
3/22/2019	EFU	0	0	0.00 K	0.00K	
5/23/2019	EF0	0	0	0.00 K	0.00K	
5/23/2019	EF0	0	0	0.00 K	0.00K	

Wildfire

Description



A **Wildfire** is “An uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Heavy fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work together to increase risk of loss.”

Wildfires are part of the natural management of the Earth’s ecosystems, but may also be caused by human factors. Wildfires may be described as follows:

- Wildfire - A fire occurring in a wildland area (e.g., grasslands, forests, brush lands). An exception to this definition is a prescribed burn.
- Prescription Burning (“Controlled Burning”) – The process of igniting fires under selected conditions, in accordance with strict parameters. For example, this fire may be undertaken by land management agencies is.

Fire probability depends on local weather conditions, outdoor activities such as camping, debris burning, and construction, and the degree of public cooperation with fire prevention measures. Drought conditions and other natural disasters (e.g., tornadoes, hurricanes, etc.) increase the probability of wildfires by producing fuel in both urban and rural settings. Fire probability may be determined by using the Keetch-Byram Drought Index (KBDI)

The result of this system is a drought index number ranging from 0 to 800 that accurately describes the amount of moisture that is missing. A rating of zero defines the point where there is no moisture deficiency and 800 is the maximum drought possible.

Keetch-Byram Drought Index

Keetch-Byram Drought Index	
Drought Index #	Potential Fire Behavior
0 - 200	Soil and fuel moisture are high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in spots and patches.
200 - 400	Fires more readily burn and will carry across an area with no gaps. Heavier fuels will still not readily ignite and burn. Also, expect smoldering and the resulting smoke to carry into and possibly through the night.
400 - 600	Fire intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days creating possible smoke and control problems.
600 - 800	Fires will burn to mineral soil. Stumps will burn to the end of underground roots and spotting will be a major problem. Fires will burn thorough the night and heavier fuels will actively burn and contribute to fire intensity.

Source: <http://www.wfas.us/content/view/32/49/>

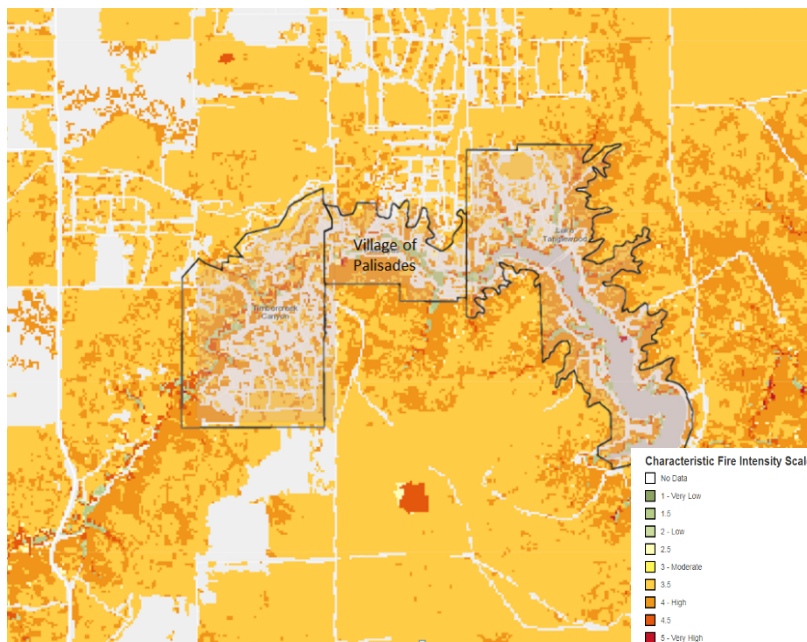
Location

The Wildfire Threat for the Village of Palisades is significant. The Fire Threat Map or Characteristic Fire Intensity Scale, below left, clearly shows the vulnerability for the entire planning area and its neighbors.

As with Tornadoes, borders do not stop fires and many fires begin in the open areas of the counties to the west, where the wind quickly blows them into the planning area. .

In addition to the Threat Map the Wildland Urban Interface Map shown below, indicates in yellow the vulnerability for the entire planning area and its neighbors. The cities are in purple with the white areas showing areas of minimal impact to wildfire threats.

Characteristic Fire Intensity Scale



Extent

Wildfires in the Village and surrounding area have ranged from small .25 acre fires to 500 acres. Due to the high winds and low vegetation, these fires can swiftly grow to sizes that make it very difficult to control even with air support.

Vulnerability and Impact

The impact of a wildfire is typically in direct relationship to weather conditions. Extreme winds that tend to be prevalent in the planning area plus dry fire fuels can escalate the size of a wildfire in minutes.

Even with well-trained firefighters and mutual aid – winds can move the fire at over 30 MPH.

The Prairie Dog Town Fork Red River runs from SW to NE as it leaves Canyon and continues in that direction until it reaches the Tanglewood Community where it bends to the SE. This creek flows through a canyon that includes the communities of Timbercreek Canyon, Palisades, and Tanglewood. The prevailing winds in this area blows from SW to NE and according to the National Weather Service makes the Texas Panhandle one of the wildest areas in the United States. Low pressure systems and down sloping winds from the Rockies produce winds into the 25-mph range with days with sustained wind that exceeding 50 mph. The danger of any uncontrolled fire is evident when sparks are caught by the wind and blown into adjacent areas. Wild fires generally move in the direction of the wind and as an area burns the heat from the fire can actually accelerate the wind speed causing the fire to move faster. Embers from grass and burning brush have been known to travel over a quarter of a mile (called spotting) and start a new fire.

The area of the canyon where the three communities are located is heavily timbered area with a lot of brush and grassy areas. A wild fire in the canyon would be very difficult to control for several reasons. Prevailing winds would move the fire down the canyon at a rapid rate. Firefighters would have difficulty moving trucks and equipment into areas to block the spreading of oncoming fire(s). There are points in Palisades and Tanglewood where fire fighters could pump water directly from the Tanglewood Lake but during dry periods there is no water in the creek in the Timbercreek area. Timbercreek has water storage tanks but in a major fire, these tanks would be rapidly depleted.

All of the communities along this creek have limited ingress and egress, residents would be forced to cut fences into neighboring land to evacuate. Wildfire occurring more than 8 miles away can contribute to smoke that will run along the creek contour and raise concern among residents that the fire is closer than it is. Many residents have horses and any evacuation will cause bottlenecks as residents attempt to save themselves and their animals. Over 90% of the residents in Palisades would be impacted with a combination of a fire in the creek and winds over 25 MPH. Although the percentage of residents is lower in the Timbercreek and Tanglewood areas, a mass evacuation would be almost impossible unless enough advanced notice is given and law enforcement is present directing the egress."

The entire planning can be impacted in the following ways:

- Loss of power and communication lines
- Water drafting from the creek could be impacted due to accessibility.
- County road dangers due to blowing smoke
- Death and injuries to responder due to fast moving fire or changing winds.
- Death and injury to residents who are all attempting to evacuate via the single egress or opting to use non-tradition evacuation routes.

Vulnerabilities
<ul style="list-style-type: none"> ● Power lines, transformers, lightning strikes have the ability to spark with high winds – thus being the igniter of grass fires. ● Roof and siding damage to the Fire Department and Community Center. ● Wildfires moving quickly with limited egress for residents to evacuate ahead of the fire. ● Damage to third party utility providers. ● Vehicle body and glass Windows: Specifically damage to city emergency response vehicles required to be out on the roads responding to calls during wildfires. ● Respiratory issues due to blowing smoke

Probability of Future Events

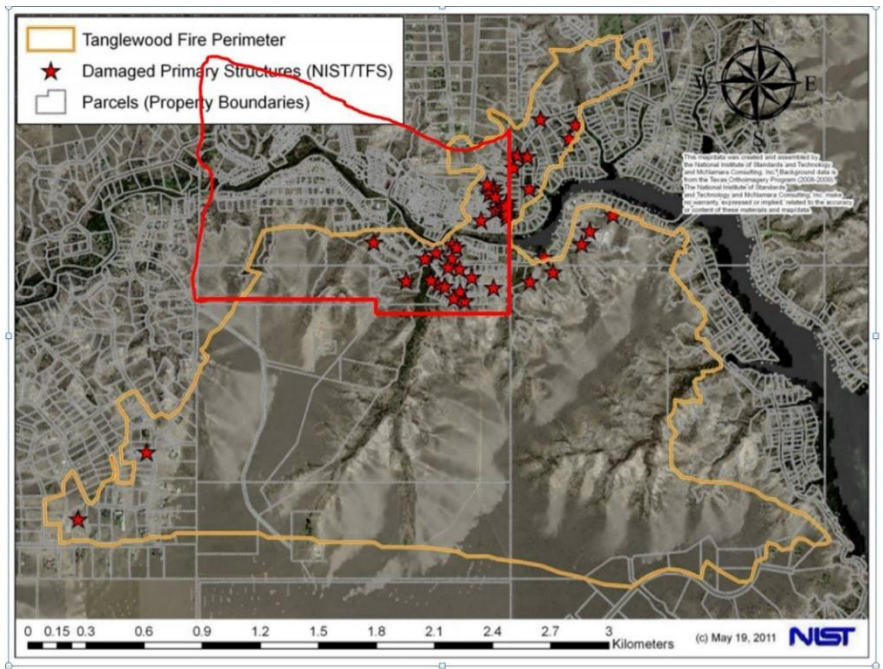
Wildfires occur with high frequency in the planning area. This vulnerability and the annual probability of occurrence for these events are estimated as follows.

Probability of Future Events	Years in Record Span 2009-2019	No. of Events in the Span	Computation	Future Probability of 1 or more events year
Unincorporated Area near Village of Palisades	9	21	$(9/21) * 100 =$	233.00%
Village of Palisades	9	8	$(9/8) * 100 =$	88.00%

May 11 tanglaire fire Need to get more info

Previous Occurrences

On February 27, 2011, Potter, Randall and Carson County were impacted by 2 large fires; Willow Creek South Complex and the Tanglewood Complex Fire. The Tanglewood Complex Fire in Randall County consumed over 1659 acres. This fire burned for 6 days and destroyed 33 homes. Heavily affected was the Village of Palisades with a loss of 26 homes. Estimated damage for the entire complex loss was almost \$6M. The fire was caused by power lines and high wind conditions. Both fires became the subject of a report by the National Institute of Standards and



Technology (NIST) titled, “Initial Reconnaissance of the 2011 Wildland-Urban Interfaces

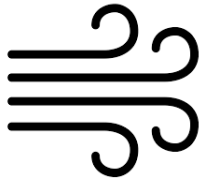
Fires in Amarillo, Texas”. Ref: https://ws680.nist.gov/publication/get_pdf.cfm?pub_id=908719

The image above shows the home loss (stars) within the Palisades boundary (Red Line). The fire margins are shown in orange.

Wildfire Cause	Start Date/Time	Primary Response Area	Acres	Homes Lost	Homes Saved	Other Lost	Other Saved	Near Misses	Total Incident Cost
Unknown	09/07/2019 15:59	No	41	0	1	3	4	1	\$ 527.00
Power Lines	08/01/2019 15:31	Yes	0.23	0	0	0	0	1	\$ 136.00
Incendiary	07/04/2019 22:44	No	0.1	0	0	0	0	1	\$ 68.00
Incendiary	07/04/2019 22:14	No	2.5	0	0	0	0	0	\$ 20.40
Incendiary	07/04/2019 22:01	No	2	0	0	0	1	1	\$ 10.20
Unknown	12/21/2018 21:27	No	5	0	2	0	3	0	\$ 68.00
Debris Burning	12/13/2018 04:18	No	0.25	0	1	0	1	2	\$ 68.00
Unknown	08/16/2018 17:32	No	1.5	0	0	1	1	1	\$ 374.00
Unknown	06/05/2018 18:36	No	2.8	0	0	0	0	0	\$ 216.75
Unknown	05/31/2018 16:37	No	12	0	2	0	0	0	\$ 216.75
Unknown	05/09/2018 23:11	No	20	0	0	0	0	0	\$ 361.25
Miscellaneous	02/02/2018 15:05	No	45	0	2	5	0	0	\$ 680.00
Miscellaneous	12/10/2017 14:49	No	110	0	0	0	0	0	\$ -
Miscellaneous	07/23/2017 11:15	No	500	0	0	0	0	0	\$ -
Miscellaneous	07/22/2017 20:47	No	100	0	0	0	0	0	\$ -
Smoking	03/17/2017 12:15	No	30	0	1	0	0	0	\$ -
Miscellaneous	10/23/2016 11:20	Yes	10	0	1	0	0	0	\$ -
Railroads	07/16/2016 10:00	No	2	0	0	0	0	0	\$ -
Debris Burning	02/13/2016 16:15	No	30	0	0	0	0	0	\$ -
Miscellaneous	10/17/2015 14:40	Yes	4	0	0	0	0	0	\$ -
Lightning	04/05/2015 12:35	No	195	0	0	0	0	0	\$ 340.00
Debris Burning	06/22/2013 10:02	Yes	1	0	0	0	0	0	\$ 70.00
Incendiary	06/25/2011 16:05	Yes	5	0	1	0	0	0	\$ 105.00
Miscellaneous	06/19/2011 15:40	No	568	0	0	1	0	0	\$ 700.00
Miscellaneous	06/16/2011 16:05	No	5	0	0	3	0	0	\$ 280.00
Power Lines	03/01/2011 13:15	Yes	5	0	0	0	0	0	\$ 140.00
Power Lines	02/27/2011 13:33	Yes	80	1	2	3	2	15	\$ 4,228.74
Debris Burning	10/31/2010 14:49	No	30	0	0	0	0	0	\$ 175.00
Equipment Use	04/05/2010 16:03	No	15	0	0	1	0	0	\$ 300.00

Windstorms

Description
















Winds begin with differences in air pressures. Pressure that is higher at one place than another sets up a force pushing from high pressure towards low pressure. The greater the difference in pressures the stronger the force. Wind is used to describe the prevailing direction from which the wind is blowing with the speed given usually in miles per hour or knots. A Wind Advisory is issued when winds are forecast to be sustained at 25 to 39 mph and/or gusts to 57

mph.

Windstorms may present themselves in many forms such as high winds or downbursts. A major concern of a wind storm is wind speed and duration. It may be a 2 minute average speed or an instantaneous speed. The problems that windstorms create can be damaged roof top equipment, broken windows, and down powerlines.

The **Beaufort Scale** is a system for estimating wind strengths based on the effects wind has on the physical environment. This scale is provided below.

Beaufort Scale

Beaufort number	Wind Speed (mph)	Seaman's term		Effects on Land
0	Under 1	Calm		Calm; smoke rises vertically.
1	1-3	Light Air		Smoke drift indicates wind direction; vanes do not move.
2	4-7	Light Breeze		Wind felt on face; leaves rustle; vanes begin to move.
3	8-12	Gentle Breeze		Leaves, small twigs in constant motion; light flags extended.
4	13-18	Moderate Breeze		Dust, leaves and loose paper raised up; small branches move.
5	19-24	Fresh Breeze		Small trees begin to sway.
6	25-31	Strong Breeze		Large branches of trees in motion; whistling heard in wires.
7	32-38	Moderate Gale		Whole trees in motion; resistance felt in walking against the wind.
8	39-46	Fresh Gale		Twigs and small branches broken off trees.
9	47-54	Strong Gale		Slight structural damage occurs; slate blown from roofs.
10	55-63	Whole Gale		Seldom experienced on land; trees broken; structural damage occurs.
11	64-72	Storm		Very rarely experienced on land; usually with widespread damage.
12	73 or higher	Hurricane Force		Violence and destruction.

In addition to the windstorms derived from thunderstorms or sustained high winds due to other conditions, the following specific wind activities could also occur.

Macroburst is a convection downdraft with an affected outflow area of at least 2.5 miles wide and peak winds lasting between 5 to 20 minutes. Macro burst may cause tornado-force damage of up to EF3 intensity.

Microburst is a convective downdraft with an affected outflow area of less than 2.5 miles wide and peak winds lasting less than 5 minutes. Microbursts may induce dangerous horizontal/vertical wind shears, which can adversely affect aircraft performance and cause property damage.

Burst Swaths can range from about 50 to 150 years in length. The damage they produce may resemble that caused by a tornado.



Red Flag Warnings are frequently issued in the planning area when the conditions are ideal for wildland fire combustion, and rapid spread. These warnings are typically sent out when the conditions stated are coupled with high or erratic winds. The Red Flag Warning becomes a critical statement for firefighting agencies.

Location

It cannot be predicted when or where a windstorm will occur, but the entire planning area can be impacted.

Extent

All participating jurisdictions in the planning area can anticipate winds in excess of 40 mph several times during the year which is an eight or higher on the Beaufort scale.

Impact

Wind can cause considerable damage to property. Injuries and deaths can occur as direct result both to people due to flying debris. High Winds can cause severe visibility issues on highways, contributing to deadly vehicle accidents. Damage to roof mounted equipment including communications equipment can put the jurisdiction at risk due to inability to reach public services.

With the type of force that can be applied, as described from the Beaufort Scale, homes and the mobile homes will always be the first to sustain damage, and possible injury from loose debris such as sheet metal or fallen trees. Since critical facilities are constructed to withstand at least medium forces, damage would be to roof mounted equipment, roof and landscaping to some degree.

Since the intensity of the various types of windstorms can generate the damage force of a F3 tornado, this would cause considerable damage. Roofs would be torn off well-constructed

houses; older foundations of frame homes would shift; mobile homes would be completely destroyed; large trees would be snapped or uprooted; light object missiles would be generated; and cars lifted off the ground.

Vulnerabilities
<ul style="list-style-type: none"> • 1 Radio/communications tower unshielded - impact could cause loss/interruption of communications • Vehicle body and glass Windows: Specifically damage to emergency response vehicles required to still be out on the roads responding to calls during windstorm events. • Damage to the Community building and Fire Station to include roof, windows and HVAC systems. • Excessive blown debris in primary roads contributing a delay in emergency response and the village does not have debris removal equipment and must reach out via mutual aid or vendors. • Damage to the Pavilion at the park.

Probability of Future Events

Since 2009, the planning area has experienced at least one significant wind event. As significant winds impact the entire county the probability is 100% that the entire planning area will experience a wind event exceeding 40 MPH on any given day.

Probability of Future Events	Years 2009-2019	No. of Events in the Span	Computation	Future Probability of 1 or more events year
Entire Planning Area	10	55	$(10/55) * 100 =$	550.00%

Previous Occurrences

In the past 10 years the planning area has had 56 significant high wind events. Although there have been no reported injuries or deaths, property damage over 100K. Residential homes would increase the reported damages exponentially. Personal insurance claims are NOT included in the property damage numbers.

Village of Palisades Wind Damage Report					
Date	Mag	Dth	Inj	PrD	CrD
4/4/2009	61	0	0	4.00K	0.00K
7/20/2009	48	0	0	6.00K	0.00K
8/18/2009	61	0	0	4.00K	0.00K
12/8/2009	56	0	0	0.00K	0.00K
5/10/2010	61	0	0	5.00K	0.00K
6/17/2010	56	0	0	0.00K	0.00K
11/26/2011	61	0	0	50.00K	0.00K
1/22/2012	61	0	0	10.00K	0.00K
2/20/2012	51	0	0	0.00K	0.00K
2/28/2012	54	0	0	0.00K	0.00K
6/16/2012	55	0	0	0.00K	0.00K

8/18/2012	62	0	0	0.00K	0.00K
8/20/2012	56	0	0	20.00K	0.00K
9/7/2012	52	0	0	0.50K	0.00K
12/14/2012	67	1	0	0.00K	0.00K

Village of Palisades Wind Damage Report					
Date	Date	Date	Date	Date	Date
12/19/2012	56	0	0	0.00K	0.00K
3/10/2013	54	0	0	0.00K	0.00K
3/17/2013	52	0	0	0.00K	0.00K
3/23/2013	52	0	0	0.00K	0.00K
4/22/2013	52	0	0	0.00K	0.00K
5/18/2013	60	0	0	0.00K	0.00K
5/28/2013	60	0	0	0.00K	0.00K
6/20/2013	63	0	0	0.00K	0.00K
6/27/2013	61	0	0	0.00K	0.00K
3/11/2014	52	0	0	0.00K	0.00K
3/15/2014	51	0	0	0.00K	0.00K
4/29/2014	52	0	0	0.00K	0.00K
6/6/2014	61	0	0	0.00K	0.00K
6/22/2014	61	0	0	0.00K	0.00K
10/12/2014	51	0	0	0.00K	0.00K
12/23/2014	51	0	0	0.00K	0.00K
4/8/2015	51	0	0	0.00K	0.00K
4/24/2015	50	0	0	0.00K	0.00K
5/5/2015	52	0	0	0.00K	0.00K
7/17/2015	52	0	0	0.00K	0.00K
8/19/2015	78	0	0	0.00K	0.00K
10/27/2015	54	0	0	0.00K	0.00K
4/26/2016	50	0	0	0.00K	0.00K
6/26/2016	50	0	0	0.00K	0.00K
7/15/2016	56	0	0	0.00K	0.00K
12/16/2016	51	0	0	0.00K	0.00K
2/28/2017	55	0	0	0.00K	0.00K
2/28/2017	55	0	0	0.00K	0.00K
6/8/2017	90	0	0	0.00K	0.00K
A damage survey conducted determined that a microburst associated with a severe thunderstorm caused damage associated with approximately 90MPH winds.					
7/4/2017	51	0	0	0.00K	0.00K
8/17/2017	52	0	0	0.00K	0.00K
4/29/2018	60	0	0	0.00K	0.00K
6/24/2018	61	0	0	0.00K	0.00K
10/5/2018	51	0	0	0.00K	0.00K
12/13/2018	52	0	0	0.00K	0.00K
2/23/2019	52	0	0	0.00K	0.00K
3/9/2019	61	0	0	0.00K	0.00K
3/13/2019	50	0	0	0.00K	0.00K

4/10/2019	61	0	0	0.00K	0.00K
6/1/2019	79	0	0	0.00K	0.00K

Winter Storm

Description

A **Winter Storm** is, "...an event in which the varieties of precipitation are formed that only occur at low temperatures, such as snow or sleet, or a rainstorm where ground temperatures are low enough to allow ice to form (i.e. freezing rain). In temperate continental climates, these storms are not necessarily restricted to the winter season, but may occur in the late autumn and early spring as well." The difference between a blizzard and winter storms lies in the presence and strength of winds. Blizzards are massive snow storms with strong winds.



The chart below distinguishes a number of the chief characteristics of both types of storms.

Comparison of Blizzard to a Winter Storm

	BLIZZARD	WINTER STORM
Occurrence:	Winter	Winter, spring, autumn
Characteristics:	Severe storm with strong winds, severe temperatures and heavy snow.	Cold storm with low temperature, sleet, snow, rain and ice formations can be seen throughout the planning area
Economic impact:	Blizzards harm local economies and cause paralysis of normal life for days.	Infections due to frostbites, death from hypothermia, power outage, car accidents on slippery roads, fires, carbon monoxide poisoning etc. lead to disruption of life until conditions improve.
Effect:	Blizzard gives rise to a white out with minimum visibility.	Avalanches, cornices and spring flooding are common in winter storms.
Types:	Traditional and ground blizzards	Snow storm, Freezing rain storm or wintry mixes.
Forms of precipitation:	Snow	Snow, rime, ice pellets, rain, graupel (snow pellets)

Source: http://www.diffen.com/difference/Blizzard_vs_Winter_Storm

Winter storms that impact the planning area can include:

Freezing Rain - Rain that falls on a surface with a temperature below freezing, forming a glaze of ice. Even small accumulations of ice can cause a significant hazard, especially on power lines and trees.

Heavy Snow Snowfall accumulating to 4" or more in depth in 12 hours or less; or snowfall accumulating to 6" or more in depth in 24 hours or less

Blizzard Conditions- Considerable falling or blowing snow with winds in excess of 25 mph and visibilities of less than ¼ for at least 3 hours.

The SPIA index chart allow for a community to prepare for a winter or an ice storm event. These events are infrequent but can cause damage. The primary areas of concern are on bridges, roadways and utility infrastructure including electric and natural gas supply lines.

Sperry-Piltz Ice Accumulation Index

The Sperry-Piltz Ice Accumulation Index, or “SPIA Index” – Copyright, February, 2009

ICE DAMAGE INDEX	DAMAGE AND IMPACT DESCRIPTIONS
0	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
2	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
3	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
4	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5 – 10 days.
5	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.

(Categories of damage are based upon combinations of precipitation totals, temperatures and wind speeds/directions.)

Location

Winter storms can affect the entire planning area often and with enough severity to be a threat to people and property. Generally, the winter storm season runs from late November to mid-March, although severe winter weather has occurred as early as October and as late as May in some locations.

Extent

The entire planning area can be impacted by extreme icing, heavy snow and white out conditions due to high winds. Ice accumulations on power lines and trees can exceed 2” with long-term power outages. Snow accumulations can reach 3 feet overall with 10-12 foot drifts resulting from extreme wind conditions. High winds in excess of 40 MPH during snow events have contributed to road closures within the Village essentially isolating the residents as there is only one ingress and egress.

Impact

Due to high winds that frequently blow over 30 MPH with gusts exceeding 50 MPH, residents are a risk for frequent electrical outages due to lines down or transformer damage – roads are greatly impacted with freezing ice and blowing snow.

Vulnerabilities
<ul style="list-style-type: none"> • Low water crossing and bridge on Canyon Creek Dr. can become icy. Neither have barrier to prevent sliding vehicles from entering the creek. • Power lines, transformers, damage due to ice could cause electric failure. • Radio Communications tower could be damaged due to ice impacting 911 calls and responder radio communications. • Vehicle body and glass Windows: Specifically damage to emergency response vehicles required to still be out on the roads responding to calls during winterstorm events. • Damage to the Community building and Fire Station to include roof, windows and HVAC systems.

- Excessive blown debris and snow in primary roads contributing a delay in emergency response and the village does not have debris removal equipment and must reach out via mutual aid or vendors.
- Impassable roads on Osage Hill.

Probability of Future Events

Historical patterns are assumed to be a dominant factor in determining future winter storm events. Based upon the historical instances of winter storm events that have occurred in the area during the last 10 years, the annual probability of occurrence for these events was estimated as follows.

Based on the following data, the MAT estimates the probability for a winter storm in any given year to be around 90%.

Probability of Future Events	Years in Record Span 2009-2019	No. of Years with impact	Computation	Future Probability of 1 or more events year
Village of Palisades	10	9	$(10/9) * 100 =$	90.00%

Previous Occurrences

The table below summarizes the winter storm events recorded for the planning area between the years 2009 and 2019. The planning area witnessed 26 separate severe winter storm events for 8 of those 10 years.

Severe Winter Storm Highlights for the Planning Area: 2009-2019

Report Year	No. of Events	Prevalent Impact
2009	1	Blizzard on 3/26 produced 14" of snow with 3-5' drifts and reduced visibility.
2010	1	10" of snow on January 28
2011	1	7" of snow; white out with winds gusting to 50 MPH on February 8.
2012	1	1" of snow
2013	9	Severe winter weather in February, April, November and December. Snow falls ranging from 1-11" and several events with road icing conditions.,
2014	6	1.5 – 5" of snow
2015	6	3" = 13". Significant blizzard occurred on 12/26/18 with 4" of snow, reduced visibility with wind gusts of 64 MPH.
2016	0	Minimal winter weather impact
2017	0	Minimal winter weather impact
2018	1	6" of snow
2019	1	5" of snow

NFIP Insured Structures and Severe Repetitive Loss (B4):

Through the Severe Repetitive Loss (SRL) Grant Program FEMA provides federal funding to assist to states and communities in implementing mitigation measures to reduce or eliminate the long-term risk of flood damage to severe repetitive loss residential structures insured under the National Flood Insurance Program (NFIP). The TWDB administers the SRL grant program for the State of Texas.

Severe Repetitive Loss properties are defined as residential properties that are:

- a) covered under the NFIP and have at least four (4) flood related damage claim payments (building and contents) over \$5,000.00 each, and the cumulative amount of such claims payments exceed \$20,000; or
- b) for which at least two (2) separate claim payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

According to the NFIP, between 1978 and 2016, there have been a total of 0 flood damage claims made in the planning area.

Vulnerable Assets and Potential Losses:

The table displays total population, building counts, and building values, summarized for the Village of Palisades. Building counts and values are also presented by their occupancy type.

List of Critical Infrastructure/Key Resources (CI/KR)

Facilities/People	Village of Palisades	
	No.	PV
Critical Facilities	1	88,302
Government Admin	0	
Law Enforcement	0	
Fire Stations	1	143,305
Infrastructure		
Bridges	1	200,000

Note: Critical Facilities estimates includes building value only

The table above provides estimates of the current Present Values (PV) of some of the more critical infrastructure in the planning area. It should be noted that based on current construction costs, it could easily cost 2 – 3 times the present value to replace structures identified on this list.

Element C – Mitigation Strategy

Existing Authorities, Policies, Programs and Resources (C1):

Existing Plans and Ordinances

Jurisdiction	Building Code	Zoning Ordinance	Subdivision Ordinance or regulation	Special purpose ordinances (floodplain management, storm water management, drainage, wildfire)	Growth management ordinances (also called "smart Growth" or anti-sprawl programs)	Site Plan review requirements	A capital improvements plan	An economic development plan	An emergency response plan	A post-disaster recovery plan	A post-disaster recovery ordinance	Real estate disclosure requirements	Other: Annual Budget Review
Village of Palisades	Y	Y	N	N	N	Y	N	Y	Y	Y	N	Y	Y

This table summarizes the current authorities and capabilities that could support the jurisdiction's efforts to implement the mitigation actions they've identified in this document. The matrix lists common planning tools/mechanisms which FEMA suggests as being contributive to local mitigation activities. In Texas, general law cities such as Palisades are somewhat limited in their ability to use this range of mechanisms. A general law city can only do what the legislature, through law, allows them to do.

The most powerful mechanism available to them is motivating the public by improving their understanding of the natural hazards they face and by providing them with practical, cost-effective, actions that can be self-implemented to reduce their risks to those hazards should be one of the most effective tools each can use in achieving their mitigation goals in their jurisdiction.

Although funding to create or expand code and zoning enforcement positions may be limited, each jurisdiction can still utilize the table above to discuss methods on implementing no or low cost strategies for planning mechanisms such as formal capital improvement or comprehensive plans.

The **Village of Palisades** will discuss the development of a formal capital improvement plan. This document will aid in establishing improvements that will promote mitigation strategies to minimize loss of life of property.

National Flood Insurance Program (NFIP) (C2)

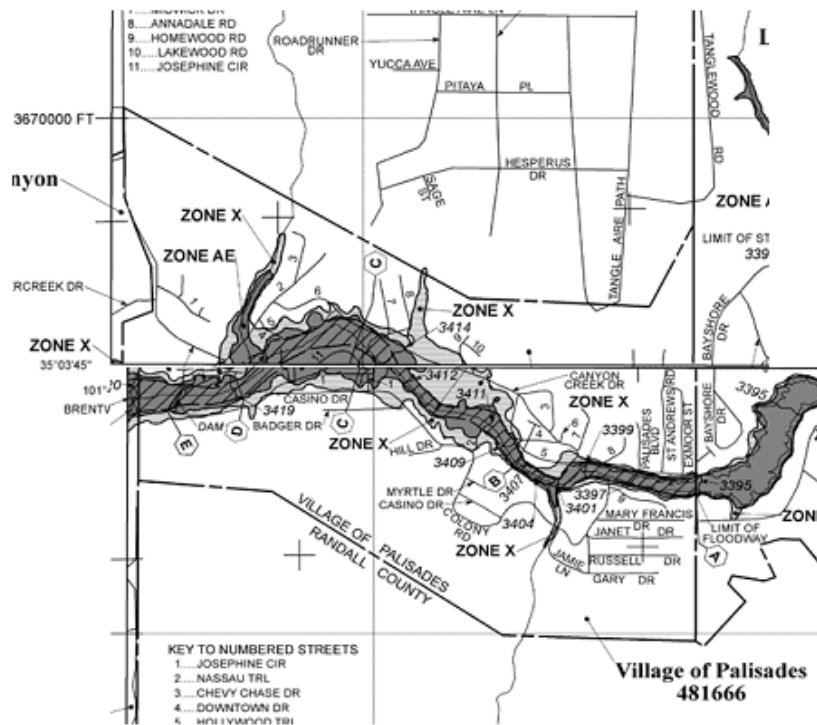
As described later in this document, flooding occurs occasionally within the Village with most of these events being flash floods. Two of the jurisdictions covered by this plan are currently participating in the NFIP. The Texas Water Development Board (TWDB) maintains a current list of County Flood Plain Administrators (FPA). The FPA list below is current as of August of 2016

County Flood Plan Administrators

CID	Community	Status	Firm Status	Map Date	Flood Plain Adminr. (FPA) & Title
481666	Village of Palisades	Participating	Mapped	6/4/2010	CEO Tommy Medlin FPA John Mustard

Village of Palisades

The Village is a participant in the National Flood Insurance Program (NFIP) and will continue to comply with all related regulatory requirements. The ordinance is enforced through requirements set forth by the City's zoning ordinance. It provides a means for prohibiting or restricting development within special flood hazard areas. This ordinance seeks to prevent property loss, insure human safety, and enable the safe and natural flow of streams.



The Mayor and Village of Aldermen will continue to review development proposals with the flood plain administrator for consistency with the ordinance.

Goals to Reduce/Avoid Long –Term Vulnerabilities (C3)

The goals and objectives of this MAP reflect goals similar to those found in the State of Texas Mitigation Plan and the National Flood Insurance Program.

The MAT began the development of the updated MAP by agreeing to a common set of goals and objectives, flexible enough they could be used to formulate customized mitigation actions for local implementation. The goals and objectives of the planning area are provided below.

Goal 1: Protect public health and safety

Objective 1.1: Advise the public about health and safety precautions to guard against injury and loss of life from hazards.

Objective 1.2: Maximize the use of modern technology to provide adequate warning, communication, and mitigation of hazards events.

Objective 1.3: Reduce the danger to, and enhance protection of, dangerous areas during hazard events.

Objective 1.4: Protect critical infrastructure facilities and critical services.

Goal 2: Protect existing and new properties

Objective 2.1: Use the most cost-effective approaches to protect existing and new building and public infrastructure from hazards.

Objective 2.2: Work to develop local guidance to ensure that development will not inadvertently endanger the public or increase threats to existing and new properties.

Goal 3: Increase public understanding, support, and demand for hazard mitigation

Objective 3.1: Increase public awareness of the full range of natural and man-made hazards they face.

Objective 3.2: Educate the public on actions they can take to prevent or reduce the loss of life or property from all hazards.

Objective 3.3: Publicize and encourage the adoption of appropriate hazard mitigation measures.

Objective 3.4: Encourage public policy to promote mitigation activities among the local jurisdictions.

Goal 4: Promote growth in a sustainable manner.

Objective 4.1: Incorporate hazard mitigation into the long-range planning and development activities

Objective 4.2: Encourage developers to voluntarily use codes and standards that will help to prevent the creation of future hazards to life and property

Goal 5: Maximize the use of outside sources of funding

Objective 5.1: Maximize the use of outside sources of funding

Objective 5.2: Maximize participation of residents in protecting their welfare and their properties

Objective 5.3: Maximize insurance coverage to provide financial protection against hazard events

Criteria for Prioritizing Actions

Considering detailed benefit/cost or cost-effectiveness analysis for every possible mitigation activity can be time consuming and may not always be practical. In using the criteria and scoring below, the MAT was able to consistently score each action as High, Medium or Low.

Evaluation Worksheet		
Rank each of the criteria with a -1, 0, or 1 using the following scale:		
<ul style="list-style-type: none"> • 1 = Highly effective or feasible • 0 = Neutral • -1 = Ineffective or not feasible 		
Score	Criteria	Description
	Life Safety	How effective will the action be at protecting lives and preventing injuries?
	Property Protection	How significant will the action be at eliminating or reducing damage to structures and infrastructure?
	Technical	Is the mitigation action technical feasible? Is it a long-term solution?
	Political	Is there overall public support for the mitigation action? Is there the political will to support it?
	Legal	Does the community have the authority to implement the action?
	Environmental	What are the potential environmental impacts of the action? Will it comply with environmental regulations?
	Social	Will the proposed action adversely affect one segment of the population?
	Administrative	Does the community have the personnel and administrative capabilities to implement the action and maintain it?
	Local Champion	Is there a strong advocate for the action or project among local departments and agencies that will support the action's implementation?
	Other Community Objectives	Does the action advance other community objectives, such as capital improvements, economic development, environmental quality, or open space preservation?
	Total Score	
Score Key High = 6-10 Medium = 3-5 Low = <3		

Mitigation Action Items (C4/5)

Hazards Addressed	Hailstorm, Flooding, Severe Winter Storm, Tornado, Wildfire, Windstorms
<i>Educate the public on mitigation strategies for all hazards.</i>	
Objective(s) Addressed:	1.1, 1.2, 3.1, 3.2, 3.3, 3.4, 5.2
Priority (High, Medium, Low):	High
Estimated Cost:	\$1,000
Potential Funding Source(s):	Local budget, Grant funds, Volunteer Hours, Business Donations
Lead Agency/Department Responsible:	Village Mayor/Aldermen/Fire Chief
Implementation Schedule:	Throughout the 5-year update period
<p>Cost Effectiveness: Outreach activities are very cost effective; they can be used to engage the public at-large in their own protection by educating them on the risks associated with the hazards and the actions they can take to avoid those risks.</p> <p>Discussion: Safety brochures, warning signs at parks, and educating school children can all help increase public awareness of hail dangers. The objective of this action is to make residents aware that hail is a hazard that should be taken seriously; failure to do so can result in serious injury or death.</p>	

Hazards Addressed	Hailstorm, Flooding, Severe Winter Storm, Tornado, Wildfire, Windstorms
<i>Purchase public alert/warning systems for locations throughout the entire planning area.</i>	
Objective(s) Addressed:	1.1, 1.2, 1.3, 2.1, 3.1, 5.1
Priority (High, Medium, Low):	Medium
Estimated Cost:	\$10,000
Potential Funding Source(s):	Grant fund, Local budget, Volunteer Hours, Business Donations
Lead Agency/Department Responsible:	Village Mayor/Aldermen/Fire Chief
Implementation Schedule:	Within 12 months of securing the necessary funding
<p>Cost Effectiveness: The use of NOAA All-Hazards Weather Radios provides a cost-effective method for alerting the public to specific issues with multiple hazards. Enhancement of the PARIS Mass Notification/ISD Notification and integration of IPAWS will continue to expand the planning area notification platforms.</p> <p>Discussion: Purchase public warning systems to alert residents to a potential emergencies or directions for all hazards. Systems would include: NOAA Weather Radios, Mass Notification Systems, Social Media and IPAWS.</p>	

Hazard/s Addressed	Hailstorm, Windstorm, Tornadoes
<i>Install hail resistant roofing and window coverings on critical facilities/structures</i>	
Objective(s) Addressed:	1.4, 2.1, 5.3, 5.4
Priority (High, Medium, Low):	High
Estimated Cost:	Annual review cost: \$0.00. Replacement cost for Fire Department and Community Center: \$10 million
Potential Funding Source(s):	Grant fund, Local budget
Lead Agency/Department Responsible:	Village Mayor/Aldermen/Fire Chief
Implementation Schedule:	Throughout the 5-year update period
<p>Cost Effectiveness The entire planning area is in a high-frequency zone for hailstorms that can cause substantial damage. Protecting critical facilities not only helps to reduce the potential for insurance claims but helps to ensure those facilities remain operable after they're endured a major hail event.</p>	
<p>Discussion: The planning area is frequently pounded by hailstorms. As documented earlier in this update, very often the hailstones are large and capable of producing considerable damage. Protecting the outer envelope of critical facilities will help to mitigate these damages but more importantly, help to ensure they remain functional after the storms pass.</p>	
Hazard/s Addressed	Hailstorm, Windstorm, Wildfire, Tornado
<i>Explore or partner with neighboring village for an outdoor warning system.</i>	
Objective(s) Addressed:	1.1, 1.2, 1.3, 1.4
Priority (High, Medium, Low):	High
Estimated Cost:	\$41,000 per siren
Potential Funding Source(s):	Grant funds, Local budget
Lead Agency/Department Responsible:	Village Mayor/Aldermen/Fire Chief
Implementation Schedule:	Within 6 months of securing the necessary funding
<p>Cost Effectiveness: Although costly, outdoor warning systems are an essential part of the City's public alerting/warning system and are effective in warning the public. For the most part, residents in this part of the State associate a siren tone with a tornado so sirens are particularly effective with tornado events.</p>	
<p>Discussion: Adding more sirens in areas where coverage is currently lean and improving and updating aging warning sirens would save lives/reduce injuries in a hazard event by providing proper and easily recognizable warning to residents.</p>	

Hazard/s Addressed	Hailstorm, Lightning, Tornados, Windstorms, Severe Winter Storms
<i>Supply critical facilities with back-up power supply</i>	
Objective(s) Addressed:	1.4, 2.1, 5.1
Priority (High, Medium, Low):	High
Estimated Cost:	\$45,000
Potential Funding Source(s):	Grant funds / Local Budget
Lead Agency/Department Responsible:	Village Mayor/Aldermen/Fire Chief
Implementation Schedule:	Within 6 months of securing the necessary funding
Cost Effectiveness: Action is projected to have a benefit greater than the cost of the equipment; from avoided damages to internal systems/equipment that could otherwise result from a power loss.	
Discussion: The participant must maintain electrical power at its critical facilities (e.g., fires stations, county barns, safe rooms etc.) at all times in order to run its emergency operations or to protect students; particularly during winter weather events.	
Hazard/s Addressed	Hailstorm, Severe Winter Weather, Tornados, Windstorms
<i>Develop/maintain a list of Functional Needs residents for the conduct welfare checks during prolonged winter storm events and identify locations of personal underground shelters for welfare checks following a tornado. This would also include portable generators for medical needs requiring electricity.</i>	
Objective(s) Addressed:	1.3, 1.4, 5.1
Priority (High, Medium, Low):	Medium
Estimated Cost:	\$200 for volunteer recruitment; \$2,400 for portable generators
Potential Funding Source(s):	Grant funds, Local budget
Lead Agency/Department Responsible:	Village Mayor/Aldermen/Fire Chief
Implementation Schedule:	Within 6 months of securing the necessary funding
Cost Effectiveness This is a low-cost option that could be used to identify local volunteers that could be used for a variety of purposes	
Discussion: There are a number of aging, vulnerable residents residing within the jurisdiction. The purpose of this action is to develop a mechanism to check on their wellbeing during winter events that may keep them housebound for several days or longer. Some of those residents may rely on electricity for medical devices so the jurisdiction will maintain a small cache of portable generators that can be used to provide temporary power when winter storms result in power outages that may place these residents at risk.	

Hazard/s Addressed	Tornados, Wildfire, Windstorms
<i>Establish & maintain a fire-safe defensible space around critical facilities in sectors in or bordering WUI areas</i>	
Objective(s) Addressed:	1.3, 2.2, 4.1
Priority (High, Medium, Low):	Medium
Estimated Cost:	\$5,000 in annual costs
Potential Funding Source(s):	Local budget
Lead Agency/Department Responsible:	Village EMC, VFD
Implementation Schedule:	Within 3 months
Cost Effectiveness: Establishing and maintaining a fire-safe defensible space around critical facilities is an easy, low-cost way to create a buffer zone and limit the potential for wildfire damages.	
Discussion: Establishing and maintaining fire-safe defensible space will reduce the likelihood that a critical facility, such as a fire station, will be affected by this type of hazard event. This will also reduce the potential threat of this type of hazard on people inside the facility and increase the jurisdiction's ability to adequately respond event during this type of hazard.	

Hazard/s Addressed	Wildfires
<i>Continue to participate in the FireWise Program through the updating of the written wildfire risk assessment for the Villages WUI.</i>	
Objective(s) Addressed:	1.3, 2.2, 4.1
Priority (High, Medium, Low):	Medium
Estimated Cost:	Minimal; the assessment can be developed by a member of the Texas Forest Service
Potential Funding Source(s):	Grant funds / local budget / local in-kind
Lead Agency/Department Responsible:	Fire Department
Implementation Schedule:	Within 24 months of securing the necessary funding
Cost Effectiveness: Development of the risk assessment will be used to determine if full-fledged participation in Firewise will be of benefit to the Village or if not, the findings can be used to identify more cost-effective measures that can lessen the impacts of wildfire in the WUI.	
Discussion: The Firewise Communities Program encourages local solutions for safety by involving homeowners in taking individual responsibility for hardening their homes against wildfire.	

Hazards Addressed	Flood
<i>Improve storm water drainage/control systems; particularly in flood prone areas of the Village, by adding or enlarging guttering, culverts, bar ditches and creek debriding to direct water to safe discharge areas.</i>	
Objective(s) Addressed:	1.2, 1.3, 1.4, 4.1, 5.1
Other Hazards(s) Addressed:	Flooding Only
Priority (High, Medium, Low):	Medium
Estimated Cost:	\$100,000.00- \$500,000.00 as currently estimated
Potential Funding Source(s):	Grant funds, local budget
Lead Agency/Department Responsible:	Village Mayor/Aldermen/Fire Chief
Implementation Schedule:	Within 12 months as local or grant funds become available.
Cost Effectiveness: Over time, the one-time cost of making improvements to a roadway frequently damaged by flashfloods will be less than the cumulative costs of making repairs to the road following each flooding event.	
Discussion: To support this action, the participant will initiate a centralized data collection program that matches precinct road maintenance logs with citizen complaints to isolate road sections/areas subject to recurring flood. A cost/benefit analysis can be used to stack the areas in priority order of cost-effectiveness so they can be programmed into the budget as funds become available.	

Hazard/s Addressed	Hailstorm, Windstorm, Tornado
<i>Construct or retrofitted a facility with a safe room.</i>	
Objective(s) Addressed:	1.3, 1.4, 2.1, 5.1, 5.2
Priority (High, Medium, Low):	High
Estimated Cost:	Dependent on the maximum number of occupants the safe room is designed to hold
Potential Funding Source(s):	Grant funds, Local budget

Lead Agency/Department Responsible:	Village Mayor/Aldermen/Fire Chief
Implementation Schedule:	Within 6 months of securing the necessary funding
Cost Effectiveness: It is critical that the safety of community at large have opportunity to shelter.	
Discussion: the location of this shelter would provide a tornado shelter to residents.	

Hazard/s	Drought
<i>Update the Village's Drought Contingency Plan; integrating strategies to further reduce water consumption cost-effectively</i>	
Objective(s) Addressed:	3.2, 3.3, 3.4, 4.1, 5.2
Priority (High, Medium, Low):	Medium
Estimated Cost:	Dependent upon restrictions and severity of drought
Potential Funding Source(s):	Grant fund, Local fund
Lead Agency/Department Responsible:	Village Mayor/Aldermen/Fire Chief
Implementation Schedule:	Plan reviewed annually with an eye toward improving water conservation measures
<p>Cost Effectiveness: The key to this action is to update the plan with conservation measures that are practically implemented, productive and cost-effective. By virtue of their implementation, these actions will be of value to the public and will support the Plan's water-savings goals.</p>	
<p>Discussion: Continuously draw on guidance from local water districts and planning groups to implement proactive water conservation measures into the Drought Contingency Plan based on Ogallala aquifer projections and on U.S. Drought Monitor drought intensity levels.</p>	

Hazard/s Addressed	Flooding, Winter Storms
<i>Use weather-resistant paving materials on resurfacing/road construction projects to minimize surface damage due to winter storms</i>	
Objective(s) Addressed:	1.2, 1.3, 5.1
Priority (High, Medium, Low):	Medium
Estimated Cost:	TBD; based on the length/width of the roadway project
Potential Funding Source(s):	Grant funds/ Local funds
Lead Agency/Department Responsible:	Village Mayor/Aldermen
Implementation Schedule:	Within 12 months of securing the necessary funding
<p>Cost Effectiveness: There are a number paving products available that are designed to withstand the harshest of weather and yet are economical and durable. Their cost is offset by reduced maintenance and replacement costs.</p>	
<p>Discussion: Recent advancements in asphalt pavement technology can be applied when resurfacing local roads helping them to stand up better to freeze/thaw cycles and safer to drive in winter weather. This technology could greatly reduce the frequency and cost of maintenance. Keeping the roads in better repair will make them safer to travel under any weather condition</p>	

Hazard/s Addressed	Flooding
<i>Petition FEMA for the development of a County-wide Floodplain map. Apply for a FEMA grant that would eliminate the risk presented at the low water crossing. Perform a CLOMR and LOMR to be able to complete and confirm the validity of the project.</i>	
Objective(s) Addressed:	1.3, 2.2, 3.3, 3.4, 4.1, 5.1
Other Hazards(s) Addressed:	Flooding only
Priority (High, Medium, Low):	Low
Estimated Cost:	TDB. It has cost upwards of \$.7 million to map other counties
Potential Funding Source(s):	FEMA's Multi-Year Flood Hazard Identification Plan
Lead Agency/Department Responsible:	FEMA in collaboration with Carson County
Implementation Schedule:	To be determined by FEMA's mapping consultants
Cost Effectiveness Until a map depicting the verified flood risk areas in the County is produced; it will be difficult to fully and effectively administer a NFIP program in Carson County.	
Discussion: As of the latest version of the Flood Map Modernization Progress Report (MHIP 3.5) [Apr. 2009] the County has yet to be sequenced into the cycle that would result in the production of a flood map for the County.	

Hazard/s Addressed	Wildfires, Drought
<i>Continue to enforce the Burn Ban Ordinance at all times to conserve water and prevent wildfires.</i>	
Objective(s) Addressed:	1.1, 2.1, 3.1, 3.2, 3.3, 3.4, 4.1, 5.2
Priority (High, Medium, Low):	High
Estimated Cost:	\$500 per year
Potential Funding Source(s):	Local funds to publicize bans
Lead Agency/Department Responsible:	Village Mayor/Aldermen
Implementation Schedule:	Throughout the life of this plan update.
Cost Effectiveness: Highly effectively. Not only will this action help to limit fires but also help to preserve water that would otherwise be used in fighting fires.	
Discussion: Historically, adverse fire seasons in the Village are preceded by periods of drought which makes vegetation and ground fuel more susceptible to wildfire outbreaks. The mandatory Burn Ban that is always in affect is a preventive measure to limit wildfires and also helps to conserve the water that would else be used in fighting the fires.	

Hazards Addressed	Flooding
<i>Install flood signage/gauges along still unmarked, low lying areas that are prone to flood.</i>	
<i>Objective(s) Addressed:</i>	1.1, 1.2, 1.3, 3.1, 5.1
<i>Priority (High, Medium, Low):</i>	Medium
<i>Estimated Cost:</i>	\$10,000
<i>Potential Funding Source(s):</i>	Grant fund, County Partnership, Local budget
<i>Lead Agency/Department Responsible:</i>	Village Mayor/Aldermen
<i>Implementation Schedule:</i>	Within 6-12 months of securing the necessary funding
Cost Effectiveness: <i>The use of flood signage will warn approaching vehicles of low areas that are susceptible to flash flooding.</i>	
Discussion: <i>Warning will aid in reducing risk to life and property during flash flooding events.</i>	
Hazard/s Addressed	Flooding
<i>To purchase portable barriers for flood prone roads in the City</i>	
<i>Objective(s) Addressed:</i>	1.1, 3.1, 3.2, 3.3 5.1, 5.2
<i>Other Hazard(s) Addressed:</i>	Flooding only
<i>Priority (High, Medium, Low):</i>	Medium
<i>Estimated Cost:</i>	\$10,000.00 (mainly, to cover the cost of shooting flood elevations)
<i>Potential Funding Source(s):</i>	PDM, HMGP, matched with General Funds as necessary
<i>Lead Agency/Department Responsible:</i>	Village Mayor/Aldermen
<i>Implementation Schedule:</i>	6 months after funding is secured
Cost Effectiveness: This would be a one-time investment that would continue return benefits throughout the life of the barrier	
Discussion: The City has not yet been able to fund this resource to carry this activity out but is hopeful that can occur sometime during the 5-year life of this update.	

Hazard/s Addressed	<i>Hailstorms, Tornados, Windstorms, Winter Storms</i>
<i>Implement a tree trimming program that routinely clears tree limbs hanging in right-of-way to include strategies for fallen tree and limb removal.</i>	
Objective(s) Addressed:	1.3, 1.4, 5.1
Priority (High, Medium, Low):	Medium
Estimated Cost:	\$40,000.00 (purchase of a wood chipper, tub grinder, chain saws)
Potential Funding Source(s):	HMGP, PDM, TCEQ Solid Waste funds; matched by City funds as may be required
Lead Agency/Department	Village Mayor/Aldermen
Implementation Schedule:	12 months after funding is secured
Cost Effectiveness: This project will help to reduce the potential for communications / power loss due to lines downed by falling limbs and branches. Reducing dry vegetation around and in the city would help mitigate wildfires.	
Discussion: Routinely trimming tree limbs that could cause damage, either to adjacent properties or to overhead utility lines, would help to mitigate the potential for damage. Project could also be used to support a wood waste diversion program in the City, thereby mitigating another in-town hazard from fires. Assisting handicapped or the aging in reducing the dry vegetation around their homes would help prevent in town fires that could quickly	

Hazard/s Addressed	Wildfire
<i>Install a network of dry hydrants in the creek for increased water supply for fire suppression.</i>	
Objective(s) Addressed:	1.3, 1.4, 2.1, 4.1, 5.1
Priority (High, Medium, Low):	High
Estimated Cost:	\$20,000 each
Potential Funding Source(s):	Grant Funds, Local budget
Lead Agency/Department Responsible:	County Facilities Maintenance /County EMC
Implementation Schedule:	Within 3 months of receipt of funding source
Cost Effectiveness: This action will provide a viable water source out in these rural areas of the county.	
Discussion: Hydrants pull water from ground sources and make it readily available whenever necessary. Tenders and pumpers can refill quickly without the additional drive back to town.	

Hazards Addressed	Flood, Severe Winter Weather
<i>Apply for a FEMA grant that would eliminate the risk presented at the low water crossing. Perform a CLOMR and LOMR to be able to complete and confirm the validity of the project.</i>	
Objective(s) Addressed:	1.2, 1.3, 1.4, 4.1, 5.1
Other Hazards(s) Addressed:	Flooding Only
Priority (High, Medium, Low):	Medium
Estimated Cost:	\$100,000.00- \$500,000.00 as currently estimated
Potential Funding Source(s):	Grant funds, local budget
Lead Agency/Department Responsible:	Village Mayor/Aldermen/Fire Chief
Implementation Schedule:	Within 12 months as local or grant funds become available.
Cost Effectiveness: Over time, the one-time cost of making improvements to a roadway frequently damaged by flashfloods will be less than the cumulative costs of making repairs to the road following each flooding event.	
Discussion: To support this action, the participant will initiate a centralized data collection program that matches precinct road maintenance logs with citizen complaints to isolate road sections/areas subject to recurring flood. A cost/benefit analysis can be used to stack the areas in priority order of cost-effectiveness so they can be programmed into the budget as funds become available.	

Hazards Addressed	Flood
<i>Removal of the concrete pylons in creek that impediments proper water drainage during large rain events.</i>	
Objective(s) Addressed:	1.2, 1.3, 1.4, 4.1, 5.1
Other Hazards(s) Addressed:	Flooding Only
Priority (High, Medium, Low):	Medium
Estimated Cost:	\$100,000.00- \$500,000.00 as currently estimated
Potential Funding Source(s):	Grant funds, local budget
Lead Agency/Department Responsible:	Village Mayor/Aldermen/Fire Chief
Implementation Schedule:	Within 12 months as local or grant funds become available.
Cost Effectiveness: Over time, the one-time cost of making improvements to a roadway frequently damaged by flashfloods will be less than the cumulative costs of making repairs to the road following each flooding event.	
Discussion: To support this action, the participant will initiate a centralized data collection program that matches precinct road maintenance logs with citizen complaints to isolate road sections/areas subject to recurring flood. A cost/benefit analysis can be used to stack the areas in priority order of cost-effectiveness so they can be programmed into the budget as funds become available.	

Integrating Mitigation Plan In To Other Planning Mechanisms (C6)

The Village of Palisades will do the following to integrate the data, information, and hazard mitigation goals and actions into other planning mechanisms..

1. Change is proposed by an elected official or other interested party.
2. Proposal is placed on the local agenda of the governing body.
3. Agenda is published at least 10 days in advance of the meeting at which it will be discussed, so members of the public have an opportunity to attend the discussion meeting. Publication is made by posting the agenda on a public bulletin board in the Gate House. Change will also be posted via email or use of social media.
4. Proposal is discussed at the public meeting, including any comments by members of the public in attendance.
5. Proposal is voted on by the governing body.
6. If the proposal is passed, the change is implemented by the appropriate local authority

The Village of Palisades does not have a code enforcement officer at this time. However, any renovations or new construction taking place throughout the community must be reviewed and approved by the Board of Aldermen to ensure it meets all requirements set forth by our ordinances.

Integration of many of the actions will be included and monitored by the Village leadership with oversight by the City Council. Palisades will pursue grant funding if financially necessary for the majority of the projects. The city council can use the planning mechanism table to discuss capital improvements or regulations to mitigate damage from natural disasters.

Element D – Plan Review, Evaluation and Implementation

Development Trends (D1/3)

The Village of Palisades has had 5 houses built in the last 10 years. Lessons learned after the 2011 wildfires and a very active council, the village is seeing growth and rejuvenations.

While population remains consistent in the Village; drought, increased wildfires and a single ingress/egress continuous to make the Village more vulnerable to identified hazards.

Mitigation Strategy Implementation

Through the involvement of this planning process, the Village was able to review existing mechanisms for identifying their existing status and hopes for the future. Although the jurisdiction has an informal process that can be related to a comprehensive plan or a capital improvement plan – through this planning process, they have become more focused on developing more formal plans. This document and the mitigation strategies that were conceived in this plan will be a guiding factor for the jurisdiction's improvement.

Element E – Plan Adoption (E1)

Plan Adoption Summary

Plan Adoption

This plan was formally adopted by the Village of Palisades. The document will be reviewed by both the Texas Division of Emergency Management (TDEM) and the Federal Emergency Management Agency (FEMA) to ensure it met current state and federal guidelines governing local MAPs.

The evidence of local adoption was sent to both agencies; essentially marking the conclusion of the planning process and the start of the plan’s implementation phase. The plan was finally adopted as of the dates shown below.

Jurisdiction/Agency	Resolution Number	Adoption Date
Village of Palisades		

Village of Palisades City Council Adoption

NOTICE OF A PUBLIC HEARING ON THE ADOPTION OF THE VILLAGE OF PALISADES HAZARD MITIGATION PLAN

The Village of Palisades City Council will conduct a public hearing before considering final adoption of the recently completed 2020 Village of Palisades Hazard Mitigation Plan Update on 9/14/2020 at 6:30 p.m. in the Council Chambers of the Village of Palisades located at 110 Brentwood, Palisades, Texas. This plan incorporates mitigation actions intended to minimize the impacts of certain natural hazards on the residents of the Village.

The Disaster Mitigation Act of 2000, as amended, requires that local governments, develop, adopt, and update natural hazard mitigation plans in order to receive certain federal assistance. A Mitigation Action Team (“MAT”) comprised of representatives from Village of Palisades was convened to assess the risks from and vulnerabilities to natural hazards that are endemic to the area, and to make recommendations on mitigating the effects of such hazards. This will be the original Hazard Mitigation plan and in order to maintain its approved status by the Federal Emergency Management Agency (FEMA), it has to be updated every five (5) years.

A copy of the Village plan is now available for review in the Palisades Community Center or it may be reviewed online at:

<https://prod.i-info.com/document/Home.aspx?pid=002Y>

The meeting is open to the public and members of the community are encouraged to attend to offer feedback and comment.

RESOLUTION NO: _____

A RESOLUTION BY THE ALDERMEN OF THE VILLAGE OF PALISADES, TEXAS, ADOPTING THE 2020 VILLAGE OF PALISADES HAZARD MITIGATION PLAN

WHEREAS, certain areas of Village of Palisades, Texas, are vulnerable and subject to a variety of natural hazards which pose a potential threat to the welfare, safety and property of the Village's residents; and,

WHEREAS, to the extent practical, the Village of Palisades intends to prepare for and mitigate against such hazards; and,

WHEREAS, under the Disaster Mitigation Act of 2000 (P.L. 106-390), as of November 1, 2004, the Federal Emergency Management Agency (FEMA) now requires that local jurisdictions maintain a FEMA-approved Hazard Mitigation Plan as a condition of receiving certain Federal mitigation grant funding; and,

WHEREAS, The Village of Palisades participated in the development of the Village of Palisades Hazard Mitigation Plan.

NOW, THEREFORE, BE IT RESOLVED BY THE ALDERMEN OF THE VILLAGE OF PALISADES, TEXAS, THAT:

1. The Village hereby adopts the 2020 updated Village of Palisades Hazard Mitigation Plan which will have a five-year lifespan from the date upon which the Plan is finally approved by FEMA.
2. The Emergency Management Coordinator is instructed to ensure the Plan is reviewed at least annually and that any proposed revisions are presented to the Aldermen for consideration of approval.
3. The Village agrees to take such other official action as may be deemed reasonably necessary to carry out the goals, objectives and mitigation actions of the updated Village of Palisades Hazard Mitigation Plan.

CONSIDERED AND APPROVED THIS _____ DAY OF _____, 2020.

Brad Kiewiet, Mayor
Village of Palisades

ATTEST:

Joanne Short, City Secretary
Village of Palisades