



# GARLAND

## AGENDA

**CITY COUNCIL WORK SESSION**  
**City of Garland**  
**Work Session Room, City Hall**  
**William E. Dollar Municipal Building**  
**200 North Fifth Street**  
**Garland, Texas**  
**Tuesday, July 5, 2022**  
**5:30 p.m.**

### DEFINITIONS:

**Written Briefing:** Items that generally do not require a presentation or discussion by the staff or Council. On these items the staff is seeking direction from the Council or providing information in a written format.

**Verbal Briefing:** These items do not require written background information or are an update on items previously discussed by the Council.

**NOTICE:** The City Council may recess from the open session and convene in a closed executive session if the discussion of any of the listed agenda items concerns one or more of the following matters:

- (1) Pending/contemplated litigation, settlement offer(s), and matters concerning privileged and unprivileged client information deemed confidential by Rule 1.05 of the Texas Disciplinary Rules of Professional Conduct. Sec. 551.071, Tex. Gov't Code.
- (2) The purchase, exchange, lease or value of real property, if the deliberation in an open meeting would have a detrimental effect on the position of the City in negotiations with a third person. Sec. 551.072, Tex. Gov't Code.
- (3) A contract for a prospective gift or donation to the City, if the deliberation in an open meeting would have a detrimental effect on the position of the City in negotiations with a third person. Sec. 551.073, Tex. Gov't Code.
- (4) Personnel matters involving the appointment, employment, evaluation, reassignment, duties, discipline or dismissal of a public officer or employee or to hear a complaint against an officer or employee. Sec. 551.074, Tex. Gov't Code.
- (5) The deployment, or specific occasions for implementation of security personnel or devices. Sec. 551.076, Tex. Gov't Code.
- (6) Discussions or deliberations regarding commercial or financial information that the City has received from a business prospect that the City seeks to have locate, stay, or expand in or near the territory of the City and with which the City is conducting economic development negotiations; or to deliberate the offer of a financial or other incentive to a business prospect of the sort described in this provision. Sec. 551.087, Tex. Gov't Code.
- (7) Discussions, deliberations, votes, or other final action on matters related to the City's competitive activity, including information that would, if disclosed, give advantage to competitors or prospective competitors and is reasonably related to one or more of the following categories of information:
  - generation unit specific and portfolio fixed and variable costs, including forecasts of those costs, capital improvement plans for generation units, and generation unit operating characteristics and outage scheduling;
  - bidding and pricing information for purchased power, generation and fuel, and Electric Reliability Council of Texas bids, prices, offers, and related services and strategies;
  - effective fuel and purchased power agreements and fuel transportation arrangements and contracts;
  - risk management information, contracts, and strategies, including fuel hedging and storage;
  - plans, studies, proposals, and analyses for system improvements, additions, or sales, other than transmission and distribution system improvements inside the service area for which the public power utility is the sole certificated retail provider; and
  - customer billing, contract, and usage information, electric power pricing information, system load characteristics, and electric power marketing analyses and strategies. Sec. 551.086; Tex. Gov't Code; Sec. 552.133, Tex. Gov't Code]

**1. Public Comments on Work Session Items**

*Persons who desire to address the City Council on any item on the Work Session agenda are allowed three minutes to speak. Speakers are taken only at the beginning of the meeting, other than invited testimony.*

*Speakers are grouped by Work Session item and will be taken in the order of the Work Session agenda. Speakers must submit to the City Secretary a completed speaker's card before the beginning of the meeting. Speaker cards will not be accepted after the Mayor calls the meeting to order. Speaker cards are available in the lobby, at the visitor's side of the Work Session Room, and from members of staff.*

*Speakers are limited to addressing items on the Work Session agenda – any item relating to a Regular Session agenda item should be addressed at the Regular Session and any item not on an agenda may be addressed during the open microphone at the end of the Regular Session.*

**2. Consider the Consent Agenda**

*A member of the City Council may ask for discussion or further information on an item posted as a consent agenda item on the next Regular Meeting of the City Council. The Council Member may also ask that an item on the posted consent agenda be pulled from the consent agenda and considered for a vote separate from consent agenda items on the regular agenda. All discussions or deliberations on this portion of the work session agenda are limited to posted agenda items and may not include a new or unposted subject matter.*

**3. Written Briefing:**

**a. COVID-19 Briefing**

*Staff will provide an update to Council and ask for direction, if needed, on various matters related to COVID-19 and actions being taken by the City.*

**b. Hazard Mitigation Action Plan Council Review Period**

*The Office of Emergency Management (OEM) is requesting Council to review the current Hazard Mitigation Action Plan (HazMAP) draft and provide any recommended feedback or changes by July 14, 2022. All edits will be compiled and a final draft will be submitted to the State of Texas and FEMA for review and conditional approval.*

**4. Verbal Briefings:**

**a. Interview for Appointment to the Texas Municipal Power Agency**

*Information was posted on the City's website for 21 days regarding the qualification for the TMPA Board Member in order to provide an opportunity for citizens to apply for the position. The current board members term will expire on July 7, 2022. An application was received from James B. Ratliff and Gary Lynn Barnett.*

**5. Discuss Appointments to Boards and Commissions**

**Deputy Mayor Pro Tem Williams**

- Blanca Sanchez - Cultural Arts Commission
- Christine Lumpkin-Bell - Property Standards Board

**Council Member Lucht**

- Rich Aubin - Plan Commission

**6. Announce Future Agenda Items**

*A member of the City Council, with a second by another member, or the Mayor alone, may ask that an item be placed on a future agenda of the City Council or a committee of the City Council. No substantive discussion of that item will take place at this time.*

**7. Council will move into Executive Session**

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**EXECUTIVE SESSION  
AGENDA**

**NOTICE:** The City Council may recess from the open session and convene in a closed executive session if the discussion of any of the listed agenda items concerns one or more of the following matters:

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**The City Council will adjourn into executive session pursuant to Sections 551.087, 551.076, and 551.071 of the Texas Government Code to deliberate or discuss:**

- 1. economic development matters related to commercial or financial information that the City has received from one or more business prospects that the City seeks to have locate, stay, or expand in or near the territory of the City and**

**with which the City is conducting economic development negotiations (551.087) related to Section 251.742 of the TABC and attorney/client matters concerning privileged and unprivileged client information related to the same (551.071); and**

- 2. the deployment, or specific occasions for implementation, of security personnel or devices (551.076) and attorney/client matters concerning privileged and unprivileged client information related to the same (551.071)**

**8. Adjourn**



**GARLAND  
CITY COUNCIL ITEM SUMMARY SHEET**

**City Council Work Session Agenda**

**3. a.**

**Meeting Date:** July 5, 2022

**Item Title:** COVID-19 Briefing

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**Summary of Request/Problem**

Staff will provide an update to Council and ask for direction, if needed, on various matters related to COVID-19 and actions being taken by the City.

**Recommendation/Action Requested and Justification**

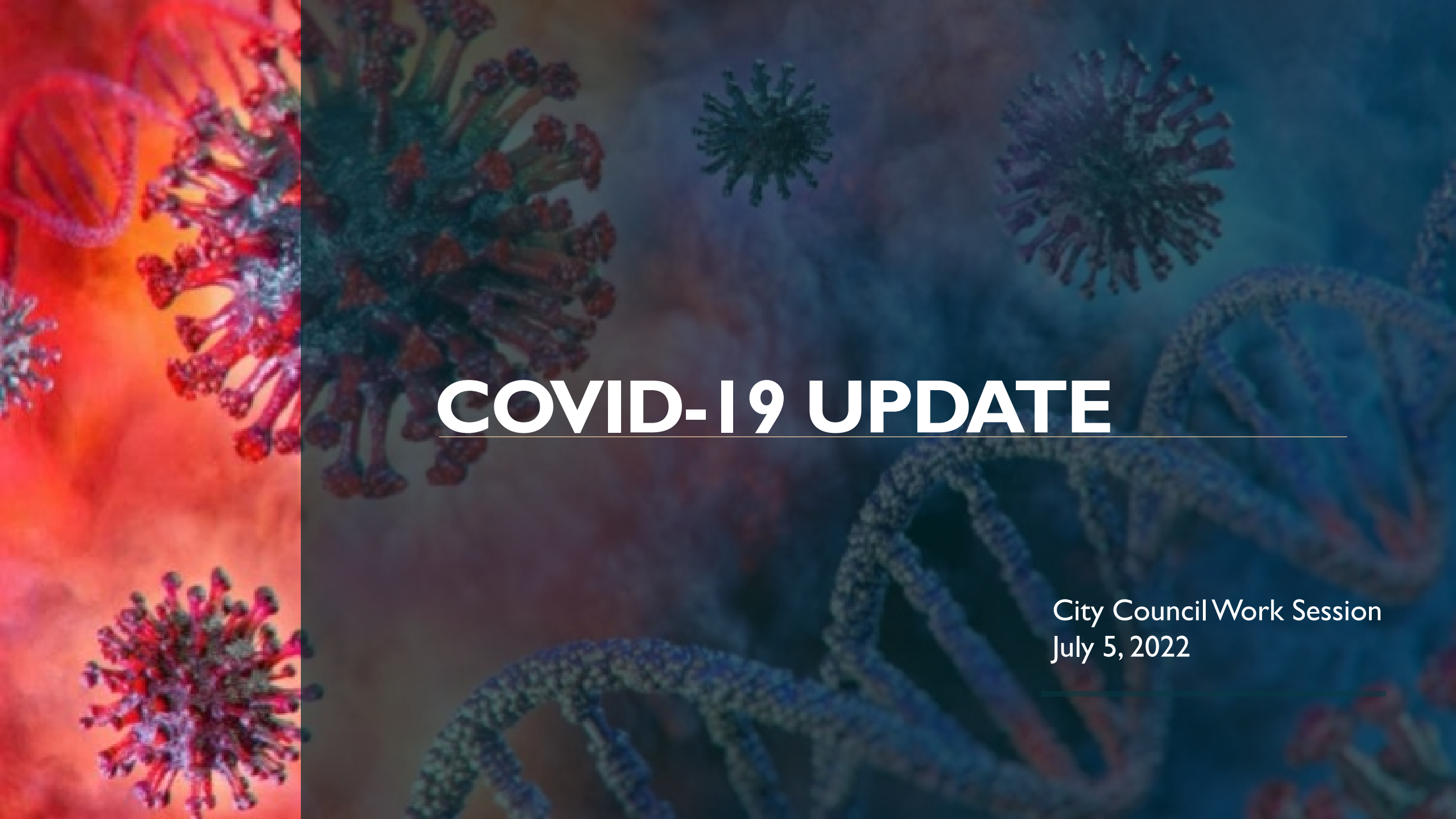
Council discussion.

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**Attachments**

COVID-19 Presentation

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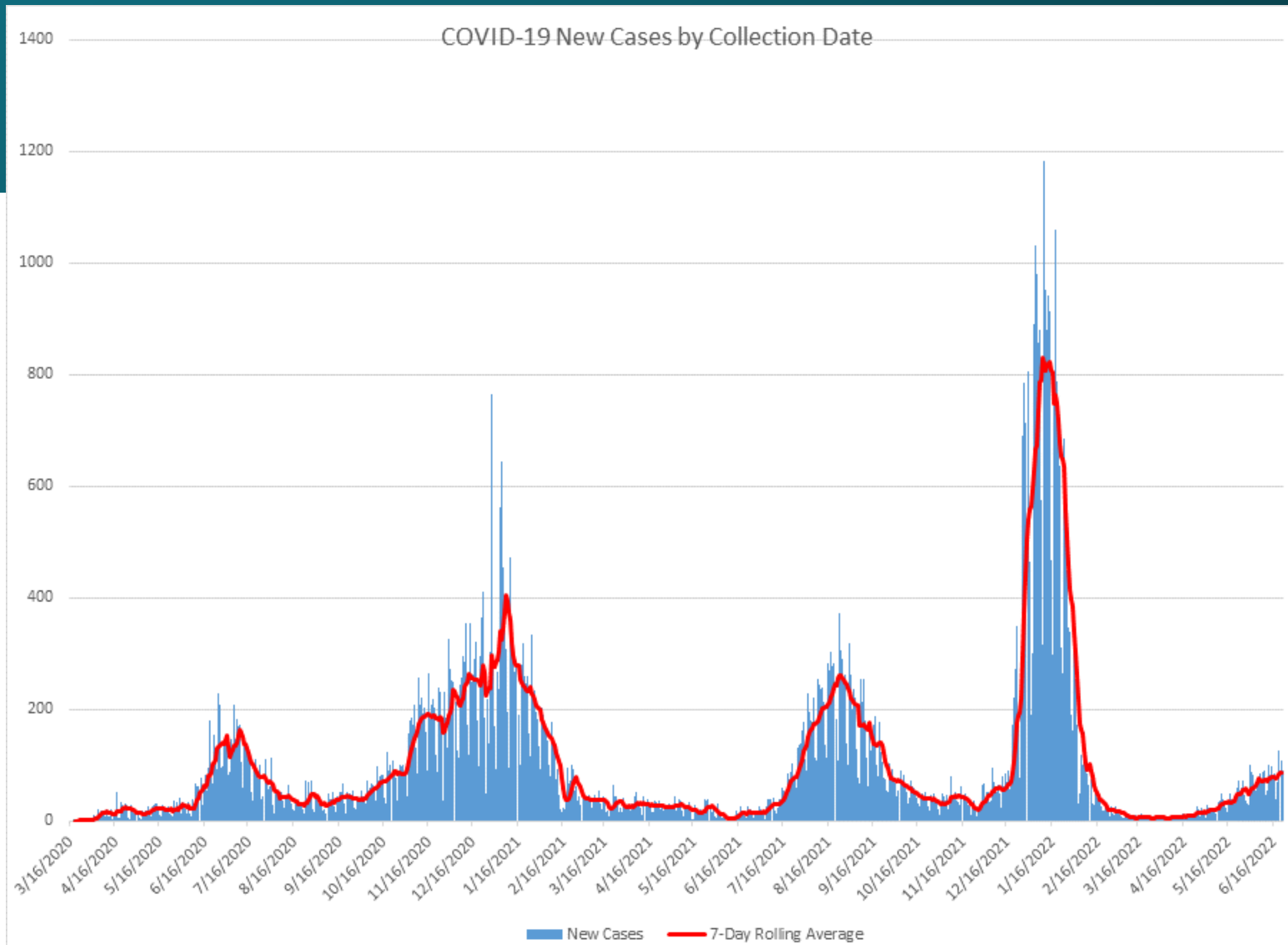
# COVID-19 UPDATE

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City Council Work Session  
July 5, 2022

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# Garland Impacts



Total Confirmed  
**62,722**

Total Recovered  
**61,210**

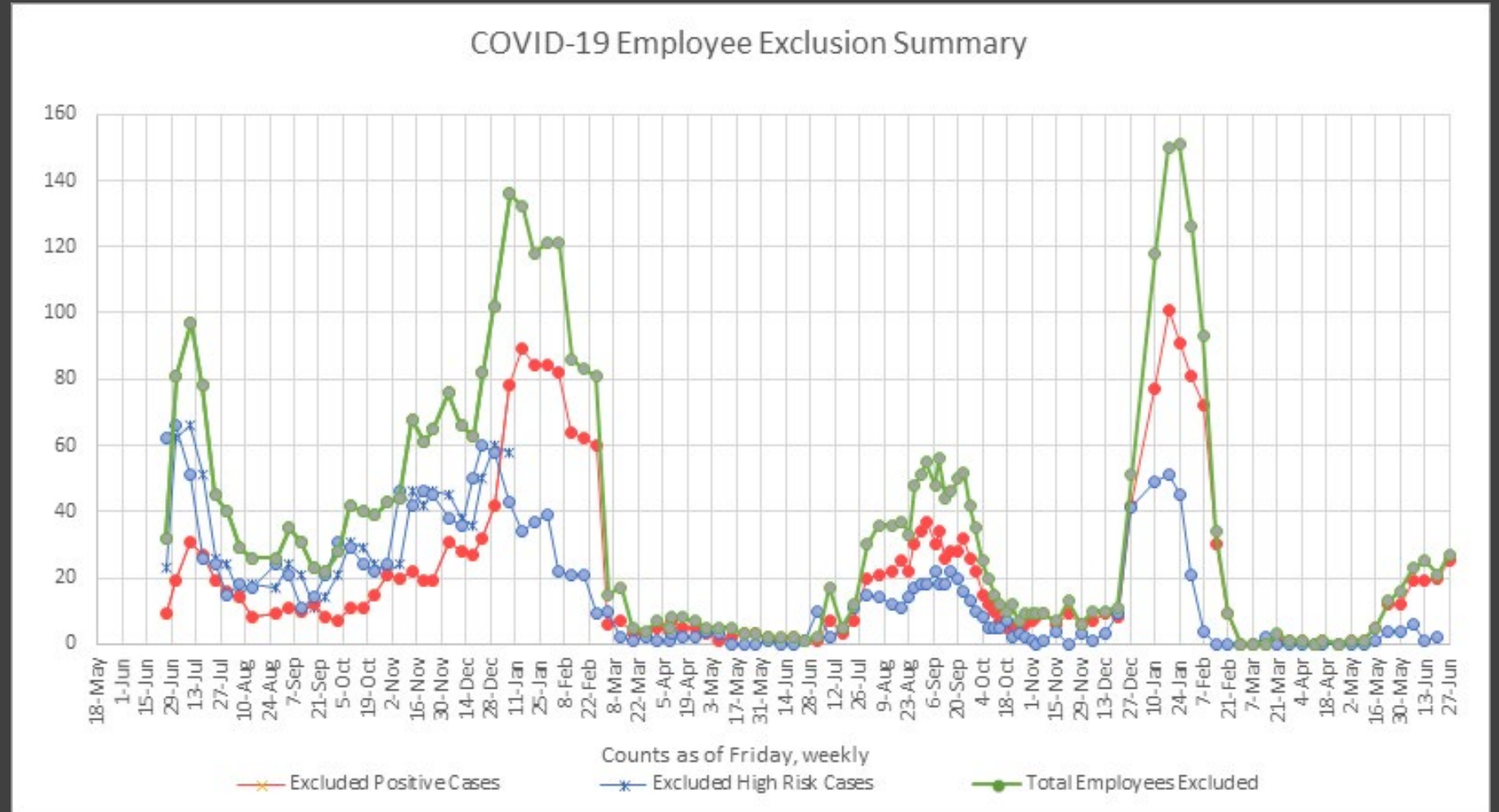
Total Deaths  
**765**

Active Cases  
**797**

# Current Staff Impacts

27 COG employees excluded due to COVID-19 as of June 22, 2022

Total  
Recovered  
**774**  
All  
Departments



# Garland Vaccinations Administered

Doses thru 6/22/22

|                                  |               |
|----------------------------------|---------------|
| First Doses                      | 21,336        |
| Second Doses                     | 19,520        |
| Third Doses                      | 6,842         |
| Fourth Doses                     | 603           |
| Single Doses (Initial + Booster) | 891           |
| Pediatric First Doses            | 1,661         |
| Pediatric Second Doses           | 1,371         |
| Pediatric Third Doses            | 14            |
| <b>Total</b>                     | <b>52,238</b> |

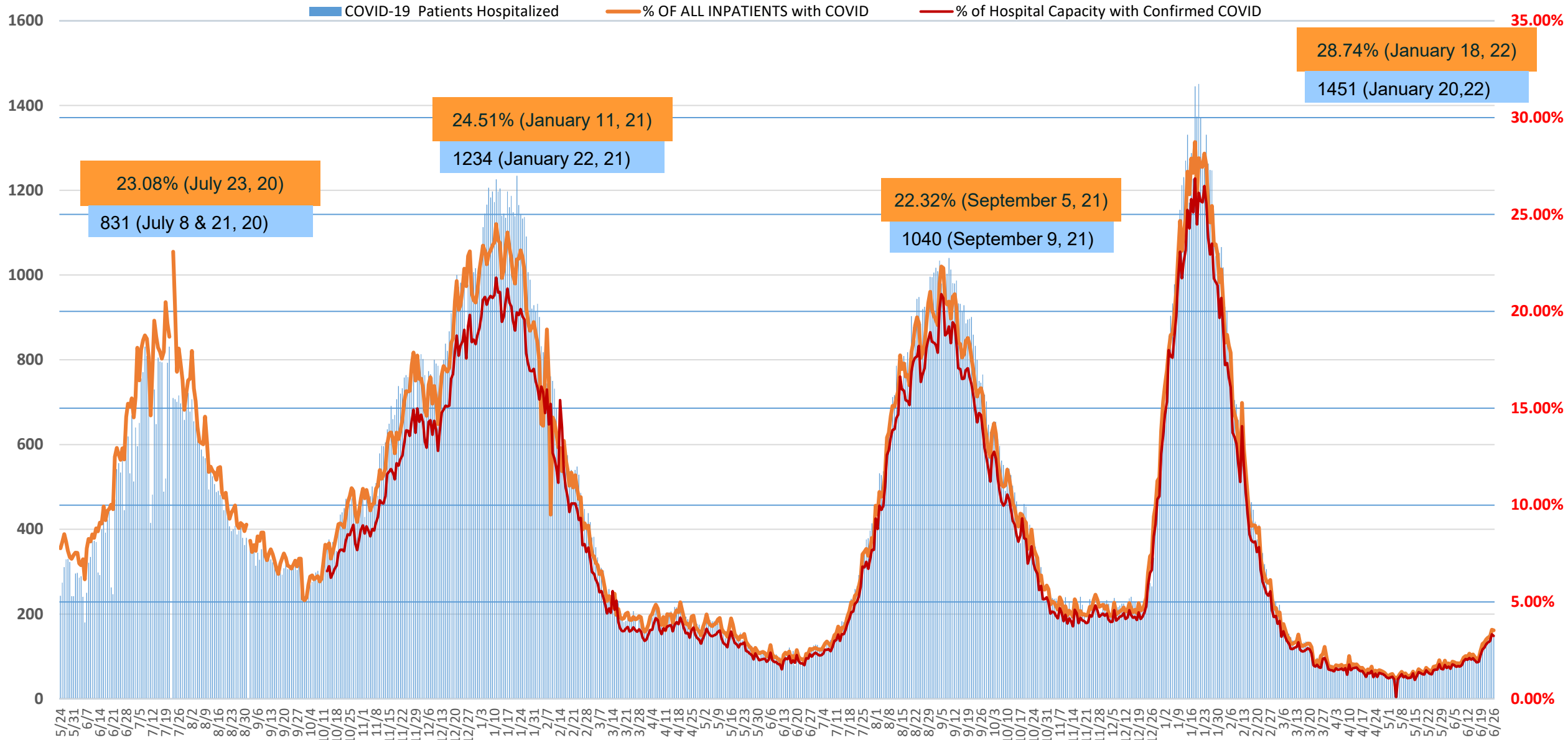
# Hospitalized COVID Patients and Percent COVID Patients to All Hospital Patients Dallas County

06/28/22 Numbers

143

3.25%

2.92%





# QUESTIONS

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**GARLAND**  
**CITY COUNCIL ITEM SUMMARY SHEET**

**City Council Work Session Agenda**

**3. b.**

**Meeting Date:** July 5, 2022

**Item Title:** Hazard Mitigation Action Plan Council Review Period

**Submitted By:** Mistie Gardner, Emergency Management Director

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**Summary of Request/Problem**

The Federal Emergency Management Agency (FEMA) requires local jurisdictions to revise the Hazard Mitigation Action Plan (HazMAP) and obtain state and federal approval every five years in order to remain eligible for certain grant funding. The Office of Emergency Management initiated the five-year review in August 2021 and has now completed the initial update and all preliminary requirements for the City of Garland HazMAP update. At this phase of update, the draft needs to be reviewed by leadership and all final edits need to be collected. Once this process is complete, the final draft will be submitted to the State of Texas and FEMA for consideration of approval. Once an acceptable draft has been approved by both the State of Texas and FEMA, a conditional approval letter will be granted to the City of Garland. At that time, the approved final will again be presented to Council for adoption via resolution.

**Recommendation/Action Requested and Justification**

The Office of Emergency Management (OEM) is requesting Council to review the current Hazard Mitigation Action Plan (HazMAP) draft and provide any recommended feedback or changes by July 14, 2022. All edits will be compiled and a final draft will be submitted to the State of Texas and FEMA for review and conditional approval.

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**Attachments**

COG 2022 Hazard Mitigation Action Plan Draft

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# HAZARD MITIGATION ACTION PLAN



**2022**

**Office of Emergency Management**



# GARLAND

For more information, visit our website at:

[www.garlandtx.gov/oem](http://www.garlandtx.gov/oem)

Written comments should be forwarded to:

Office of Emergency Management (OEM)

P.O. Box 469002

Garland, Texas 75040

[oem@garlandtx.gov](mailto:oem@garlandtx.gov)

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### Purpose

The City of Garland's Hazard Mitigation Action Plan (HazMAP) is designed to meet the planning requirements for State, Tribal and Local Mitigation Plans found in the Code of Federal Regulations (CFR) at Title 44, Chapter 1, Part 201 (44 CFR Part 201). Local governments are required to develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance, including funding for mitigation projects. The Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, (Public Law 93-288, FEMA P-592 Vol. 1, May 2021), provides the legal basis for state, local, and tribal governments to develop and submit a mitigation plan to reduce the impacts from identified natural hazards, risks and vulnerabilities. Appendix A is reserved for the City Council Resolution, formally adopting the City of Garland Hazard Mitigation Action Plan, which occurs after FEMA's conditionally approval.

### Organization

The City of Garland Hazard Mitigation Action Plan is divided into nine sections. Each section is necessary to meet the planning requirements. The City of Garland Hazard Mitigation Action Plan sections include:

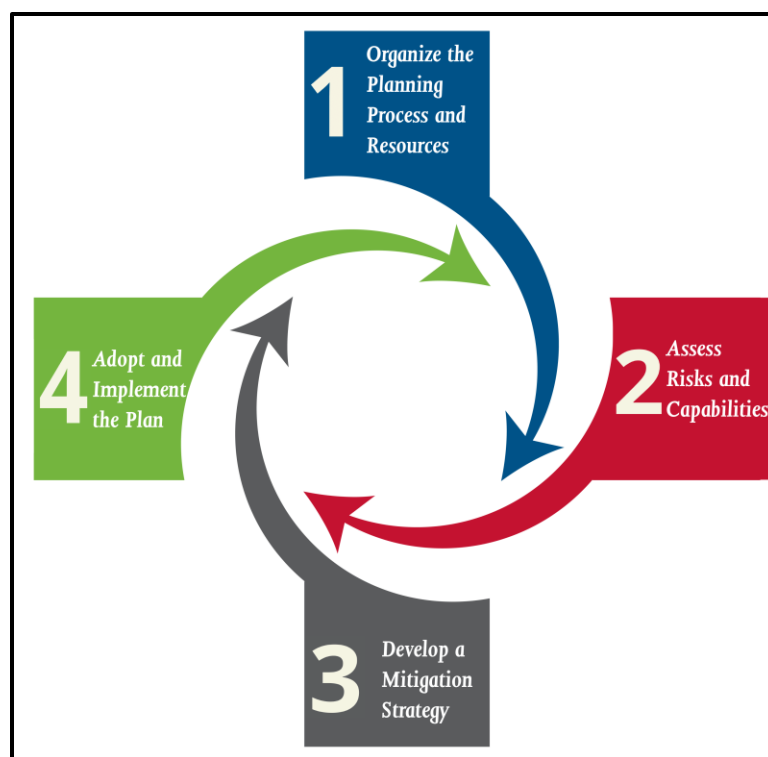
1. **Introduction:** Describes the purpose and authority of the Hazard Mitigation Action Plan and its organization.
2. **Planning Process:** Provides a description of the planning process the City of Garland followed to develop the Hazard Mitigation Action Plan.
3. **Community Profile:** Describes the profile of the City of Garland and is a helpful tool in understanding how to best mitigate local hazards.
4. **Risk Overview:** Provides detail on the hazard identification analysis and risk assessment, and shows how the Risk Summary (Table 4.5) was developed and hazard ranking.
5. **Hazard Profiles:** Contains the hazard profiles that pose the greatest risk to the City of Garland. Each hazard profile contains the location, severity, previous occurrences, probability of future events, impacts and vulnerability of those hazards.
6. **Hazard Mitigation Strategy:** Outlines the City of Garland's mitigation strategy, goals and objectives, reports progress on previous mitigation actions and addresses prioritizing mitigation actions.
7. **Hazard Mitigation Actions:** Outlines mitigation actions for the identified hazards.
8. **Plan Maintenance:** Describes the plan maintenance process for how the plan will be monitored, evaluated, incorporated and updated.
9. **Appendix:** Includes the appendix that provides additional information referenced in the plan.

The City of Garland’s Hazard Mitigation Action Plan was developed based on guidelines published by FEMA and includes four phases depicted in Figure 2.1 below.

At the onset of the planning process, numerous organizations and interested parties were invited to participate in the HazMAP efforts. These partners included local, regional and state agencies, private residents, and community based associations. Involving a variety of planning partners helped ensure a strong foundation for the Hazard Mitigation Action Plan.

Meetings were held with the Hazard Mitigation Planning Team, where risks were assessed and mitigation goals and actions created. Local and regional contacts also provided information directly to the Planning Team, which was an important aspect to the planning process.

**Figure 2.1**



Source:  
Federal Emergency  
Management  
Agency

## Planning Team

The Planning Team members were identified based on their expertise and authority to implement the

mitigation actions. The following are the members of Garland's Hazard Mitigation Action Planning Team:

- Building Inspection, Building Official
- Emergency Management, Director
- Emergency Management, Planning and Preparedness Coordinator
- Engineering, Director
- Environmental Health Manager
- Facilities, Physical Security Program Manager
- Fire Department, Assistant Fire Chief
- Garland Power & Light (GP&L), Chief Operations Officer
- Public Health, Environmental Health Manager
- Neighborhood Vitality, Administrator
- Community Development, Housing Agency, Library and Neighborhood Vitality, Managing Director
- Parks and Recreation and Cultural Arts, Parks Director
- Police Department, Captain
- Water Department, Wastewater Treatment Director

## **Kickoff and Subsequent Meetings**

The kickoff meeting was held virtually on November 17, 2021. This initial meeting was an opportunity to inform key department heads and Planning Team members about how the planning process pertained to their distinct roles and responsibilities. Progress of past mitigation activities were discussed and the new hazard identification process began.

The Planning Team participated in additional meetings and did work outside of the group meetings. The Planning Team performed the following activities: identified hazards, conducted risk assessments, ranked hazards, developed a public outreach strategy, planned implementation of mitigation actions, assisted in research and gathering information to include in the plan and participated in the draft plan review. The Team will also monitor progress of the updated mitigation actions and will assist with plan updates as needed. The summary of planning meetings is outlined in Table 2.2 and meeting documentation is found in Appendix B.

**Table 2.2 - Meeting Summaries**

| <b>Date</b>       | <b>Purpose</b>                                                                                                                                                                                                                                                   |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| November 17, 2021 | <ul style="list-style-type: none"><li>• Kickoff meeting</li><li>• Discussion about the purpose of mitigation and planning process</li><li>• Reviewed Previous Mitigation Goal Progress and Implementation</li><li>• Hazard Mitigation Survey Explained</li></ul> |
| December 15, 2021 | <ul style="list-style-type: none"><li>• Hazard Mitigation Survey Results (Identified Hazards)</li><li>• Planning Team Impact Assessment</li><li>• Review/Discuss edits or changes</li><li>• Project list from 2017 – Additions/Status</li></ul>                  |
| January 26, 2022  | <ul style="list-style-type: none"><li>• Planning Team Impact Assessment Review</li><li>• Review/Discuss edits or changes</li><li>• Project Lists from 2017 – Additions/Status</li><li>• Discuss Climate Change acknowledgement</li></ul>                         |
| March 2, 2022     | <ul style="list-style-type: none"><li>• Review/Discuss edits or changes</li><li>• Finalize Mitigation strategies</li><li>• Summarize/Review of HazMAP Public Meetings</li><li>• Discuss final steps/final review</li></ul>                                       |

## **Mitigation Review and Development**

The Planning Team developed the 2022-2027 mitigation strategy. During the initial kickoff meeting, the Planning Team gave progress reports on all mitigation actions listed in the 2017 Plan. After initial reports were given the Planning Team completed department updates with additional details regarding 2022 mitigation actions and information. Planning Team members reported accomplishments, obstacles, delays, and revisions of the 2022 mitigation actions and updated information, images, data and statistics that related to each mitigation action and HazMAP as a whole. Development of the mitigation actions for the 2022 HazMAP was ongoing throughout the planning process. An educational component was conducted at the January 26, 2022 and the March 2, 2022 meetings to ensure Planning Team members were actively considering all mitigation actions for HazMAP. The City's Capital Improvement Plan and department budgets were reviewed to determine possible mitigation actions. Planning Team members identified proposed actions, hazard(s) addressed, costs and benefits, the responsible parties, effects on new and existing structures, implementation schedules and potential funding sources. All Mitigation actions identified during the process were made available to the Planning Team for review. In addition, the draft Plan was made available for public review and comment on the City of Garland's website, through the City Secretaries Office and through open public meetings.

## **Review of Existing Plans, Plan Integration and Implementation**

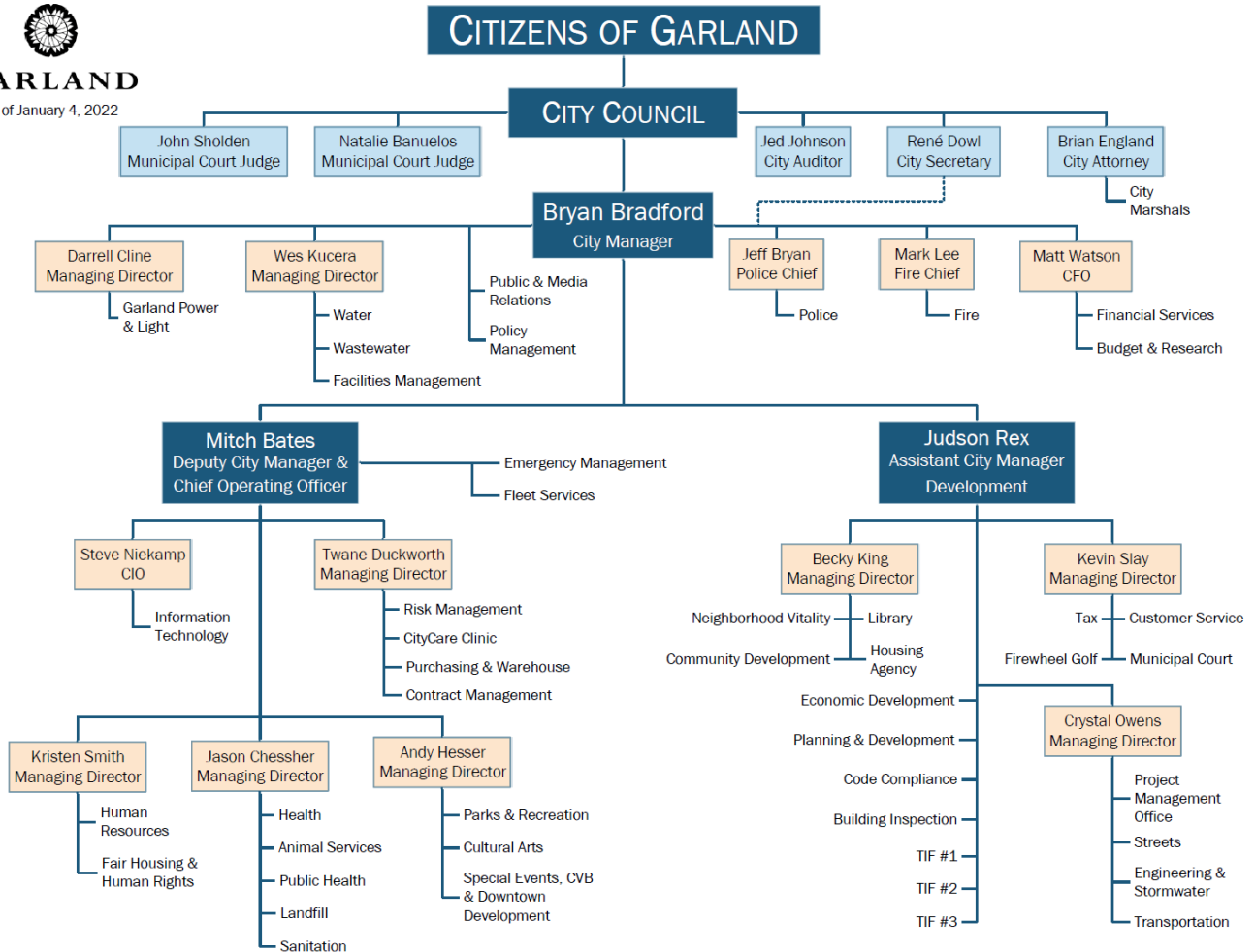
A variety of existing studies, plans, reports, and technical information were reviewed as part of the planning process. Sources of the information included FEMA, TDEM, Dallas County, surrounding jurisdictions and the City of Garland.

Other documents, including those from the National Oceanic and Atmospheric Administration (NOAA) that includes the National Climatic Data Center (NCDC), provided previous hazard occurrence data and descriptions of events in the area. Materials from FEMA and TDEM were reviewed for guidance on plan development requirements and utilized in the development of the Plan at all stages. The Dallas County HazMAP including multiple surrounding jurisdictions and the City of Dallas Local Mitigation Action Plan were reviewed to confirm consistency with methodology, hazard identification and prioritization relative to Garland's Plan update. Internally, the City of Garland's Capital Improvement Plan and Operating Budget were reviewed to identify what mitigating activities the City of Garland has currently budgeted to complete.

The annual budget review is an important tool in controlling and executing mitigation goals and objectives. It is this phase where identified mitigation actions may be locally funded. Each action has been assigned to a specific department that is responsible for tracking and implementing the mitigation actions explained in Section 7. A funding source and implementation timeline are included for department use. The timelines will be impacted and partially directed by the City's comprehensive planning process, Capital Improvement Plan, budgetary constraints, community needs and any additional funding sources obtained including grant funds

## **Capability Assessment**

The Planning Team identified current capabilities for completing and implementing hazard mitigation actions. Members verified all planning/regulatory, administrative/technical, financial and educational capabilities were included in the document for all City of Garland departments. The City of Garland organizational chart (Figure 2.3) presents departments who have roles in the hazard mitigation process. The Regulatory Tools and Capabilities Assessment (Figure 2.4) describes policies, programs, resources, codes and ordinances to accomplish hazard mitigation through the listed departments.



**Figure 2.3 - City of Garland Organization Chart**

**Figure 2.4 – Regulatory Tools and Capabilities Assessment**

| <b>Regulatory Tools<br/>(ordinances, codes, plans)</b> | <b>Additional Information</b>                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Comprehensive / Master Plan</b>                     | <ul style="list-style-type: none"> <li>• 2030 Envision Garland</li> </ul>                                                                                                                                                                                                                                                                                           |
| <b>Capital Improvements Plan</b>                       | <ul style="list-style-type: none"> <li>• 2021 CIP Plan Adopted</li> </ul>                                                                                                                                                                                                                                                                                           |
| <b>Economic Development Plans</b>                      | <ul style="list-style-type: none"> <li>• Economic Development Department</li> <li>• 2030 Envision Garland</li> <li>• Garland Economic Development Partnership (GISD, City of Garland and Chamber of Commerce)</li> </ul>                                                                                                                                            |
| <b>Local Emergency Operations Plans</b>                | <ul style="list-style-type: none"> <li>• City of Garland Emergency Operations Plan</li> </ul>                                                                                                                                                                                                                                                                       |
| <b>Continuity of Operations Plans</b>                  | <ul style="list-style-type: none"> <li>• Citywide Continuity of Operations (COOP) Plan</li> </ul>                                                                                                                                                                                                                                                                   |
| <b>Transportation Plan</b>                             | <ul style="list-style-type: none"> <li>• Thoroughfare Plan, Comprehensive Corridor Plan SH-78, Strategic Transportation Enhancement Plan (STEP)</li> </ul>                                                                                                                                                                                                          |
| <b>Building Code</b>                                   | <ul style="list-style-type: none"> <li>• Adopted 2015 International Building Code</li> </ul>                                                                                                                                                                                                                                                                        |
| <b>Fire Department ISO Rating</b>                      | <ul style="list-style-type: none"> <li>• ISO Rating 1 (Highest rating)</li> </ul>                                                                                                                                                                                                                                                                                   |
| <b>Site Plan Review Requirements</b>                   | <ul style="list-style-type: none"> <li>• Approved by the City Engineering Department as part of the Site Permit</li> </ul>                                                                                                                                                                                                                                          |
| <b>Zoning Ordinance</b>                                | <ul style="list-style-type: none"> <li>• Comprehensive Zoning List 4647, includes the zoning districts, land use permissibility, definitions, parking requirements, and development standards</li> </ul>                                                                                                                                                            |
| <b>Subdivision Ordinance</b>                           | <ul style="list-style-type: none"> <li>• Garland Development Code</li> </ul>                                                                                                                                                                                                                                                                                        |
| <b>Flood Insurance Rate Maps</b>                       | <ul style="list-style-type: none"> <li>• Engineering: Floodplain and Drainage - FEMA has published Flood Insurance Rate Maps (FIRMs) graphically showing the extents of approximately 2,400 acres in the 100-year floodplain in Garland</li> <li>• Passive recreational and park uses are encouraged while encroachments and obstructions are prohibited</li> </ul> |
| <b>Growth Management Ordinances</b>                    | <ul style="list-style-type: none"> <li>• Garland Development Code</li> </ul>                                                                                                                                                                                                                                                                                        |

|                                            |                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Drought Management</b>                  | <ul style="list-style-type: none"> <li>• Water Conservation Plan</li> <li>• Drought Contingency Response Plan</li> </ul>                                                                                                                                                                        |
| <b>Planning Commission</b>                 | <ul style="list-style-type: none"> <li>• Composed of nine members appointed by the City Council. One member is appointed to represent each of the eight Council districts, and one member is appointed at-large</li> </ul>                                                                      |
| <b>Mutual Aid Agreements</b>               | <ul style="list-style-type: none"> <li>• Dallas County mutual aid agreement, Inter-local agreements with Wylie, Farmersville, Brownsville, Greenville, Jasper, Newton, Bryan, Denton, Rowlett and Sachse</li> </ul>                                                                             |
| <b>Maintenance Programs to Reduce Risk</b> | <ul style="list-style-type: none"> <li>• Code Compliance: Single Family Rental Program (requires properties to be permitted), Code Cares (tree trimming, fence maintenance, trash/debris removal)</li> <li>• GP&amp;L: Annual tree trimming/vegetation management program</li> </ul>            |
| <b>NFIP Participation</b>                  | <ul style="list-style-type: none"> <li>• Engineering: Floodplain and Drainage – 100-year floodplains are near Duck Creek, Rowlett Creek, Spring Creek, and their tributaries</li> <li>• All new development projects are reviewed for compliance with the flood prevention ordinance</li> </ul> |
| <b>Chief Building Official</b>             | <ul style="list-style-type: none"> <li>• Full Time - Building Inspection, Brita Van Horne</li> </ul>                                                                                                                                                                                            |
| <b>Emergency Management</b>                | <ul style="list-style-type: none"> <li>• Full Time – Director of Emergency Management, Mistie Gardner</li> <li>• Full Time – Office of Emergency Management Planning and Preparedness Coordinator, Brad Kavanaugh</li> </ul>                                                                    |
| <b>Floodplain Administrator</b>            | <ul style="list-style-type: none"> <li>• Full Time – Engineering, Michael C. Polocek, P.E.</li> </ul>                                                                                                                                                                                           |
| <b>Community Planner</b>                   | <ul style="list-style-type: none"> <li>• Full Time – Planning &amp; Community Development</li> </ul>                                                                                                                                                                                            |
| <b>Drainage and Development Engineer</b>   | <ul style="list-style-type: none"> <li>• Full Time – Jake Fisher, P.E.</li> </ul>                                                                                                                                                                                                               |
| <b>Surveyors</b>                           | <ul style="list-style-type: none"> <li>• Engineering - land surveying, easements, platting and right-of-way</li> </ul>                                                                                                                                                                          |
| <b>Warning Systems/Services</b>            | <ul style="list-style-type: none"> <li>• Garland Alert System</li> <li>• Outdoor Warning System</li> <li>• Integrated Public Alert &amp; Warning System through the National Weather Service and the State of Texas</li> </ul>                                                                  |

## **Expanding and Improving**

The City of Garland is progressive and forward thinking continually expanding and improving existing policies and programs for the wellbeing of the community. New Federal regulations and best practices are adopted through various ordinances to strengthen current policies. The City Council and City Manager address the budget, policies, regulations and codes, hire staff, approve plans and determine the direction of the city overall. Ability to implement and approve mitigation actions, expand existing mitigation actions and integrate mitigation into existing policies and programs is function of this group. Additional positions will be considered for staffing the Office of Emergency Management, as there are currently gaps in local capacity regarding preparedness, mitigation, response and recovery. Funding constraints make increased staffing a challenge.

## **Stakeholder and Public Involvement**

Stakeholders provide an essential service in hazard mitigation planning. Therefore, throughout the planning process, local government, members of community groups and local businesses were encouraged to participate in surveys and public meetings. In addition to the public outreach campaign, the City of Garland sought input on the HazMAP from its neighboring jurisdictions, county emergency management office and regional Council of Government. The table below lists the individuals contacted and method of contact. All input received was implemented into the plan.

| <b>Organization</b>                        | <b>Name and Title</b>                                      | <b>Method of Contact</b> |
|--------------------------------------------|------------------------------------------------------------|--------------------------|
| City of Richardson                         | Alisha Gimbel, Emergency Management Coordinator            | Email                    |
| City of Mesquite                           | Jason Block, Emergency Management Coordinator              | Email                    |
| City of Plano                              | Carrie Little, Emergency Management Coordinator            | Email                    |
| Dallas County                              | Denisse Martinez, Emergency Planning/Volunteer Coordinator | Email                    |
| City of Dallas                             | Travis Houston, Senior Emergency Management Specialist     | Email                    |
| City of Rowlett                            | Ed Balderas, Emergency Management Coordinator              | Email                    |
| City of Sachse                             | Marty Wade, Fire Chief                                     | Email                    |
| Garland ISD                                | Mark Quinn, Director of Security                           | Email                    |
| North Central Texas Council of Governments | Molly McFadden, Emergency Preparedness Director            | Email                    |

Input from individual residents representing the whole community provided the Planning Team with a greater understanding of local concerns and increases the likelihood of successfully implementing mitigation actions. The City of Garland incorporated several methods to engage the public throughout the planning process, prior to official Plan approval and adoption. These methods included a public survey, posting information to the city's website, designated point of contact for HazMAP questions and comments, open public meetings, open access to plan for review during all city business hours during the planning process and inclusion of the public on the Planning Team.

In September 2021, the Office of Emergency Management developed an informational flyer explaining how to participate with plan review and complete the survey. This flyer was inserted into the month of September's utility bills and mailed to every Garland residence. This provided information to each household on multiple ways to provide hazard mitigation input. A QR code was placed on the flyer that allowed citizens to scan the code to be automatically redirected to the survey. This allowed survey results to be electronically recorded and geographic data would be made available. In addition to mailing flyers, the survey was circulated to a wide audience through all available channels that included:

- Distribution of the survey and mitigation information electronically via City of Garland's Facebook, Twitter, Instagram, LinkedIn and Nextdoor social media platforms.
- Paper copies were made available at six City Recreation Centers, four City Libraries and one City

Senior Center in English, Spanish and Vietnamese providing a manual process for feedback and input.

- Residents were also able to access the survey at all four public libraries' computers and could request a paper copy of the survey from the HazMAP point of contact, information provided via all channels.

The survey solicited public feedback on the hazards residents felt had the greatest impact on Garland. Residents were asked to review the list of hazards identified by the City's Planning Team and rank those hazards in order of importance and of greatest impact. The survey included 15 questions and was available in English, Spanish and Vietnamese. 149 surveys were completed; the survey and results are included in Appendix D.

The purpose of the survey was to obtain public input during the planning process, confirm the Planning Teams findings with the public input, and determine any other areas of concern.

During hazard analysis it was determined that the Public ranked hazards based on their personal capabilities and experiences while the Planning Team ranked hazards according to the City of Garland capabilities to respond to each hazard.

After the initial public survey results were analyzed, Garland OEM further surveyed and interviewed residents regarding hazard ranking and the rationale behind their ranking decisions. These public conversations occurred at City of Garland's Public Hazard Mitigation Meetings held on February 17, 2022 and February 26, 2022, which confirmed what the original survey had unveiled. The Public ranks hazards based on personal experiences. Statements regarding ranking were made such as:

- "I have lived in Garland for 45 days. I have not experienced any concerns to date."
- "Let residents know if their neighborhood is in a high risk area for potential hazards and damages."
- "Make electrical power more resistant to extreme heat and cold temperatures, to avoid power outages that last for days."

Closing this perception gap will require public education. Instructing individuals to see beyond themselves and understand the whole community concept of hazard mitigation required continuous outreach and public education, which is already offered by Garland OEM and other relevant City departments.

Throughout the process of creating the Hazard Mitigation Action Plan, updates were made to the City of Garland Office of Emergency Management website ([www.garlandtx.gov/oem](http://www.garlandtx.gov/oem)). The information posted on the website included:

- |                                |                                           |
|--------------------------------|-------------------------------------------|
| • Hazard mitigation definition | • Explanation of the planning process     |
| • Why Garland needs a plan     | • Hazards identified by the Planning Team |
| • Mitigation action examples   | • HazMAP Point of Contact                 |



## GARLAND

### Community Profile

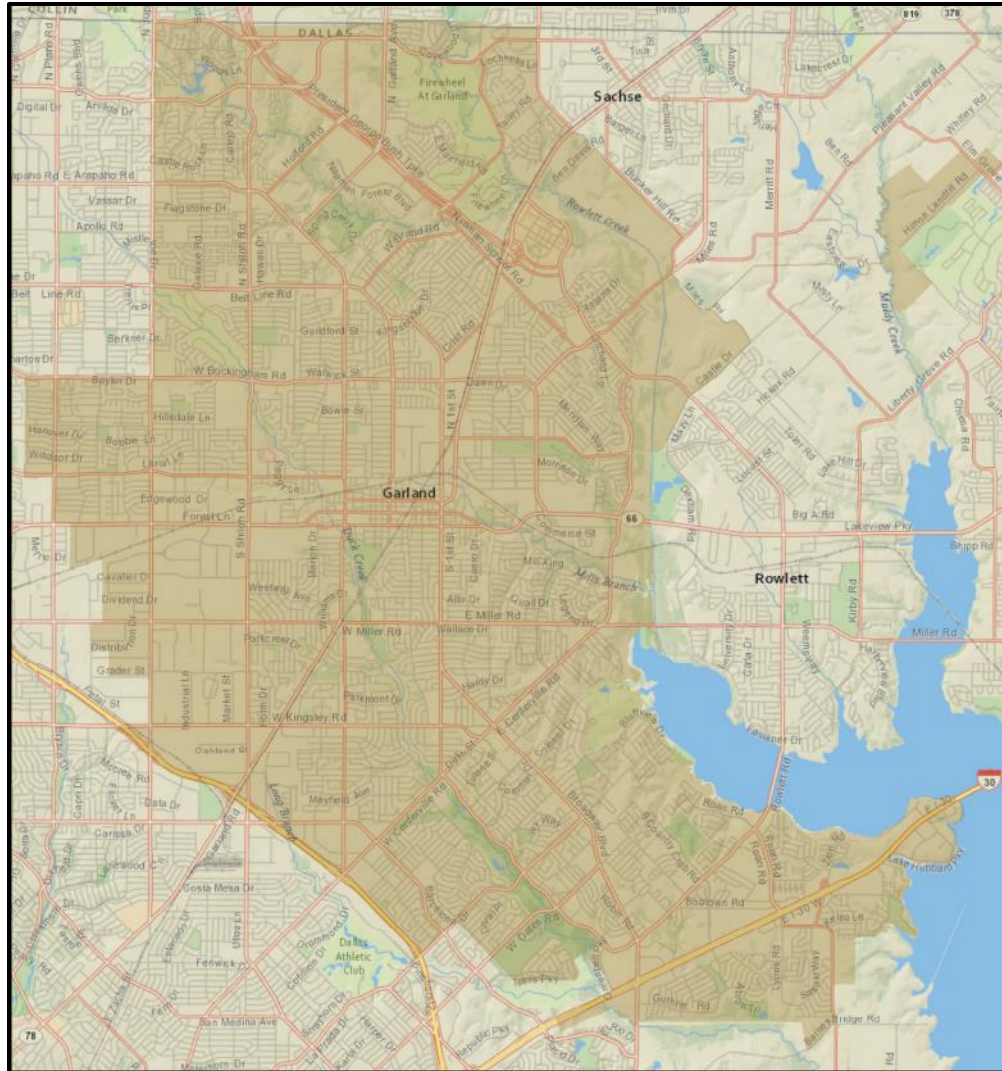
The Plan was uploaded to the Office of Emergency Management's website and a physical copy was placed in the City Secretary's Office for public comment and review on March 1, 2022. Outreach efforts were made to notify citizens of the opportunity for review through physical mailings, public education presentations, social media and the Office of Emergency Management's website. A point of contact was also provided for residents to send additional comments privately.

Public outreach documentation located in Appendix C.

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The planning area for this Hazard Mitigation Action Plan includes the City of Garland incorporated areas. The planning area is indicated by the darker tan shading in Figure 3.1. The City of Garland is primarily located in northeast Dallas County, although a small portion of the city extends into Collin County. Garland shares common boundaries with the City of Dallas, Richardson, Mesquite, Rowlett, Sachse, and Sunnyvale. The City of Garland covers a land area of 57.1 square miles, six percent of the total area of Dallas County.

**Figure 3.1 - City of Garland Incorporated Area**



Source: City of Garland GIS Department

## Population

The City of Garland, like many other Dallas-Fort Worth communities, continues to grow significantly each year. Much of Garland's population growth occurred during the 1960's, 1970's, and 1980's. The City of Garland is the second largest city in Dallas County, and is home to an estimated **246,018** residents. Table 3.2 represents the City of Garland's population change from **1990-2021**.

**Table 3.2 – City of Garland Population**

| Year              | 1990    | 2000    | 2009    | 2015    | 2021    |
|-------------------|---------|---------|---------|---------|---------|
| <b>Population</b> | 180,650 | 215,768 | 228,858 | 236,897 | 246,018 |

## Community Features and Considerations

### Building Stock

The Dallas County Appraisal District Estimated Values Report for the City of Garland will be used in order to establish an accurate inventory of the types of buildings within the City of Garland. Table 3.3 shows the amount of parcels, estimated market value, and taxable value for commercial property, business personal property, residential property, and the combined totals for all three separate categories.

**Table 3.3 - Certified Estimated Values Report (EVR)  
July 22, 2021 for tax year 2021**

| Type of Building           | Parcels | Market Value     | Taxable Value    |
|----------------------------|---------|------------------|------------------|
| Commercial                 | 4,519   | \$6,410,767,420  | \$5,010,058,007  |
| Business Personal Property | 5,925   | \$2,336,194,130  | \$2,017,522,860  |
| Residential                | 64,814  | \$13,327,520,650 | \$10,937,825,133 |
| Grand Total                | 75,258  | \$22,074,482,200 | \$17,965,406,000 |

Source: Dallas Central Appraisal District (DCAD), 07/22/2021

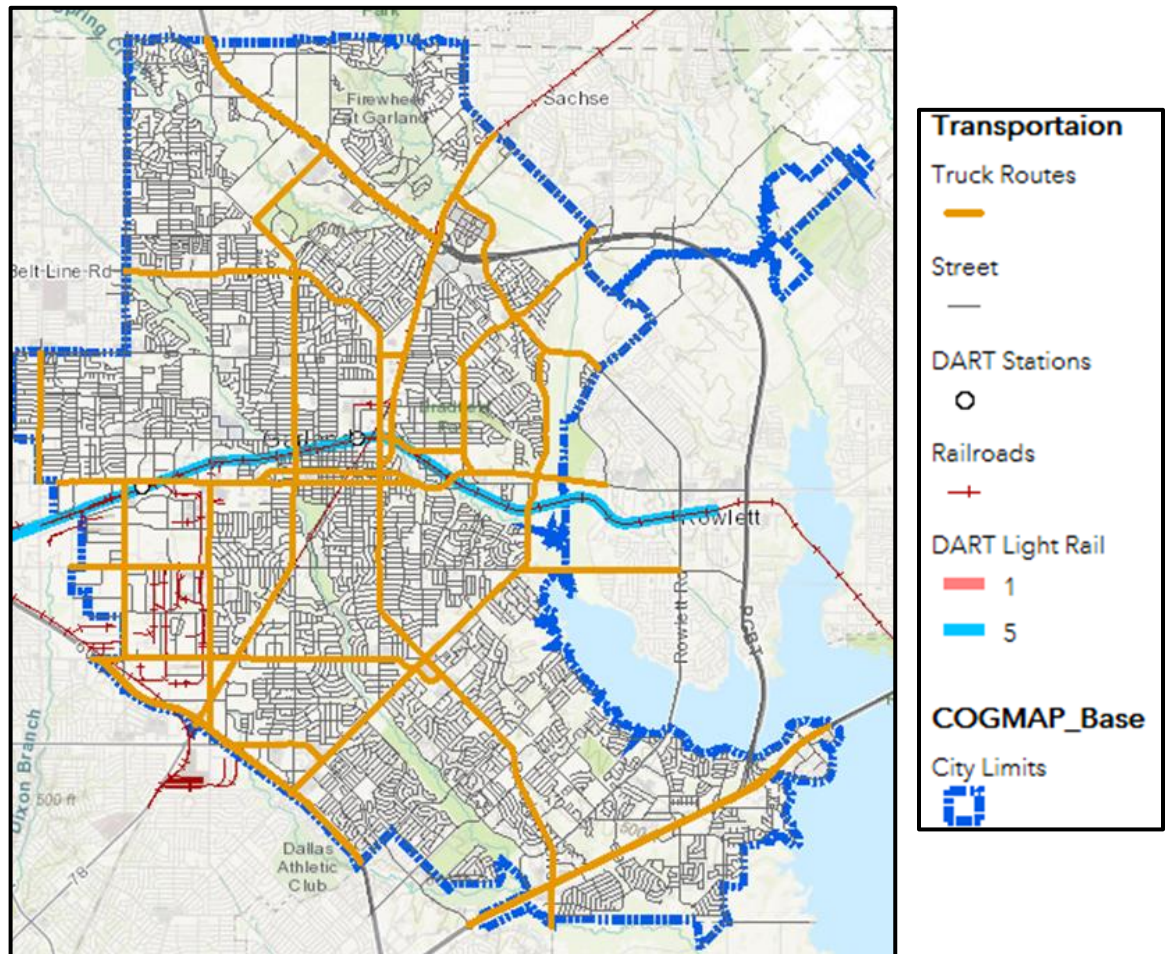
### Transportation

The City of Garland offers many transportation opportunities. Active transportation options include the Dallas Area Rapid Transit (DART) light rail system, railroads, highways, and a heliport.

There are five highways and thoroughfares that serve the City of Garland: Lyndon Baines Johnson (LBJ) Freeway (IH-635), President George Bush Turnpike (SH 190), IH-30, State Highway 78 and State Highway 66. LBJ Freeway, IH-30, State Highway 66, and the President George Bush Turnpike run primarily east to west. State Highway 78 runs primarily north to south.

In addition to the highway routes that pass through the City, several major transportation arteries cross through the City. Figure 3.4 identifies the transportation routes.

**Figure 3.4 - Transportation Routes**



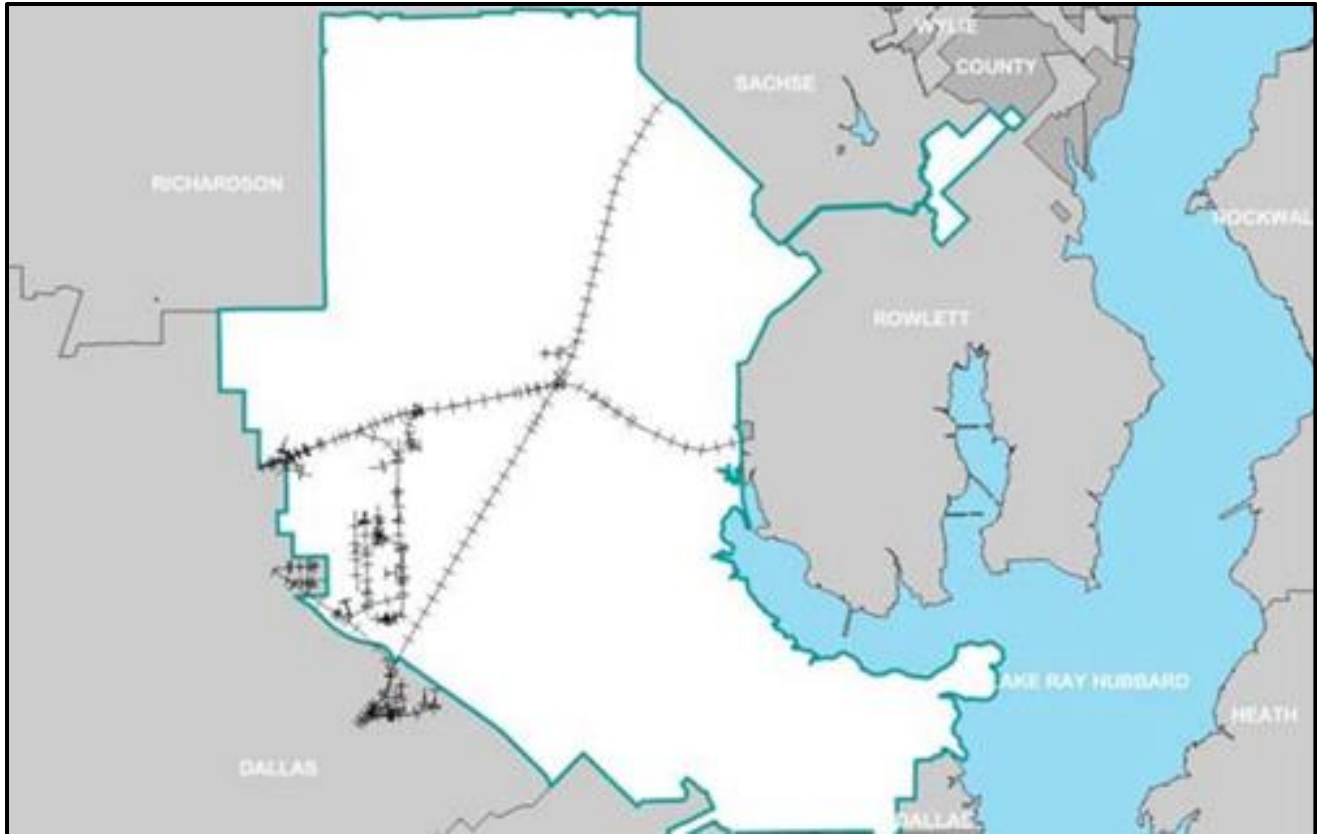
*Source: City of Garland GIS Department*

Two freight rail lines serve the City of Garland. Dallas Garland and Northeastern Railroad (DGNR) and Kansas City Southern Railroads pass through the city limits. Figure 3.5 depicts the rail systems in Garland.

The freight rail lines intersect with the DART passenger light rail system in central Garland. The DART light rail system is a public transportation system that links downtown Garland to the rest of the Dallas-Fort Worth area and extends east into Rowlett.

**Figure 3.5 – Railroad**

*Source: City of Garland GIS Department*



## **Lifeline Utility Systems**

The City of Garland owns and operates two state-of-the-art advanced biological wastewater treatment facilities. Wastewater is collected for each facility in two separate drainage basins, the Duck Creek Basin and the Rowlett Creek Basin. Wastewater is then received and treated at two separate facilities, the Rowlett Creek and Duck Creek Wastewater Treatment Centers. The Duck Creek Treatment Plant receives wastewater from the west side of Garland, and from portions of the cities of Dallas, Richardson and the

Town of Sunnyvale. The Rowlett Creek Treatment Plant serves the east side of Garland including the cities of Rowlett and Sachse

Since 1923, the City of Garland has been providing electric service to its residents through Garland Power & Light (GP&L), a locally owned and controlled not-for-profit municipal utility. With more than 72,000 customers, GP&L is the fourth largest municipal utility in Texas and the 43rd largest in the nation.

GP&L's diverse energy portfolio includes power from natural gas, wind, solar and hydroelectric resources. The utility owns natural gas and hydroelectric generation facilities, and has power purchase contracts for wind and solar energy.

GP&L's electric distribution system has 387 linear miles of overhead lines and 613 linear miles of underground lines. The transmission system consists of 28 substations and 200 linear miles of transmission lines. The utility's peak load for 2021 was 467 megawatts, with annual operating revenues of \$298 million. The other 15% of Garland residents are served by ONCOR, a transmission and distribution provider that serves much of north Texas.

## Economic Elements

The labor force within the City of Garland stands at 121,323 according to the City of Garland's Workforce Profile. The unemployment rate for the City as of December 2021 is 3.7%. The Garland Independent School District is the largest employer within the City, employing 7,211. The top ten major employers are listed in Table 3.6.

**Table 3.6 - Top Ten Major Employers**

| Employer                  | Number of Employees |
|---------------------------|---------------------|
| Garland ISD               | 7,211               |
| City of Garland           | 2,046               |
| Kraft Heinz Company       | 1,222               |
| Sherwin Williams          | 636                 |
| Epiroc Drilling Solutions | 525                 |
| U.S. Food Service         | 520                 |
| Anderson Windows          | 425                 |
| Arrow Fabricated Windows  | 340                 |
| General Dynamics OTS      | 329                 |
| Bass Pro Shops            | 300                 |

*Source: City of Garland Economic Development*

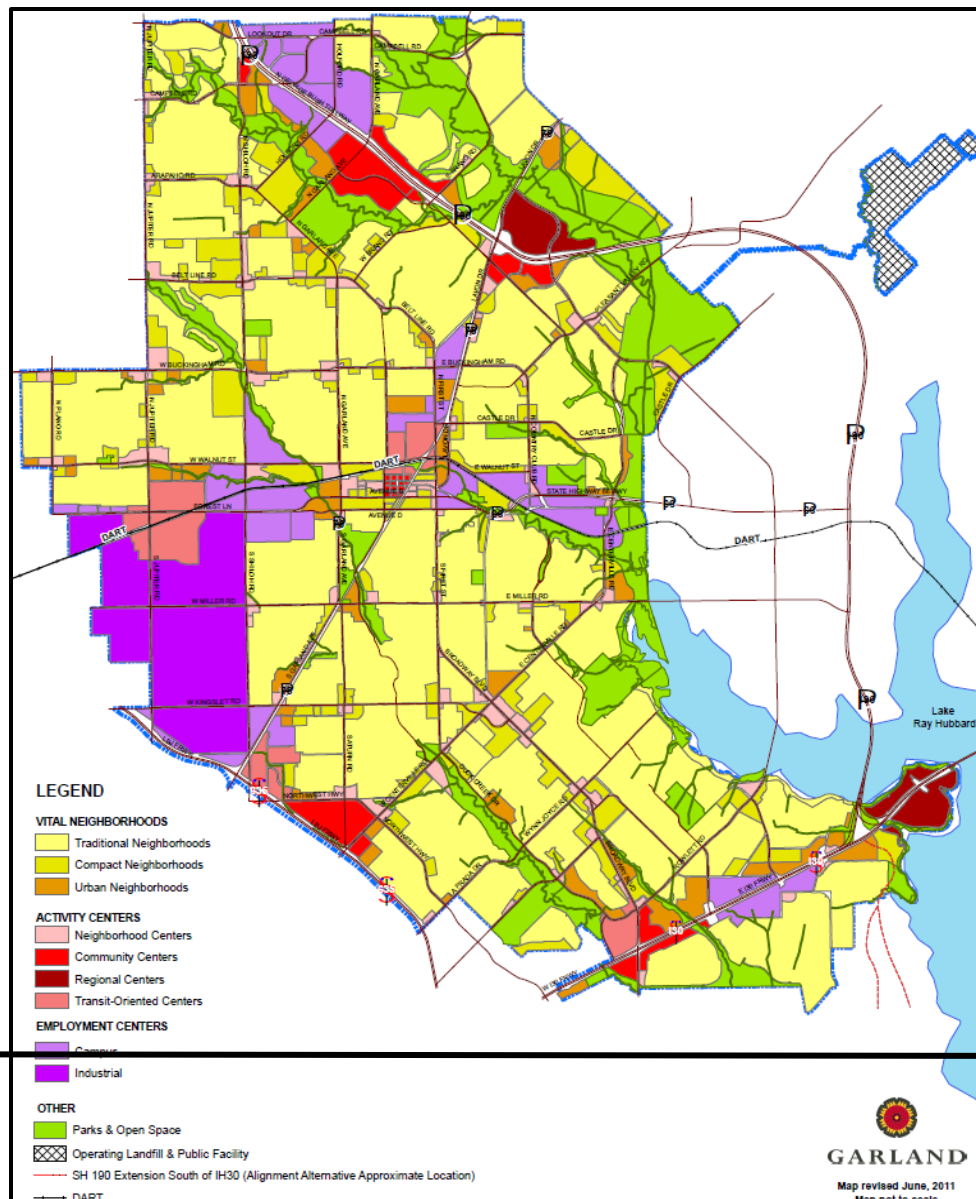
## Future Development Consideration

The City of Garland is legally required to have and maintain a comprehensive plan. Garland's first comprehensive plan was developed in the 1960's. A second plan was developed in the 1980s and was periodically updated. Envision Garland is the current comprehensive plan that addresses the community's future through 2030. This HazMAP has been extensively revised to reflect not only infrastructure and residence development, which has been minimal but also reflects the changes in hazards that now greatly



affect the City. No significant changes in development have occurred in the past five years in Garland. Therefore, the vulnerability to all hazards is unchanged.

**Figure 3.7 - Future Land Use**



## Future Development Consideration

This section begins the risk assessment. The purpose of this section is to provide background information for the hazard identification and risk analysis process. Section five provides a hazard profile for each of the Planning Team's identified hazards for the City of Garland. Each hazard profile includes a description of the hazard, location, severity, previous occurrences, probability of those hazards occurring in the future, impacts and summary of vulnerability to each hazard.

The City of Garland Planning Team initially reviewed the full range of natural hazards suggested under FEMA planning guidance. The team also considered the State of Texas Hazard Mitigation Plan identified hazards, Dallas County Hazard Mitigation Action Plan identified hazards, and other neighboring jurisdiction's hazards and risk assessments. Based on this analysis and historical occurrences that have impacted Garland, the Team identified 31 natural and human-caused hazards that pose risk to Garland, Texas. Those hazards are listed below.

|                        |                                                   |
|------------------------|---------------------------------------------------|
| Active Shooter         | Hazardous Materials Release (Fixed and Transport) |
| Aircraft Incident      | Information Systems Failure                       |
| Biological Event       | Lightning                                         |
| Bomb Threat            | Plant Explosion                                   |
| Civil Disturbance      | Power Outages                                     |
| Communications Failure | Railroad Incidents                                |
| Dam Failure            | Severe Winter Weather                             |
| Drought                | Sewer and Treatment Plant Failure                 |
| Earthquake             | Subsidence                                        |
| Erosion                | Terrorism                                         |
| Expansive Soil         | Tornado                                           |
| Extreme Cold           | VIP Situation                                     |
| Extreme Heat           | Water Failure                                     |
| Flood                  | Wildfire                                          |
| Fuel Shortage          | Wind                                              |
| Hail                   |                                                   |

Those 31 potential hazards were included in the hazard assessment (Appendix E). The hazard assessment identified high-risk hazards, provided justification for resources spent and ensured risk and mitigation actions aligned. Because the City of Garland has limited funding, the Planning Team prioritized the hazards that have the greatest risk and impact to the City. As additional funding becomes available, the Planning Team will reassess the list of hazards. The Hazard Assessment used a formula that accounted for Geographic Area Affected, Probability of Future Events in the Next Year, Possibility of Death or Injury, Interruption of Business Services, Preparedness, Response Time, and Effectiveness and Resources Available. Each member of the Planning Team completed a Hazard Assessment and assigned a percentage to all 31 previously identified hazards for each parameter to determine the risk for each hazard for Garland. The results of the hazard assessment determined Garland's top hazards that were then further evaluated in the Community Risk and Impact Assessment.

## Acknowledgement: Climate Change

Climate change includes both global warming and its impacts on Earth's weather patterns. Climate change has the potential to impact citizens due to increased flooding, extreme heat, more disease, and economic loss. With increasing global surface temperatures, the possibility of more droughts and increased intensity of storms will likely occur. Mitigation strategies include retrofitting buildings to make them more energy efficient; adopting renewable energy sources like solar, wind and small hydro; helping cities develop more sustainable transport such as bus rapid transit, electric vehicles, and biofuels; and promoting more sustainable uses of land and forests.

## Hazard Ranking

Listed are 14 hazards that were identified from the result of the hazard assessment. These are the hazards that will be addressed in the Hazard Mitigation Action Plan. FEMA “recognizes that a comprehensive strategy to mitigate the nation’s hazards cannot address natural hazards alone” and “that natural events can trigger technological disasters.” Technological hazards are distinct from natural hazards primarily in that they originate from human activity.

|                                               |                                     |
|-----------------------------------------------|-------------------------------------|
| Biological Event                              | Extreme Heat                        |
| Communications Failure/Infrastructure Failure | Flood                               |
| Destructive Hail                              | Power Outages                       |
| Drought                                       | Severe Thunderstorms/Damaging Winds |
| Earthquake                                    | Severe Winter Weather               |
| Erosion                                       | Tornado                             |
| Expansive Soils                               |                                     |

Each member of the Planning Team completed a Hazard and Vulnerability Assessment, located in Appendix E. This assessment estimated the potential impact each hazard would have on specific areas of the community. These areas include Location, Probability, Human Impact, Business Impact, Preparedness, Internal Repose and External Response.

Each Planning Team member was asked to base their responses on their experience. Definitions of the parameters were provided for each impact type and level. These definitions are also located in Appendix E.

- A collective risk score was calculated using the Community Risk and Impact Assessment for each hazard based on the given definitions. The higher the score the higher the collective risk to the City of Garland.
- The Community Risk and Impact Assessment also assessed the Severity of Impact each hazard

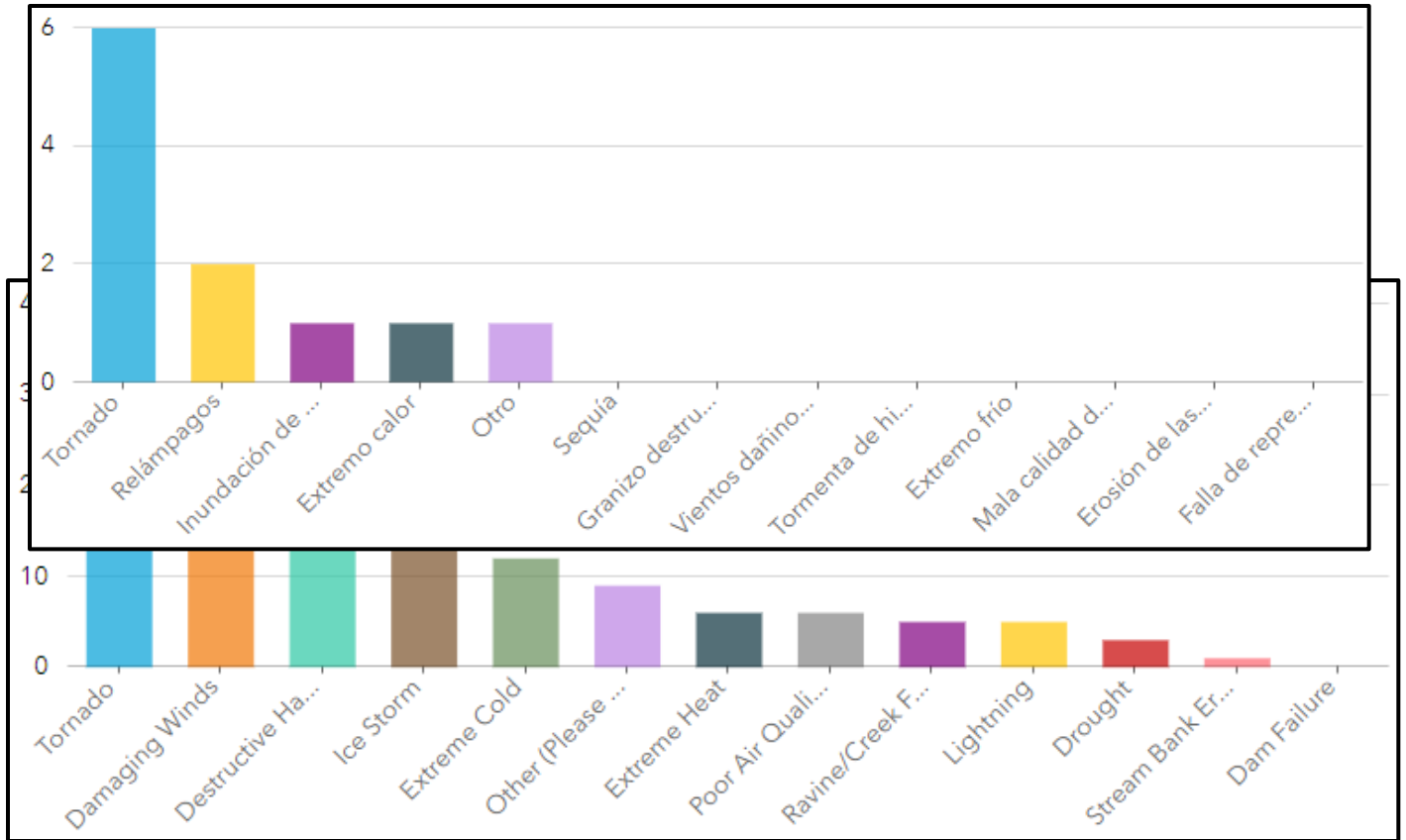
may have on the City of Garland and further prioritized the hazards to develop relevant mitigation actions.

- The Public Ranking represented in the Risk Summary table was derived from the results of the public survey (Figure 4.1).

The combined analysis is shown in the Hazard Risk Summary in Table 4.5 (Frequency, Severity of Impact, Risk Score, Planning Team Risk Ranking and Public Ranking)

**Figure 4.1 - Public Survey Question**

**Please select the natural hazard that you think is the highest threat to your neighborhood (Select one):**  
English Survey Results



**Table 4.2 - Public Survey Hazard Ranking**

| Hazard           | Combined Total |
|------------------|----------------|
| Tornado          | 42             |
| Damaging Winds   | 21             |
| Destructive Hail | 19             |

|                       |    |
|-----------------------|----|
| Ice Storms            | 15 |
| Extreme Cold          | 12 |
| Other                 | 10 |
| Lightning             | 7  |
| Extreme Heat          | 7  |
| Ravine/Creek Flooding | 6  |
| Poor Air Quality      | 6  |
| Drought               | 3  |
| Stream Bank Erosion   | 1  |
| Dam Failure           | 0  |

**TABLE 4.3 - Hazard Frequency Ranking**

| FREQUENCY     | CALCULATION                                          | PROBABILITY DEFINITION                  |
|---------------|------------------------------------------------------|-----------------------------------------|
| Highly Likely | NCDC Data Calculations > .8<br>Or continuous hazards | Event is probable in the next year.     |
| Likely        | NCDC Data Calculations > .4                          | Event is probable in the next 3 years.  |
| Occasional    | Previous Occurrence                                  | Event is probable in the next 6 years.  |
| Unlikely      | No unlikely hazards in HazMAP                        | Event is probable in the next 10 years. |

**TABLE 4.4 - Severity of Impact**

|                    |                                                                                                                                                |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Substantial</b> | Multiple deaths or complete shutdown of critical facilities and services for 1 week or more or more than 50% of property or residents impacted |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------|

|                |                                                                                                                                                                                               |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Major</b>   | Multiple injuries and/or illnesses or complete shutdown of critical facilities/services for at least one or more days but less than a week or more than 25% of property or residents impacted |
| <b>Minor</b>   | Injuries and/or illnesses do not result in permanent disability or critical facilities and services modified or more than 10 percent of property or residents impacted                        |
| <b>Limited</b> | Injuries and/or illnesses that are treatable with first aid or; Minor quality of life lost or no shutdown of critical facilities and services less than 5% of property or residents impacted  |

**Table 4.5 - Hazard Risk Summary**

| HAZARD                                               | FREQUENCY/<br>YEAR | SEVERITY<br>OF<br>IMPACT | RISK<br>SCORE | RISK<br>RANKING | PUBLIC<br>RANKING |
|------------------------------------------------------|--------------------|--------------------------|---------------|-----------------|-------------------|
| <b>Tornado</b>                                       | Highly Likely      | Substantial              | 54.4          | High            | High              |
| <b>Power Outages</b>                                 | Highly Likely      | Substantial              | 48.53         | High            | High              |
| <b>Severe Winter Weather/Extreme Cold</b>            | Highly Likely      | Substantial              | 48            | High            | High              |
| <b>Drought</b>                                       | Highly Likely      | Substantial              | 41.5          | High            | High              |
| <b>Communications Failure/Infrastructure Failure</b> | Highly Likely      | Substantial              | 41.07         | High            | High              |
| <b>Flood</b>                                         | Highly Likely      | Major                    | 35.97         | High            | Moderate          |
| <b>Extreme Heat</b>                                  | Likely             | Major                    | 35.93         | Moderate        | Moderate          |
| <b>Severe Thunderstorms/Damaging Winds</b>           | Highly Likely      | Minor                    | 26.8          | High            | Moderate          |
| <b>Erosion</b>                                       | Likely             | Minor                    | 26.6          | Moderate        | Moderate          |



|                         | Highly Likely | Minor   | 26    | Hazard Profiles | Severe |
|-------------------------|---------------|---------|-------|-----------------|--------|
| <b>Biological Event</b> | Highly Likely | Limited | 22.2  | High            | Low    |
| <b>Destructive Hail</b> | Highly Likely | Limited | 20.17 | High            | Low    |
| <b>Earthquake</b>       | Occasionally  | Limited | 17.73 | Low             | Low    |

---

## Tornado

### Hazard Description

A tornado is defined as a rapidly rotating vortex or funnel of air extending ground ward from a cumulonimbus cloud. Most of the time, vortices remain suspended in the atmosphere. Spawned from powerful thunderstorms, tornadoes can cause fatalities and devastate neighborhoods in seconds. A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with winds that can reach 300 miles per hour. According to the National Weather Service, the City of Garland is issued an average of 9-10 tornado watches per year.

### Location

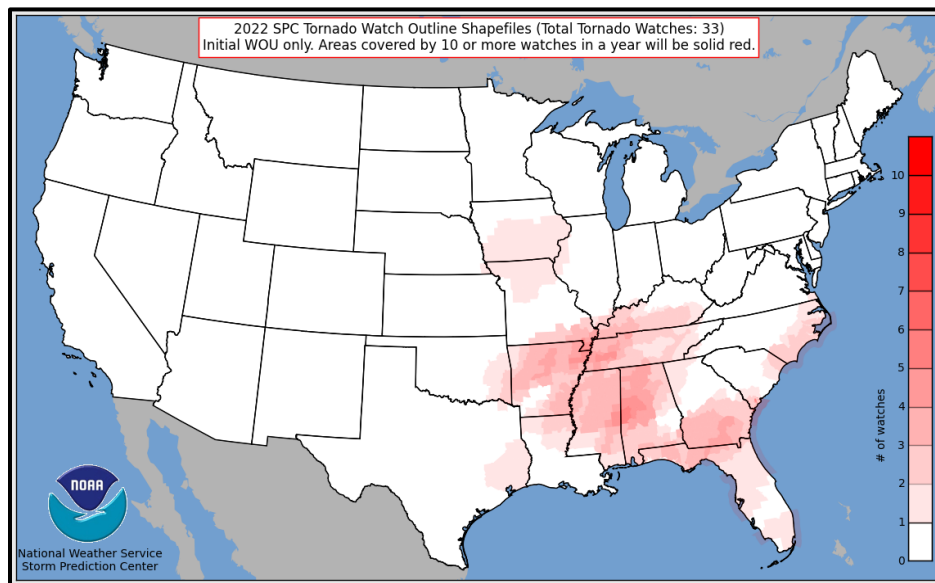
Due to the unpredictable nature of tornadoes, it is impossible to determine the exact area of future tornado occurrences. The entire planning area, the City of Garland, is equally vulnerable to tornadoes.

### Severity

The severity of a tornado can be determined by the Enhanced Fujita Scale. The Enhanced Fujita Scale rates tornadoes within the United States by estimating the amount of damage they cause. Table 5.2 provides a

better understanding of the possible magnitude of tornado events. The table correlates the Enhanced Fujita Rating with the wind speed and severity of damage tornadoes may cause. An EF-4 tornado has impacted Dallas County before and it is expected that an EF-5 will occur in Garland sometime in the future.

**Figure 5.1 - NOAA's Storm Prediction Center (2022)**



**Table 5.2 - Enhanced Fujita Scale**

| F Scale    | Character | Estimated Winds | Description                                                                                                                                                                |
|------------|-----------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Zero (F0)  | Weak      | 40-72 mph       | <b>Light Damage.</b> Some damage to chimneys; branches broken off trees, shallow-rooted trees uprooted, signboards damaged.                                                |
| One (F1)   | Weak      | 73-112 mph      | <b>Moderate damage.</b> Roof surfaces peeled off; mobile homes pushed foundations or overturned; moving autos pushed off road.                                             |
| Two (F2)   | Strong    | 113-157 mph     | <b>Considerable damage.</b> Roofs torn from frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light objects become projectiles. |
| Three (F3) | Strong    | 158-206 mph     | <b>Severe damage.</b> Roofs and some walls torn from well-constructed houses; trains overturned; most trees in forested area uprooted; heavy cars lifted and thrown.       |
| Four (F4)  | Violent   | 207-260 mph     | <b>Devastating damage.</b> Well-constructed houses leveled; structures with weak foundation blown some distance; cars thrown; large missiles generated.                    |

|           |         |             |                                                                                                                                                                                                         |
|-----------|---------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Five (F5) | Violent | 260-318 mph | <b>Incredible damage.</b> Strong frame houses lifted off foundations, carried considerable distances, and disintegrated; auto-sized missiles airborne for several hundred feet or more; trees debarked. |
|-----------|---------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

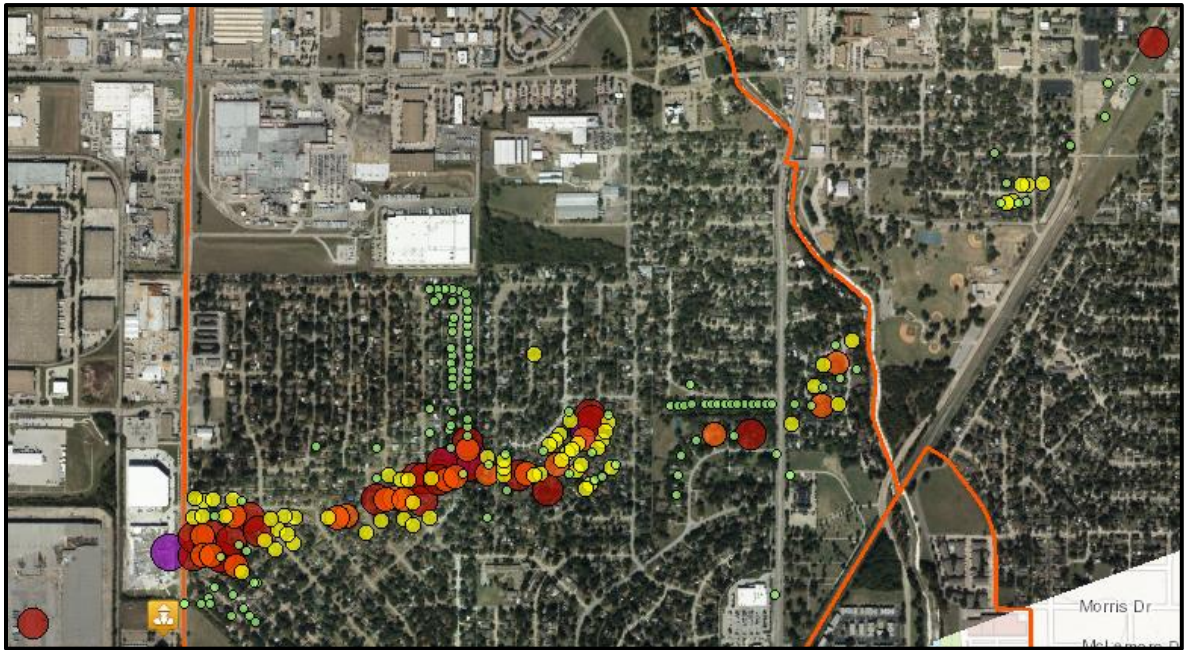
Source: <https://www.weather.gov/oun/efscale>

### Previous Occurrences

On December 26, 2015, an EF 4 tornado with wind speeds of 180 mph impacted the City of Garland. The tornado left a 13-mile long and 550-yard wide path of destruction. The tornado caused nine fatalities on the George Bush Turnpike and caused damage to 440 single-family homes, 753 apartment units, 17 commercial buildings and 2 churches. About 48,000 cubic yards of debris had to be removed from the impacted area and 26 animals rescued. This tornado cost the City of Garland roughly \$1,703,320.00.

Additionally, on October 20, 2019, an EF-2 tornado with wind speeds reaching 135 mph impacted the City of Garland. The tornado left a 2.48-mile long path of destruction. This tornado struck and damaged several Sears-complex buildings and destroyed a 225,000 square-foot building at 1801 South Shiloh, before it traveled east-northeast for six minutes through central Garland, damaging a total of 174 homes and businesses. Waste Services and the Parks Department collected over 1646 tons of debris from affected areas, without outside support or the need to activate contracts. Parks cleared and an additional 39 tons of debris from Central Park. This tornado cost the City of Garland roughly \$2,766,073.43 in public property damages.

**Figure 5.3 - Tornado Path**

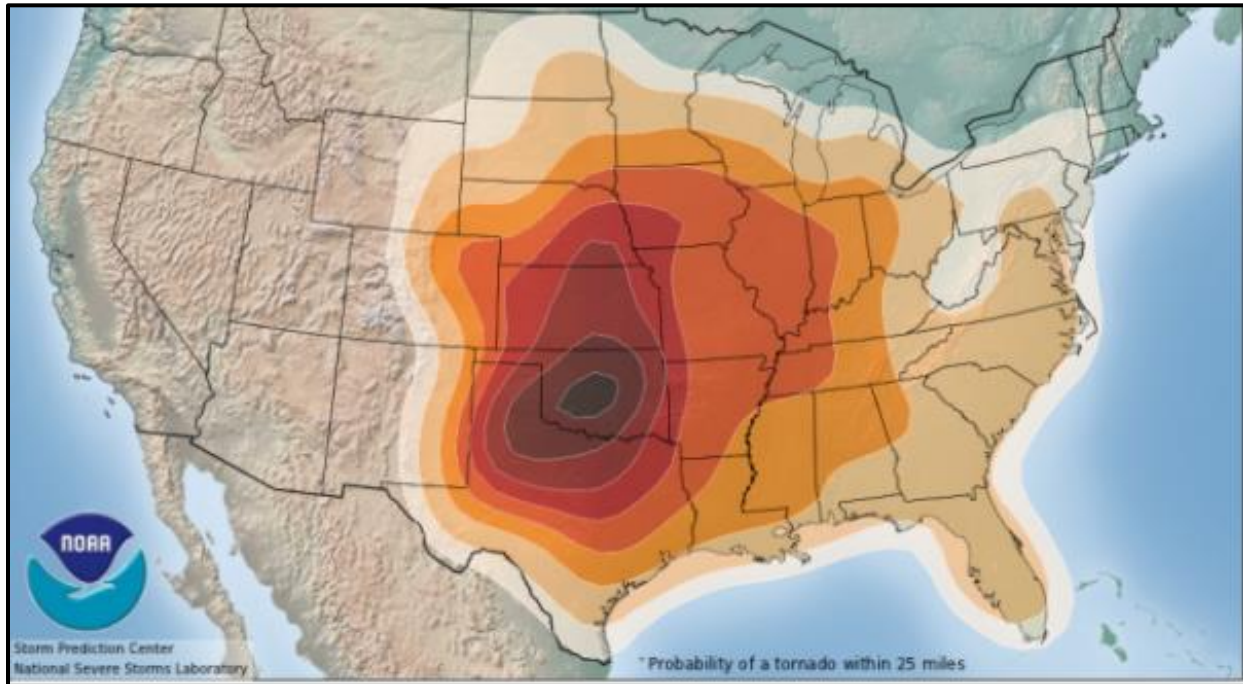


*Source: City of Garland GIS Department*

### **Probability of Future Events**

The City of Garland sits in “Tornado Alley,” and has a high vulnerability to tornadoes. Previous historical data in Table 5.5 shows ninety-seven tornadoes occurring within Dallas County since 1952. Data is not currently available specifically for the City of Garland. Calculations from this data suggests that a tornado will impact Dallas County 1.5 times a year. Therefore, according to Table 4.3 Hazard Frequency Ranking, it is high for a tornado to occur within Dallas County in the next year.

**Figure 5.4 – Tornado Probability**



*Source: National Oceanic and Atmospheric Administration*

### **Impact on Community**

A future event is obviously capable of doing substantial damage to the community. The city is the second largest in Dallas County with an estimated 246,018 residents as of April 1, 2020. Infrastructure within the region is also for the most part built out. This makes warning time critical. A large population of residents would have little time to react to such an event. A tornado of medium severity (EF2-EF3) would be capable of doing great damage in such a heavily populated area.

Table 5.5 shows previous tornado occurrences from the National Climatic Data Center for all of Dallas County, Texas between 1/1/1952 and 12/31/2021. 106 tornadoes have been reported in Dallas County. They have caused 23 deaths, 836 injuries, and an estimated \$2,554,473,030 in damage. Regionally, tornadoes have accounted for \$70.1 million in losses since 1996.

### **Summary of Vulnerability**

The entire planning area is equally vulnerable to tornadoes. A large tornado event is capable of producing winds that can reach 300 miles per hour. Damage paths can be in excess of one-mile-wide and 50 miles long. The Hazard Mitigation Planning Team has determined that the City of Garland is at high risk of substantial impacts from tornadoes due to the number of previous occurrences combined with the impacts of those occurrences. All residential neighborhoods, businesses, critical facilities, infrastructure and populations are vulnerable to tornadoes. In addition, there is 1 police station, 11 fire stations, 1 hospital, 4 DART Transit Centers, and 72 GISD schools at risk from impact of a tornado.

**Table 5.5 – Tornado Historical Data**

| COUNTY | DATE       | EVENT TYPE | EF SCALE | DEATHS | INJURIES | PROPERTY DAMAGE | CROP DAMAGE |
|--------|------------|------------|----------|--------|----------|-----------------|-------------|
| Dallas | 3/2/1952   | Tornado    | F0       | 0      | 0        | 2,500           | 0           |
| Dallas | 4/2/1957   | Tornado    | F3       | 10     | 200      | 2,500,000       | 0           |
| Dallas | 4/3/1957   | Tornado    | F0       | 0      | 0        | 250             | 0           |
| Dallas | 4/20/1957  | Tornado    |          | 0      | 0        | 30              | 0           |
| Dallas | 6/12/1957  | Tornado    | F3       | 0      | 0        | 2,500           | 0           |
| Dallas | 8/12/1958  | Tornado    | F2       | 0      | 0        | 2,500           | 0           |
| Dallas | 10/4/1959  | Tornado    | F3       | 0      | 0        | 250,000         | 0           |
| Dallas | 5/5/1960   | Tornado    | F0       | 0      | 0        | 0               | 0           |
| Dallas | 5/5/1960   | Tornado    | F0       | 0      | 0        | 2,500           | 0           |
| Dallas | 4/11/1961  | Tornado    | F2       | 0      | 3        | 25,000          | 0           |
| Dallas | 5/27/1963  | Tornado    | F0       | 0      | 0        | 0               | 0           |
| Dallas | 5/29/1963  | Tornado    | F0       | 0      | 0        | 0               | 0           |
| Dallas | 9/5/1963   | Tornado    |          | 0      | 0        | 0               | 0           |
| Dallas | 5/23/1966  | Tornado    | F2       | 0      | 0        | 25,000          | 0           |
| Dallas | 3/26/1967  | Tornado    | F0       | 0      | 0        | 0               | 0           |
| Dallas | 5/13/1968  | Tornado    | F1       | 0      | 0        | 250             | 0           |
| Dallas | 5/25/1968  | Tornado    | F0       | 0      | 1        | 25,000          | 0           |
| Dallas | 5/8/1969   | Tornado    | F0       | 0      | 0        | 0               | 0           |
| Dallas | 10/12/1969 | Tornado    | F3       | 0      | 2        | 2,500           | 0           |
| Dallas | 4/25/1970  | Tornado    | F2       | 0      | 12       | 2,500,000       | 0           |
| Dallas | 2/18/1971  | Tornado    | F1       | 0      | 0        | 2,500           | 0           |
| Dallas | 10/19/1971 | Tornado    | F1       | 0      | 2        | 250,000         | 0           |
| Dallas | 12/14/1971 | Tornado    | F1       | 0      | 1        | 2,500,000       | 0           |
| Dallas | 12/14/1971 | Tornado    | F1       | 0      | 1        | 25,000          | 0           |
| Dallas | 12/14/1971 | Tornado    | F1       | 0      | 0        | 250,000         | 0           |
| Dallas | 12/14/1971 | Tornado    | F2       | 0      | 4        | 2,500,000       | 0           |
| Dallas | 12/14/1971 | Tornado    | F1       | 0      | 4        | 2,500,000       | 0           |
| Dallas | 11/12/1972 | Tornado    | F1       | 0      | 0        | 25,000          | 0           |
| Dallas | 11/12/1972 | Tornado    | F1       | 0      | 0        | 250,000         | 0           |
| Dallas | 5/1/1973   | Tornado    | F1       | 0      | 0        | 25,000          | 0           |
| Dallas | 4/11/1974  | Tornado    | F2       | 0      | 0        | 250,000         | 0           |
| Dallas | 6/12/1974  | Tornado    |          | 0      | 0        | 0               | 0           |
| Dallas | 6/8/1975   | Tornado    | F0       | 0      | 0        | 0               | 0           |
| Dallas | 7/25/1975  | Tornado    | F0       | 0      | 0        | 0               | 0           |
| Dallas | 3/26/1976  | Tornado    | F1       | 0      | 0        | 250             | 0           |
| Dallas | 5/26/1976  | Tornado    | F3       | 0      | 1        | 2,500,000       | 0           |

|        |            |         |    |   |    |            |   |
|--------|------------|---------|----|---|----|------------|---|
| Dallas | 7/4/1976   | Tornado |    | 0 | 0  | 2,500      | 0 |
| Dallas | 4/20/1977  | Tornado | F2 | 0 | 0  | 25,000     | 0 |
| Dallas | 5/3/1979   | Tornado | F1 | 0 | 0  | 25,000     | 0 |
| Dallas | 5/3/1979   | Tornado | F1 | 0 | 0  | 25,000     | 0 |
| Dallas | 5/3/1979   | Tornado | F2 | 0 | 5  | 25,000,000 | 0 |
| Dallas | 5/3/1979   | Tornado | F0 | 0 | 0  | 250        | 0 |
| Dallas | 5/8/1981   | Tornado | F2 | 0 | 0  | 25,000     | 0 |
| Dallas | 10/13/1981 | Tornado | F1 | 0 | 0  | 0          | 0 |
| Dallas | 3/14/1982  | Tornado | F1 | 0 | 0  | 250,000    | 0 |
| Dallas | 4/16/1982  | Tornado | F0 | 0 | 0  | 0          | 0 |
| Dallas | 5/11/1982  | Tornado | F1 | 0 | 1  | 250,000    | 0 |
| Dallas | 3/23/1984  | Tornado | F1 | 0 | 0  | 25,000     | 0 |
| Dallas | 12/13/1984 | Tornado | F3 | 0 | 0  | 25,000,000 | 0 |
| Dallas | 12/13/1984 | Tornado | F3 | 0 | 28 | 25,000,000 | 0 |
| Dallas | 5/13/1985  | Tornado | F2 | 0 | 16 | 2,500,000  | 0 |
| Dallas | 3/16/1987  | Tornado | F0 | 0 | 0  | 0          | 0 |
| Dallas | 1/19/1990  | Tornado | F2 | 0 | 1  | 2,500,000  | 0 |
| Dallas | 10/7/1992  | Tornado | F0 | 0 | 0  | 2,500      | 0 |
| Dallas | 5/9/1993   | Tornado | F1 | 0 | 1  | 5,000,000  | 0 |
| Dallas | 4/25/1994  | Tornado | F0 | 0 | 0  | 50,000     | 0 |
| Dallas | 4/25/1994  | Tornado | F2 | 0 | 7  | 50,000,000 | 0 |
| Dallas | 4/25/1994  | Tornado | F4 | 3 | 48 | 500,000    | 0 |
| Dallas | 4/29/1994  | Tornado | F0 | 0 | 0  | 0          | 0 |
| Dallas | 10/21/1994 | Tornado | F0 | 0 | 0  | 0          | 0 |
| Dallas | 10/21/1994 | Tornado | F0 | 0 | 0  | 0          | 0 |
| Dallas | 10/21/1994 | Tornado | F0 | 0 | 0  | 0          | 0 |
| Dallas | 10/21/1994 | Tornado | F0 | 0 | 0  | 0          | 0 |
| Dallas | 3/25/1995  | Tornado | F0 | 0 | 0  | 0          | 0 |
| Dallas | 4/19/1995  | Tornado | F0 | 0 | 0  | 0          | 0 |
| Dallas | 4/19/1995  | Tornado | F1 | 0 | 8  | 6,000,000  | 0 |
| Dallas | 1/17/1996  | Tornado | F1 | 0 | 1  | 750,000    | 0 |
| Dallas | 1/17/1996  | Tornado | F2 | 0 | 0  | 750,000    | 0 |
| Dallas | 1/17/1996  | Tornado | F1 | 0 | 0  | 0          | 0 |
| Dallas | 1/17/1996  | Tornado | F1 | 0 | 0  | 0          | 0 |
| Dallas | 1/17/1996  | Tornado | F0 | 0 | 0  | 0          | 0 |
| Dallas | 1/17/1996  | Tornado | F0 | 0 | 0  | 0          | 0 |
| Dallas | 1/17/1996  | Tornado | F1 | 0 | 0  | 0          | 0 |
| Dallas | 10/21/1996 | Tornado | F1 | 0 | 7  | 3,000,000  | 0 |
| Dallas | 10/21/1996 | Tornado | F0 | 0 | 1  | 120,000    | 0 |

|        |            |         |     |    |     |               |       |
|--------|------------|---------|-----|----|-----|---------------|-------|
| Dallas | 3/28/2000  | Tornado | F2  | 0  | 0   | 0             | 0     |
| Dallas | 3/28/2000  | Tornado | F0  | 0  | 0   | 0             | 0     |
| Dallas | 9/5/2001   | Tornado | F1  | 0  | 0   | 125,000       | 0     |
| Dallas | 4/5/2003   | Tornado | F0  | 0  | 0   | 1,000         | 0     |
| Dallas | 4/25/2005  | Tornado | F0  | 0  | 0   | 0             | 0     |
| Dallas | 4/13/2007  | Tornado | EF0 | 0  | 0   | 50,000        | 0     |
| Dallas | 6/26/2007  | Tornado | EF0 | 0  | 0   | 60,000        | 0     |
| Dallas | 4/10/2008  | Tornado | EF1 | 0  | 0   | 1,000,000     | 0     |
| Dallas | 9/8/2010   | Tornado | EF1 | 0  | 0   | 200,000       | 0     |
| Dallas | 9/8/2010   | Tornado | EF2 | 0  | 1   | 750,000       | 0     |
| Dallas | 5/24/2011  | Tornado | EF1 | 0  | 0   | 150,000       | 0     |
| Dallas | 5/24/2011  | Tornado | EF0 | 0  | 0   | 0             | 0     |
| Dallas | 4/3/2012   | Tornado | EF2 | 0  | 10  | 400,000,000   | 3,000 |
| Dallas | 4/3/2012   | Tornado | EF0 | 0  | 0   | 4,000         | 0     |
| Dallas | 4/3/2012   | Tornado | EF0 | 0  | 0   | 100,000       | 0     |
| Dallas | 4/3/2012   | Tornado | EF0 | 0  | 0   | 150,000       | 0     |
| Dallas | 4/3/2012   | Tornado | EF0 | 0  | 2   | 300,000       | 0     |
| Dallas | 5/8/2014   | Tornado | EF0 | 0  | 0   | 80,000        | 0     |
| Dallas | 5/24/2015  | Tornado | EF1 | 0  | 0   | 100,000       | 0     |
| Dallas | 5/24/2015  | Tornado | EF1 | 0  | 0   | 600,000       | 0     |
| Dallas | 12/26/2015 | Tornado | EF3 | 0  | 0   | 1,370,000     | 0     |
| Dallas | 12/26/2015 | Tornado | EF4 | 10 | 468 | 26,000,000    | 0     |
| Dallas | 1/15/2017  | Tornado | EF0 | 0  | 0   | 120,000       | 0     |
| Dallas | 3/9/2019   | Tornado | EF0 | 0  | 0   | 10,000        | 0     |
| Dallas | 6/16/2019  | Tornado | EF0 | 0  | 0   | 20,000        | 0     |
| Dallas | 10/20/2019 | Tornado | EF3 | 0  | 0   | 1,550,000,000 | 0     |
| Dallas | 10/20/2019 | Tornado | EF2 | 0  | 0   | 400,000,000   | 0     |
| Dallas | 10/20/2019 | Tornado | EF1 | 0  | 0   | 10,000,000    | 0     |
| Dallas | 1/10/2020  | Tornado | EF0 | 0  | 0   | 15,000        | 0     |
| Dallas | 5/16/2021  | Tornado | EF0 | 0  | 0   | 2,000         | 0     |
| Dallas | 5/16/2021  | Tornado | EF1 | 0  | 0   | 50,000        | 0     |

Source: NOAA Storm Events Database

## Severe Winter Weather/Extreme Cold

### Hazard Description

Severe winter weather can be a variety of precipitation that forms at low temperatures such as heavy snowfall, sleet or ice. Many winter depressions give rise to exceptionally heavy rain and widespread flooding. Conditions worsen if the precipitation is frozen.

### Location

Due to the unpredictable nature of winter storms, it is impossible to determine the exact area of their future occurrences. The entire planning area, City of Garland, is equally subject to severe winter weather.

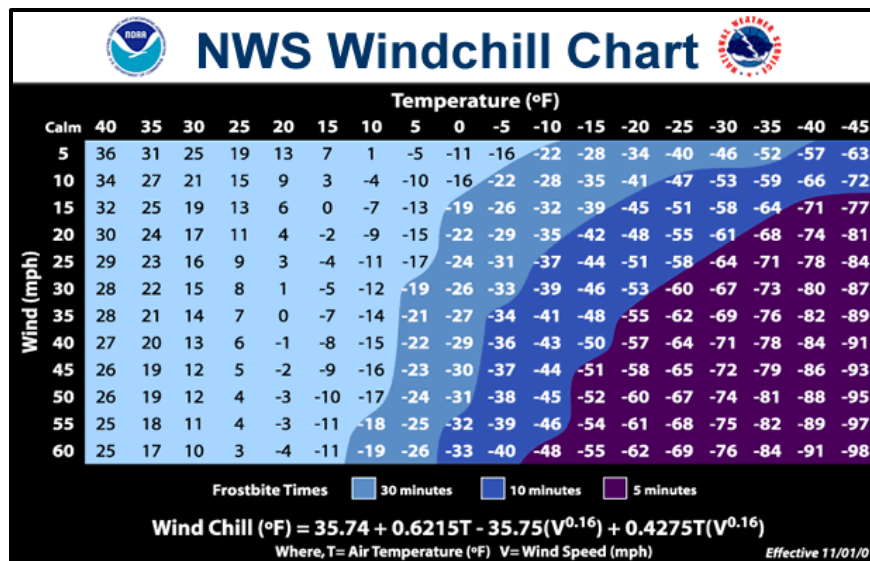
### Severity

Table 5-10 shows the National Weather Service Wind Chill Temperature (WCT) index. It uses advances in science, technology, and computer modeling to provide an accurate, understandable, and useful formula for calculating the dangers from winter winds and freezing temperatures. The index:

- Calculates wind speed at an average height of five feet
- Incorporates heat transfer theory which is heat loss from the body to its surroundings during cold windy days
- Lowers the calm wind threshold to 3 mph
- Uses a consistent standard for skin tissue resistance
- Assumes no impact from the sun (i.e., clear night sky)

The lowest temperature recorded in Garland was 2 ° in 1949; 0.8 inches of snow fell as well. Although temperatures are increasing, severe winter weather remains a threat to Garland and it is possible that temperatures could reach record lows again in the future.

Table 5.6



## **Previous Occurrences**

Several major severe winter weather events have impacted Garland over the past few years. Most recently, a cold front moved into the Dallas area beginning February 10, 2021. With this cold air in place, lingering precipitation the following day fell as sleet and freezing rain across the northwestern counties. Freezing drizzle occurred across much of the region, which led to a thin coating of nearly invisible ice on many roadways. School districts were closed for the duration of the event and most municipal courts and solid waste services had to be cancelled or postponed.

In 2013, Winter Storm Cleon delivered snow, sleet, and freezing rain in Dallas County from December 1, 2013 through the morning of December 7, 2013. Garland had the following impacts from this winter weather event: approximately 200 reports of downed trees, 3,500 power outages, 7 house fires, City facility walkways iced over, one fire station could not take calls due to affected power lines, City services and staffing levels were modified, Garland Independent School District closed early, Dallas Area Rapid Transit (DART) light rails were not operational and major increases of vehicle accidents.

## **Probability of Future Events**

Severe winter weather within Dallas County occurs several times a year, although the severity of impact varies. Previous historical data in Table 5.7 shows 67 severe winter weather events have occurred within Dallas County since 1996. Data is not currently available specifically for the City of Garland. Calculations from this data suggests that a severe winter weather event will impact Dallas County 2.58 times a year. Therefore, according to Table 4.3 Hazard Frequency Ranking, it is high for a severe winter weather event to occur within the next year.

## **Impact on Community**

City of Garland residents are generally unfamiliar with snow, ice and freezing temperatures. When temperatures fall below freezing this kills tender vegetation, such as flowering plants and citrus fruit crops. Wet snow and ice rapidly accumulates on trees with leaves, causing the branches to snap under the load. Motorists are unaccustomed to driving on slick roads and accidents increase exponentially. Some buildings are poorly insulated or lack heat altogether, forcing residents to live in freezing temperatures. While snowstorms are not frequent in Texas, ice storms create dangerous driving conditions causing an increase in accidents. Pipes freeze and leave residents without water and damage to their homes. Power lines and trees snap due to the weight of the ice on them leaving residents unable to run the heater in their homes. Because more than half of residents are impacted by large severe winter weather, the Planning Team has determined that impacts are substantial.

The biggest concern with severe winter weather is the previously stated nature of residents being unaccustomed to it. Although Dallas County is impacted by some form of severe winter weather several times a year, large incidents are not as frequent. This brings up safety concerns, as some are not educated on how to properly deal with large amounts of snow and ice. According to the National Climatic Data Center, 58 severe winter weather events have been reported in Dallas County, Texas between 1/1/1996 and 12/31/2021. They have caused three deaths, and caused an estimated \$20,280,000 in property damage. Regionally, winter weather has accounted for \$16.7 million in losses since 1996.

**Table 5.7 – Winter Weather Historical Data**

| <b>COUNTY</b> | <b>DATE</b> | <b>EVENT TYPE</b> | <b>DEATHS</b> | <b>PROPERTY DAMAGE</b> |
|---------------|-------------|-------------------|---------------|------------------------|
| Dallas        | 2/1/1996    | Heavy Snow        | 0             | 0                      |
| Dallas        | 11/24/1996  | Winter Storm      | 0             | 0                      |
| Dallas        | 1/6/1997    | Heavy Snow        | 0             | 0                      |
| Dallas        | 1/12/1997   | Winter Weather    | 0             | 0                      |
| Dallas        | 1/14/1997   | Winter Weather    | 0             | 0                      |
| Dallas        | 12/22/1998  | Ice Storm         | 0             | 0                      |
| Dallas        | 1/25/2000   | Winter Storm      | 1             | 0                      |
| Dallas        | 12/12/2000  | Winter Storm      | 0             | 0                      |
| Dallas        | 12/25/2000  | Winter Storm      | 0             | 0                      |
| Dallas        | 12/31/2000  | Winter Storm      | 0             | 0                      |
| Dallas        | 1/1/2001    | Heavy Snow        | 0             | 0                      |
| Dallas        | 11/28/2001  | Ice Storm         | 0             | 0                      |
| Dallas        | 2/5/2002    | Winter Storm      | 0             | 0                      |
| Dallas        | 3/2/2002    | Winter Storm      | 0             | 0                      |
| Dallas        | 2/24/2003   | Winter Storm      | 0             | 0                      |
| Dallas        | 2/14/2004   | Heavy Snow        | 0             | 0                      |
| Dallas        | 12/22/2004  | Winter Weather    | 0             | 0                      |
| Dallas        | 12/7/2005   | Winter Storm      | 0             | 0                      |
| Dallas        | 2/18/2006   | Winter Weather    | 0             | 0                      |
| Dallas        | 11/30/2006  | Winter Storm      | 0             | 20,000                 |
| Dallas        | 1/13/2007   | Ice Storm         | 0             | 50,000                 |
| Dallas        | 1/17/2007   | Winter Weather    | 0             | 20,000                 |
| Dallas        | 2/1/2007    | Winter Weather    | 0             | 0                      |
| Dallas        | 12/15/2008  | Winter Weather    | 0             | 0                      |
| Dallas        | 12/23/2008  | Winter Weather    | 0             | 0                      |
| Dallas        | 1/5/2009    | Winter Weather    | 0             | 35,000                 |
| Dallas        | 1/27/2009   | Ice Storm         | 1             | 300,000                |
| Dallas        | 12/24/2009  | Winter Weather    | 0             | 250,000                |
| Dallas        | 1/7/2010    | Winter Weather    | 0             | 700,000                |
| Dallas        | 2/11/2010   | Heavy Snow        | 0             | 16,000,000             |
| Dallas        | 3/20/2010   | Winter Weather    | 0             | 100,000                |
| Dallas        | 2/1/2011    | Ice Storm         | 0             | 500,000                |
| Dallas        | 2/3/2011    | Heavy Snow        | 0             | 150,000                |
| Dallas        | 12/5/2013   | Winter Storm      | 0             | 2,000,000              |
| Dallas        | 2/10/2014   | Winter Weather    | 0             | 0                      |
| Dallas        | 2/22/2015   | Winter Storm      | 0             | 25,000                 |
| Dallas        | 3/4/2015    | Winter Weather    | 0             | 0                      |
| Dallas        | 3/4/2015    | Sleet             | 0             | 0                      |
| Dallas        | 3/4/2015    | Sleet             | 0             | 0                      |
| Dallas        | 3/4/2015    | Heavy Snow        | 0             | 0                      |
| Dallas        | 3/5/2015    | Winter Weather    | 0             | 0                      |

|        |            |                |   |         |
|--------|------------|----------------|---|---------|
| Dallas | 3/5/2015   | Winter Weather | 0 | 0       |
| Dallas | 3/5/2015   | Sleet          | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 3/5/2015   | Heavy Snow     | 0 | 0       |
| Dallas | 12/7/2017  | Winter Weather | 0 | 0       |
| Dallas | 12/31/2017 | Winter Weather | 0 | 10,000  |
| Dallas | 1/16/2018  | Winter Weather | 0 | 0       |
| Dallas | 2/11/2018  | Winter Weather | 0 | 0       |
| Dallas | 2/28/2019  | Winter Weather | 0 | 10,000  |
| Dallas | 2/28/2019  | Winter Weather | 0 | 0       |
| Dallas | 2/10/2021  | Winter Weather | 0 | 100,000 |
| Dallas | 2/11/2021  | Winter Weather | 0 | 10,000  |
| Dallas | 2/13/2021  | Winter Storm   | 1 | 0       |

### Summary of Vulnerability

The entire planning area is equally vulnerable to severe winter weather. The Planning Team has determined that the City is at high risk of substantial impact from severe winter weather. The biggest concern to the planning area is maintaining power to structures, as winter weather may cause disruptions. The other concern is the citizen's inexperience in preparing for the highly likely severe winter weather events. Severe winter weather has an increased impact on vulnerable populations and properties, including the elderly, transients and those in homes without adequate heating capabilities. These storms would also have an increase vulnerability on all overhead utility lines, streets and highways, especially overpasses. Electric services may be interrupted due to impacted overhead utility lines being damaged. In addition, there is 1 police station, 11 fire stations, 1 hospital, 4 DART Transit Centers, and 72 GISD schools at risk of impact from severe winter weather.

## Biological Event

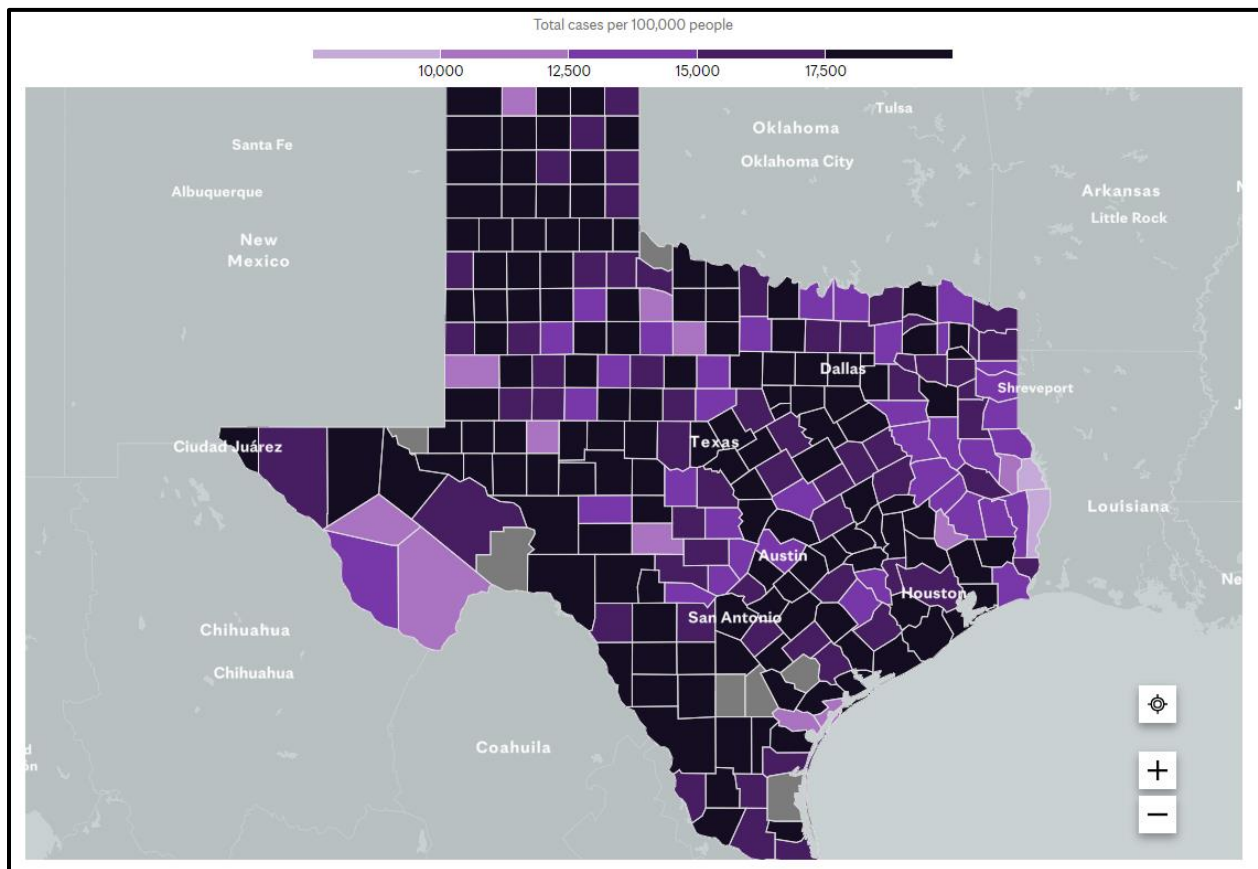
### Hazard Description

In this section, biological hazards refer to an accidental or naturally occurring disease outbreak of known or unknown origin that poses a threat to the health of living organisms, primarily that of humans. This definition also includes those biological agents found in the environment, or diagnosed in animals, that have the potential for transmission to humans. Examples of biological events include but are not limited to: COVID-19, Zika, H1N1, Ebola, and West Nile.

### Location

Because of the mobile nature of populations, it is impossible to map the location of biological events. The City of Garland is equally subject to biological events.

**Figure 5.9**

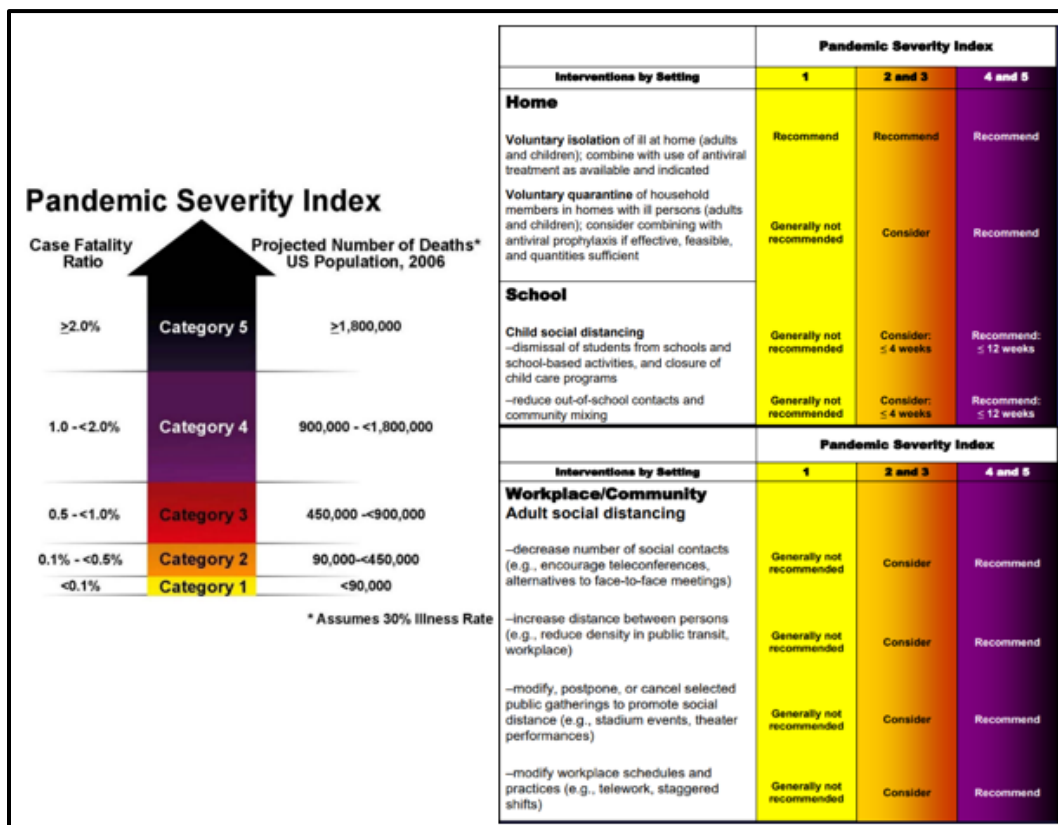


Source: Mayo Clinic

## Severity

The Center for Disease Control and Prevention (CDC) determines the severity of pandemics and communicable disease outbreaks based on a measurement system known as the Pandemic Severity Index. The main criteria used to measure pandemic severity will be the case-fatality ratio (CFR), the percentage of deaths out of the total reported cases of the disease. Accompanying the Pandemic Severity Index is the Interventions by setting table that can be used as a guide for mitigation actions during a biological event. In Table 5.31 below, these tools are illustrated. Several biological events have affected Garland and it is expected that another occur in the future.

Table 5.10



Source: <https://www.cdc.gov/media/pdf/MitigationSlides.pdf>

## Previous Occurrences

Texas Governor Greg Abbott issued a disaster proclamation on March 13, 2020, certifying under Section 418.014 of the Texas Government Code that the novel coronavirus (COVID-19) poses an imminent threat of disaster for all counties in the State of Texas. As of March 14, 2022, the City of Garland has confirmed 60,095 positive COVID-19 cases. Of those cases, 59,123 have recovered and 743 have died. COVID-19 is an ongoing issue worldwide.

On October 17, 2014, the City of Garland Public Health Department reported that three cases of Ebola had been confirmed in Dallas County since September 28. At least five contacts in Garland were monitored by Dallas County Health and Human Services. These contacts were on an airplane with a nurse that tested positive for the virus. One of the contacts in Garland was asked by Dallas County Health to stay home for 21 days, was monitored twice a day by phone, and was told not to travel. The four additional Garland contacts were considered extremely low risk. They self-monitored twice a day by phone. Approximately 177 people in the Dallas area fell under some type of quarantine.

### **Probability of Future Events**

The occurrence of a biological event is largely impossible to predict, due to the mobile nature of humans and the speed at which a pathogen can spread and mutate. Three biological events have occurred within Dallas County, with a direct impact on the City of Garland, since 2009. Calculations from this data suggests that a biological event will occur in Dallas County and subsequently the City of Garland, 0.4 times a year. Therefore, according to Table 4.3 Hazard Frequency Ranking, it is highly likely a biological event will occur in Garland within the next three years.

### **Impact on Community**

The potential impact of loss of life and illness from a large biological event is major. Government service levels could potentially be modified to prevent the spread of illness.

### **Summary of Vulnerability**

The entire planning area is equally vulnerable to biological events. The probability of a biological event occurring in Garland to some extent within the next three years is highly likely. This type of hazard has the potential to cause major impacts to the lives of Garland residents. These factors make a biological hazard a high risk for the City of Garland. The most vulnerable individuals to biological agents would be those who live and work in areas with frequent interpersonal contact, those with compromised immune systems, the young, the elderly, and individuals who travel frequently. There is 1 police station, 11 fire stations, 1 hospital, 4 DART Transit Centers, and 72 GISD schools at risk of impact from biological event.

# Flood

## Hazard Description

Floods are the most prevalent hazard in the United States. A flood is defined as two or more acres of dry land or two or more properties that are covered by water temporarily. There are three types of flooding that occur in Garland: river, inland and flash flooding. Two types of floods that do not affect Garland are coastal floods and storm surges.

A river flood occurs when water levels rise over the top of riverbanks due to excessive rain or persistent thunderstorms over the same area for extended periods.

Inland flooding occurs when moderate precipitation accumulates over several days where intense precipitation falls over a short period.

A flash flood is caused by heavy or excessive rainfall in a short period, generally less than six hours. Flash floods are usually characterized by raging torrents after heavy rains that rip through riverbeds and urban streets. They can occur within minutes or a few hours of excessive rainfall. They can also occur when no rain has fallen in the area or after a levee or dam has failed. Flash floods are particularly dangerous in urban areas and cause the greatest damage. As more farmlands and wooded areas are converted to urban and suburban areas, the amount of surface area available for water infiltration into the soils decrease. Home sites, parking lots, buildings, and roadways all decrease the surface area of soil on the Earth's surface.

**Figure 5.11**

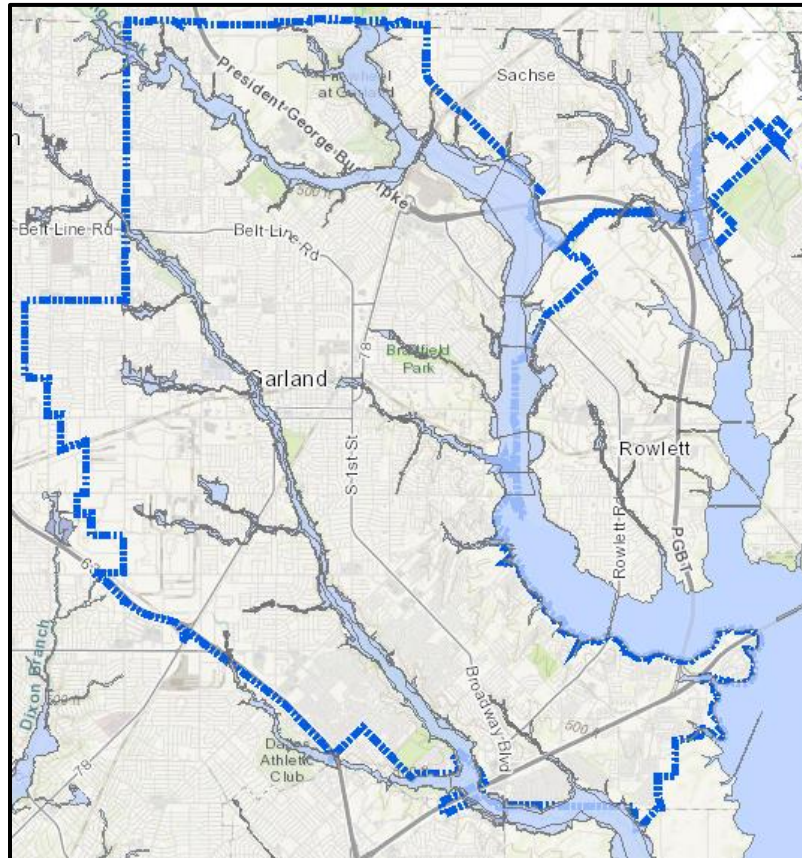


*Garland, TX – 2021*

## Location

Figure 5.12 shows the City of Garland in relation to the 100 and 500-year floodplains. FEMA has published Flood Insurance Rate Maps (FIRM's) showing approximately 2,400 acres of the 100-year floodplain primarily along Duck Creek, Rowlett Creek, Spring Creek, Mills Branch and their tributaries.

**Figure 5.12**



*Source: City of Garland GIS Department*

## Severity

Flood severities are determined by Federal Emergency Management Agency (FEMA) flood zone designations. Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map. Each zone reflects the severity of impact or type of flooding in the area. Only a few small areas within the City of Garland are in Zone A. Historically, the worst flood Garland has seen was in 1990 and 1991 when water levels rose to 3 feet.

**Table 5.13 - FEMA Flood Zones**

**Moderate to Low Risk**

| <b>Zone</b> | <b>Description</b>                                                                                                                                                                                                                                                                                                                              |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| B and X     | Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. B Zones are used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than a foot or drainage areas less than one square mile. |
| C and X     | Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that do not warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.               |

**High Risk Areas**

| <b>Zone</b> | <b>Description</b>                                                                                                                                                                                                                                                                                                                                                |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A           | Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas. No depths or base flood elevations are shown within these zones.                                                                                                                          |
| AE          | The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.                                                                                                                                                                                                                                  |
| A1-30       | These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format).                                                                                                                                                                                                                                       |
| AH          | Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.                                         |
| AO          | River or stream flood hazard areas and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths are shown within these zones.                                      |
| AR          | Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations. |

|     |                                                                                                                                                                                                                                  |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A99 | Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones. |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### **High Risk – Coastal Areas**

| <b>Zone</b> | <b>Description</b>                                                                                                                                                                                                                                                                                  |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V           | Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones.                                                   |
| VE, V1-30   | Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones. |

#### **Undetermined Risk Areas**

| <b>Zone</b> | <b>Description</b>                                                                                                                                                     |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D           | Areas with possible but undetermined flood hazards. A flood hazard analysis has not been conducted. Insurance rates are commensurate with the uncertainty of the risk. |

*Source: FEMA*

#### **Previous Occurrences**

Since 2017, the City of Garland's Street Department has responded to 97 calls for service regarding flooding. Damaging flood events occurred on Duck Creek in 1949, 1957, 1962, 1966, 1969, 1971, 1977, 1981, 1989, 1990, 1991, 2015 and 2021. These floods caused considerable damage. Following the flooding events of 1990 and 1991, the City of Garland collaborated with the United States Army Corps of Engineers to complete a channel improvement project for Duck Creek. This project was complete in 1998. As a result, the base flood elevation was lowered to a level where 514 structures now have the ground floor situated above the base flood elevation. The Letter of Map Revision (LOMR) indicates this change and was finalized on February 5, 2003. Since this improvement to Duck Creek, flood events have lowered dramatically, until 2015 when two flood incidents took the life of one person attempting to cross a flooded road. This was a result of an estimated 100-year flood. However, damage would have been much greater had the Army Corps of Engineers channel improvement project not been completed. Since the 2015 incidents, locking floodgates have been installed across frequently flooded roadways to minimize future loss of life to residents and increase safety.

### Probability of Future Events

The City of Garland is subject to flooding from Duck Creek, Rowlett Creek, Spring Creek, Mills Branch, and their tributaries. The planning area is subject to intense local thunderstorms of short duration and general storms extending over periods of several days. Flooding results primarily from stream overflow caused by rainfall runoff, ponding, and sheet flow. Most of the flooding events occur in the spring and summer months. However, severe flooding can be produced by rainfall at any time. Previous historical data in Table 5.14 shows 16 flood events have occurred within Garland since 1998. Calculations from this data suggests that a flood event will impact Garland 0.67 times a year. Therefore, according to Table 4.3 Hazard Frequency Ranking it is highly likely for a flood event to occur within the next year.

### Impact on Community

A flood of the same magnitude as that of the 1991 Duck Creek flooding event would cause significantly less damage than it did before the channel-widening project. Table 5.14 shows previous flood occurrence data from the NCD. Sixteen flood events have been reported in Garland between 1/1/1998 and 12/31/2021. Those floods caused three deaths. The May 2015 flood caused an estimated \$8 million dollars in property damage impacting over 100 homes and caused \$884,506.19 of damage to City facilities and infrastructure. Regionally, riverine flooding has accounted for \$68.4 million in losses since 1996.

**Table 5.14 - Flood Historical Data**

| COUNTY | CITY    | DATE       | EVENT TYPE  | DEATHS | PROPERTY DAMAGE | CROP DAMAGE |
|--------|---------|------------|-------------|--------|-----------------|-------------|
| Dallas | Garland | 9/16/1998  | Flash Flood | 0      | 0               | 0           |
| Dallas | Garland | 12/4/1998  | Flash Flood | 1      | 0               | 0           |
| Dallas | Garland | 12/4/1998  | Flash Flood | 0      | 0               | 0           |
| Dallas | Garland | 6/11/2000  | Flash Flood | 0      | 0               | 0           |
| Dallas | Garland | 4/7/2002   | Flash Flood | 0      | 0               | 0           |
| Dallas | Garland | 10/18/2002 | Flash Flood | 0      | 0               | 0           |
| Dallas | Garland | 1/3/2005   | Flash Flood | 0      | 0               | 0           |
| Dallas | Garland | 6/26/2007  | Flash Flood | 1      | 0               | 0           |
| Dallas | Garland | 6/27/2007  | Flash Flood | 0      | 0               | 0           |
| Dallas | Garland | 9/9/2007   | Flash Flood | 0      | 25,000          | 0           |
| Dallas | Garland | 3/18/2008  | Flash Flood | 0      | 15,000          | 0           |
| Dallas | Garland | 5/29/2015  | Flash Flood | 0      | 0               | 0           |

|        |         |           |             |   |           |   |
|--------|---------|-----------|-------------|---|-----------|---|
| DALLAS | Garland | 5/29/2015 | Flash Flood | 0 | 8,884,506 | 0 |
| DALLAS | Garland | 5/30/2015 | Flash Flood | 0 | 0         | 0 |
| DALLAS | Garland | 6/6/2021  | Flash Flood | 1 | 0         | 0 |
| DALLAS | Garland | 6/7/2021  | Flash Flood | 0 | 0         | 0 |

### **Summary of Vulnerability**

The principal flood problem in the City of Garland is the low-lying area adjacent to Duck Creek. The Duck Creek watershed is approximately 96% developed with only a small portion of the watershed available for future development. The United States Army Corps of Engineers (USACE) considers existing and future urbanization conditions to remain the same for the Duck Creek basin. The mitigation enhancements to the City include eight floodgates and an aggressive floodplain management program has lessened the impact of a flood event. The Hazard Mitigation Planning Team has determined that the City of Garland is at high risk of major impacts from floods due to the number of previous occurrences, combined with the impacts of those occurrences, severe thunderstorms the area sustains and heavy development surrounding Garland. There are 474 total flood loss claims (252 properties) in Garland valued at roughly \$10.1 million, which are the most vulnerable to flooding. In addition to these parcels, there is 1 police station, 11 fire stations, 1 hospital, 4 DART Transit Centers, and 72 GISD schools at risk of impact from flooding.

## National Flood Insurance Program Overview

### Summary

Nearly 20,000 communities across the United States and its territories participate in the NFIP by adopting and enforcing floodplain management ordinances. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities. Participation in the NFIP is voluntary.

Flood insurance is designed to provide an alternative to disaster assistance and reduce the costs of repairing damage to buildings and their contents caused by floods. Flood damage is reduced by nearly \$1 billion a year through communities implementing sound floodplain management requirements and property owners purchasing flood insurance. Additionally, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance.

### Local Participation in the NFIP

Based on TCEQ records, the City of Garland enrolled in the NFIP Emergency Program on August 8, 1970 and the Regular Program on April 16, 1971. As of March 2021, the City of Garland had 544 active flood insurance policies within the community. Between January 1, 1978 and March 1, 2021 the City of Garland had 474 total flood losses, damage valued roughly at \$10.1 million dollars. Table 5.16 shows all flood losses for the City of Garland. Through the Building Inspections and Engineering Department, Garland will continue to comply with NFIP. Garland will meet FEMA ordinances regarding new developments and will enforce ordinances and regulations in regards to existing developments.

**Table 5.15**

| <b>Federal Emergency Management Agency Loss Statistics from 1/1/1978 through 3/2/2022</b> |              |               |                    |             |              |
|-------------------------------------------------------------------------------------------|--------------|---------------|--------------------|-------------|--------------|
| <b>Community</b>                                                                          | <b>Total</b> | <b>Closed</b> | <b>Open Losses</b> | <b>CWOP</b> | <b>Total</b> |
| Garland                                                                                   | 496          | 474           | 0                  | 22          | \$10,101,863 |

### Repetitive Loss Properties

- Two or more claims of more than \$1,000 paid by the NFIP within any 10-year period since 1978.

To focus resources on those properties that represent the best opportunities for mitigation, Congress defined a subset called “Severe Repetitive Loss Properties” defined below. Garland has 56 repetitive loss properties, three of which are commercial properties.

### Severe Repetitive Loss Properties

- Four or more claims of more the \$5,000; or
- Two to three claims that cumulatively exceed the building’s value

### Assessing Vulnerability: Addressing Repetitive Loss

The Federal Emergency Management Agency (FEMA) produces statistics on community flood losses. Losses are determined by claims made to the National Flood Insurance Program (NFIP). The following section is an assessment of claims to the NFIP, and properties within the City of Garland, which are designated as repetitive loss structures.

Table 5.16 provides a summary of residential repetitive flood insurance claims for individual streets in Garland that include repetitive loss properties. Address data about individual sites has been omitted for confidentiality. The loss history includes all flood claims paid on an insured property, regardless of any change of ownership. The data begins at the building's construction or back to 1978 if the building was constructed prior to 1978. The history includes the number of repetitive loss properties on each street, average total amount paid to each structure, date of the last loss, and the average estimated structure value.

**Table 5.16 - City of Garland Repetitive Loss Properties**

| Street Name         | Number of Properties with Losses | Total Number of Losses | Date of Last Loss | Average Amount Paid Per Structure | Average Structure Value |
|---------------------|----------------------------------|------------------------|-------------------|-----------------------------------|-------------------------|
| Ridgedale Dr.       | 13                               | 37                     | 04/16/1990        | \$29,004.62                       | \$205,084               |
| Forest Lane         | 3                                | 9                      | 05/28/2015        | \$29,592.44                       | \$118,278               |
| Rock Creek          | 3                                | 6                      | 04/12/1991        | \$17,588.75                       | \$385,918               |
| Pleasant Valley Rd. | 1                                | 21                     | 09/22/2018        | \$28,001.28                       | \$300,702               |
| University Dr.      | 2                                | 5                      | 04/12/1991        | \$4,032.67                        | \$101,250               |
| Frances Dr.         | 1                                | 3                      | 05/29/2015        | \$27,455.59                       | \$204,669               |
| St. George          | 1                                | 2                      | 04/15/1990        | \$2,860.99                        | \$73,600                |
| W. Centerville Rd.  | 1                                | 4                      | 06/11/2000        | \$7,690.44                        | \$46,170                |
| Iroquois            | 1                                | 2                      | 05/05/1995        | \$3,611.98                        | \$121,000               |
| Rollingridge Ln.    | 1                                | 2                      | 05/29/2015        | \$33,590.57                       | \$149,310               |
| Fieldside Dr.       | 1                                | 2                      | 05/29/2015        | \$58,612.13                       | \$186,206               |
| Carroll Dr.         | 1                                | 5                      | 06/21/2000        | \$10,354.15                       | \$4,216,875             |
| Newcastle Dr.       | 1                                | 2                      | 04/12/1991        | \$10,083.27                       | \$54,000                |
| Brookview Dr.       | 1                                | 3                      | 04/11/1991        | \$8,589.00                        | \$83,200                |
| Rainier Circle      | 3                                | 6                      | 04/11/1991        | \$17,023.88                       | \$277,900               |
| Glenbrook Dr.       | 25                               | 99                     | 06/13/2015        | \$43,972.61                       | \$231,831               |

FEMA – Garland Repetitive Loss Properties 08-24-2021

# Earthquake

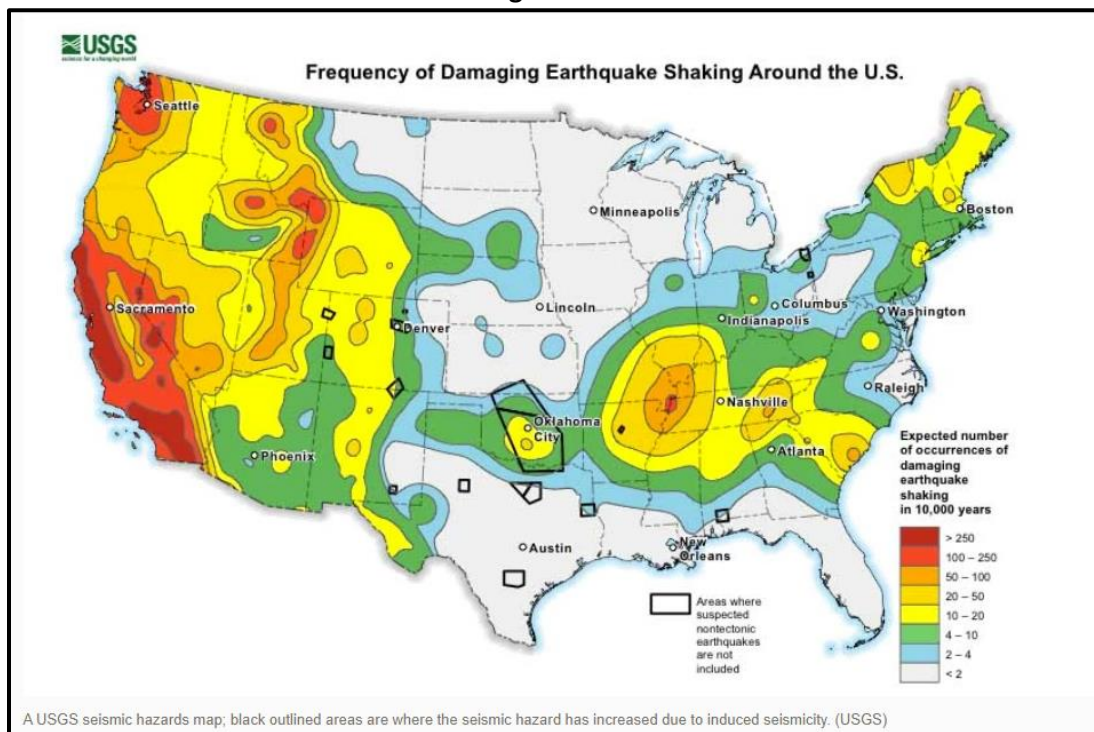
## Hazard Description

Earthquakes are sudden rolling or shaking events caused by movement under the earth's surface. Earthquakes happen along cracks in the earth's surface, called fault lines, and can be felt over large areas. They usually last less than one minute but can cause substantial damage to infrastructure in a short amount of time.

## Location

All 50 states and five U.S. territories are at some risk for earthquakes and they can happen at any time of the year. The most significant hazards from induced seismicity are in six states, listed in order from highest to lowest potential hazard: Oklahoma, Kansas, Texas, Colorado, New Mexico and Arkansas. Oklahoma and Texas have the largest populations exposed to induced earthquakes. The City of Garland is equally subject to earthquakes.

Figure 5.17



## Severity

Texas earthquakes have not exceeded a magnitude of 6.0, and most have been fairly small and caused little to no damage. The largest one in Dallas County was a 3.6 on the Richter scale. Similar sized earthquakes are expected in the future. Table 5.18 combines the Mercalli and Richter scale, which allows planners to assess the impact earthquakes have.

**Table 5.18 - Mercalli and Richter scale**

| Intensity | Shaking     | Description/Damage                                                                                                                                                                                                                                             |
|-----------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I         | Not felt    | Not felt except by a very few under especially favorable conditions.                                                                                                                                                                                           |
| II        | Weak        | Felt only by a few persons at rest, especially on upper floors of buildings.                                                                                                                                                                                   |
| III       | Weak        | Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.                  |
| IV        | Light       | Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.                               |
| V         | Moderate    | Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.                                                                                                                                    |
| VI        | Strong      | Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.                                                                                                                                                    |
| VII       | Very strong | Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.                                                  |
| VIII      | Severe      | Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. |
| IX        | Violent     | Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.                                                     |
| X         | Extreme     | Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.                                                                                                                                         |

### **Previous Occurrences**

Earthquakes have only recently been recorded in the region. The strongest quake to rattle Dallas County occurred on January 6, 2015, and registered a magnitude of 3.6. To date, there have been no injuries, fatalities or major damage recorded. The magnitudes experienced in Dallas County are considered minor and only felt by humans but have not caused damage. Currently, there is not a significant amount of data for earthquakes in Dallas County.

### **Probability of Future Events**

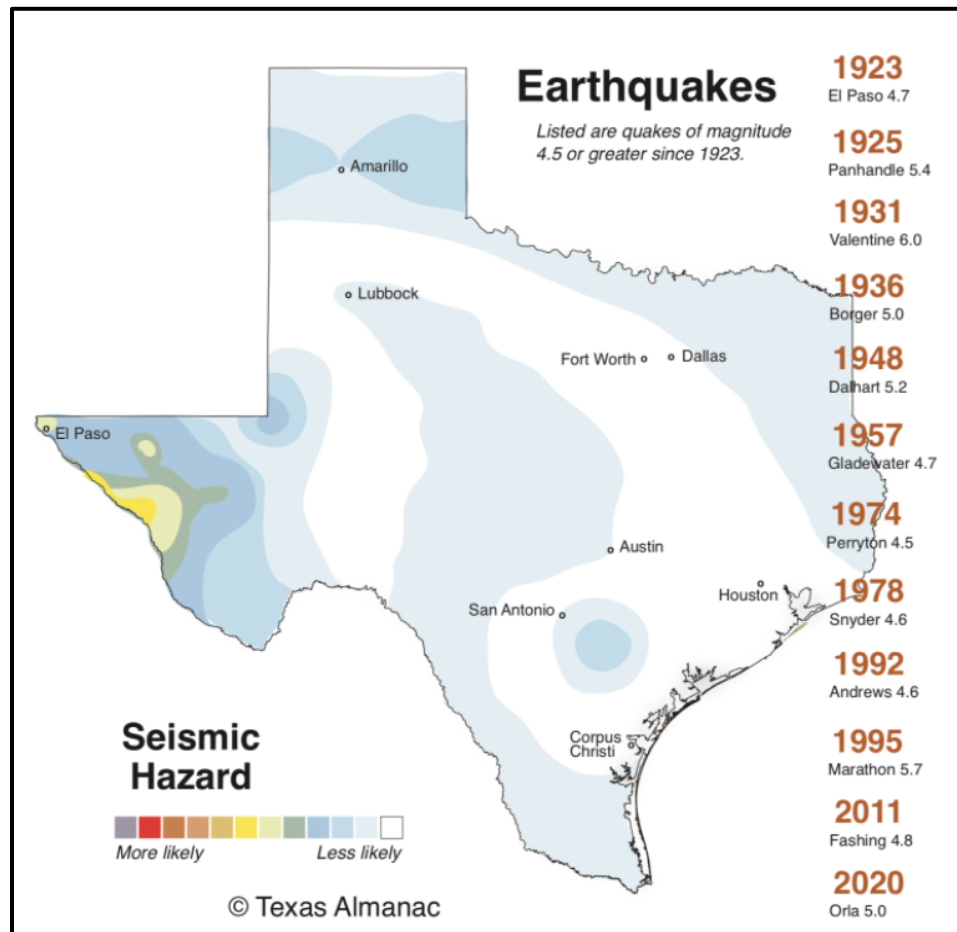
In 2015, there were 11 earthquakes in Dallas County. The strongest was measured at 3.6 magnitude. In 2017, two earthquakes occurred within weeks; a 3.1 magnitude quake on August 27 and a 2.7 quake on Sept. 1, 2017. Data is not currently available specifically for the City of Garland. Calculations from this data suggests that a similar sized earthquake will occur 0.4 times a year. Therefore, according to Table 4.3 Hazard Frequency Ranking, it is not likely, or occasional, that an earthquake occurs within the next three years.

### **Impact on Community**

A 6.0 earthquake, the largest recorded in Texas, if in the City of Garland would have limited impacts. Damage has occurred in at least twenty-five of the recorded earthquakes in Texas and one death has been attributed to a Texas quake. Because this hazard is new to the region, residents, businesses, built

infrastructure and first responders have not been educated nor are they prepared for this type of event. The tremors could cause hairline cracks in underground pipes, gas lines and in walls of buildings. The majority of the damages to the community would be the result of property and infrastructure damages. Major damage could potentially be caused to large overpasses at I-30 and the George Bush Turnpike.

Figure 5.19



## Vulnerability

The entire planning area is equally vulnerable to earthquakes. The probability of a small earthquake occurring in Garland within the next three years is not likely, or occasional. Large-scale earthquakes are considered an isolated event, however would cause major damage due to a low risk of high magnitude earthquakes in this area. The unpredictability and unschooled population regarding earthquakes is a concern. Because the region as a whole has not faced infrastructure complications regarding earthquakes the impacts of a large earthquake would be major. Therefore, the risk of earthquakes to the City of Garland is low. Built environment including structures and overpasses would be the most vulnerable to an earthquake event. There is 1 police station, 11 fire stations, 1 hospital, 4 DART Transit Centers, and 72 GISD schools at risk of impact from an earthquake.

## **Severe Thunderstorms/Damaging Winds**

### **Hazard Description**

The National Weather Service defines a severe thunderstorm as a storm that has winds of at least 58 mph (50 knots), and/or hail at least 1" in diameter. Severe thunderstorms also can be capable of producing a tornado. Structural wind damage may imply the occurrence of a severe thunderstorm. Straight-line winds are often responsible for wind damage associated with a severe thunderstorm. These winds are often confused with tornadoes because of similar damage and wind speeds. Downbursts or microbursts are examples of damaging straight-line winds. Wind speeds in some of the stronger downbursts can reach 100 to 150 miles per hour. Lightning is a characteristic of thunderstorms. Lightning is a giant spark of electricity in the atmosphere between clouds, the air, or the ground. Air acts as an insulator between the positive and negative charges in the cloud and between the cloud and the ground. When the opposite charges build up, the insulating capacity of the air breaks down and there is a rapid discharge of electricity that we know as lightning.

### **Location**

The greatest severe thunderstorm threat in the United States extends from Texas to southern Minnesota. No place in the United States is completely safe from the threat of severe thunderstorms. Due to the unpredictable nature of severe thunderstorms, it is impossible to determine the exact area of their future occurrences. The entire planning area, the City of Garland, is equally subject to severe thunderstorms.

### **Severity**

Table 5.20 shows the level of categorical risk of thunderstorms in Day 1-3 Convective Outlooks derived from probability forecasts of tornadoes, damaging winds and large hail. Table 5.21 shows The Beaufort Wind Scale. The Beaufort Wind Scale is representative of the damage from high winds this community may sustain. The Beaufort Wind Scale allows planners in the community to assess historical data and mitigate for future events. The highest winds to impact Garland in the past 20 years occurred in 2009 and 2011 when winds recorded exceeded 80 mph. This is not a rare occurrence in North Texas and it is expected that 80 mph winds or higher be expected in the future.

Table 5.20.

| Understanding Severe Thunderstorm Risk Categories                                                                                                                                                                                                                                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| THUNDERSTORMS<br>(no label)                                                                                                                                                                                                                                                                                                                       | 1 - MARGINAL<br>(MRGL)                                                            | 2 - SLIGHT<br>(SLGT)                                                              | 3 - ENHANCED<br>(ENH)                                                             | 4 - MODERATE<br>(MDT)                                                              | 5 - HIGH<br>(HIGH)                                                                  |
| No severe*<br>thunderstorms<br>expected                                                                                                                                                                                                                                                                                                           | Isolated severe<br>thunderstorms<br>possible                                      | Scattered<br>severe storms<br>possible                                            | Numerous<br>severe storms<br>possible                                             | Widespread<br>severe storms<br>likely                                              | Widespread<br>severe storms<br>expected                                             |
| Lightning/flooding<br>threats exist with all<br>thunderstorms                                                                                                                                                                                                                                                                                     | Limited in duration<br>and/or coverage<br>and/or intensity                        | Short-lived and/or<br>not widespread,<br>isolated intense<br>storms possible      | More persistent<br>and/or widespread,<br>a few intense                            | Long-lived,<br>widespread and<br>intense                                           | Long-lived, very<br>widespread and<br>particularly intense                          |
|                                                                                                                                                                                                                                                                  |  |  |  |  |  |
| <small>* NWS defines a severe thunderstorm as measured wind gusts to at least 58 mph, and/or hail to at least one inch in diameter, and/or a tornado. All thunderstorm categories imply lightning and the potential for flooding. Categories are also tied to the probability of a severe weather event within 25 miles of your location.</small> |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
| <div>  <div> National Weather Service<br/> <a href="http://www.spc.noaa.gov">www.spc.noaa.gov</a> </div>  </div>                                                              |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |

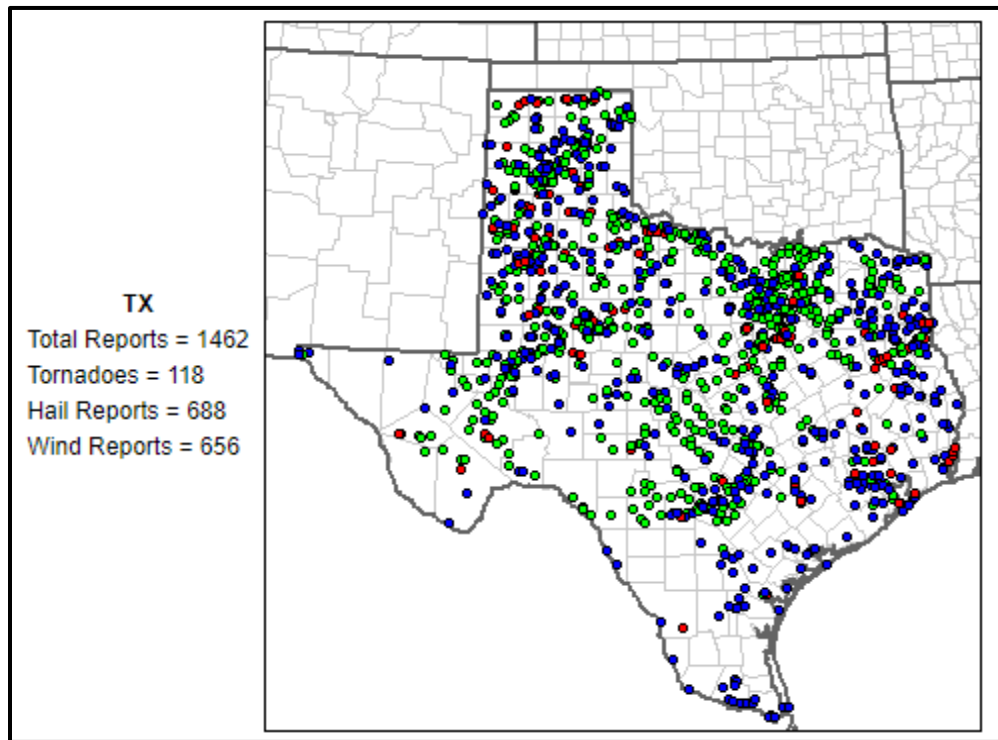
**Table 5.21 - Beaufort Wind Scale**

| Beaufort Number | Wind Speed (miles/hour) | Wind Speed (km/hour) | Wind Speed (knots) | Description     | Wind Effects on Land                                                                           |
|-----------------|-------------------------|----------------------|--------------------|-----------------|------------------------------------------------------------------------------------------------|
| 0               | < 1                     | < 1                  | < 1                | Calm            | Calm. Smoke rises vertically.                                                                  |
| 1               | 1-3                     | 1-5                  | 1-3                | Light Air       | Wind motion visible in smoke.                                                                  |
| 2               | 4-7                     | 6-11                 | 4-6                | Light Breeze    | Wind felt on exposed skin. Leaves rustle.                                                      |
| 3               | 8-12                    | 12-19                | 7-12               | Gentle Breeze   | Leaves and smaller twigs in constant motion.                                                   |
| 4               | 13-18                   | 20-28                | 11-16              | Moderate Breeze | Dust and loose paper are raised. Small branches begin to move.                                 |
| 5               | 19-24                   | 29-38                | 17-21              | Fresh Breeze    | Small trees begin to sway.                                                                     |
| 6               | 25-31                   | 39-49                | 22-27              | Strong Breeze   | Large branches are in motion. Whistling is heard in overhead wires. Umbrella use is difficult. |
| 7               | 32-38                   | 50-61                | 28-33              | Near Gale       | Whole trees in motion. Some difficulty experienced walking into the wind.                      |
| 8               | 39-46                   | 62-74                | 34-40              | Gale            | Twigs and small branches break from trees. Cars veer on road.                                  |
| 9               | 47-54                   | 75-88                | 41-47              | Strong Gale     | Larger branches break from trees. Light structural damage.                                     |
| 10              | 55-63                   | 89-102               | 48-55              | Storm           | Trees broken and uprooted. Considerable structural damage.                                     |
| 11              | 64-72                   | 103-117              | 56-63              | Violent Storm   | Widespread damage to structures and vegetation.                                                |
| 12              | > 73                    | > 117                | > 64               | Hurricane       | Considerable and widespread damage to structures and vegetation. Violence.                     |

### Previous Occurrences

The National Weather Service's Storm Prediction Center reported 1,344 severe thunderstorm events in Texas during 2021. This excludes tornadoes, as Garland's HazMAP classifies tornadoes as a separate hazard. Narrowing occurrences to the defined planning area of Garland, the National Climatic Data Center reported 36 thunderstorms with high winds have been reported between 2/29/1994 and 12/31/2021.

**Figure 5.22 - Annual Severe Thunderstorm Report Summary - 2021**



### **Probability of Future Events**

Calculations from historical data suggests that a severe thunderstorm will impact Garland at least 1 time a year. Therefore, according to Table 4.3 Hazard Frequency Ranking, it is highly likely that severe thunderstorms occur in the next year.

### **Impact on Community**

According to the National Climatic Data Center, 22 severe thunderstorms/thunderstorms with significant wind have caused an estimated \$200,000 in property damage. The most common impacts of severe thunderstorms are power outages and private property damage consisting of roof and vehicle damage from wind and hail. Because severe thunderstorms are such a common occurrence, residents are prepared and practiced in mitigating damage. Public education is also a focus through many different channels: The National Weather Service, media outlets and several City departments push severe thunderstorm messaging year round. The City of Garland and Garland Power & Light both have tree-trimming programs to help mitigate effects of severe thunderstorms. GP&L trims trees and other vegetation away from power lines to provide safe and reliable electric service. Because of this proactive vegetation management program, GP&L customers experience fewer outages than average as reported by the American Public Power Association (APPA). For these reasons, it has been determined that severe thunderstorm impacts that do occur are minor.

**Table 5.23 - Severe Thunderstorm Historical Data**

| <b>City</b> | <b>Date</b> | <b>Event Type</b> | <b>Wind Speeds</b> | <b>Property Damage</b> |
|-------------|-------------|-------------------|--------------------|------------------------|
| Garland     | 5/29/1994   | Thunderstorm Wind | 52                 | 0                      |
| Garland     | 11/3/1994   | Thunderstorm Wind | 56                 | 0                      |
| Garland     | 11/4/1994   | Thunderstorm Wind | 0                  | 5000                   |
| Garland     | 4/19/1995   | Thunderstorm Wind | 0                  | 2000                   |
| Garland     | 4/19/1996   | Thunderstorm Wind |                    | 2000                   |
| Garland     | 6/15/1996   | Thunderstorm Wind |                    | 0                      |
| Garland     | 6/15/1996   | Thunderstorm Wind | 61                 | 2000                   |
| Garland     | 6/15/1996   | Thunderstorm Wind |                    | 0                      |
| Garland     | 6/17/1996   | Thunderstorm Wind |                    | 0                      |
| Garland     | 6/16/1997   | Thunderstorm Wind | 52                 | 0                      |
| Garland     | 5/8/1998    | Thunderstorm Wind |                    | 0                      |
| Garland     | 5/8/1998    | Thunderstorm Wind |                    | 0                      |
| Garland     | 5/27/1998   | Thunderstorm Wind |                    | 0                      |
| Garland     | 10/2/1998   | Thunderstorm Wind | 55                 | 0                      |
| Garland     | 11/9/1998   | Thunderstorm Wind | 52                 | 0                      |
| Garland     | 4/26/1999   | Thunderstorm Wind |                    | 5000                   |
| Garland     | 2/9/2001    | Thunderstorm Wind | 52                 | 0                      |
| Garland     | 6/14/2001   | Thunderstorm Wind | 52                 | 0                      |
| Garland     | 6/14/2001   | Thunderstorm Wind | 52                 | 0                      |
| Garland     | 4/7/2002    | Thunderstorm Wind | 52                 | 0                      |
| Garland     | 8/8/2005    | Thunderstorm Wind | 50                 | 20000                  |
| Garland     | 5/2/2007    | Thunderstorm Wind | 50                 | 0                      |
| Garland     | 2/10/2009   | Thunderstorm Wind | 70                 | 0                      |
| Garland     | 4/14/2011   | Thunderstorm Wind | 70                 | 50000                  |
| Garland     | 4/14/2011   | Thunderstorm Wind | 56                 | 50000                  |
| Garland     | 4/14/2011   | Thunderstorm Wind | 64                 | 50000                  |
| Garland     | 10/23/2011  | Thunderstorm Wind | 61                 | 10000                  |
| Garland     | 10/23/2011  | Thunderstorm Wind | 61                 | 10000                  |
| Garland     | 5/21/2013   | Thunderstorm Wind | 50                 | 10000                  |
| Garland     | 5/21/2013   | Thunderstorm Wind | 60                 | 30000                  |
| Garland     | 8/13/2013   | Thunderstorm Wind | 43                 | 3000                   |
| Garland     | 10/2/2014   | Thunderstorm Wind | 50                 | 5000                   |
| Garland     | 3/8/2016    | Thunderstorm Wind | 60                 | 10000                  |
| Garland     | 3/29/2017   | Thunderstorm Wind | 55                 | 5000                   |
| Garland     | 3/29/2017   | Thunderstorm Wind | 55                 | 1000                   |
| Garland     | 10/7/2018   | Thunderstorm Wind | 43                 | 5000                   |

### **Summary of Vulnerability**

The entire planning area is equally vulnerable to severe thunderstorms. All structures and populations within the City are equally vulnerable to the effects of severe thunderstorms. In addition to these parcels, there is 1 police station, 11 fire stations, 1 hospital, 4 DART Transit Centers, and 72 GISD schools at risk of impact from severe thunderstorms. The highly likelihood of severe thunderstorm is a concern but because the City of Garland is so accustomed to severe thunderstorms and have current mitigation programs the impacts are minor. Therefore, the risk of severe thunderstorms is minor.

## **Infrastructure and Communications Failure**

### **Hazard Description**

Infrastructure is the basic facilities and services needed for a community. The City of Garland infrastructure includes roads, wastewater treatment plants, water and wastewater pipes, power plants, electrical lines, bridges, an airport, railroads, and schools. Infrastructure also includes telecommunications equipment, which if impacted may cause a communications failure. A communications failure is the interruption or loss of communications systems including transmission lines, communications satellites, and associated hardware and software necessary for the communications system to function. It can include telecommunications, radio and information technology failures. A communications failure may be the result of an equipment failure, human act (deliberate or accidental) or the result of another hazard event.

### **Location**

Because of the large array of possible infrastructure and communications failures, it is impossible to map the location they would occur. The entire planning area, the City of Garland, is equally subject to infrastructure and communications failures.

### **Severity**

When an infrastructure/communications failure occurs, it can have a wide range of effects on a community. Deteriorating infrastructure is a problem all of America is facing. Every four years, the American Society of Civil Engineers Committee on America's Infrastructure provides a comprehensive assessment of the nation's 16 major infrastructure categories grading A to F. The components that are considered when grading include: capacity, condition, funding, future need, operation and maintenance, public safety and resilience.

### **Previous Occurrences**

Most past occurrences have been small incidents that were quickly addressed and to date there has not been a significant infrastructure failure within the City of Garland. There was however a communications failure. On March 8, 2017, there was a nationwide issue. AT&T cell phone were unable to call 911 for several hours.

### **Probability of Future Events**

The occurrence of an infrastructure/communications failure is largely impossible to predict. The likelihood of a large-scale extended communications failure is high. Additionally, small-scale failures with a short duration is not abnormal. Therefore, according to Table 4.3 Hazard Frequency Ranking the Planning Team has concluded that an infrastructure/communications failure is highly likely to occur in the City of Garland in the next six years.

### **Impact on Community**

Nearly every aspect of modern life is dependent on digital infrastructure. Critical infrastructure services, such as emergency services, utility services, water services and telecommunications can be impacted by a communications or infrastructure failure. Failures can result in a 911 or emergency warning system failure, a delay of response times by emergency service providers, and has the potential to impact the entire community.

Flooding typically damages the infrastructure of a community, including roads, bridges, power lines and plants. It can take a significant amount of time repair these facilities and infrastructure, depending on the nature of the damage and the resources available that can be dedicated.

### **Summary of Vulnerability**

The entire planning area is equally vulnerable to infrastructure and communications failures. This type of failure will occasionally occur to some extent within the next six years. This type of hazard has historically caused substantial impacts to the City of Garland. These factors make infrastructure/communications failure a high risk for the City of Garland.

# Drought

## Hazard Description

Drought is a period without substantial rainfall that persists from one year to the next. Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of anticipated natural precipitation reduction over an extended period, usually a season or more in length. Droughts can be classified as meteorological, hydrologic, agricultural and socioeconomic.

- Meteorological drought is an interval of time, generally about months or years, during which the actual moisture supply at a given place consistently falls below the climatically appropriate moisture supply.
- Agricultural drought occurs when there is inadequate soil moisture to meet the needs of a particular crop at a particular time. Agricultural drought usually occurs after or during meteorological drought, but before hydrological drought and can affect livestock and other dry land agricultural operations.
- Hydrological drought refers to the deficiencies in surface and subsurface water supplies. It is measured as stream flow, snow pack, and as lake, reservoir and groundwater levels. There is usually a delay between lack of rain or snow and less measurable water in streams, lakes, and reservoirs. Therefore, hydrological measurement tends to lag behind other drought indicators.
- Socio-economic drought occurs when physical water shortages start to affect the health, well-being and quality of life of people, or when the drought starts to affect the supply and demand of an economic product.

Droughts are one of the most complex natural hazards, as it is difficult to determine their precise beginning or end. In addition, droughts can lead to other hazards such as extreme heat and wildfires. Their impact on wildlife and environment is enormous, often killing crops, grazing land, edible plants and trees.

## Location

Due to the unpredictable nature of a drought, it is impossible to determine the exact area of their future occurrences. The entire planning area, the City of Garland, is equally subject to drought.

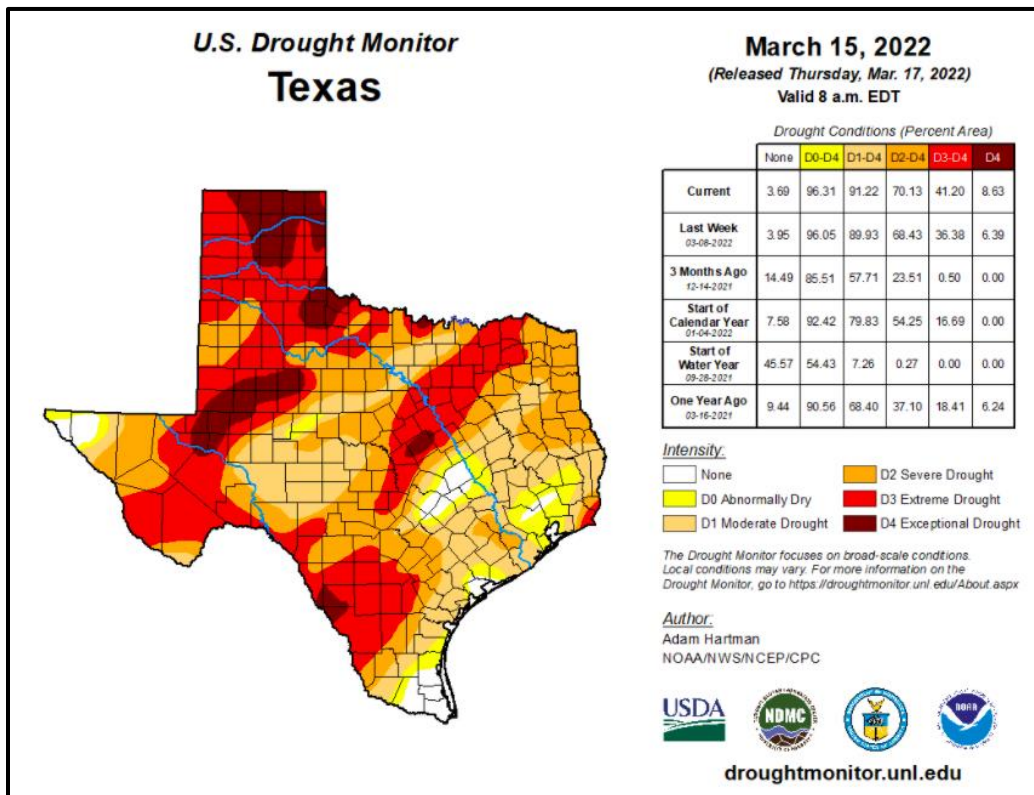
## Severity

The Severity of drought periods is measured using the U.S. Drought Monitor (USDM) (Table 5.24). The USDM was developed by Mark Svoboda in 1999 and is produced through a partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration. The USDM uses a process that synthesizes multiple indices, outlooks and local impacts, into an assessment that best represents current drought conditions and reflects observed precipitation. The outcome of each Drought Monitor map is a consensus of federal, state and academic scientists. Historically, the City of Garland has already experienced exceptional (D4) drought conditions. Due to increasing temperatures, Garland could fall into the D4 drought category for much longer periods.

**Table 5.24 - Drought Severity Classification and Map**

| Drought Severity    | Return Period (years) | Description of Possible Impacts                                                                                                                                                                   | Drought Monitoring Indices             |                        |                      |
|---------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------|----------------------|
|                     |                       |                                                                                                                                                                                                   | Standardized Precipitation Index (SPI) | NDMC* Drought Category | Palmer Drought Index |
| Minor Drought       | 3 to 4                | Going into drought; short-term dryness slowing growth of crops or pastures; fire risk above average. Coming out of drought; some lingering water deficits; pastures or crops not fully recovered. | -0.5 to -0.7                           | D0                     | -1.0 to -1.9         |
| Moderate Drought    | 5 to 9                | Some damage to crops or pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing or imminent, voluntary water use restrictions requested.                     | -0.8 to -1.2                           | D1                     | -2.0 to -2.9         |
| Severe Drought      | 10 to 17              | Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed.                                                                                           | -1.3 to -1.5                           | D2                     | -3.0 to -3.9         |
| Extreme Drought     | 18 to 43              | Major crop and pasture losses; extreme fire danger; widespread water shortages or restrictions.                                                                                                   | -1.6 to -1.9                           | D3                     | -4.0 to -4.9         |
| Exceptional Drought | 44+                   | Exceptional and widespread crop and pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells creating water emergencies.                                       | less than -2                           | D4                     | -5.0 or less         |

\*NDMC - National Drought Mitigation Center



## Previous Occurrences

According to the National Climatic Data Center, Dallas County, Texas was in a drought for 28 months during the last 20 years. This consisted of seven separate droughts that continued for multiple months. The longest of which was almost a full year and began in January 2006 through November 2006. Data is not currently available specifically for the City of Garland.

## Probability of Future Events

Drought events are not expected to occur every year, but are prevalent enough to be a concern. Previous historical data in Table 5.25 shows the drought events that have occurred within Garland since 1996. Calculations from this data suggests that a drought event will impact Garland 0.4 times a year. Therefore, according to Table 4.3 Hazard Frequency Ranking, it is highly likely a drought will occur in the next three years.

## Impact on Community

The impact of a drought within the City of Garland is expected to be minor. This considers the large water supply available to the community. The major damages associated with droughts are typically on crops and livestock. However, Garland is a more urbanized area and contains very little agricultural land or livestock to cause major financial disruptions. For Garland, the financial burden of droughts is on structures. The primary causes of structural damage associated with drought are foundation issues. This is caused by expansive soil, resulting in structural repairs. Since 1996, droughts have caused \$512,000 dollars in structural damage and \$1,405,000 in crop damage within Dallas County. Regionally, droughts have accounted for \$39.8. million in losses since 1996.

The Water Conservation Plan and Drought Contingency Response Plan have been put into place in the City of Garland to negate the effects of drought. These consist of a strict seasonal water use schedule that goes into effect within the City between April and October. Details of this plan include: customers may water twice-per-week using an in-ground sprinkler system. November through March watering with sprinkler systems are limited to one day a week. Sprinkler system use is not allowed between 10 a.m. and 6 p.m. to prevent excessive evaporation. Newly planted landscape and/or sod requiring water more than one time a week, must request a variance. In stage 3 of a drought, no lawn watering at any time is allowed within the City. These actions make the community more resilient during drought events.

**Table 5.25 - Drought Historical Data**

| County | Date     | Event Type | Property Damage | Crop Damage |
|--------|----------|------------|-----------------|-------------|
| Dallas | 5/1/1996 | Drought    | 0               | 0           |
| Dallas | 8/1/1996 | Drought    | 0               | 0           |
| Dallas | 7/1/1998 | Drought    | 0               | 0           |
| Dallas | 8/1/2000 | Drought    | 0               | 0           |
| Dallas | 9/1/2000 | Drought    | 0               | 0           |
| Dallas | 6/1/2005 | Drought    | 0               | 0           |

|        |           |         |         |         |
|--------|-----------|---------|---------|---------|
| Dallas | 7/1/2005  | Drought | 0       | 0       |
| Dallas | 8/1/2005  | Drought | 0       | 0       |
| Dallas | 9/1/2005  | Drought | 0       | 0       |
| Dallas | 10/1/2005 | Drought | 0       | 0       |
| Dallas | 11/1/2005 | Drought | 0       | 0       |
| Dallas | 12/1/2005 | Drought | 0       | 0       |
| Dallas | 1/1/2006  | Drought | 0       | 0       |
| Dallas | 2/1/2006  | Drought | 0       | 0       |
| Dallas | 3/1/2006  | Drought | 0       | 0       |
| Dallas | 4/1/2006  | Drought | 0       | 0       |
| Dallas | 5/1/2006  | Drought | 0       | 0       |
| Dallas | 6/6/2006  | Drought | 0       | 0       |
| Dallas | 7/1/2006  | Drought | 0       | 0       |
| Dallas | 8/1/2006  | Drought | 0       | 0       |
| Dallas | 9/1/2006  | Drought | 0       | 0       |
| Dallas | 10/1/2006 | Drought | 500,000 | 500,000 |
| Dallas | 11/1/2006 | Drought | 0       | 800,000 |
| Dallas | 4/1/2011  | Drought | 0       | 5,000   |
| Dallas | 8/1/2011  | Drought | 0       | 10,000  |
| Dallas | 9/1/2011  | Drought | 0       | 25,000  |
| Dallas | 10/1/2011 | Drought | 0       | 5,000   |
| Dallas | 8/7/2012  | Drought | 0       | 0       |
| Dallas | 12/1/2012 | Drought | 0       | 2,000   |
| Dallas | 1/1/2013  | Drought | 0       | 1,000   |
| Dallas | 4/1/2013  | Drought | 0       | 2,000   |
| Dallas | 6/25/2013 | Drought | 0       | 2,000   |
| Dallas | 7/1/2013  | Drought | 0       | 2,000   |
| Dallas | 8/1/2013  | Drought | 5,000   | 5,000   |
| Dallas | 9/1/2013  | Drought | 0       | 4,000   |
| Dallas | 2/25/2014 | Drought | 0       | 1,000   |
| Dallas | 3/1/2014  | Drought | 0       | 4,000   |
| Dallas | 4/1/2014  | Drought | 0       | 3,000   |
| Dallas | 5/1/2014  | Drought | 0       | 3,000   |
| Dallas | 6/1/2014  | Drought | 0       | 2,000   |
| Dallas | 7/1/2014  | Drought | 0       | 3,000   |
| Dallas | 8/1/2014  | Drought | 0       | 1,000   |
| Dallas | 9/1/2014  | Drought | 5,000   | 0       |
| Dallas | 10/1/2014 | Drought | 0       | 5,000   |
| Dallas | 11/1/2014 | Drought | 0       | 2,000   |

|        |            |         |       |       |
|--------|------------|---------|-------|-------|
| Dallas | 12/1/2014  | Drought | 0     | 6,000 |
| Dallas | 1/1/2015   | Drought | 0     | 2,000 |
| Dallas | 2/1/2015   | Drought | 0     | 2,000 |
| Dallas | 3/1/2015   | Drought | 0     | 3,000 |
| Dallas | 4/1/2015   | Drought | 0     | 1,000 |
| Dallas | 8/25/2015  | Drought | 0     | 0     |
| Dallas | 9/1/2015   | Drought | 0     | 1,000 |
| Dallas | 10/1/2015  | Drought | 2,000 | 0     |
| Dallas | 12/1/2017  | Drought | 0     | 1,000 |
| Dallas | 7/1/2018   | Drought | 0     | 0     |
| Dallas | 8/1/2018   | Drought | 0     | 1,000 |
| Dallas | 9/24/2019  | Drought | 0     | 1,000 |
| Dallas | 10/1/2019  | Drought | 0     | 0     |
| Dallas | 11/24/2020 | Drought | 0     | 0     |
| Dallas | 12/1/2020  | Drought | 0     | 0     |

### Summary of Vulnerability

The entire planning area is equally vulnerable to drought. Drought is of substantial risk to the community. Although it is a highly likely event, it has substantial impact on the City due to the low agricultural industry and ongoing mitigation actions taken by the City and residents. While there is no data to currently suggest an effect on any population, drought often coincides with Extreme Heat events, which impact elderly, low-income, and transient populations.

## Extreme Heat

### Hazard Description

Extreme heat is characterized by a combination of exceptionally high temperatures and humidity. When these conditions persist over a period, it is called a heat wave. Although heat can damage buildings and facilities, it presents a more significant threat to the safety and welfare of residents.

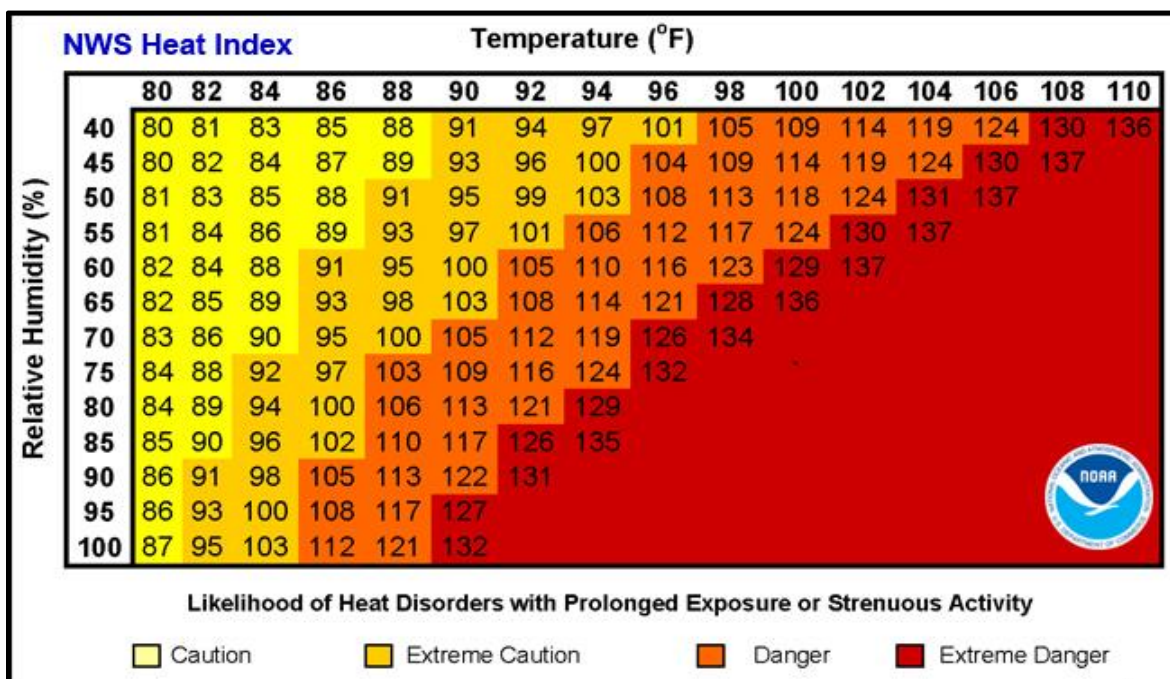
### Location

Due to the unpredictable nature of extreme heat, it is impossible to determine the exact area of their future occurrences. The entire planning area, the City of Garland, is equally subject to extreme heat.

### Severity

The danger of extreme heat is gauged by using the Extreme Heat Index (Figure 5.26). The Heat Index, as seen below, displays the relative danger in regards to Air Temperature and Relative Humidity. The record high temperature was recorded in Garland at 112 ° in 1980. With increasing temperatures, it is expected that by the end of this century, the average number of days where temperatures are above 95° will likely increase by as much as 14 times. This means that instead of having nine days per year of extreme heat at temperatures above 95, as we currently do, we can expect future number of days of extreme heat temperatures above 95 to rise as many as 123 days per year.

Figure 5.26 - Extreme Heat Index



Source: <https://www.weather.gov/ama/heatindex>

### Previous Occurrences

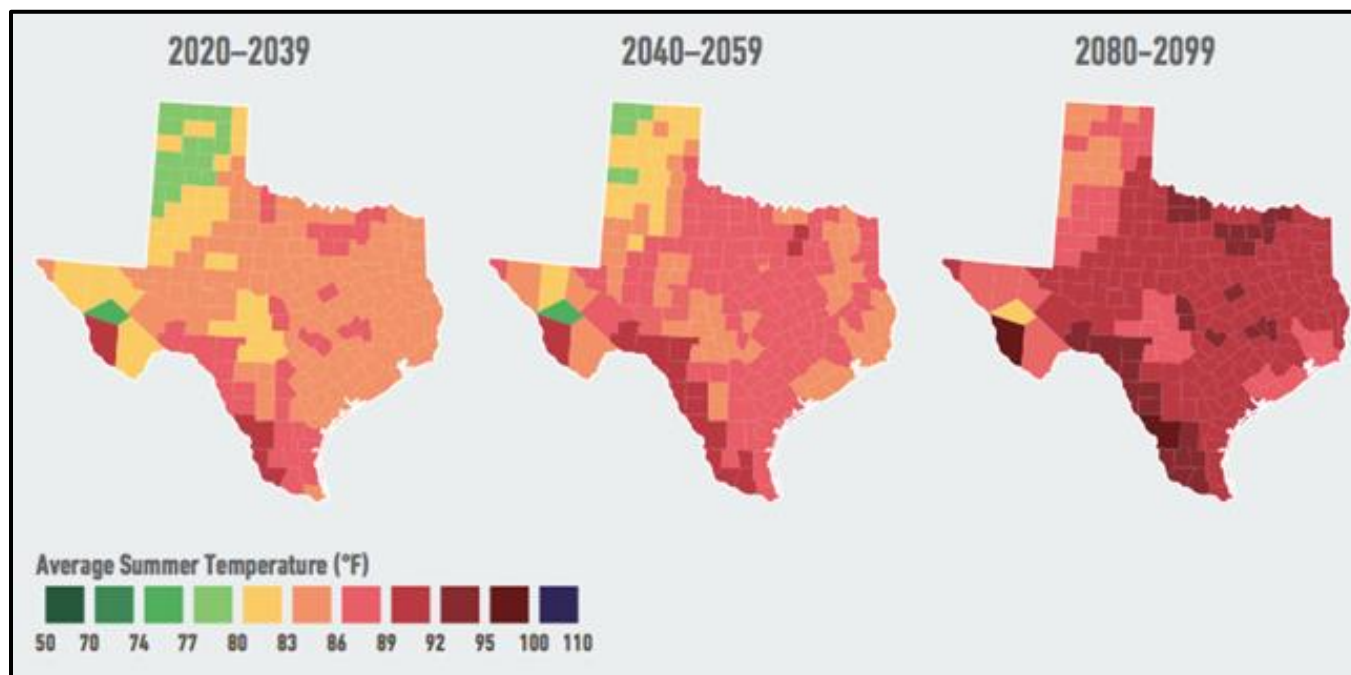
According to the National Climatic Data Center, 48 extreme heat events have been reported in Dallas County, Texas between 7/1/1996 and 12/31/2021.

### Probability of Future Events

Temperatures remain warm throughout the summer months and are relatively warmer throughout the year than other areas of the country. The occurrence of extreme heat events is likely within the area given the humidity levels and high summer temperatures. Previous historical data in Table 5.28 shows 48 extreme heat events have occurred in Dallas County since 1996. Data is not currently available specifically for the City of Garland. Calculations from this data suggest that an extreme heat event will impact Dallas County 1.85 times a year. Therefore, according to Table 4.3 Hazard Frequency Ranking, it is likely for an extreme heat event to occur within the next year.

According to the Southeast Report released by the Risky Business Project, average temperatures are likely to increase across Texas due to climate change. The prospectus states dangerous levels of extreme heat are projected to threaten lives dramatically reduce labor productivity and increase energy demand and cost. The study predicts over the next 5 to 25 years, extreme heat will likely cause as many as 2,570 additional deaths per year.

**Figure 5.27 - Future Average Summer Temperatures in Texas**



## Impact on Community

The risks associated with extreme heat include: sunburn, dehydration, heatstroke, heat exhaustion, heat syncope, heat cramps and in severe cases death. The most at risk populations are outdoor laborers, the elderly, children, and the disabled who frequently live on low or fixed incomes and do not run air conditioning on a regular basis. These populations are sometimes isolated, with no immediate family or friends to look out for their well-being. The effects of extreme heat are always more pronounced in urbanized areas than in rural areas. According to the Journal of Applied Meteorology and Climatology, the problem is exacerbated in Garland by what is known as the heat island effect. The concrete and metal infrastructure absorbs radiant heat energy from the sun during the day and radiates that heat energy during the night. This cyclical process essentially “traps” the heat in the urbanized area and makes it as much as 5.4°C warmer. Since 1996 there have been 88 fatalities and 711 injuries caused by extreme heat in Dallas County. The Planning Team has determined that because of available cooling centers and programs in place to mitigate extreme heat the impacts of this hazard are limited.

**Table 5.28 - Extreme Heat Historical Data**

| County | Date      | Event Type | Deaths | Injuries |
|--------|-----------|------------|--------|----------|
| Dallas | 7/1/1996  | Heat       | 2      | 0        |
| Dallas | 7/19/1997 | Heat       | 2      | 0        |
| Dallas | 6/1/1998  | Heat       | 1      | 0        |
| Dallas | 7/1/1998  | Heat       | 23     | 0        |
| Dallas | 8/3/1998  | Heat       | 5      | 0        |
| Dallas | 8/1/1999  | Heat       | 3      | 0        |
| Dallas | 7/1/2000  | Heat       | 8      | 0        |
| Dallas | 8/1/2000  | Heat       | 3      | 0        |
| Dallas | 9/1/2000  | Heat       | 4      | 0        |
| Dallas | 7/14/2006 | Heat       | 1      | 0        |
| Dallas | 7/27/2006 | Heat       | 1      | 0        |
| Dallas | 8/10/2006 | Heat       | 0      | 0        |
| Dallas | 6/23/2009 | Heat       | 1      | 0        |
| Dallas | 4/29/2010 | Heat       | 0      | 0        |
| Dallas | 6/20/2010 | Heat       | 1      | 0        |
| Dallas | 6/13/2011 | Heat       | 3      | 140      |

|        |           |                |   |     |
|--------|-----------|----------------|---|-----|
| Dallas | 7/1/2011  | Heat           | 9 | 223 |
| Dallas | 8/6/2011  | Heat           | 3 | 210 |
| Dallas | 6/15/2016 | Heat           | 0 | 1   |
| Dallas | 6/16/2016 | Heat           | 1 | 0   |
| Dallas | 6/16/2016 | Heat           | 0 | 7   |
| Dallas | 7/18/2016 | Heat           | 1 | 0   |
| Dallas | 7/24/2016 | Heat           | 1 | 0   |
| Dallas | 7/8/2019  | Heat           | 0 | 0   |
| Dallas | 7/16/2019 | Heat           | 0 | 0   |
| Dallas | 8/7/2019  | Heat           | 0 | 0   |
| Dallas | 8/17/2019 | Heat           | 0 | 0   |
| Dallas | 8/26/2019 | Heat           | 0 | 0   |
| Dallas | 7/9/2020  | Heat           | 0 | 0   |
| Dallas | 8/12/2020 | Heat           | 0 | 0   |
| Dallas | 8/30/2020 | Heat           | 0 | 0   |
| Dallas | 9/1/2020  | Heat           | 0 | 0   |
| Dallas | 7/25/2021 | Heat           | 0 | 0   |
| Dallas | 7/29/2021 | Heat           | 0 | 0   |
| Dallas | 8/1/2021  | Heat           | 0 | 0   |
| Dallas | 8/9/2021  | Heat           | 0 | 0   |
| Dallas | 9/1/2021  | Heat           | 0 | 0   |
| Dallas | 8/13/2007 | Excessive Heat | 1 | 0   |
| Dallas | 7/23/2008 | Excessive Heat | 1 | 0   |
| Dallas | 7/28/2008 | Excessive Heat | 2 | 0   |
| Dallas | 8/1/2008  | Excessive Heat | 4 | 0   |
| Dallas | 8/1/2011  | Excessive Heat | 4 | 130 |
| Dallas | 7/20/2012 | Excessive Heat | 1 | 0   |
| Dallas | 5/17/2013 | Excessive Heat | 1 | 0   |
| Dallas | 7/18/2015 | Excessive Heat | 1 | 0   |
| Dallas | 6/20/2019 | Excessive Heat | 0 | 0   |
| Dallas | 8/13/2020 | Excessive Heat | 0 | 0   |
| Dallas | 8/28/2020 | Excessive Heat | 0 | 0   |

## **Summary of Vulnerability**

The entire planning area is equally vulnerable to extreme heat events. For now, extreme heat is considered a low risk to the City of Garland. Because extreme heat is a common occurrence, residents are prepared and practiced in mitigating damage. The City of Garland also has many faith-based communities that offer cooling centers during these times of extreme heat. Although heat events are very common to the area, they cause little damage to structures. The main concern with an extreme heat event is that it leads to other hazards, such as drought. The City of Garland is accustomed to long periods of hot weather as local summer temperatures often reach one hundred degrees Fahrenheit or more. Structure damage from extreme heat is likely. Garland has a hot and humid climate. Summers are hot, with temperatures approaching those of desert and semi-desert locations of similar latitude. The most vulnerable populations to extreme heat include the elderly, transients, and those in homes without adequate cooling capabilities.

## Power Outage

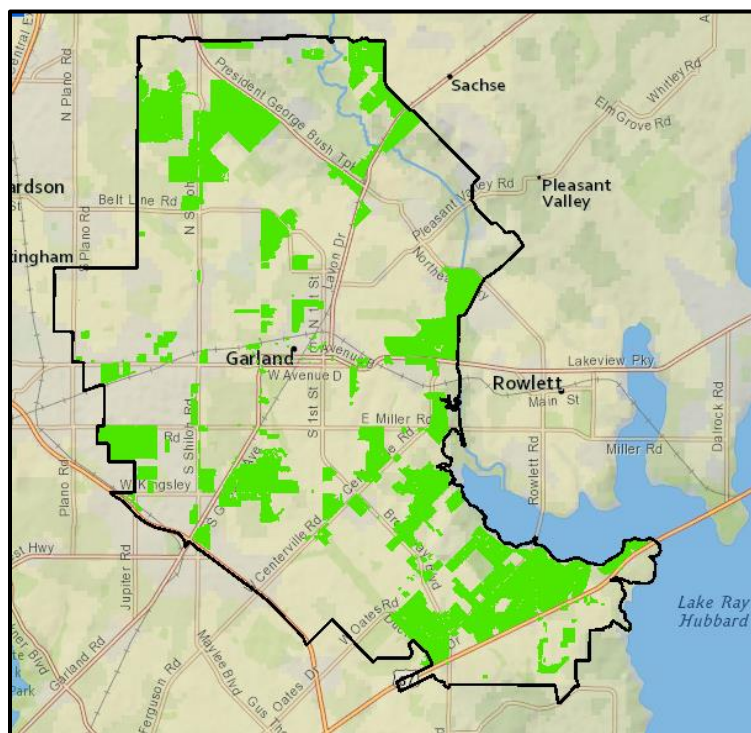
### Hazard Description

Power outage is defined as any interruption or loss of electrical service caused by disruption of power transmission, which may be the result of an accident, sabotage, natural hazards or equipment failure. A significant power failure is defined as any incident of a long duration, which would require the City of Garland to provide food, water, heating, cooling and/or shelter.

### Location

Power outages in the City of Garland are usually localized and are normally the result of a natural hazard involving high winds. The entire planning area, the City of Garland, is equally subject to power outages. However, the City of Garland has their own power provider, Garland Power & Light (GP&L), which serves approximately 85% of Garland. The other 15% of residents are served by ONCOR. Figure 5.29 below shows the areas in Garland that are not in the GP&L service area. When outages do occur, areas that are GP&L customers typically have power restored faster than those with other providers do.

**Figure 5.29 - Garland Power & Light Service Area**



Non-GP&L Service Area



## **Severity**

Power outages can range in duration and in the severity of impacts, from minor loss of communication systems at a facility, to loss of water and electricity. Power outages and interruptions usually occur because of severe thunderstorms, high winds, tornado, ice accumulation on lines, flooding or heavy demand on the electrical grid. Outages can also be caused by faulty equipment, human error and animals. Individuals who rely on power for health and/or life safety, such as those on life support systems, could be placed in jeopardy in the event of a power outage.

## **Previous Occurrences**

In February 2021, a severe winter weather event impacted North Texas. Due to power generators going offline across Texas and extremely high demand, power outages were increasing across the state. 1.1 million ONCOR customers were impacted by power outages due to this event in North Texas. Additionally, on December 26, 2015, an EF-4 tornado impacted the City of Garland. This tornado destroyed families, homes, vehicles and left about 3,000 residents without power. The tornado knocked down an estimated 40 power poles along the I-30 service road. In October 2014, severe storms left thousands without power causing several school districts to cancel classes. ONCOR reported more than 113,000 North Texas electricity customers without service. 65,977 residents were impacted in Dallas County.

## **Probability of Future Events**

According to Garland Power & Light, an average of 0.37 interruptions occur annually per customer for a duration of 15 minutes. There are number of hazards that occur often in Garland that result in power outages. Therefore, according to Table 4.3 Hazard Frequency Ranking, it is highly likely for a power outage occur within the next year.

## **Impact on Community**

The United States Annual Blackout Tracker Report of 2014 ranked Texas as having the third most outages in the United States. Between 2008 and 2014, 335 outages occurred that affected 818,506 people. Because power outages average a short duration and Garland has its own power provider, the overall impact to the community is substantial. The greatest impact to the City of Garland occurs during summer outages when residents are unable to use air conditioning. This cascading event may then cause impacts from extreme heat as previously described

## **Summary of Vulnerability**

The entire planning area is equally vulnerable to power outages. The probability of a power outage less than half an hour occurring in Garland within the next year is highly likely and would cause substantial impacts to the community. As the days get warmer, temperatures rise as discussed in the extreme heat section. Demand for energy on the grid will increase, therefore increasing the vulnerability of the power providers in Garland.

## **Expansive Soils**

### **Hazard Description**

Expansive soils contain minerals such as smectite clays that are capable of absorbing water. When they absorb water, they increase in volume. The more water they absorb, the more their volume increases. Expansions of ten percent or more are common. This change in volume can exert enough force on a building or other structure to cause damage. Expansive soils will also shrink when they dry out. This shrinkage can remove support from buildings or other structures, and result in damaging subsidence. Fissures in the soil can also develop. These fissures can facilitate the deep penetration of water when moist conditions or runoff occurs. This produces a cycle of shrinkage and swelling that places repetitive stress on structures. Soils with this shrink-swell capacity fall under the soil order of Vertisols, which is how this hazard is referred to by the United States Department of Agriculture. Further naming of the soil in Garland is Blackland Prairie with characteristics of very high amounts of clay.

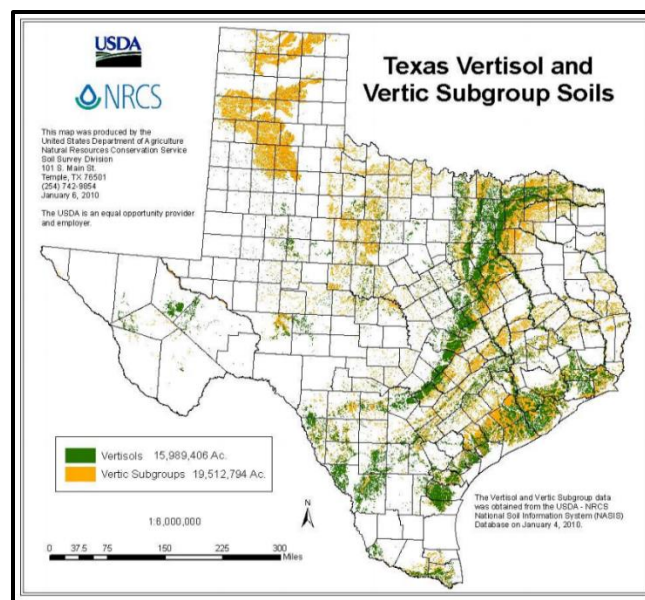
### **Location**

The entire planning area, the City of Garland, is subject to expansive soils.

### **Severity**

Utility poles and roadways are often the victims of expansive soils, which causes over 2.3 billion dollars in damage each year nationwide. Figure 5.30, below depicts the areas where expansive soil is prevalent. Vertisol soil is the makeup in Garland. According to the U. S. Department of Agriculture, Vertisol soil consists of at least 30% clay. Historically, expansive soil has damaged infrastructure and structure foundations in Garland. Due to increasing temperatures, it is anticipated that damage from expansive soils continue to rise in the future.

**Figure 5.30 - USDA 2010**



### **Previous Occurrences**

Expansive soils are a slow onset hazard that has caused gradual damage to City of Garland infrastructure and foundations. It is difficult to document the direct effects of expansive soil as most damage is cumulative. Within the past five years, cumulative damage has caused the Streets Department to fund the seven street rehab and reconstruction projects below.

### **Probability of Future Events**

Expansive soils are a continuous hazard for the city. Therefore, according to Table 4.3 Hazard Frequency Ranking, it is highly likely that expansive soils will occur in the next year. Predictions are not reliable because the location and time when water is available to the soil cannot be easily foreseen. Most associated structural distress can occur a few years after construction, but the effects may also not be observed for many years until some change occurs in the foundation conditions.

### **Impact on Community**

As development and city build-out occurs, the unforeseen consequences of dense construction activities on shrinking and swelling soil are constantly occurring. Soil expansion poses risks for existing and future infrastructure and homes. Transportation, utility public works, including electrical, communications and water infrastructure are all impacted, as well as residential housing. Many structural foundations are susceptible to damage by slow, continuous soil movements. This greatly impacts residents. Poor foundations lessen a family's greatest asset and can become a financial burden. Poor structural integrity of a home also poses a life threatening risk, especially when combined with other hazards like tornadoes, floods and earthquakes. The City of Garland and its residents have endured expansive soils for quite some time. Residents can take mitigating actions by simply watering the foundation of their homes during droughts. The severity of impact to the community from expansive soil is minor.

### **Summary of Vulnerability**

The entire planning area is equally vulnerable to expansive soils. All built environment is vulnerable to expansive soils, especially buildings and overpasses. There is 1 police station, 11 fire stations, 1 hospital, 4 DART Transit Centers, and 72 GISD schools at risk of impact from expansive soils. The hazard is constantly occurring; the impact is minor. Therefore, the planning team considers expansive soil to be a high risk hazard.

## **Destructive Hail**

### **Hazard Description**

Severe thunderstorms produce precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter, falling from a cumulonimbus cloud. These balls of irregularly shaped ice fall with rain. Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to warm air rising rapidly into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until they have developed sufficient weight and fall as precipitation.

The size of hailstones is a direct correlation of the severity of impact and size of the storm. For example, penny size hail may cause damage to crops and vegetation. Ping-pong ball size hail will cause damage to windows in homes and vehicles. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a function of the intensity of heating at the Earth's surface. Higher temperature gradients relative to elevations above the surface result in increased suspension time and hailstone size.

### **Location**

Due to the unpredictable nature of hailstorms, it is impossible to determine the exact area of their future occurrences. The City of Garland is equally subject to hailstorms.

### **Severity**

Table 5.31 shows the Combined National Ocean and Atmospheric Administration's and the Tornado and Storm Research Organization's Hailstorm Intensity Scales. The Hailstorm Intensity Scale is representative of the damage from hailstorms this community has experienced in the past. The Hailstorm Intensity Scale allows planners to gauge past damage and mitigate for future expected damage. The worst hail that occurred was in 2016 when a storm produced hail 4.25 inches in diameter. That hail caused major damage. It is expected that that size or larger hail impact Garland in the future.

**Table 5.31 - Combined NOAA/TORRO Hailstorm Intensity Scales**

| Intensity category |                      | Typical hail diameter<br>(mm)* | Probable<br>kinetic energy J/m <sup>2</sup> | Typical damage impacts                                                                           |
|--------------------|----------------------|--------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------|
| H0                 | Hard Hail            | 5–7                            | 0–20                                        | No noticeable damage                                                                             |
| H1                 | Potentially Damaging | 5–15                           | 20–100                                      | Slight general damage to plants, crops                                                           |
| H2                 | Significant          | 10–20                          | 100–300                                     | Significant damage to fruit, crop, vegetation                                                    |
| H3                 | Severe               | 20–30                          | 300–500                                     | Severe damage to fruit and crops, damage to glass and plastics structures, paint and wood scored |
| H4                 | Severe               | 25–40                          | 500–800                                     | Widespread glass damage, vehicle bodywork damage                                                 |
| H5                 | Destructive          | 30–50                          | >800                                        | Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries              |
| H6                 | Destructive          | 40–60                          |                                             | Bodywork of grounded aircraft, bodywork dented, brick walls pitted                               |
| H7                 | Destructive          | 50–75                          |                                             | Severe roof damage, risk of serious injuries                                                     |
| H8                 | Destructive          | 60–90                          |                                             | Severe damage to aircraft bodywork                                                               |
| H9                 | Super Hailstorms     | 75–100                         |                                             | Extensive structural damage. Risk of severe or fatal injuries persons caught in the open         |
| H10                | Super Hailstorms     | > 100                          |                                             | –/–                                                                                              |

### Previous Occurrences

On April 11, 2015, quarter-sized to softball-sized hail was reported in Collin and Rockwall counties. Wylie was among the hardest-hit areas with reports of softball sized hail (4.25-inch), reported by the National Weather Service. Classes were canceled for all Wylie ISD schools. The number of storm damage calls to Wylie 911 overwhelmed the system, tennis ball-sized hail flew through windows and the area had wind gusts up to 60 mph.

This major event is significant to the City of Garland as the impacted area is only a few miles away from Garland. This hail event alone caused \$300 million dollars in property damage. Regionally, hail has accounted for \$190.4 million in losses since 1996.

### Probability of Future Events

The possibility of a hail occurrence is highly likely to happen every year based on historical data, although the severity of impacts will vary. Hail events are common in Garland, as the North Central Texas region is frequented by severe thunderstorms in the spring through summer months. Previous historical data Table 5.32 shows 20 hail events have occurred within Garland since 1994. Calculations from this data suggests that a hail event will impact Garland 0.9 times a year. Therefore, according to Table 4.3 Hazard Frequency Ranking, it is highly likely for a hail event to occur within the next year.

### Impact on Community

The severity of impact from hail in the City of Garland would be limited relative to their frequent occurrence. Property damage would be the biggest impact to the community. Broken windows, damaged vehicles, and roofing are all subject to damage from a severe hailstorm. According to the National Climatic Data Center, 20 hail events have been reported in Garland, Texas between 1/1/1994 and 12/31/2021. Hail has caused an estimated \$10,724,000 in property damage. The City is located in a very urbanized region making the loss of crops a minimal concern. Garland has recorded 35 hail events since 1994.

**Table 5.32 - Hail Historical Data**

| <b>City</b> | <b>Date</b> | <b>Event Type</b> | <b>Size</b> | <b>Deaths</b> | <b>Property Damage</b> |
|-------------|-------------|-------------------|-------------|---------------|------------------------|
| Garland     | 5/2/1994    | Hail              | 0.75        | 0             | 0                      |
| Garland     | 8/7/1994    | Hail              | 0.75        | 0             | 0                      |
| Garland     | 10/21/1994  | Hail              | 2           | 0             | 0                      |
| Garland     | 11/3/1994   | Hail              | 0.75        | 0             | 0                      |
| Garland     | 3/25/1995   | Hail              | 1.75        | 0             | 10,000,000             |
| Garland     | 4/12/1996   | Hail              | 1           | 0             | 0                      |
| Garland     | 5/28/1996   | Hail              | 1.50        | 0             | 0                      |
| Garland     | 6/15/1996   | Hail              | 0.75        | 0             | 0                      |
| Garland     | 1/21/1998   | Hail              | 1           | 0             | 0                      |
| Garland     | 4/8/1998    | Hail              | 0.75        | 0             | 0                      |
| Garland     | 5/2/1998    | Hail              | 2           | 0             | 0                      |
| Garland     | 2/25/2000   | Hail              | 3.75        | 0             | 0                      |
| Garland     | 6/29/2001   | Hail              | 2           | 0             | 0                      |
| Garland     | 7/12/2002   | Hail              | 0.75        | 0             | 0                      |
| Garland     | 5/24/2003   | Hail              | 0.75        | 0             | 0                      |
| Garland     | 6/5/2004    | Hail              | 1           | 0             | 0                      |
| Garland     | 4/5/2005    | Hail              | 1.5         | 0             | 0                      |
| Garland     | 2/5/2008    | Hail              | 1           | 0             | 0                      |
| Garland     | 7/19/2009   | Hail              | 1.75        | 0             | 5,000                  |
| Garland     | 7/19/2009   | Hail              | 1           | 0             | 0                      |
| Garland     | 4/14/2011   | Hail              | 1.75        | 0             | 50,000                 |
| Garland     | 4/14/2011   | Hail              | 0.88        | 0             | 0                      |
| Garland     | 4/14/2011   | Hail              | 1.75        | 0             | 50,000                 |
| Garland     | 4/25/2011   | Hail              | 1           | 0             | 0                      |
| Garland     | 9/18/2011   | Hail              | 2           | 0             | 15,000                 |
| Garland     | 10/23/2011  | Hail              | 1           | 0             | 0                      |
| Garland     | 10/23/2011  | Hail              | 1           | 0             | 4,000                  |
| Garland     | 10/23/2011  | Hail              | 0.88        | 0             | 0                      |
| Garland     | 4/3/2012    | Hail              | 1.25        | 0             | 0                      |
| Garland     | 4/3/2012    | Hail              | 1.75        | 0             | 600,000                |
| Garland     | 6/6/2012    | Hail              | 0.75        | 0             | 0                      |
| Garland     | 3/23/2016   | Hail              | 1           | 0             | 0                      |
| Garland     | 4/26/2016   | Hail              | 0.88        | 0             | 0                      |
| Garland     | 7/8/2017    | Hail              | 1           | 0             | 0                      |
| Garland     | 6/9/2019    | Hail              | 1.5         | 0             | 0                      |

National Climatic Data Center

## **Summary of Vulnerability**

The entire planning area is equally vulnerable to hail events. If tennis ball size hail (2.5 inches) were to occur it would cause major impacts to the community, causing severe roof damage and serious risk of injuries. However, that type of impact is rare compared to how often hail occurs in the area. The Planning Team has determined that a hail incident for the City of Garland is low risk and has a limited impact due to the small hail size that usually occurs in Garland. Large hail that caused major damage has only occurred once since 1991. All roofing structures, vehicles and exposed equipment are the most vulnerable to hail. This includes Garland's 1 police station, 11 fire stations, 1 hospital, 4 DART Transit Centers, and 72 GISD schools at risk of impact from hail.

## **Erosion**

### **Hazard Description**

Erosion involves the wearing of rock and soil found along the riverbed and banks. Erosion also involves the breaking down of the rock particles being carried downstream by the river. Vertical erosion is the downward erosion, which deepens the channel, and lateral erosion is sideward erosion, which widens the channel.

There are four ways a river can erode a bed and bank:

- Hydraulic Action – The force of water flow that breaks rock and drags it away from the bed and the banks of the river.
- Corrosion/Abrasion – The grinding of the rock fragments carried by the river against the banks and bed of the channel. This grinding action widens and deepens the channel.
- Attrition – The knocking of rock fragments in the water against each other. The fragments are broken into smaller, smoother pebbles.
- Solution/Corrosion – The process of the water reacts chemically with soluble minerals in the rocks and dissolve them.

Water erosion is not the only type of erosion affecting soil in the area; wind erosion will also be considered in this section.

### **Location**

All of the creeks, streams and tributaries in the City of Garland are equally subject to erosion. The planning area also includes about eight miles of lakeshore that is subject to erosion. Duck Creek has had the greatest water erosion problems in the City of Garland. Figure 5.33 shows the location of the areas that may experience erosion. The droughts in Garland increase the effects of wind erosion on the entire planning area as well. When droughts occur, there is less vegetation to hold land in place.

### **Severity**

Of the 32 million acres of cropland in Texas, more than 12.8 million acres or 40 percent are classified as highly erodible. According to the Texas Environmental Almanac, Texas soil erosion rates is one of the eight highest in the country. Garland floods have scoured the silt banks near the concrete pedestrian and bike path at Duck Creek Greenbelt Park. In this area and throughout Garland the riverbanks erode approximately 2 inches a year. Creek bank erosion creates a loss of park, land and facilities leading to loss of park infrastructure. The potential for additional erosion is great because of increasing temperatures that will in turn cause longer periods of drought in Garland. This hazard threatens the Lake Ray Hubbard shoreline and creeks throughout the City. We expect to see the same amount of future erosion annually and increased erosion during flood events.

Figure 5.33 - Garland Creeks, Streams and Tributaries

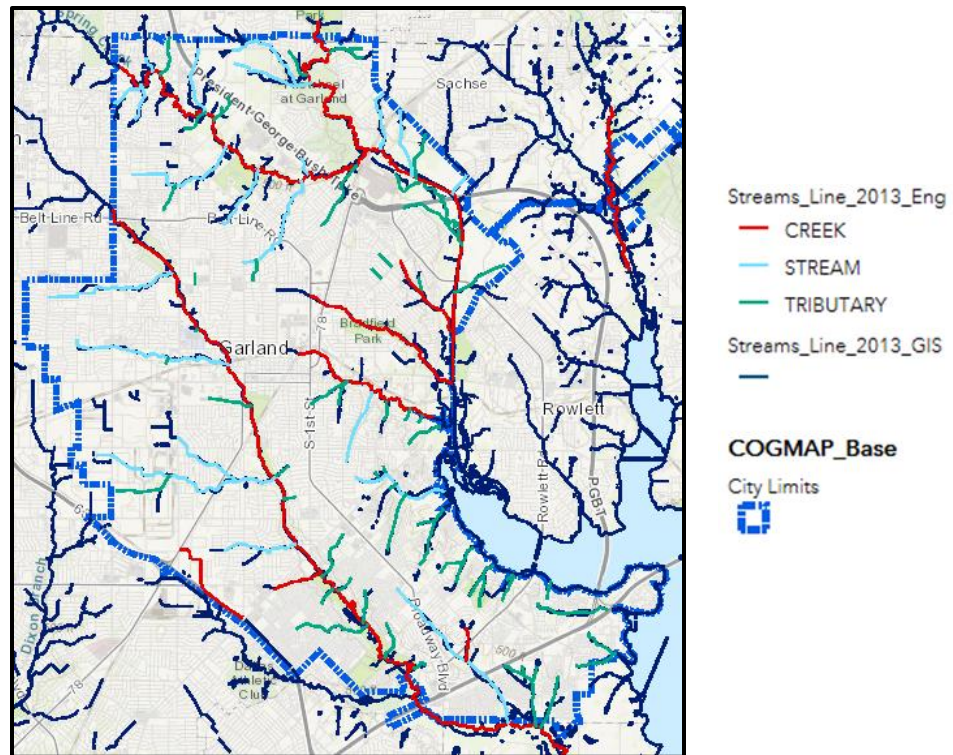
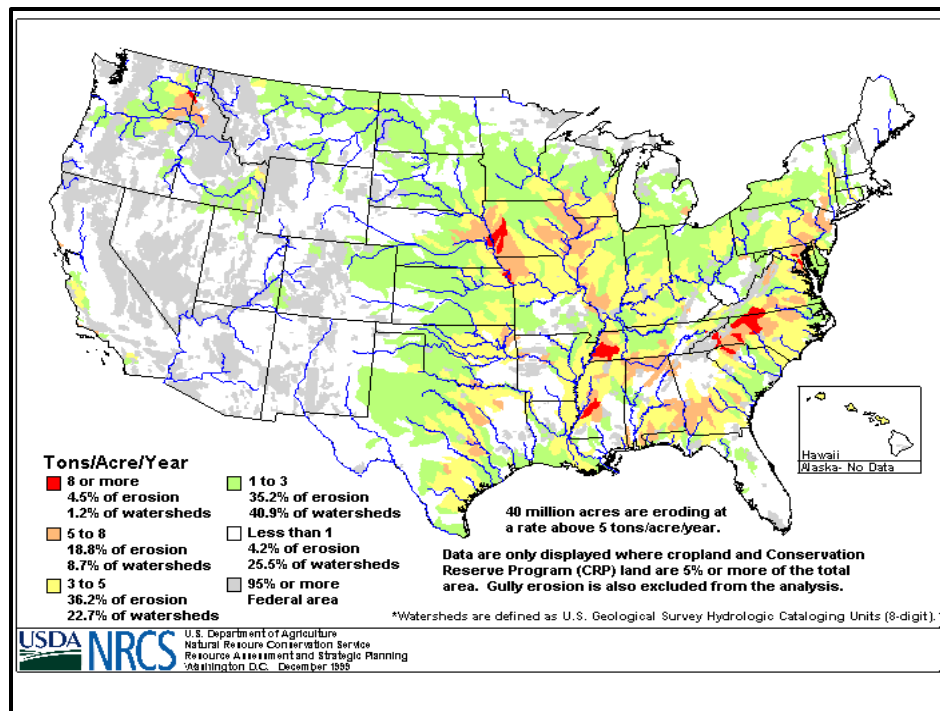


Figure 5.34 - Average Annual Soil Erosion by Wind and Water



### **Previous Occurrences**

Erosion is a slow process and is not sudden onset like many other hazards. Documentation of historical data is difficult to obtain because of this slow process. Each year the following areas have eroded by a minimum of 2 inches:

- Windsurf Bay Park
- Duck Creek
- Meadowcreek Branch Greenbelt
- Rowlett Creek
- Spring Creek

### **Probability of Future Events**

Erosion is a continuous hazard for the city. Therefore, according to Table 4.3 Hazard Frequency Ranking, it is likely that erosion will occur in the next year. Predictions are not reliable because the different variables that exacerbate erosion cannot be easily foreseen.

### **Impact on Community**

Erosion can affect many different areas of a community. Erosion can cause city parks, residents and business to lose property, and even structures. Another problem that can arise from erosion is sedimentation. The Texas Environmental Almanac states sedimentation is usually the result of the erosion process. When a soil particle is detached and transported by water to a new site of deposit, it is referred to as sediment. The soil particle might be temporarily deposited several times before it reaches its end destination. Sediment can fill reservoirs, clog waterways, reduce recreational use of waters, and increase operating costs of water-treatment facilities. Erosion also loosens soils and forms dust, leading to allergies, crop loss, desertification, and the spread of noxious weeds. There are wide ranges of impacts that erosion may have, however the severity of impact to the community is minor. Locally, land is eroding, shrinking outdoor recreation space and damaging paved sidewalks and facilities within the City of Garland at Windsurf Bay Park, Duck Creek and the Greenbelt. In addition, drainage systems throughout Garland are being damaged either from land eroding and bypassing drainage routes or by depositing soil-rendering drainage useless.

### **Summary of Vulnerability**

All of the creeks, streams and tributaries in the City of Garland are equally subject to erosion. Although the hazard is constantly occurring, the impact is minor. Therefore, the planning team considers erosion to be a moderate risk hazard. The land and built environment most vulnerable to erosion within Garland are in Windsurf Bay Park, Duck Creek, Rowlett Creek, Spring Creek and Meadowcreek Branch Greenbelt.



### **Local Hazard Mitigation Goals and Objectives**

The City of Garland has identified mitigation goals to help direct mitigation planning efforts within the community. These mitigation goals have changed based on the updated Hazard Assessment, Community Impact and Risk Assessment and Capabilities Assessment. The Hazard Mitigation Action Plan now includes additional hazards than the previously FEMA approved plan contained. These goals identify areas to which specific mitigation actions should be directed. They were developed to reduce or avoid vulnerabilities to identified hazards. Implementation of the following goals and objectives will help the community to reduce or eliminate the loss of life and property from the identified hazards.

**Goal 1:** Protect residents from the impacts of natural, technological and man-made disasters.

- Objective 1.1 - Reduce or eliminate hazards that may cause injuries, loss of life or severe risk.

**Goal 2:** Protect property, new and existing structures, from the impacts of natural, technological, and man-made disasters.

- Objective 2.1 - Reduce or eliminate hazards that cause property damage/repetitive loss.
- Objective 2.2 - Ensure compliance with the National Flood Insurance Program.
- Objective 2.3 - Implement training activities and regulations that provide the community with a more hazard resistant infrastructure.

**Goal 3:** Enhance public education, awareness and support for hazard mitigation.

- Objective 3.1 – Provide guidance to local businesses to lessen the economic impact when hazards occur.
- Objective 3.2 - Provide strategies for the public to apply mitigation within their own household.
- Objective 3.3 - Encourage public involvement in the emergency management process.
- Objective 3.4 - Identify agencies, personnel and resources available or needed to implement pre-disaster mitigation activities and initiatives.
- Objective 3.5 - Continue to assess and understand hazards to the community.

## **Mitigation Action Report**

Table 6.1 is a summary of project progress for hazard mitigation actions discussed in Garland’s previous FEMA approved HazMAP plan. The HazMAP’s previous identified hazards assisted departments to isolate projects and funding to focus on for the past five years.

**Table 6.1 - Mitigation Action Report**

| <b>Mitigation Action</b>                                  | <b>Description</b>                                                                                                                                                                                                                                                                                                  | <b>Status</b>                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Implement the “Texas Individual Safe Room Rebate Program” | The “Texas Individual Safe Room Rebate Program” will reimburse a homeowner or developer for half of the cost to install an individual safe room in an existing or planned home, up to a cap of \$3,000. Individuals may not apply directly to the State; their city or county must apply for funds on their behalf. | <b>Project Stopped</b> – Final list of Safe rooms that were installed in Garland because of the program has been received.                                                                                                                                                                                                                                                                                                                            |
| Adopt Wind Related Building Codes                         | Mitigate wind related hazards by adopting and implementing new building codes in order to enhance tornado and wind resistance of structures.                                                                                                                                                                        | <b>New</b><br><b>Timeline for Completion:</b> 3 years                                                                                                                                                                                                                                                                                                                                                                                                 |
| Administer Desktop Security Training                      | Conduct Wombat Training to City employees on safe web browsing, mobile device security, identifying phishing and smishing attacks, password security, and safe URLs. Phishing emails are sent to employees to test response                                                                                         | <b>Project Completed:</b> Wombat has been replaced with KnowBe4 as our security awareness training provider. KnowBe4 is on the list off DIR approved vendors to comply with HB 3834 mandated training. Training will continue indefinitely.                                                                                                                                                                                                           |
| Attain SWAT and EOD Team Equipment Enhancement            | Enhancing the SWAT and EOD team response capabilities through the procurement of equipment needed to sustain NIMS Type 1 status.                                                                                                                                                                                    | <b>New</b><br><b>Timeline for Completion:</b> 3 years<br><br><b>Advancements:</b><br><i>EOD:</i> Portable X-Ray Equipment, Improvised Explosive Device/Explosive Ordnance Disposal Ensemble.<br><br><i>SWAT:</i> Tactical Communications equipment, Protective Ballistic Gear, Negotiations tactical device, Dual Tube Night Vision systems, Bounce Imaging Explorer tactical camera ball, and 2 Long-Range Acoustic Devices (LRAD’s) for Negotiators |

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                             |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Acquire Mosquito Trucks                                          | This plan will help to minimize breeding sources in the City by the use of truck-mounted larvicide equipment and liquid larvicide. The one-time purchase of equipment plus the ongoing purchase of liquid biological larvicide is an alternative to using chemical adulticide, which can kill other beneficial insects.                                                                                                                                                                                                  | <b>Project Complete</b>                                                                                                                     |
| Retrofit Backup Police and Fire Communications Center / Dispatch | The radio network will be connected with microwave and fiber. All 8 workstations and equipment in the 911 center will be on UPS and generator backup power. Structural retrofitting of the building to reduce or eliminate the risk of future hail damage.                                                                                                                                                                                                                                                               | <b>Project Completed:</b> Installed a UPS, the radio network is fed from both microwave and fiber, and connected to the building generator. |
| Bank Stabilization - Duck Creek Greenbelt Park Improvements      | Installation of bank stabilization along sections of Duck Creek Greenbelt where flood events have scoured the silt banks near the concrete pedestrian and bike path. The bank has failed, sloughing-off to a point where this 8-ft wide concrete trail will need to be relocated because it is now too close to the edge of the bank. Project design will need to include topographic survey, hydraulic study of that segment, and an analysis of possible materials and methods for the most appropriate stabilization. | <b>New</b><br><b>Timeline for Completion:</b> 3 years                                                                                       |
| Calcium Soil Stabilizer                                          | Apply calcium soil stabilizer to areas around critical infrastructure.                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>New</b><br><b>Timeline for Completion:</b> 4 years                                                                                       |
| Keen Branch Channel Improvements                                 | Channelization improvements to Keen Branch                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Project Delayed</b> - This project also has a BC ratio <1.                                                                               |
| Provide Education on Mitigation Techniques                       | Provide education and mitigation techniques to residents and local businesses.                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Project Implemented</b> (with new OEM position)<br><b>Timeline for Completion:</b> Ongoing                                               |
| Acquire Mitigation Coordinator                                   | This new position within the Office of Emergency Management will focus on implementing City mitigation actions, educate the public on what they can do to mitigate hazards in their homes and how prepare for emergencies.                                                                                                                                                                                                                                                                                               | <b>Project Completed</b> – Planning and Preparedness Coordinator position created and filled.                                               |
| Stream 2C3 and 2C4 Channel Improvements                          | Improvements/widening of the channels of streams 2C3 and 2C4 in Garland to reduce flooding risks to residents and businesses along said streams.                                                                                                                                                                                                                                                                                                                                                                         | <b>Project Delayed</b> – Funding and property acquisition obstacles. This project also has a BC ratio <1.                                   |
| Country Club Estates Storm Sewer Improvements                    | Storm sewer and channel improvements to increase their drainage capacity                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Project Update</b> – Project is in the design phase. Anticipated to start construction in late 2022.                                     |

|                                                            |                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Purchase and install generators on Critical Infrastructure | Acquisition of generators at critical facilities                                                                                                                                                                                                                                                                              | <p><b>New</b></p> <p><b>Timeline for Completion:</b> Water and Wastewater is scheduled for completion in the next 4 years. One project is in construction and two are in design.</p> <p>PMO has initiated a study of existing fire stations (all except FS #5, which already has a backup generator) for the possible implementation of more capable emergency generators to fully power the entirety of the stations for continued daily operations. Study is anticipated to be completed 02/2022. Next step(s) are dependent upon review and subsequent decisions/directions by staff and City Council.</p> |
| Fleet Services Continuity of Operations                    | <p>Acquisition of generators at the two main City of Garland fuel sources, 2343 Forest Lane and Gasoline Alley, and a new mobile fuel truck for emergency operations</p> <p>Generators and a new fuel truck would ensure continuity of operations in a winter storm event as fuel would remain available to City vehicles</p> | <p><b>Project Completed</b> – Gasoline Alley generator has been completed.</p> <p><b>Project Progress</b> – The generator on Forest Lane will be incorporated with the new Water Department Building once built.</p> <p><b>Project Delayed</b> – Fuel Truck: Funding obstacles</p>                                                                                                                                                                                                                                                                                                                            |
| Acquire Recreation Center Generators                       | Power loss is often one of the results of many hazards; generators would maintain energy for these facilities, which the City uses as community shelters.                                                                                                                                                                     | <p><b>Project Update</b>– The PMO has initiated a study of four rec centers (Audubon RC, Fields RC, Garland Senior AC, Hollabaugh RC) for the possible implementation of emergency generators. Study is anticipated to be completed 02/2022. Next step(s) are dependent upon review and subsequent decisions/directions by staff and then Council.</p> <p><b>Timeline for Completion:</b> 5 years</p>                                                                                                                                                                                                         |
| West Pressure Plane Improvements                           | This project incorporates a phased approach to add additional capacity to the West Pressure Plane of the water distribution system. Phase one includes the expansion and rehabilitation of Wallace Pump Station to increase available water.                                                                                  | <b>Project Completed</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| East Zone Water Tower                                      | Design and construction of a new elevated water storage tank and associated piping in the East Pressure Plane. This will provide peak-hour pressures to the southern portion of Garland and enhance off-peak service and fire protection.                                                                                     | <p><b>Project Update:</b> Water has completed the study and the new tower is 5 to 10 years out.</p> <p><b>Timeline for Completion:</b> 5-10 years</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|                                                         |                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                        |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Flood Buyout Program                                    | Develop a City Ordinance to establish the terms and conditions of a Buyout Program for Floodplain Repetitive Loss Properties. Establish internal steps and procedures for proper implementation of the Flood Prone Property Buyout Program.                                                                                          | <b>Project on Schedule</b><br><br><b>Timeline for Completion:</b> 1½ years.                                                            |
| Flood Warning System for high water areas               | Collaborate with the TWDB / NWS / USGS to establish stream gauge stations at low water crossings throughout the City, producing real-time flood levels that can be used by an automated flood warning system or installation of other automated warning devices in identified at-risk areas where only manual gates exist currently. | <b>Project Update</b> – Coordination has begun between departments. Funding obstacles.<br><br><b>Timeline for Completion:</b> 10 years |
| Erosion Control: Multiple Locations                     | Volunteer drainage participation projects with various property owner to mitigate erosion along creek banks on private property. The City participates 50/50 with the private property owners.                                                                                                                                       | <b>Project on Schedule</b><br><br><b>Timeline for Completion:</b> Ongoing                                                              |
| Holford Section C – Bridge Redevelopment / Construction | Construction of a new bridge structure on Holford Road over Spring Creek. Elevating the bridge deck a minimum 2' above the 100-year base flood elevation established by FEMA.                                                                                                                                                        | <b>Project on Schedule</b><br><b>Timeline for Completion:</b> 5 years                                                                  |
| Tree Health Assessment and Mitigation Study             | Work with contractor to do a comprehensive Tree inventory and health assessment to prioritize damaged and dying trees which need to be remediated to alleviate further damages especially during a natural weather incident such as high winds, thunderstorms or tornadoes                                                           | <b>New</b><br><b>Timeline for Completion:</b> 3 years and ongoing                                                                      |

The City of Garland Hazard Mitigation Planning Team identified the following mitigation actions in order to reduce the impact of local hazards. Each mitigation action was developed in conjunction with local mitigation goals and objectives. The mitigation actions identified below are organized by hazard. The actions are described along with the benefits of each action, the estimated cost, the organization responsible for completing the action, the effect on new and existing structures, timeline, and the potential funding sources.

### **Tornado, Severe Winter Weather, Severe Thunderstorm and Hail Combined Mitigation Actions**

| <b>Adopt Wind-Related Building Codes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| <p><b>Description:</b> Mitigate wind related hazards by adopting and implementing new building codes in order to enhance tornado and wind resistance of structures.</p> <p><b>Hazard(s) Addressed:</b> Severe Thunderstorms, Tornado and Flood</p> <p><b>Goals and objectives addressed:</b> 1.1, 2.1</p> <p><b>Lead Office:</b> Building Inspection</p> <p><b>Funding Source(s):</b> General Fund</p> <p><b>Effect on New Structures:</b> New structures will be more resilient to high wind and flood.</p> <p><b>Effect on Existing Structures:</b> Existing structures may be more resilient if remodeled.</p> <p><b>Timeline for Completion:</b> 3 years</p> <p><b>Costs (Estimated):</b> Staff time</p> <p>Cost Effectiveness and Risk Reduction: Buildings that are more resilient withstand higher wind speeds, reducing loss during high wind events and saving on reconstruction costs along with more durable finishes, which should last longer.</p> |

## Flood Mitigation Actions

| Stream 2C3 and 2C4 Channel Improvements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Description:</b> Improvements/widening of the channels of streams 2C3 and 2C4 in Garland to reduce flooding risks to residents and businesses along said streams.</p> <p><b>Hazard(s) Addressed:</b> Flooding</p> <p><b>Goals and objectives addressed:</b> 2.1, 3.1, 3.4</p> <p><b>Lead Office:</b> Engineering</p> <p><b>Funding Source(s):</b> To be proposed in a future budget; Mitigation grant funding</p> <p><b>New Structures:</b> Flood losses would be reduced in any new structures along the stream.</p> <p><b>Effect on Existing Structures:</b> Flood losses would be reduced in any existing structures along the stream.</p> <p><b>Timeline for Completion:</b> 5 years</p> <p><b>Costs (Estimated):</b> \$9,207,500</p> <p>Cost Effectiveness and Risk Reduction: Homeowners along affected stream would save money on flood insurance premiums and possibly see an improvement in property values. Fewer insurance payments would be required under NFIP, and loss of life and property would be reduced.</p> |

| Country Club Estates Storm Sewer Improvements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Description:</b> Storm sewer and channel improvements to increase their drainage capacity</p> <p><b>Hazard(s) Addressed:</b> Flooding, Erosion</p> <p><b>Goals and objectives addressed:</b> 1.1, 2.1, 2.2, 3.1,3.4</p> <p><b>Lead Office:</b> Engineering</p> <p><b>Funding Source(s):</b> To be proposed in a future budget; Mitigation grant funding</p> <p><b>New Structures:</b> Elimination of some known cases of homes that are subject to Code “A” internal flooding; also, reduction of Code “C” bank erosion in new structures built in the Country Club Estates neighborhood.</p> <p><b>Effect on Existing Structures:</b> Elimination of some known cases of homes that are subject to Code “A” internal flooding; also, reduction of Code “C” bank erosion in existing structures in the Country Club Estates neighborhood.</p> <p><b>Timeline for Completion:</b> 5 years</p> <p><b>Costs (Estimated):</b> \$1,122,500</p> <p>Cost Effectiveness and Risk Reduction: Homeowners in the Country Club Estates neighborhood would see a reduction or elimination of flood loss. Garland would reduce money spent on bank erosion repairs.</p> |

| Keen Branch Channel Improvements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <p><b>Description:</b> Channelization improvements to Keen Branch</p> <p><b>Hazard(s) Addressed:</b> Flooding</p> <p><b>Goals and objectives addressed:</b> 1.1, 2.1, 2.2, 3.1, 3.4</p> <p><b>Lead Office:</b> Engineering</p> <p><b>Funding Source(s):</b> To be proposed in a future budget; Mitigation grant funding</p> <p><b>New Structures:</b> New structures built along Keen Branch would be less vulnerable to flood hazards</p> <p><b>Effect on Existing Structures:</b> Existing structures along Keen Branch would be less vulnerable to flood hazards</p> <p><b>Timeline for Completion:</b> 5 years</p> <p><b>Costs (Estimated):</b> \$7,073,750</p> <p>Cost Effectiveness and Risk Reduction: Project would reduce flood claims for residential flood losses in structures along Keen Branch.</p> |

## Drought Mitigation Actions

| East Zone Water Tower Improvements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| <p><b>Description:</b> Design and construction of a new elevated water storage tank and associated piping in the East Pressure Plane in order to provide peak-hour pressures to the southern portion of Garland and enhance off-peak service and fire protection</p> <p><b>Hazard(s) Addressed:</b> Drought</p> <p><b>Goals and objectives addressed:</b> 1.1, 2.3, 3.4, 3.5</p> <p><b>Lead Office:</b> Water</p> <p><b>Funding Source(s):</b> To be proposed in a future budget; Mitigation grant funding</p> <p><b>Effect on New Structures:</b> New structures would have more access to water in a drought event</p> <p><b>Effect on Existing Structures:</b> Existing structures would have more access to water in a drought event</p> <p><b>Timeline for Completion:</b> 5-10 years</p> <p><b>Costs (Estimated):</b> \$9,000,000</p> <p>Cost Effectiveness and Risk Reduction: Minor impact on the City's operating budget due to additional facility maintenance costs. Residents of the southern portion of Garland will be less vulnerable to water shortages in a drought.</p> |

## Erosion and Expansive Soil Mitigation Actions

| Bank Stabilization - Duck Creek Greenbelt Park Improvements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <p><b>Description:</b> Installation of bank stabilization along sections of Duck Creek Greenbelt where flood events have scoured the silt banks near the concrete pedestrian and bike path. The bank has failed, sluffing-off to a point where this 8-ft wide concrete trail will need to be relocated because it is now too close to the edge of the bank. Project design will need to include topographic survey, hydraulic study of that segment, and an analysis of possible materials and methods for the most appropriate stabilization.</p> <p><b>Hazard(s) Addressed:</b> Erosion and Flooding</p> <p><b>Goals and objectives addressed:</b> 2.1, 2.3, 3.4</p> <p><b>Lead Office:</b> Parks and Recreation and Engineering</p> <p><b>Funding Source(s):</b> General Fund or mitigation funding</p> <p><b>Effect on New Structures:</b> N/A</p> <p><b>Effect on Existing Structures:</b> Will protect creek bank and adjacent park pedestrian and bike facilities from further damage.</p> <p><b>Timeline for Completion:</b> 3 years</p> <p><b>Costs (Estimated):</b> \$3.5 Million</p> |
| <p><b>Cost Effectiveness and Risk Reduction:</b> This section of Duck Creek Greenbelt Park is part of a multimodal pedestrian and bike system, which connects with transit facilities and provides off-street connection between Centerville Road and the City of Mesquite's bike/ pedestrian trail, south of IH-30. Current funding will be extending the concrete trail from IH-30 into Mesquite, and extending the off-street bike path from its current north terminus, into Lon Wynne Park and will cross Duck Creek via a pedestrian-bike bridge, and connect to on-street bike facilities.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| Calcium Soil Stabilizer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Description:</b> Apply calcium soil stabilizer to areas around critical infrastructure.</p> <p><b>Hazard(s) Addressed:</b> Expansive Soil</p> <p><b>Goals and objectives addressed:</b> 2.1, 2.3, 3.4</p> <p><b>Lead Office:</b> Engineering</p> <p><b>Funding Source(s):</b> General Fund or mitigation funding</p> <p><b>Effect on New Structures:</b> Will protect infrastructure from expansive soils.</p> <p><b>Effect on Existing Structures:</b> Will protect infrastructure from further damage.</p> <p><b>Timeline for Completion:</b> 4 years</p> <p><b>Costs (Estimated):</b> \$300,000</p> |
| <p><b>Cost Effectiveness and Risk Reduction:</b> Reducing damages to critical infrastructure will reduce costs associated with repairing them.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## All Hazards Mitigation Actions

| Provide Education on Mitigation Techniques                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| <p><b>Description:</b> Provide education and mitigation techniques to residents and local businesses.</p> <p><b>Hazard(s) Addressed:</b> Tornado, Severe Winter Weather, Biological Event, Flood, Earthquake, Severe Thunderstorm, Infrastructure and Communications Failure, Drought, Extreme Heat, Power Outage, Expansive Soils, Hail, Erosion</p> <p><b>Goals and objectives addressed:</b> 2.1, 2.3, 3.1, 3.2, 3.3, 3.4, 3.5</p> <p><b>Lead Office:</b> Emergency Management</p> <p><b>Funding Source(s):</b> General Fund</p> <p><b>Effect on New Structures:</b> Development of business continuity plan.</p> <p><b>Effect on Existing Structures:</b> Development of business continuity plan.</p> <p><b>Timeline for Completion:</b> Ongoing</p> <p><b>Costs (Estimated):</b> \$5,000</p> <p>Cost Effectiveness and Risk Reduction: Losses in the community translate into the loss of resources for local residents as they try to recover, and the loss of taxes and services to local governments as they try to manage the recovery.</p> |

| Acquire Recreation Center Generators                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <p><b>Description:</b> Power loss is often one of the results of many hazards; generators would maintain energy for these facilities, which the City uses as community shelters.</p> <p><b>Hazard(s) Addressed:</b> Tornado, Severe Winter Weather, Biological Event, Flood, Earthquake, Severe Thunderstorm, Infrastructure and Communications Failure, Extreme Heat, Power Outage, Hail</p> <p><b>Goals and objectives addressed:</b> 1.1, 3.1, 3.4</p> <p><b>Lead Office:</b> Parks and Recreation</p> <p><b>Funding Source(s):</b> Mitigation grant funding or general fund</p> <p><b>Effect on New Structures:</b> None</p> <p><b>Effect on Existing Structures:</b> Existing recreation centers will have power backup to serve as more sustainable warming centers and shelters to local residents</p> <p><b>Timeline for Completion:</b> 5 years</p> <p><b>Costs (Estimated):</b> \$10,000</p> <p>Cost Effectiveness and Risk Reduction: Generators at the community recreation centers would provide more sustainable warming centers and shelters for residents, as people will have a safe place to stay during hazard events. The City will save money by sending fewer first responders on calls related to hazards.</p> |

| Fleet Services Continuity of Operations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Description:</b> Acquisition of a generator at the Forest Lane fueling source.</p> <p><b>Hazard(s) Addressed:</b> Tornado, Severe Winter Weather, Biological Event, Flood, Earthquake, Severe Thunderstorm, Infrastructure and Communications Failure, Extreme Heat, Power Outage, Hail</p> <p><b>Goals and objectives addressed:</b> 1.1, 3.1, 3.4</p> <p><b>Lead Office:</b> Fleet</p> <p><b>Funding Source(s):</b> Mitigation grant funding or general fund</p> <p><b>Effect on New Structures:</b> None</p> <p><b>Effect on Existing Structures:</b> Acquisition of one generator has been completed. New generator on Forest Lane will be incorporated with new structure.</p> <p><b>Timeline for Completion:</b> 5 years</p> <p><b>Costs (Estimated):</b> \$10,000</p> |
| <p>Cost Effectiveness and Risk Reduction: Generator at the Forest Lane fueling source would provide access to the fueling sources and would provide the ability to continue operations throughout an incident.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| Purchase and Install Generators                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <p><b>Description:</b> Acquisition of generators at critical facilities</p> <p><b>Hazard(s) Addressed:</b> Tornado, Severe Winter Weather, Biological Event, Flood, Earthquake, Severe Thunderstorm, Infrastructure and Communications Failure, Extreme Heat, Power Outage, Hail</p> <p><b>Goals and objectives addressed:</b> 1.1, 2.3, 3.4</p> <p><b>Lead Office:</b> Water and Wastewater</p> <p><b>Funding Source(s):</b> Capital Improvements Project</p> <p><b>Effect on New Structures:</b> New structures would have improved capabilities and continuity of operations</p> <p><b>Effect on Existing Structures:</b> Existing structures would have improved capabilities and continuity of operations</p> <p><b>Timeline for Completion:</b> 4 years</p> <p><b>Costs (Estimated):</b> \$15,450,000</p> |
| <p>Cost Effectiveness and Risk Reduction: The City of Garland would be able to continue services and maintain operations. The City would be able to maintain pumping of potable water and treating wastewater during power outages.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Attain SWAT and EOD Team Equipment Enhancement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| <p><b>Description:</b> Enhancing the SWAT and EOD team response capabilities through the procurement of equipment needed to sustain NIMS Type 1 status.</p> <p><b>Hazard(s) Addressed:</b> All Hazards</p> <p><b>Goals and objectives addressed:</b> 1.1</p> <p><b>Lead Office:</b> Police Department</p> <p><b>Funding Source(s):</b> Grant and general funding</p> <p><b>Effect on New Structures:</b> N/A</p> <p><b>Effect on Existing Structures:</b> N/A</p> <p><b>Timeline for Completion:</b> 3 years</p> <p><b>Costs (Estimated):</b> \$100,000</p> |
| <p>Cost Effectiveness and Risk Reduction: Maintaining Type 1 status is a crucial part of this in house regional asset. Not maintaining these capabilities would not only have major impacts to the City of Garland, but the entire region. This team saves lives and protects infrastructure.</p>                                                                                                                                                                                                                                                           |

## Benefit-Cost Review and Prioritizing Mitigation Actions

The City of Garland Planning Team prioritized mitigation activities using the Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) Method, per Federal Emergency Management Agency (FEMA) recommendations. STAPLEE is a benefit-cost review tool and includes considerations for Social, Technical, Administrative, Political, Legal, Environmental, and Economic issues. Each of these items is assigned a positive or negative value. Projects that score the highest are considered the most effective, and their funding most justified. A lower score indicates that several obstacles exist that would prevent the proposed project from being completed. Most mitigation strategies have at least one obstacle and, very frequently, this obstacle is economic. Part of putting the mitigation strategies in a prioritized list is being able to justify the need for a project should funding become available.

| City of Garland STAPLEE Action Evaluation and Prioritization Table |                      |                                 |                      |                    |                   |          |                    |                        |                   |                |                |                 |                          |                            |                   |                |                         |                          |                      |                              |                              |                             |                            |
|--------------------------------------------------------------------|----------------------|---------------------------------|----------------------|--------------------|-------------------|----------|--------------------|------------------------|-------------------|----------------|----------------|-----------------|--------------------------|----------------------------|-------------------|----------------|-------------------------|--------------------------|----------------------|------------------------------|------------------------------|-----------------------------|----------------------------|
|                                                                    | Social               |                                 | Technical            |                    | Administrative    |          | Political          |                        | Legal             |                | Economic       |                 | Environmental            |                            |                   |                |                         |                          |                      |                              |                              |                             |                            |
| Mitigation Actions                                                 | Community Acceptance | Effect on Segment of Population | Technically Feasible | Long-Term Solution | Secondary Impacts | Staffing | Funding Allocation | Maintenance/Operations | Political Support | Local Champion | Public Support | State Authority | Existing Local Authority | Potential Legal Challenges | Benefit of Action | Cost of Action | Contributes to Economic | Outside Funding Required | Effect on Land/Water | Consistent with Federal Laws | Effect on HAZMAT Waste Sites | Matches Environmental Goals | Total Prioritization Score |
| #1 Safe Room                                                       | +                    | +                               | +                    | +                  | +                 | N        | -                  | N                      | +                 | N              | +              | N               | +                        | +                          | +                 | N              | N                       | -                        | N                    | +                            | N                            | N                           | 9                          |
| #2 Bldg. Codes                                                     | +                    | +                               | +                    | +                  | +                 | +        | +                  | +                      | +                 | +              | +              | +               | +                        | -                          | +                 | -              | +                       | N                        | N                    | +                            | N                            | N                           | 14                         |
| #3 SWAT/EOD                                                        | +                    | +                               | +                    | +                  | -                 | +        | +                  | +                      | +                 | +              | -              | +               | +                        | +                          | +                 | +              | N                       | -                        | N                    | -                            | N                            | N                           | 14                         |
| #4 Dispatch                                                        | +                    | +                               | +                    | +                  | +                 | +        | +                  | +                      | +                 | +              | +              | +               | +                        | +                          | +                 | +              | N                       | +                        | N                    | +                            | N                            | +                           | 19                         |
| #5 Duck Creek                                                      | +                    | +                               | +                    | +                  | +                 | +        | +                  | +                      | +                 | +              | +              | +               | +                        | +                          | +                 | +              | +                       | +                        | +                    | +                            | N                            | +                           | 21                         |
| #6 Calcium Soil                                                    | +                    | +                               | +                    | +                  | +                 | +        | -                  | +                      | +                 | +              | +              | +               | +                        | +                          | +                 | -              | +                       | -                        | +                    | +                            | N                            | +                           | 15                         |
| #7 Keen Branch                                                     | +                    | +                               | +                    | +                  | +                 | +        | -                  | +                      | +                 | +              | +              | +               | +                        | +                          | -                 | -              | N                       | -                        | +                    | +                            | N                            | +                           | 12                         |
| #8 Mitigation Education                                            | +                    | +                               | +                    | +                  | +                 | +        | +                  | +                      | +                 | +              | +              | +               | +                        | +                          | +                 | -              | N                       | -                        | N                    | +                            | N                            | N                           | 13                         |
| #9 Stream 2C3/4                                                    | +                    | +                               | +                    | +                  | +                 | +        | -                  | +                      | +                 | +              | +              | +               | +                        | +                          | +                 | +              | N                       | -                        | +                    | +                            | N                            | +                           | 16                         |
| #10 Country Club Estates                                           | +                    | +                               | +                    | +                  | +                 | +        | -                  | +                      | +                 | +              | +              | +               | +                        | +                          | -                 | -              | N                       | -                        | +                    | +                            | N                            | +                           | 13                         |
| #11 Generators                                                     | +                    | +                               | +                    | +                  | +                 | +        | -                  | +                      | +                 | +              | +              | +               | +                        | +                          | +                 | +              | N                       | -                        | N                    | +                            | N                            | N                           | 14                         |
| #12 Fleet                                                          | +                    | +                               | +                    | +                  | +                 | +        | -                  | +                      | +                 | N              | +              | +               | +                        | +                          | +                 | N              | N                       | -                        | N                    | +                            | N                            | N                           | 12                         |

|                        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |
|------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|
| #13 Recreation Gens.   | + | + | + | + | + | + | - | + | + | + | + | + | + | + | + | + | N | - | N | + | N | N | 14 |
| #14 East Water Tower   | + | + | + | + | + | + | - | + | + | + | + | + | + | + | + | + | + | - | + | + | N | + | 17 |
| #15 Flood Buyout       | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | N | - | + | + | N | + | 18 |
| #16 Flood Warning Sys. | + | + | + | + | + | + | - | + | + | + | + | + | + | + | + | - | N | - | + | + | N | + | 14 |
| #17 Erosion Control    | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | N | - | + | + | N | + | 18 |
| #18 Holford Rd.        | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | N | - | + | + | N | + | 18 |



Planning Team members will be responsible for coordinating a periodic review of the Plan to ensure integration of hazard mitigation strategies

### **Monitoring, Evaluating and Updating the Plan**

The City of Garland Hazard Mitigation Action Plan goals, integration and planning processes will be monitored and evaluated each January within its five-year life cycle by reconvening the Planning Team. The Planning Team will evaluate mitigations using the Department Update form, which includes project status, project achievement, cost effectiveness, problems, and relevance. The team will determine if the identified hazards have changed or if risk and impact of the hazards have increased or decreased. Updates may also be the result of the City of Garland Budget Review, Capital Improvement Plan or major disaster within the community. The Advisory Committee, comprised of department heads, including the Planning and Preparedness Coordinator, will monitor and evaluate mitigation actions from a department perspective and determine how improvements could be made after the Planning Team has summarized their findings. Following each update to the Hazard Mitigation Action Plan, the City of Garland Office of Emergency Management will document the update in the record of changes table in the Plan. This table will track any meetings, activities, completed initiatives, resulting risk reduction, limitations or processes used for the purpose of the plan update. One year before the 5-year plan update, the planning team will reconvene along with any additional individuals or organizations that have subject matter expertise. Once again, the Planning Team will review the threats and hazards to determine if these have changed or decide if there is the need for another Community Risk and Impact Assessment.

### **Incorporation into Existing Planning Mechanisms**

The HazMAP identifies current capabilities and mechanisms available for implementing hazard mitigation strategies. Integration of the Hazard Mitigation Action Plan into other existing planning mechanisms will take place through coordinating HazMAP with Annex P: Hazard Mitigation, working with City Department Directors and the Advisory Committee to coordinate Capital Improvement planning and mitigation goals, and through City Council approval and adoption. Mitigation actions smaller in nature that are not separate budget items, and do not have great impacts on residents or departments are not required to be presented to City Council. Department Directors and managers simply implement the mitigation action into current department plans and procedures informally. Larger mitigation actions requiring substantial resources, large changes in City services or department activities must first be approved through Department Directors and then approved by the Managing Director of that department. Then, approval by the City Manager and finally presented to City Council for approved by vote. After final approval, the Department Directors and Managers will begin the implementation process. During any mitigation action implementation, the Office of Emergency Management plays a support role to departments implementing mitigation actions.

## **Continued Public Involvement**

In order to maintain public involvement, the City of Garland Planning Team will continue to seek the input of the public and stakeholders. A copy of the Local Hazard Mitigation Action Plan will continue to be available through the Office of Emergency Management for review and comment. The public will also be continuously engaged through a number of various tasks completed by the City of Garland Office of Emergency Management and other City Departments. Methods for public involvement during implementation include but are not limited to: adding an Economic Resistance and Recovery Education Coordinator to the Department of Emergency Management, Economic Resistance and Recovery Education through the Chamber of Commerce, presentations, community preparedness campaigns, and seasonal preparedness updates on the department website.

Discussion with citizens about hazards and risks, builds support for implementation of mitigation activities. During annual events, OEM will gauge the public's preparedness through discussion and survey tools to assist in monitoring plan impacts and report findings at the annual Planning Team meeting. A formal survey may be distributed with similar questions to the initial survey in Appendix D to easily compare and evaluate components of the HazMAP plan during the 5-year plan update.

## Plan Maintenance Summary

| Maintenance Activity         | Local Planning Documents          | Responsible Personnel                 | Schedule                                | Plan                                                                                                                                           |
|------------------------------|-----------------------------------|---------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Implementation               | City Budget                       | City Manager                          | Annually                                | Integration of mitigation projects identified in HazMAP, grants, and other fiscal allowances for mitigation actions and related costs          |
| Implementation               | Emergency Operations Plan updates | Planning and Preparedness Coordinator | Reviewed annually, update as needed     | EOP Mitigation annex updates based on HazMAP HIRA; update preparedness, response and recovery actions related to identified hazards            |
| Implementation               | Floodplain Ordinances             | Drainage and Development Engineer     | As Needed                               | Enhance mitigation of flood hazards using LMAP flood data for floodplain management and community development.                                 |
| Implementation               | Community Rating System           | Drainage and Development Engineer     | Annually                                |                                                                                                                                                |
| Implementation               | Capital Improvement Plans         | Budget and Research                   | Annually                                | Strengthen critical infrastructure and key resources based on HazMAP hazard analysis, incorporate vulnerability data and action items.         |
| Monitoring Evaluation Update | HazMAP                            | HazMAP Planning Team                  | Annually in January                     | Evaluate each mitigation action using the Department Update form. Determine changes in hazards, risk and impact.                               |
| Monitoring Evaluation        | HazMAP                            | Advisory Committee                    | Annually after Planning Team Summarizes | Assess progress in mitigation activities implemented by the plan and decide how improvements could be made to the overall mitigation strategy. |



**A. City Council Resolution**

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## B. Documentation of Planning Meetings



# Garland Hazard Mitigation Action Plan (HazMAP) | 2021

### HAZMAP BASIS/AUTHORITY

There are two main federal authorities requiring locals to maintain a Hazard Mitigation Program, which identify the requirements and procedures for both the program and plan:

1. Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act (DMA) of 2000
2. Code of Federal Regulations, Title 44, Chapter 1, Part 201 (44 CFR Part 201)

The HazMAP must be formally adopted via City Council Resolution and the plan must be made public for all to reference and opportunities for input must be provided to partners and the public. Plans go through a strict review process and must be approved by FEMA for jurisdictions to be eligible for pre or post mitigation funding.

### PLANNING PROCESS AND TEAM (2017 PLAN)

- Building Inspection, Building Official
- Chamber of Commerce, Vice President
- Emergency Management Director
- Emergency Management Planning and Preparedness Coordinator
- Engineering, Drainage and Development Engineer
- Environmental Health Manager
- Facilities, Director
- Fire Department, Assistant Fire Chief
- Neighborhood Vitality, Administrator
- Parks and Recreation, Services Manager
- Police Department, Captain
- Garland Power & Light, Chief Operation Officer
- Public/Radio Amateur Civil Emergency Service (RACES)
- Water Department, Utilities Director

The Planning Team performs the following activities: identified hazards, conducted risk assessments, ranked hazards, developed a public outreach strategy, planned implementation of mitigation actions, assisted in research and gathering information to include in the plan and participated in the draft plan review.

### CAPABILITIES ASSESSMENT

As part of this assessment, we must PROVE we have coordinated the HazMAP with the existing planning documents and tools the city has implemented such as the current Comprehensive Master Plan, Capital Improvement Plan, Economic Development Plan, Building Codes, Zoning Ordinances, etc.

### STAKEHOLDER AND COMMUNITY INVOLVEMENT

The HazMAP must be a publically accessible document and the planning team must prove not only multiple opportunities for involvement but supply the information provided by the public and partners. At least two open meetings must be conducted to review these findings and collect additional input.

## **COMMUNITY PROFILE**

The profile includes very detailed information about the physical boundaries of the city, demographics, property use and values, transportation systems, utility lifelines, etc.

## **RISK OVERVIEW & HAZARD PROFILES**

The risk overview includes a detailed hazard identification process and formula-based analysis that must take into account the input of not only City staff but partner agencies (GISD, private industry, etc.) and the public. We have already posted and sent a utility mailer to start collecting public input for this section. Each hazard has to be ranked based on likelihood, frequency of occurrence and severity of “potential” impact. For each of the highest ranking hazards, a detailed hazard profile must be developed and updated.

## **HAZARD MITIGATION STRATEGY**

This section details the Goals for the City’s Hazard Mitigation program overall and then identifies specific objectives to achieving these goals. Part of this section includes a detailed report on progress towards the goals and objectives since the last submission and a progress report for the identified Mitigation Actions from the last submission.

Existing Goals:

Goal 1: Protect residents from the impacts of natural, technological and man-made disasters.

Goal 2: Protect property, new and existing structures, from the impacts of natural, technological, and man-made disasters.

Goal 3: Enhance public education, awareness and support for hazard mitigation.

## **HAZARD MITIGATION ACTIONS (MOST IMPORTANT SECTION)**

The Hazard Mitigation Action section details the identified mitigation projects the team developed in order to achieve the agreed upon Goals and Objectives. The identified actions are divided by hazard and MUST specifically address the vulnerabilities and ways the project will lessen the impacts of each specific hazard as explained in the Hazard Profiles. The current plan has 18 identification Hazard Mitigation Actions (see Mitigation Action Report attached).

Required Elements of a Mitigation Action (project):

- Link to plan Goals and Objectives
- Assignment of responsibility
- Timeline
- List of potential funding sources
- Detailed description of impacts on new and existing structures
- Cost estimate
- Cost Benefit and Risk Reduction Analysis (**MOST IMPORTANT ELEMENT**)

## **Meeting Purpose**

- Provide a quick refresher regarding Hazard Mitigation Action Plan
- Identify Planning Team for 2021-2022
- Review Update Timeline

## **Plan Overview**

- Authorities
- Planning Process and Team
- Capabilities Assessment
- Stakeholder & Community Involvement
- Community Profile
- Risk Overview/Hazard Profiles
- Hazard Mitigation Strategy
- Hazard Mitigation Actions

## **Action Items**

- Identify department representatives to serve on Planning Team



## HazMAP Update Leadership Kickoff Meeting



1

### Purpose

- What is the Hazard Mitigation Action Plan?
- Identify Planning Team for 2021-2022
- Review Update Timeline
  - Next meeting
  - 6 planning meetings

2

### HazMAP Authorities

- Federal Authorities
  - Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288)
  - Code of Federal Regulations, Title 44, Chapter 1, Part 201 (44 CFR Part 201)
- Requires City Council Resolution
- Must be made public, opportunities for input are required
- Review process/FEMA approval for mitigation funding

3

### Community Profile

- Physical Boundaries
- Demographics
- Property Use and Values
- Transportation Systems
- Utility Lifelines





4

### Capabilities Assessment

- HazMAP must coordinate with existing planning documents:
  - Comprehensive Master Plan
  - Capital Improvement Plan
  - Economic Development Plan
  - Building Codes
  - Zoning Ordinances



5

### Stakeholder & Community Involvement

- Must be publically accessible
- Multiple opportunities for public input
- At least two open meetings must be conducted



6

### Risk Overview/Hazard Profiles

- Hazard identification process must include input from partner agencies and the public
- Utility mailer sent out in September
  - Survey - 76 responses as of 10/18/2021.
  - Results will be ranked



QR Code to Hazard Mitigation Survey

7

### Garland Specific Hazard Mitigation Strategy

- Goals
- Specific objectives
- Must report progress since last submission
  - Existing Goals:
    1. Protect residents from the impacts of natural, technological and man-made disasters.
    2. Protect property, new and existing structures, from the impacts of natural, technological, and man-made disasters.
    3. Enhance public education, awareness and support for hazard mitigation.

8

### Hazard Mitigation Actions

- List of specific tasks the City wants to do to lessen the impacts of disaster
- Must follow strict Mitigation criteria and specifically address identified vulnerabilities

Required Elements:

- >Link to plan Goals & Objectives
- >Assignment of responsibility
- >Timeline
- >List of potential funding sources
- >Detailed description of impacts on new & existing structures
- >Cost estimate
- >Cost Benefit and Risk Reduction Analysis (MOST IMPORTANT ELEMENT)

9

### Planning and Process Team

- Planning Team Involvement:
  - Identify Hazards
  - Risk Assessments
  - Rank Hazards
  - Public Outreach Strategy
  - Mitigation Actions Review/Implementation
  - Research

Team Members (2021)

- Building Inspection, Building Official
- Chairman of Commission, Vice President
- Emergency Management Director
- Emergency Management Planning and Preparedness Coordinator
- Engineering, Drainage and Development Engineer
- Environmental Health Manager
- Facilities Director
- Fire Department, Assistant Fire Chief
- Neighborhood Vitality Administrator
- Police and Recreation Services Manager
- Police Department, Captain
- Garland Power & Light, Chief Operation Officer
- Water Department, Utilities Director

10

### Action Items

- Identify department representative to serve on planning team
- Preferred meeting format
- Meeting Schedule
  - Nov 17 @ 1000
  - Dec 15 @ 1000
  - Jan 26 @ 1000
  - March 2 @ 1000
  - April 13 @ 1000 (Draft submitted for Leadership Final Review)
  - May 18 @ 1000

11

# HazMAP Planning Team Kickoff Meeting

**November 17, 2021  
10:00 AM**

- Introductions
- Discussion about the purpose of mitigation and planning process
- Review Previous Mitigation Goal Progress and Implementation
- Review/Discuss edits or changes
- Hazard Mitigation Survey explained
- Questions or Comments?

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## **Next Meeting**

December 15, 2021 - 10:00 AM



**GARLAND**

## HazMAP Planning Team Kickoff Meeting

City of Garland  
Office of Emergency Management  
November 17th, 2021



1

### Introductions

- Name
- Department/Position
- HazMAP Experience



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2

### Purpose

- What is the Hazard Mitigation Action Plan?
- Review Update Timeline
  - 6 Planning Team Meetings



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3

### Planning and Process Team

- Planning Team Involvement:
  - Introduction
  - Planning Process
  - Community Profile
  - Risk Overview
  - Hazard Profiles
  - Hazard Mitigation Strategy
  - Hazard Mitigation Actions
  - Plan Maintenance
  - Appendix

**Team Members (cont.)**

- Building Inspection, Building Official
- Chamber of Commerce, Vice President
- Emergency Management Director
- Emergency Management Planning and Preparedness Coordinator
- Engineering, Director
- Environment of Health Manager
- Facilities, Physical Security Program Manager
- Fire Department, Assistant Fire Chief
- Neighborhood Vitality, Managing Director
- Parks and Recreation, Director
- Police Department, Captain
- Garland Power & Light, Chief Operation Officer
- Water Department, Wastewater Director

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4

### Hazard Mitigation Survey

- Hazard identification process must include input from partner agencies and the public
- Utility mailer sent out in September
  - Survey: 84 responses as of 11/17/2021
  - Results will be ranked



QR Code as Hazard Mitigation Survey

 GARLAND

5

### Planning Team Input

- Review of sections in Section 1 & Section 2 of HazMAP



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6

### Action Items

- Preferred meeting format
- Meeting Schedule
  - December 15, 2021 10:00 AM
  - January 26, 2022 10:00 AM
  - March 2, 2022 10:00 AM
  - April 13, 2022 10:00 AM (Date subject to availability/Need Review)
  - May 18, 2022 10:00 AM

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7

## Questions?

Thank you for attending!

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8

City of Garland | Hazard Mitigation Action Plan | Page 106

# HazMAP Planning Team Meeting

**December 15, 2021  
10:00 AM**

- Hazard Mitigation Survey Results (Identified Hazards)
- Community Risk and Impact Assessment
- Review/Discuss edits or changes
- Project list from 2017 – Additions/Status
- Questions or Comments?



**GARLAND**

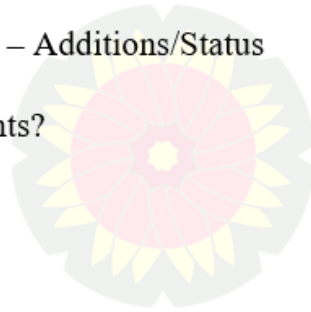
## **Next Meeting**

**January 26, 2022 - 10:00 AM**

# HazMAP Planning Team Meeting

**January 26, 2022  
10:00 AM**

- Acknowledgement paragraph for Climate Change portion
- Community Risk and Impact Assessment
- Review/Discuss edits or changes
- Project list from 2017 – Additions/Status
- Questions or Comments?



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## **Next Meeting**

March 2, 2022 - 10:00 AM

# HazMAP Planning Team Meeting

**March 3, 2022**  
**10:00 AM**

- Review/Discuss edits or changes
- Finalize Mitigation strategies
- Summarize/Review of HazMAP Public Meetings
- Discuss final steps
- Questions or Comments?



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## C. Public Outreach Methods



### GARLAND EMERGENCY MANAGEMENT

## Hazard Mitigation Action Plan

### What is Hazard Mitigation?

Hazard Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters.

### Importance of a Hazard Mitigation Plan

Through projects, programs, and policies the City of Garland is constantly creating ways to protect the City from hazards and recover from disasters quickly. The Hazard Mitigation Action Plan (HazMAP) creates safer communities by reducing loss of life and property damage. The plan includes a list of specific actions and goals for city departments. It also includes information the public can use to prepare themselves for hazards.



*GP&L – Winter Weather, February 2022*

### Key Mitigation Actions

- Educating citizens on Mitigation techniques
- Elevation of structures in flood prone areas
- Texas Individual Saferoom Rebate Program
- Erosion and drainage control to reduce flooding
- Update building codes for improved structural stability
- Enhancing SWAT and EOD equipment
- Retrofit backup Police and Fire Communications Center to avoid future hail damage
- Acquire Generators:
  - Two City of Garland Fueling Centers (Partial Completion)
  - Recreation Centers (Shelters)
  - Critical Facilities
- Apply calcium soil stabilizer to areas around critical infrastructure

### Hazards Identified by the City's HazMAP Planning Team

- |                                      |                                                 |
|--------------------------------------|-------------------------------------------------|
| • Tornado                            | • Power Outages                                 |
| • Severe Winter Weather/Extreme Cold | • Earthquake                                    |
| • Flood                              | • Communications Failure/Infrastructure Failure |
| • Drought                            | • Severe Thunderstorms/Damaging Winds           |
| • Biological Event                   | • Destructive Hail                              |
| • Terrorism/Cyber Attacks            | • Erosion                                       |
| • Extreme Heat                       | • Expansive Soil                                |

Office of Emergency Management | 972-781-7273 | [OEM@garlandtx.gov](mailto:OEM@garlandtx.gov)



**City of Garland, Texas Government** ✓

23 hrs · 🌐

It's #nationalpreparednessmonth, so today we want to ask: did you know that most insurance policies don't cover flooding?

Be sure to review your insurance, make sure it is up-to-date, and that it aligns with the needs of your household. In addition, it is important to know the potential hazards in your area. Knowing the potential risks can help limit the impacts a disaster can have on you and your family.

Take this opportunity to let us know your opinion on hazards in your area and what steps you have taken to prepare your household by taking this quick survey! Please visit: <http://www.garlandtx.gov/201/Hazard-Mitigation>



👍 6

👍 Like

💬 Comment

➦ Share

Social Media Post – Advertisement of Hazard Mitigation Survey



# Help Keep Garland *Safe.*

**We NEED YOUR HELP** to update the City's **Hazard Mitigation Action Plan**. Providing your opinion will help us make a better plan to keep Garland safe. *Please take the short survey below.*



Scan the QR code to complete the **Hazard Mitigation Survey** in English, Española or Tiếng Việt.

**Hazard Mitigation Survey link**  
**<https://bit.ly/3k4huv1>**

All Garland library locations will allow residents to complete the survey on library computers. Call 972-205-2500 for locations and hours.

Paper copies can be requested by contacting the Office of Emergency Management at 972-781-7273 or [OEM@GarlandTX.gov](mailto:OEM@GarlandTX.gov)



***Hazard mitigation*** is the effort to reduce loss of life and property by lessening the impact of disasters.

Utility Bill Insert – Distributed September 2021



City of Garland, Texas Government

February 12 at 12:00 PM · 🌐

The Office of Emergency Management wants your input to update the Hazard Mitigation Action Plan for 2022. Two public meetings are scheduled: 6 p.m. Thursday, Feb. 17, and 10 a.m. Saturday, Feb. 26, in Room 417 in the Fire Administration Building, 1500 State Highway 66. The purpose of the Hazard Mitigation Action Plan is to implement actions to help reduce loss of life and property due to the impacts of disasters. More info at <http://ow.ly/bnUX50HTkaZ>



## ***Hazard Mitigation Action Plan***

👍 14

9 Shares



Like



Comment



Share

Social Media Post – Advertisement of Hazard Mitigation Public Meeting



City of Garland, Texas Government

February 24 at 12:01 PM · 🌐

The Office of Emergency Management wants your input to update the Hazard Mitigation Action Plan for 2022. A public meeting is scheduled at 10:00 A.M. Saturday, February 26, in Room 417 in the Fire Administration Building, 1500 State Highway 66.

The purpose of the Hazard Mitigation Action Plan is to implement actions to help reduce loss of life and property due to the impacts of disasters.

More info at <http://ow.ly/bnUX50HTkaZ...> See more



2 Shares



Like



Comment



Share

Social Media Post – Advertisement of Hazard Mitigation Public Meeting

Garland Alert System

Prepare - Get Ready for  
Disaster +

Hazard Mitigation

Think - Know Your  
Community +

Act - Get Involved

About OEM

[Home](#) > [Government](#) > [Departments E - G](#) > [Emergency Management](#) > Hazard Mitigation

## HAZARD MITIGATION

### HAZARD MITIGATION ACTION PLAN PUBLIC MEETINGS

The Office of Emergency Management wants your input to update the Hazard Mitigation Action Plan for 2022. Your input is critical to improve the effectiveness of this plan by helping staff identify all potential hazards and ways to reduce the impacts of those hazards.



Emergency Management staff will host two opportunities to meet with you:

- 6 p.m. Thursday, Feb. 17
- 10 a.m. Saturday, Feb. 26

Both meetings will take place in Room 417 in the Fire Administration Building, 1500 State Highway 66.

The purpose of the Hazard Mitigation Action Plan is to implement actions to help reduce loss of life and property due to the impacts of disasters. Through projects, programs and policies, the City of Garland is constantly developing ways to protect the city from hazards and recover from disasters quickly. Take this opportunity to participate in focused discussions to confirm all possible hazards and all impacts have been considered, and help identify relevant projects that could further reduce the impacts of disaster.

If you have questions or concerns, contact the Office of Emergency Management at [OEM@GarlandTX.gov](mailto:OEM@GarlandTX.gov) or 972-781-7273.

### HAZARD MITIGATION PLAN

- [City of Garland 2017 Revised Hazard Mitigation Action Plan \(PDF\)](#)

### FAQs

- [What is hazard mitigation?](#)
- [Why do we need a hazard mitigation plan?](#)
- [What are some examples of mitigation actions?](#)
- [What is the planning process for hazard mitigation?](#)
- [What are some hazards identified by the City's Hazard Mitigation Action Planning Team?](#)

[View All](#)



### Contact Us

#### Emergency Management

[Email the Office of Emergency Management](#)

#### Mailing Address

P.O. Box 469002  
Garland, TX 75046

Phone: 972-781-7272

[Directory](#)

City of Garland's Emergency Management Website – Advertisement of Hazard Mitigation Public Meeting

[Print](#)



## GARLAND

### NOTICE OF SPECIAL MEETING OF THE CITY COUNCIL CITY OF GARLAND, TEXAS

Room 417 of the Fire Administration Building  
1500 State Highway 66  
Garland, Texas  
February 17, 2022, at 6:00 p.m.

**NOTICE** is hereby given that a quorum of the City Council of the City of Garland, Texas may attend the following ceremonial event or function:

#### AGENDA:

1. **INTRODUCTION**
  - A. Garland OEM: Planning and Preparedness Coordinator
  - B. Introduction to HazMAP
2. **PLANNING PROCESS**
  - A. Overview
  - B. Planning and Process Team
3. **PLAN REVIEW**
  - A. Review of Hazards
  - B. Mitigation Actions Status Review
4. **INPUT**
  - A. Explanation of HazMAP Survey
  - B. Open Discussion: Public Input on HazMAP
5. **ADJOURN**

**NOTE:** No formal action or deliberations between or among members of the City Council will take place. The City Council does not control the content of any communications made during the event and any public business or public policy to be discussed is not within the supervision or control of the City Council. Any discussion of public business at the event or function is incidental to the event.

## City of Garland – Notice of Special Meeting

[Print](#)



## GARLAND

### NOTICE OF POTENTIAL QUORUM OF THE CITY COUNCIL CITY OF GARLAND, TEXAS

1500 State Highway 66  
Garland, Texas  
February 26, at 10:00 a.m.

**NOTICE** is hereby given that a quorum of the City Council of the City of Garland, Texas may attend the following ceremonial event or function:

**Public Meeting for Hazard Mitigation Action Plan for 2022**  
Fire Administration Building - Room 417  
1500 State Highway 66  
Garland, TX 75040

**NOTE:** No formal action or deliberations between or among members of the City Council will take place. The City Council does not control the content of any communications made during the event and any public business or public policy to be discussed is not within the supervision or control of the City Council. Any discussion of public business at the event or function is incidental to the event.

## City of Garland – Notice of Potential Quorum

[Print](#)



## GARLAND

### NOTICE OF SPECIAL MEETING OF THE EMERGENCY MANAGEMENT DEPARTMENT OF THE CITY OF GARLAND, TEXAS

Room 417 of the Fire Administration Building  
1500 State Highway 66  
Garland, Texas  
February 26, 2022, at 10:00 a.m.

**NOTICE** is hereby given that a quorum of the City Council of the City of Garland, Texas may attend the following ceremonial event or function:

#### **AGENDA:**

1. **ITEMS FOR INDIVIDUAL CONSIDERATION**
  - A. Garland OEM: Planning and Preparedness Coordinator
  - B. Introduction to HazMAP
2. **PLANNING PROCESS**
  - A. Overview
  - B. Planning and Process Team
3. **PLAN REVIEW**
  - A. Review of Hazards
  - B. Mitigation Actions Status Review
4. **INPUT**
  - A. Explanation of HazMAP Survey
  - B. Open Discussion: Public Input on HazMAP
5. **ADJOURN**

City of Garland – Notice of Special Meeting

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## GARLAND

### NOTICE OF POTENTIAL QUORUM OF THE CITY COUNCIL CITY OF GARLAND, TEXAS

1500 State Highway 66  
Garland, Texas  
February 26, at 10:00 a.m.

NOTICE is hereby given that a quorum of the City Council of the City of Garland, Texas may attend the following ceremonial event or function:

Public Meeting for Hazard Mitigation Action Plan for 2022  
Fire Administration Building - Room 417  
1500 State Highway 66  
Garland, TX 75040

NOTE: No formal action or deliberations between or among members of the City Council will take place. The City Council does not control the content of any communications made during the event and any public business or public policy to be discussed is not within the supervision or control of the City Council. Any discussion of public business at the event or function is incidental to the event.

## City of Garland – Notice of Potential Quorum

# Hazard Mitigation Action Plan Public Meeting

February 17, 2022  
6:00 PM

## **Introduction**

- Garland OEM: Planning and Preparedness Coordinator
- Introduction to HazMAP

## **Planning Process**

- Overview
- Planning and Process Team

## **Plan Review**

- Review of Hazards
- Mitigation Actions Status Review

## **Input**

- Explanation of HazMAP Survey
- Open Discussion: Public Input on HazMAP

## **Next Public Meeting**

February 26, 2022 – 10:00 AM

# Hazard Mitigation Action Plan Public Meeting

February 26, 2022  
10:00 AM

## **Introduction**

- Garland OEM: Planning and Preparedness Coordinator
- Introduction to HazMAP

## **Planning Process**

- Overview
- Planning and Process Team

## **Plan Review**

- Review of Hazards
- Mitigation Actions Status Review

## **Input**

- Explanation of HazMAP Survey
- Open Discussion: Public Input on HazMAP

## **NOTICE**

The Hazard Mitigation Action Plan is available for review in the City Secretary's  
Office, 200 N Fifth Street, Fourth Floor, Garland, TX, 75040.

Please send any questions or comments to [OEM@garlandtx.gov](mailto:OEM@garlandtx.gov)



# GARLAND

## Hazard Mitigation Action Plan Public Meeting

City of Garland  
Office of Emergency Management



1

# Introduction

- Welcome
- Garland OEM
  - Brad Kavanaugh
  - Planning and Preparedness Coordinator



# GARLAND

## EMERGENCY MANAGEMENT


GARLAND

2

# Hazard Assessment

### Community Impact Assessment

Please complete the following assessment by ranking each hazard 1 through 5

|                                             | Geographic Scope | Duration | Health Effects | Displacement | Financial Impact | Environmental Impact | Public Perception | Infrastructure | Communication | Emergency Services | Community Safety | Recovery (30 Days) | Recovery (60 Days) | Recovery (90 Days) | Recovery (180 Days) | Recovery (365 Days) |
|---------------------------------------------|------------------|----------|----------------|--------------|------------------|----------------------|-------------------|----------------|---------------|--------------------|------------------|--------------------|--------------------|--------------------|---------------------|---------------------|
| Drought                                     |                  |          |                |              |                  |                      |                   |                |               |                    |                  |                    |                    |                    |                     |                     |
| Earthquake                                  |                  |          |                |              |                  |                      |                   |                |               |                    |                  |                    |                    |                    |                     |                     |
| Explosion                                   |                  |          |                |              |                  |                      |                   |                |               |                    |                  |                    |                    |                    |                     |                     |
| Explosive Soil                              |                  |          |                |              |                  |                      |                   |                |               |                    |                  |                    |                    |                    |                     |                     |
| Extreme Heat                                |                  |          |                |              |                  |                      |                   |                |               |                    |                  |                    |                    |                    |                     |                     |
| Flood                                       |                  |          |                |              |                  |                      |                   |                |               |                    |                  |                    |                    |                    |                     |                     |
| Hail                                        |                  |          |                |              |                  |                      |                   |                |               |                    |                  |                    |                    |                    |                     |                     |
| Severe Thunderstorms                        |                  |          |                |              |                  |                      |                   |                |               |                    |                  |                    |                    |                    |                     |                     |
| Severe Winter Weather                       |                  |          |                |              |                  |                      |                   |                |               |                    |                  |                    |                    |                    |                     |                     |
| Tornado                                     |                  |          |                |              |                  |                      |                   |                |               |                    |                  |                    |                    |                    |                     |                     |
| Biological Event                            |                  |          |                |              |                  |                      |                   |                |               |                    |                  |                    |                    |                    |                     |                     |
| Communication Failure / Information Failure |                  |          |                |              |                  |                      |                   |                |               |                    |                  |                    |                    |                    |                     |                     |
| Power Outage                                |                  |          |                |              |                  |                      |                   |                |               |                    |                  |                    |                    |                    |                     |                     |
| Terrorism/Cyber Attacks                     |                  |          |                |              |                  |                      |                   |                |               |                    |                  |                    |                    |                    |                     |                     |


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3

# Hazard Assessment

- Review definitions
- Rank each hazard 1 to 5
- Based on your experience
- Gather results




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4

# Hazard Mitigation Action Plan

- Purpose: The effort to reduce loss of life and property by lessening the impact of disasters
- Meeting Scope
  - Planning Process
  - Hazard Assessment
  - Mitigation Action Review


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5

# Planning Process


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6

## The Planning Process

1. Organizing the Planning Process and Resources
2. Assess Risks and Capabilities
3. Develop a Mitigation Strategy
4. Adopt and Implement the Plan



## Planning Team

|                                                 |                                                                                      |                                                   |                                  |                                                 |                                                          |
|-------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------|----------------------------------|-------------------------------------------------|----------------------------------------------------------|
| <b>Whole Community</b><br>• Citizens of Garland | <b>Emergency Management</b><br>• Director<br>• Planning and Preparedness Coordinator | <b>Building Inspection</b><br>• Building Official | <b>Engineering</b><br>• Director | <b>Health</b><br>• Environmental Health Manager | <b>Facilities</b><br>• Physical Security Program Manager |
| <b>Fire</b><br>• Assistant Fire Chief           | <b>Neighborhood Vitality</b><br>• Administrator                                      | <b>Parks and Recreation</b><br>• Director         | <b>Police</b><br>• Captain       | <b>GP&amp;L</b><br>• Chief Operation Officer    | <b>Water</b><br>• Wastewater Treatment Director          |

## Planning Team Responsibilities

|                  |                                          |
|------------------|------------------------------------------|
| Identify Hazards | Public Outreach Strategy                 |
| Risk Assessments | Mitigation Actions Review/Implementation |
| Rank Hazards     | Research                                 |

## Hazard Assessment

## Hazard Profiles

- Hazard Description
- Location
- Severity
- Previous Occurrences
- Probability of Future Events
- Impact on Community
- Summary of Vulnerability
- Other Information
  - Charts, Graphs, Maps, Historical Data, etc.



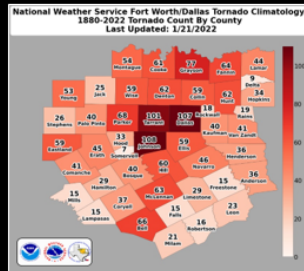
## Top 5 Hazards

1. Tornado
2. Severe Thunderstorms/Damaging Winds
3. Destructive Hail
4. Severe Winter Weather/Extreme Cold
5. Extreme Heat



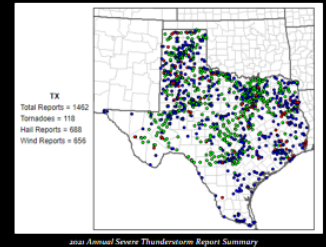
## Hazard - Tornado

- Hazard Description
- Severity
- Previous Occurrences/Probability of Future Events
  - December 26, 2015 – EF4
  - October 20, 2019 – EF2
    - 174 homes impacted
    - 1656 tons of debris
  - 107 Total in Dallas County
  - Impact on Community



## Hazard – Severe Thunderstorms/Damaging Winds

- Hazard Description
- Severity
- Previous Occurrences/Probability of Future Events
  - 1462 total reports in Texas
- Impact on Community



2021 Annual Severe Thunderstorm Report Summary

## Hazard – Destructive Hail

- Hazard Description
- Severity
- Previous Occurrences/Probability of Future Events
  - 34 events: 0.75" or greater (1994)
  - April 11, 2016 – Wylie, TX
- Impact on Community



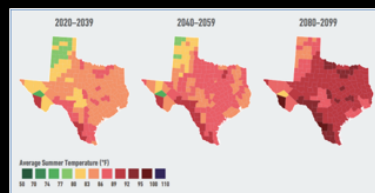
## Hazard – Severe Winter Weather/Extreme Cold

- Hazard Description
- Severity
- Previous Occurrences/Probability of Future Events
  - 66 events in past 25 years
- Impact on Community



## Hazard – Extreme Heat

- Hazard Description
- Severity
- Previous Occurrences/Probability of Future Events
  - 48 in past 25 years
  - Numerous injuries
  - 112+ (1980s)
- Impact on Community



## Public Input

- What hazards do you feel you're most vulnerable to?
  - Why?
- What would you do to reduce risk and threat of hazards?
- What would you like to see added/deleted from plan?

# Mitigation Action Review



19

## Hazard Mitigation Actions

- Specific projects the City wants to do to lessen the impacts of disaster
- Must follow strict Mitigation criteria and specifically address identified vulnerabilities

### Required Elements :

- Link to plan Goals & Objectives
- Assignment of responsibility
- Timeline
- List of potential funding sources
- Detailed description of impacts on new & existing structures
- Cost estimate
- Cost Benefit and Risk Reduction Analysis



20

## Key Mitigation Actions

- Educating citizens on Mitigation techniques
- Elevation of structures in flood prone areas
- Erosion and drainage control to reduce flooding
- Update building codes for improved structural stability
- Enhancing SWAT and EOD equipment
- Retrofit backup Police and Fire Communications Center to avoid future hail damage
  - Acquire Generators
  - Two City of Garland Fueling Centers (1 of 2 completed)
  - Recreation Centers (Shelters)
  - Critical Facilities
- Apply calcium soil stabilizer to areas around critical infrastructure



21

# Questions?



22

## Final Thoughts

- Hazard Mitigation Survey
- Garland Alert System
- Public Education Materials



23

# THANK YOU!

**Brad Kavanaugh**

City of Garland - Office of Emergency Management

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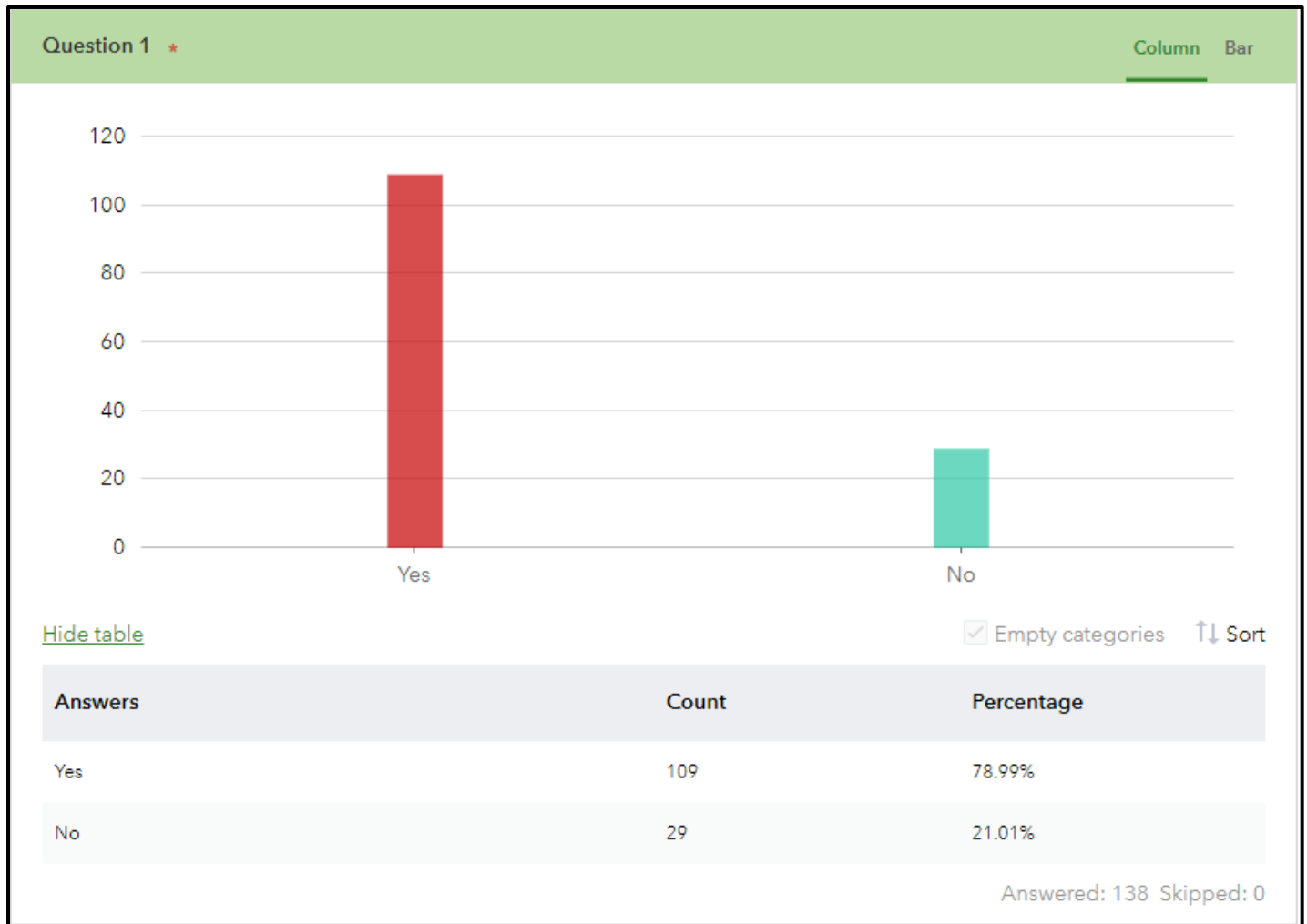
Phone: 972-781-7273



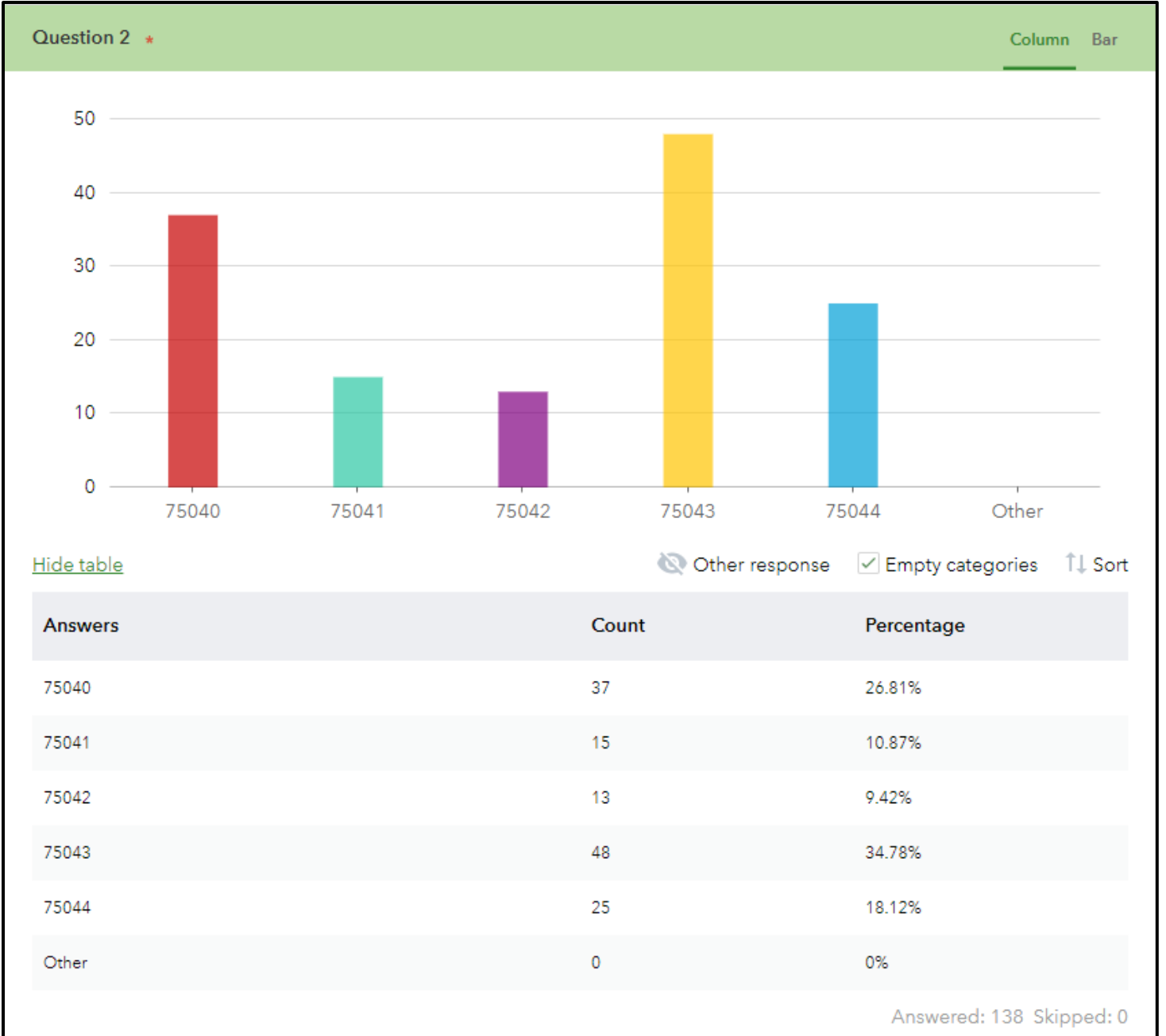
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## D. Public Survey and Results

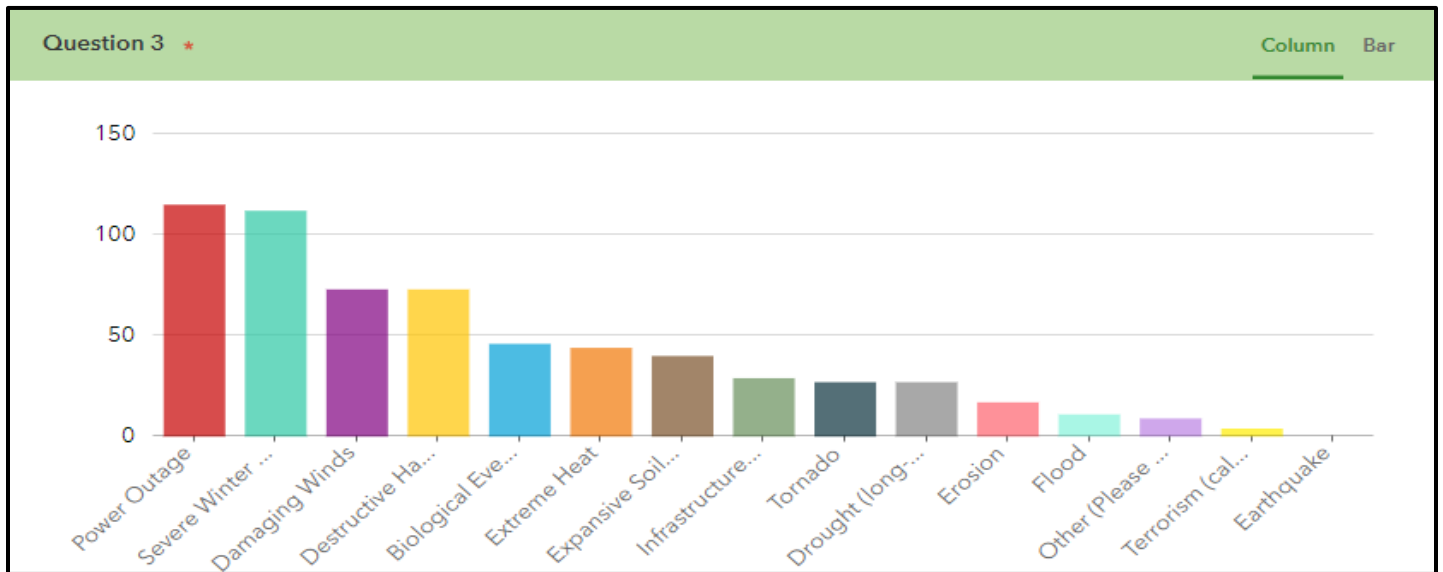
**Q1:** Are you registered to receive notifications from the Garland Alert System? (If you answered No, please register by following the QR Code on the last page)



**Q2: In which zip code do you live?**

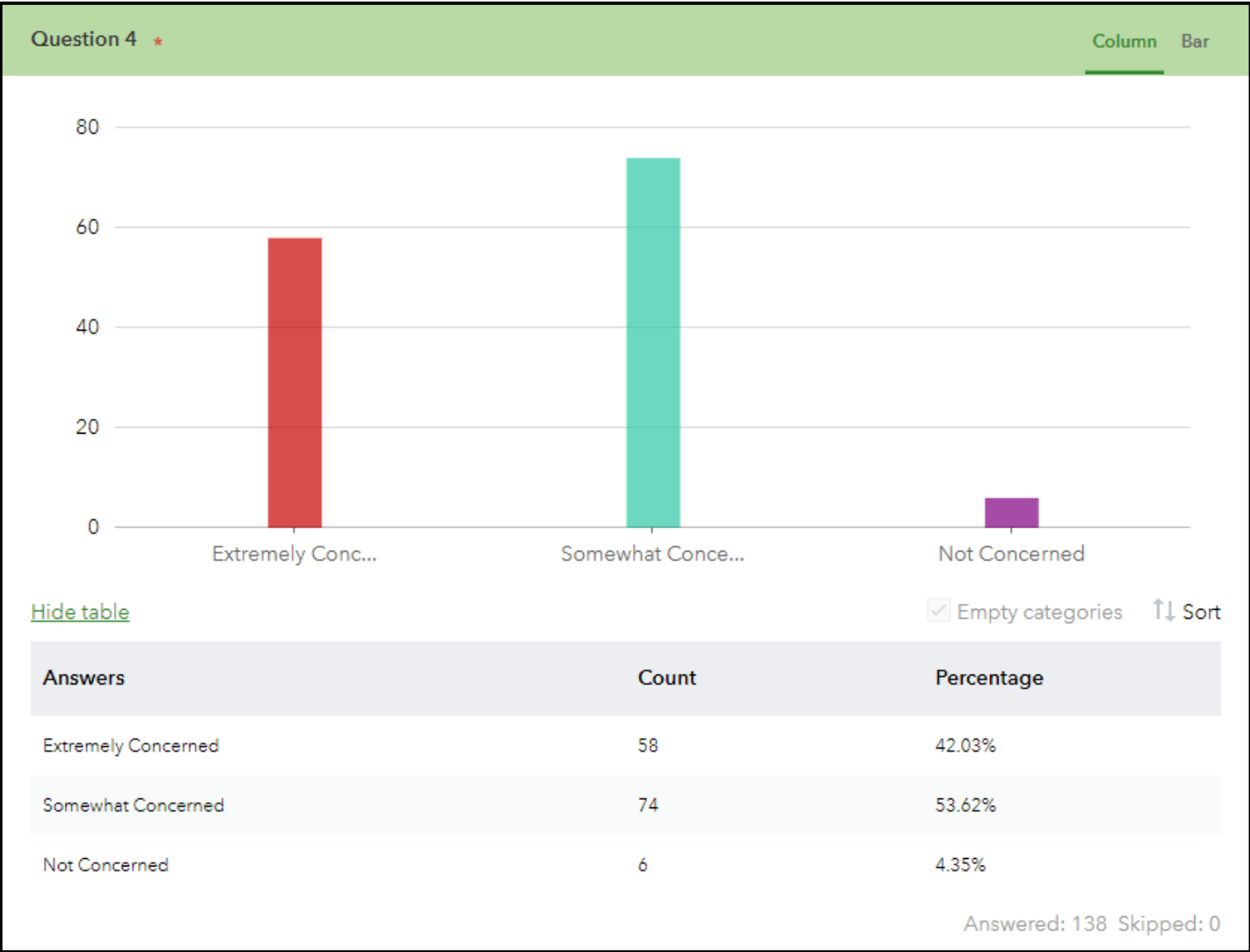


**Q3:** While in the Garland area, have you ever been impacted by any of the hazards listed below? (Check all that apply)

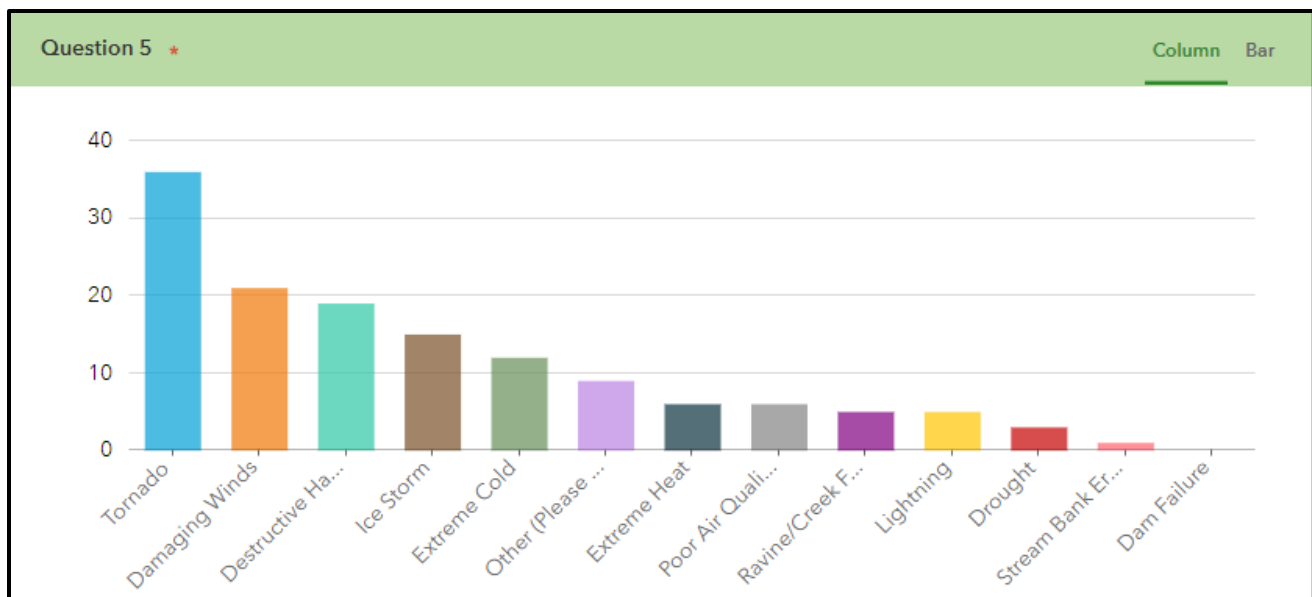


|                                                                                      |     |        |
|--------------------------------------------------------------------------------------|-----|--------|
| Power Outage                                                                         | 115 | 83.33% |
| Severe Winter Weather                                                                | 112 | 81.16% |
| Damaging Winds                                                                       | 73  | 52.9%  |
| Destructive Hail                                                                     | 73  | 52.9%  |
| Biological Event (disease/illness outbreak i.e. COVID-19, H1N1, West Nile, Smallpox) | 46  | 33.33% |
| Extreme Heat                                                                         | 44  | 31.88% |
| Expansive Soils                                                                      | 40  | 28.99% |
| Infrastructure and Communications Failure                                            | 29  | 21.01% |
| Tornado                                                                              | 27  | 19.57% |
| Drought (long-term)                                                                  | 27  | 19.57% |
| Erosion                                                                              | 17  | 12.32% |
| Flood                                                                                | 11  | 7.97%  |
| Other (Please Explain)                                                               | 9   | 6.52%  |
| Terrorism (calculated violence to generate fear in the population)                   | 4   | 2.9%   |
| Earthquake                                                                           | 0   | 0%     |

**Q4:** How concerned are you about the possibility of your community being impacted by these hazards?

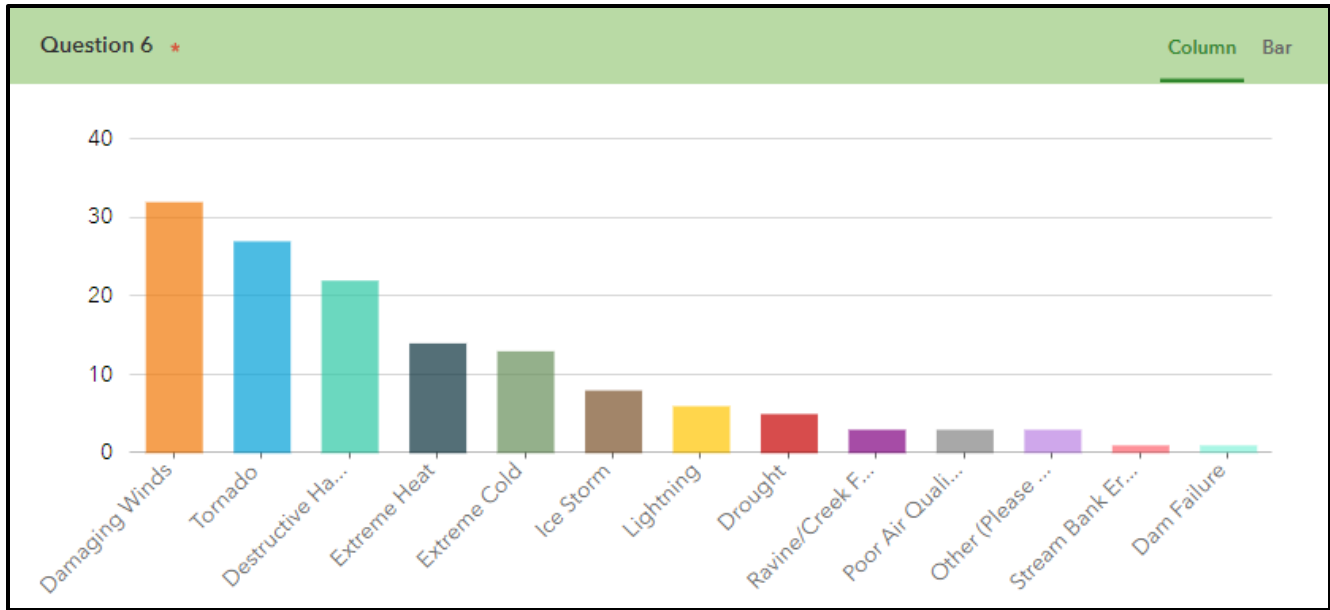


**Q5:** Please select the natural hazard that you think is the highest threat to your neighborhood (Select one):



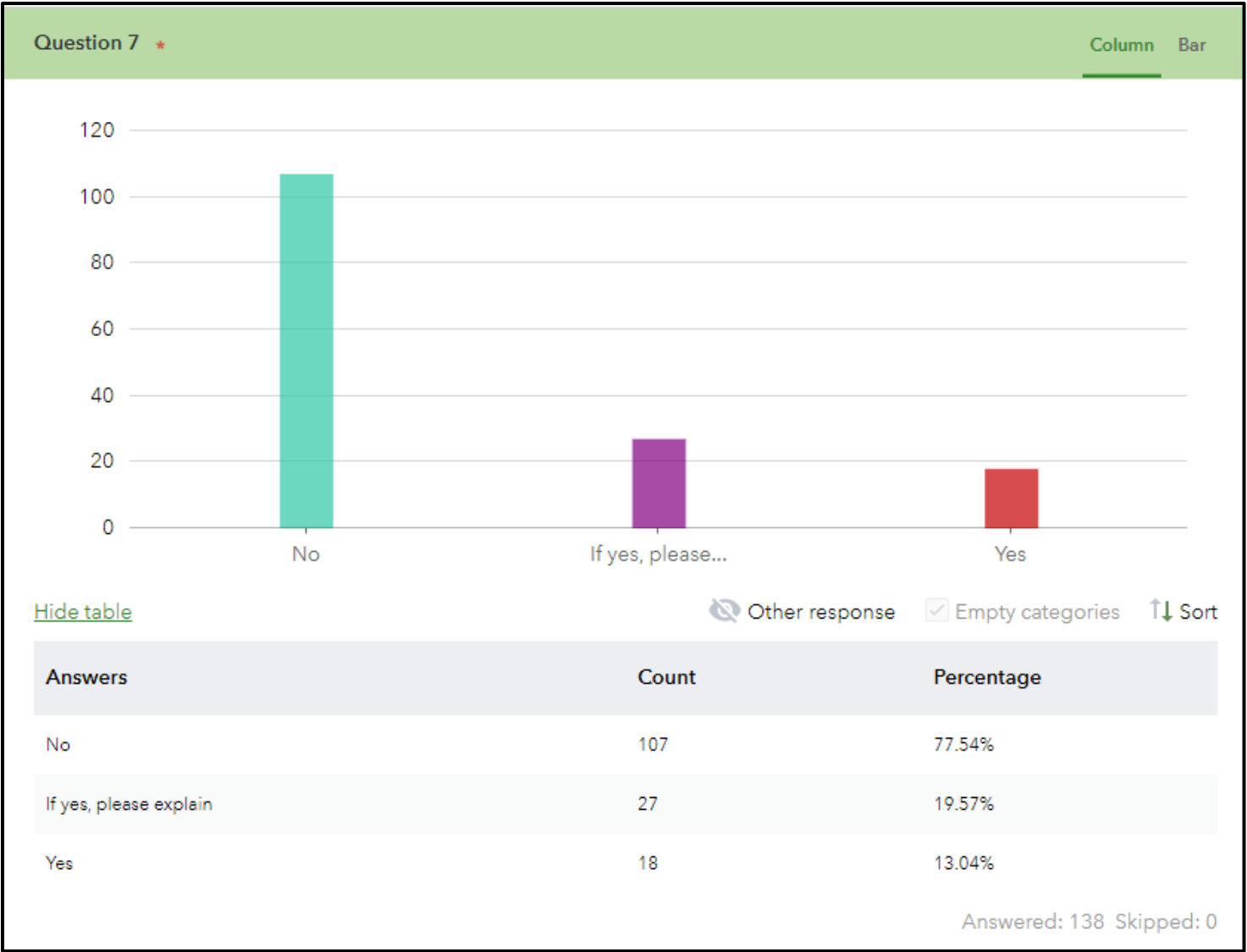
|                        |    |        |
|------------------------|----|--------|
| Tornado                | 36 | 26.09% |
| Damaging Winds         | 21 | 15.22% |
| Destructive Hail       | 19 | 13.77% |
| Ice Storm              | 15 | 10.87% |
| Extreme Cold           | 12 | 8.7%   |
| Other (Please Explain) | 9  | 6.52%  |
| Extreme Heat           | 6  | 4.35%  |
| Poor Air Quality       | 6  | 4.35%  |
| Ravine/Creek Flooding  | 5  | 3.62%  |
| Lightning              | 5  | 3.62%  |
| Drought                | 3  | 2.17%  |
| Stream Bank Erosion    | 1  | 0.72%  |
| Dam Failure            | 0  | 0%     |

**Q6:** Please select the natural hazard that you think is the second highest threat to your neighborhood  
(Select one):

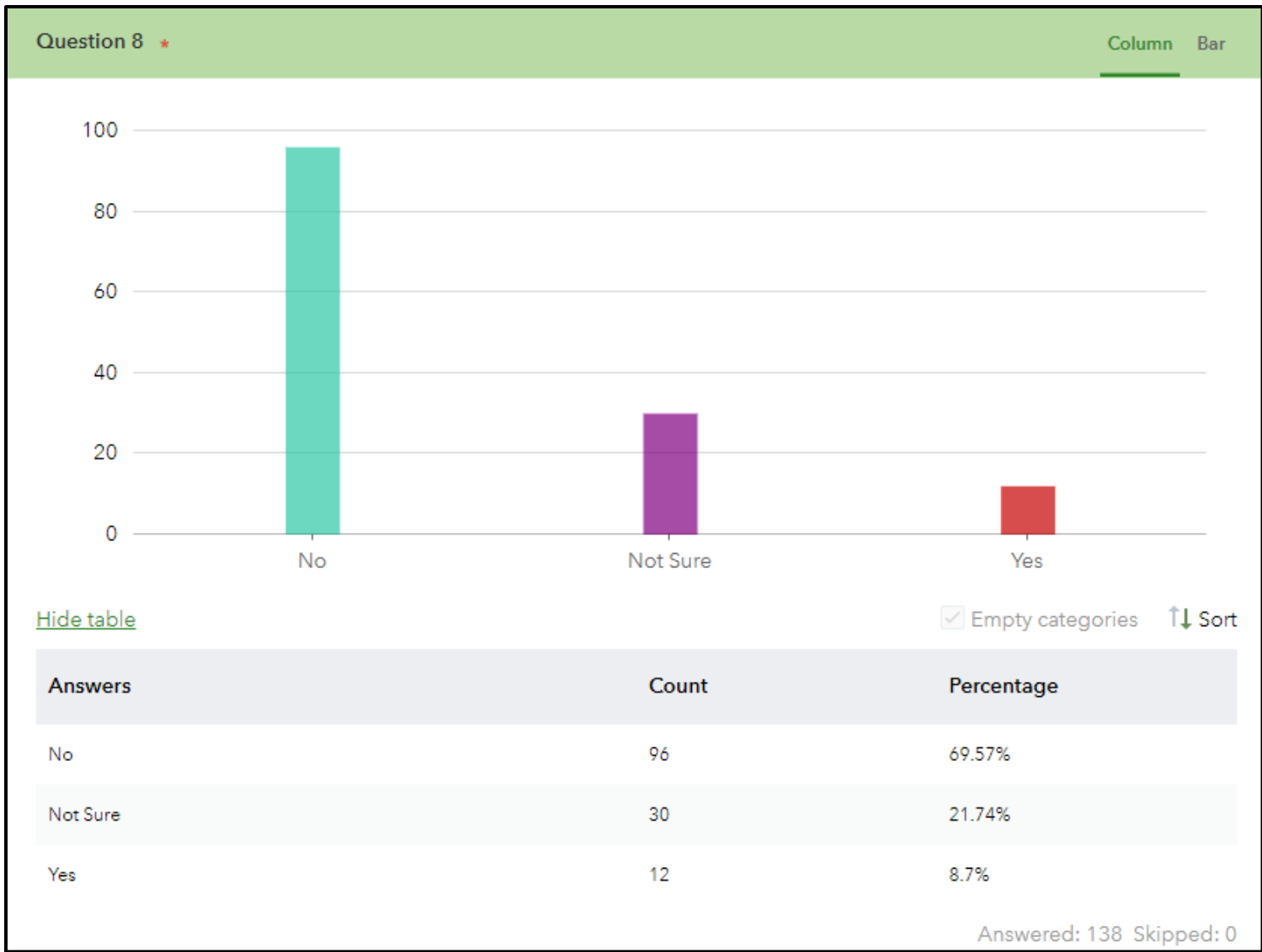


|                        |    |        |
|------------------------|----|--------|
| Damaging Winds         | 32 | 23.19% |
| Tornado                | 27 | 19.57% |
| Destructive Hail       | 22 | 15.94% |
| Extreme Heat           | 14 | 10.14% |
| Extreme Cold           | 13 | 9.42%  |
| Ice Storm              | 8  | 5.8%   |
| Lightning              | 6  | 4.35%  |
| Drought                | 5  | 3.62%  |
| Ravine/Creek Flooding  | 3  | 2.17%  |
| Poor Air Quality       | 3  | 2.17%  |
| Other (Please Explain) | 3  | 2.17%  |
| Stream Bank Erosion    | 1  | 0.72%  |
| Dam Failure            | 1  | 0.72%  |

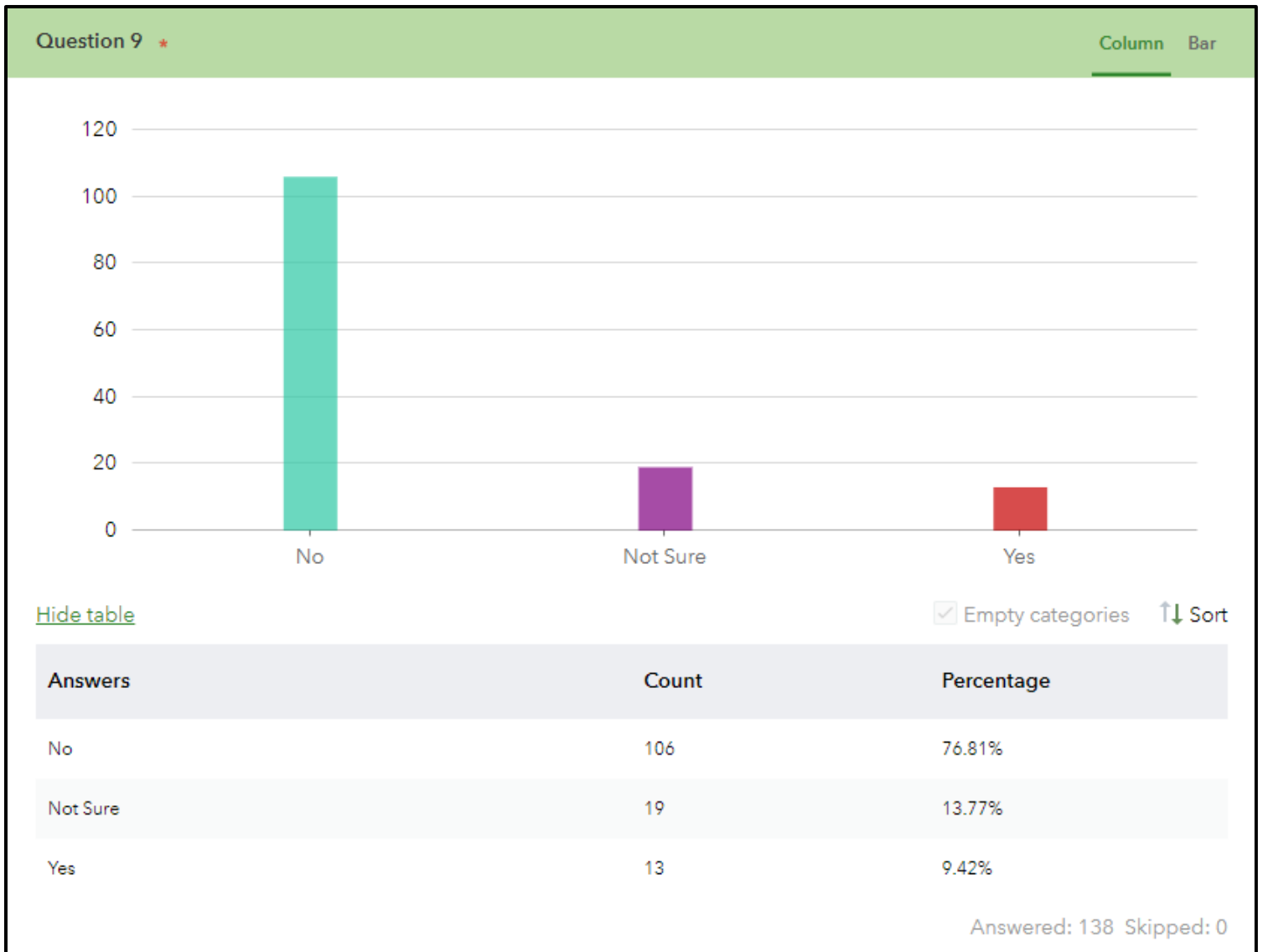
**Q7:** Is there another hazard not listed in this survey that you think is a wide-scale threat to your community?



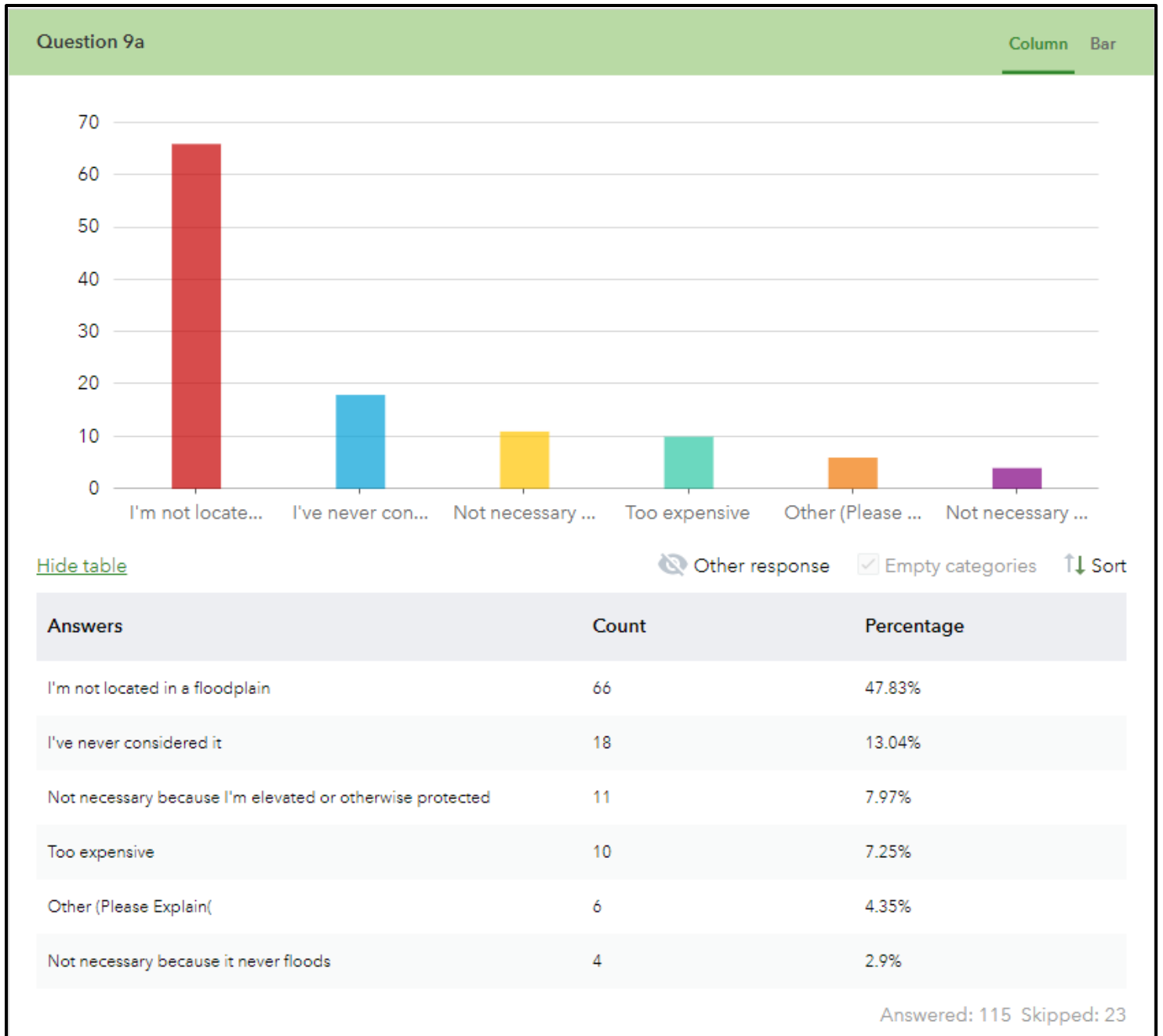
**Q8:** Is your home or neighborhood located in a designated floodplain of a creek or ravine?



**Q9:** Do you have flood insurance?



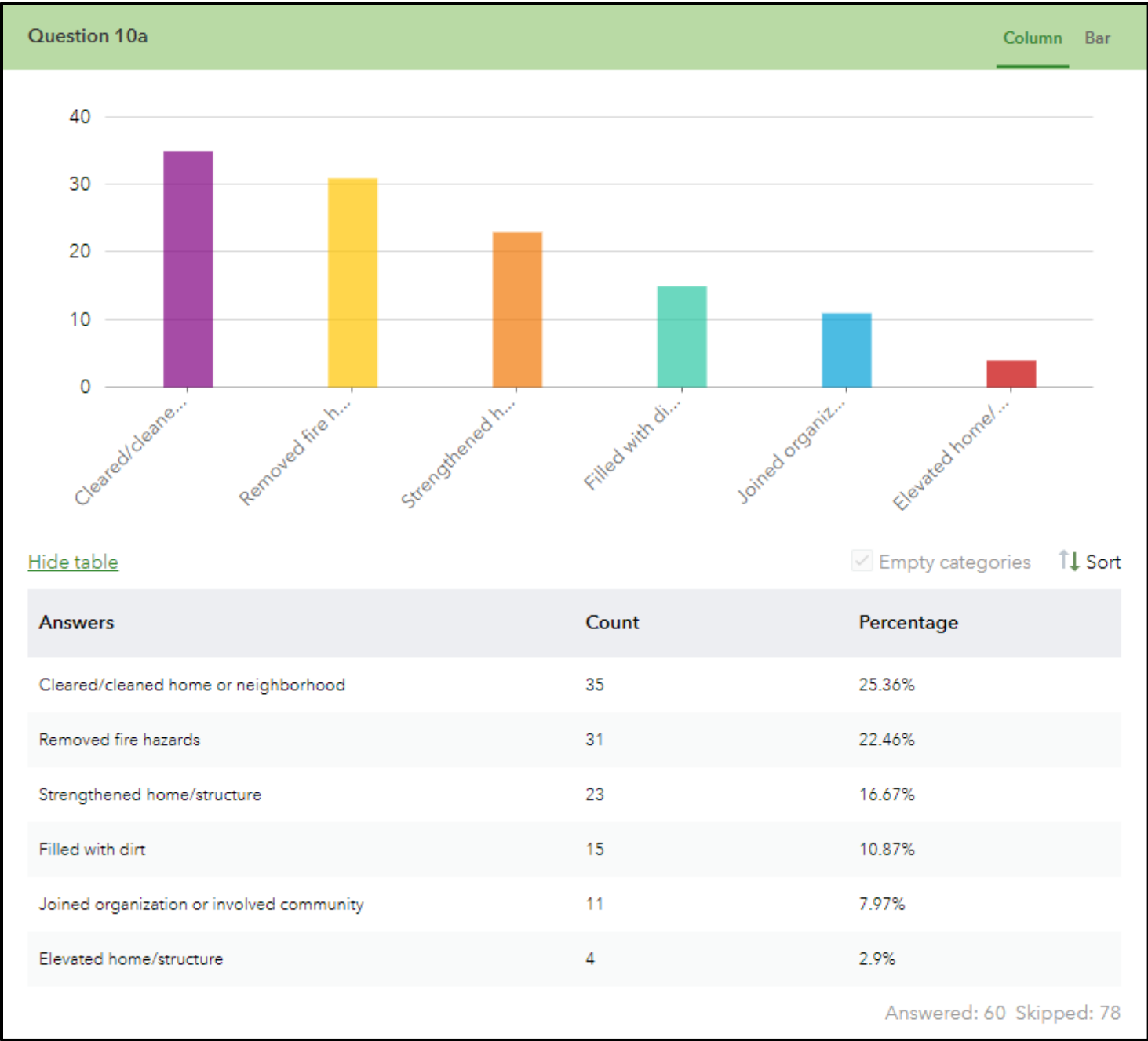
**Q9a: If you answered “No” to Question 9, why do you not have flood insurance?**



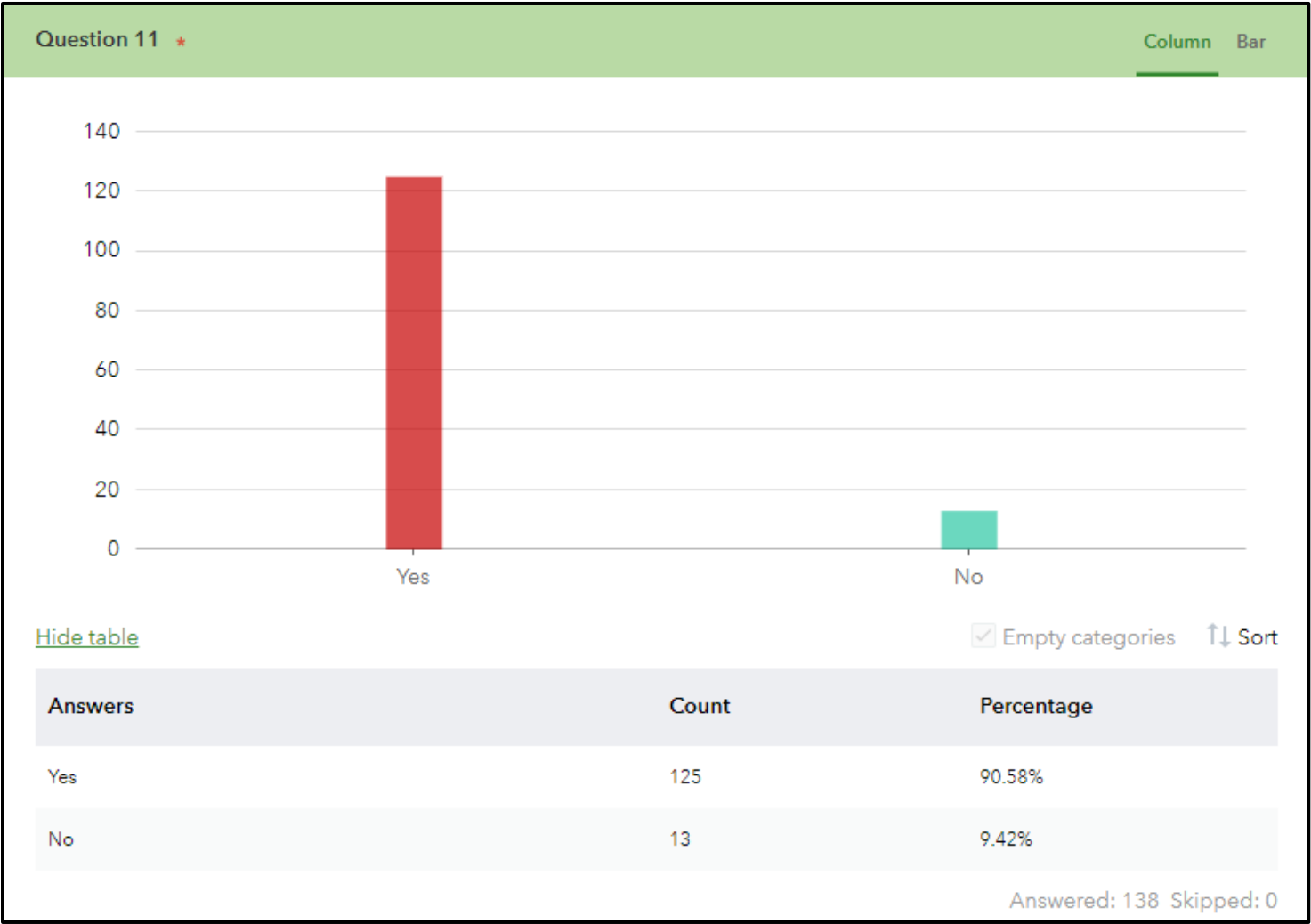
**Q10:** Have you taken any actions to make your home or neighborhood more resistant to hazards?



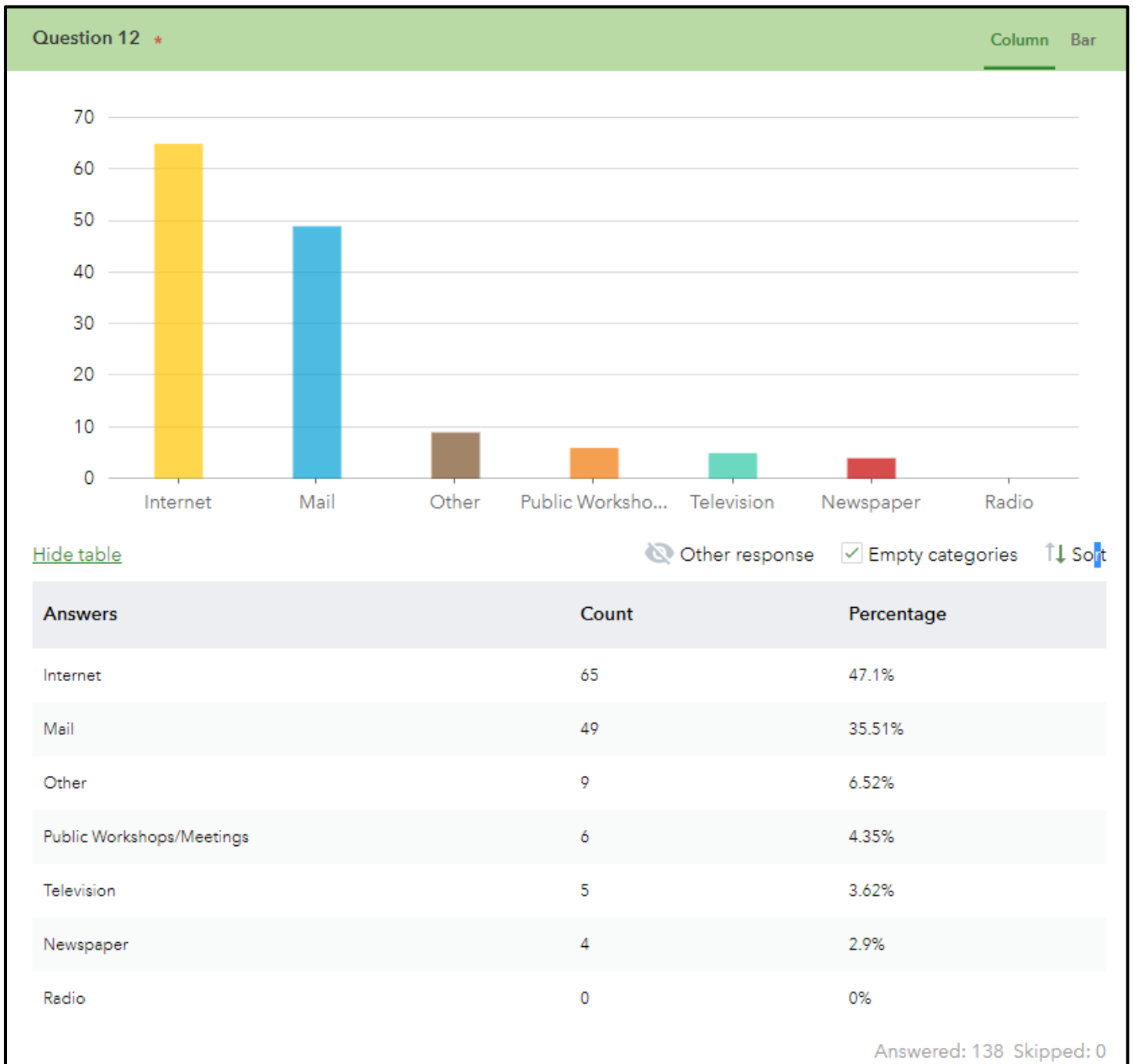
**Q10a:** If you answered “Yes” to Question 10, please indicate whether you have taken any of these actions (check all that apply):



**Q11:** Are you interested in making your home or neighborhood more resistant to hazards?



**Q12:** What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards?



**Q13:** In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood? (Common Responses Listed)

|                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Continue to dredge out, clean and apply engineering strategies to Duck Creek. Monitor the creek for trash, limbs and other items that obstruct the flow of water, especially at the Greenbelt/Audubon Park areas and along S. Glenbrook.              |
| Better plan for rolling blackouts                                                                                                                                                                                                                     |
| Better communication such as TV and or internet E-Mail City website. Improve Telephone notification.                                                                                                                                                  |
| Be sure our power grid is sufficient during extreme cold and hot times of the year.                                                                                                                                                                   |
| Available mobile generators to rent to citizens in emergencies. Updating infrastructure for power supply.                                                                                                                                             |
| As my concerns are more weather directed, I do not see ways of improvements. We don't flood here, with the exception of the roads in extremely rainy times, but those are short lived once it stops raining, which drain as soon as rain stops.       |
| As a GP&L customer, I wish that our community had adequate generating capacity (and fuel reserves) so that we could be internally self-sufficient, for at least a few days, from the outside electrical grid.                                         |
| Alert community Educate community                                                                                                                                                                                                                     |
| Accidents happen frequently on Northwest Hwy between Birchwood and LaPrada. There are 2 curves. Signs are up for the 2nd curve, but not the 1st. It starts at the United Methodist Church and goes to the intersection of Northwest and Sleepy Hollow |
| A neighborhood watch for hazard conditions. Local list of people who are at-risk elderly, housebound, handicapped, etc.                                                                                                                               |
| 1. Provide information that individuals can use for their own homes. 2. Promote group activities to assist residents who are unable to implement suggestions to their homes. 3. Provide information related to current flood plain maps.              |
| 1. More investigation and communication on impact of changing zoning with my Shoal Creek community. Feel we are overbuilding. 2. Insurance costs are skyrocketing in Texas and that is impacting us all.                                              |
| 1) Get out of the state energy grid network. They do not regulate properly and it costs Garland. 2) Great job enhancing early warning sirens; however, some people I know cannot hear them--maybe a few more?                                         |

**Q14:** Are there any other issues regarding the reduction of risk and loss associated with natural hazards or disasters in the community that you think are important? (Common Responses Listed)

Power grid. Electric and water service during extreme weather. Emergency phone service during power outages.

I am very concerned about the failure of the power grid last winter. I did not list ice storms above as highest threat only because they do not occur as often as high winds/tornados, but even usual winter storms are dangerous without heat.

Education regarding the proper way to mulch and trim trees Damage and loss of trees affect air and water quality, damage to homes, etc.

Better communication about tornado warnings. Sometimes I hear the sirens and sometimes not.

Acknowledge the worsening effects of climate change and change relevant policies to help mitigate its effects as much as possible.

Organize neighborhood groups to prepare for emergencies. Assume normal governmental resources are not available or are preoccupied.

Provide ways to organize people who wish to help in the wake of disasters.

More storm shelters for residents to go to in the event of a Tornado

More awareness advertisement for garland emergency alerts system

Make sure power grid is able to handle heavier than average loads whether that is winter or summer. Winterize power plants.

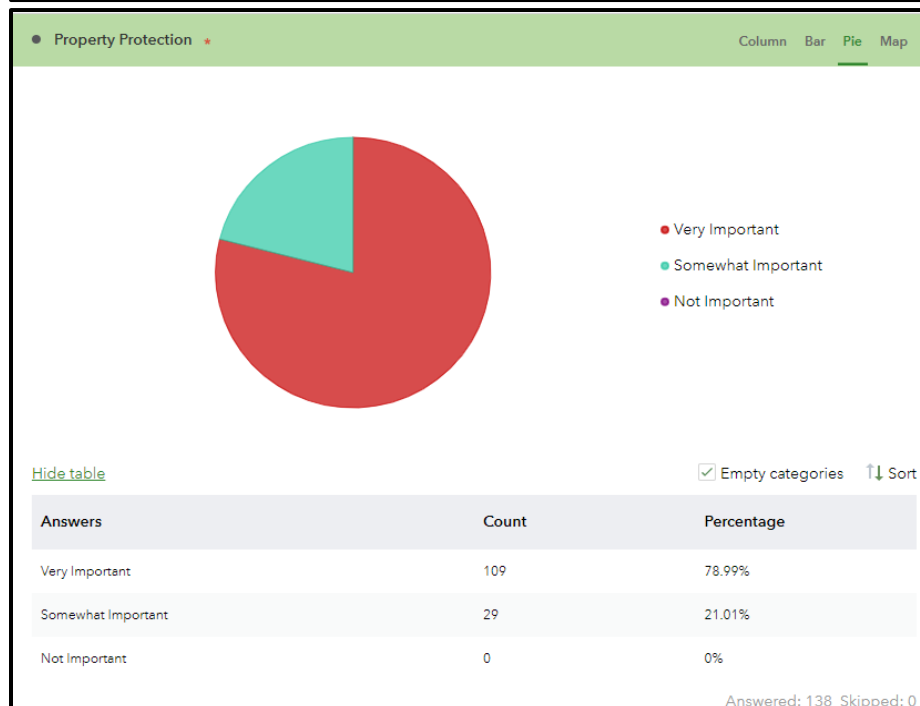
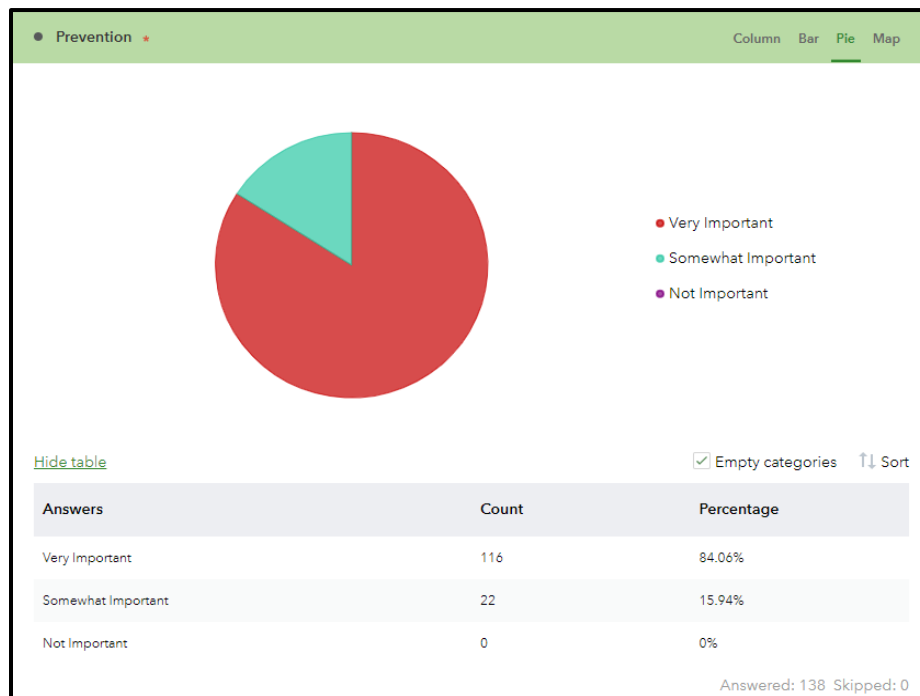
Keep improving Everbridge notifications especially early warning for destructive events like the recent tornadoes.

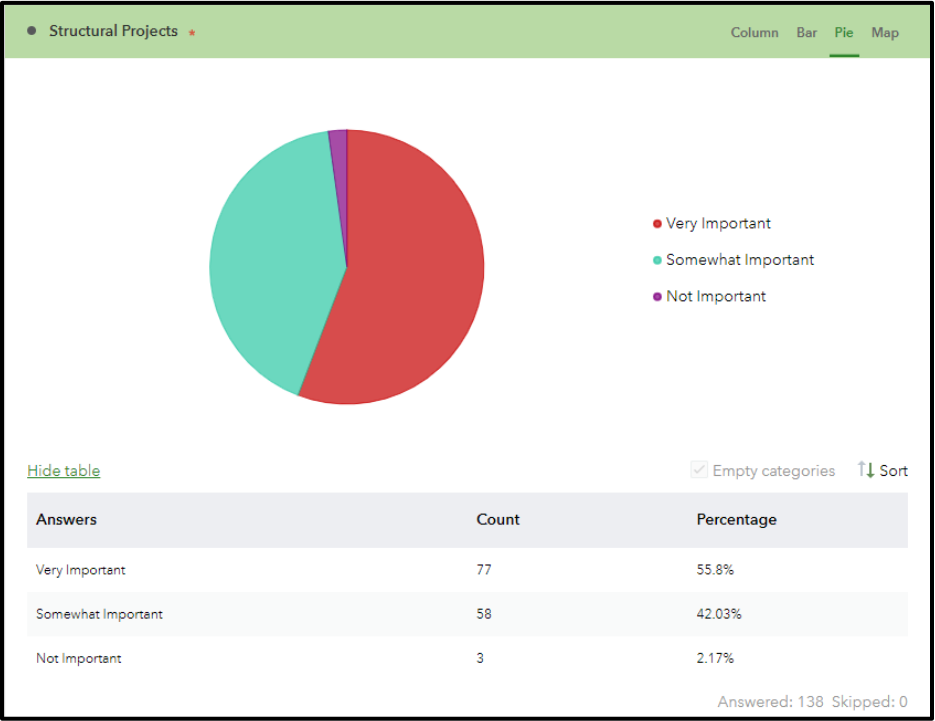
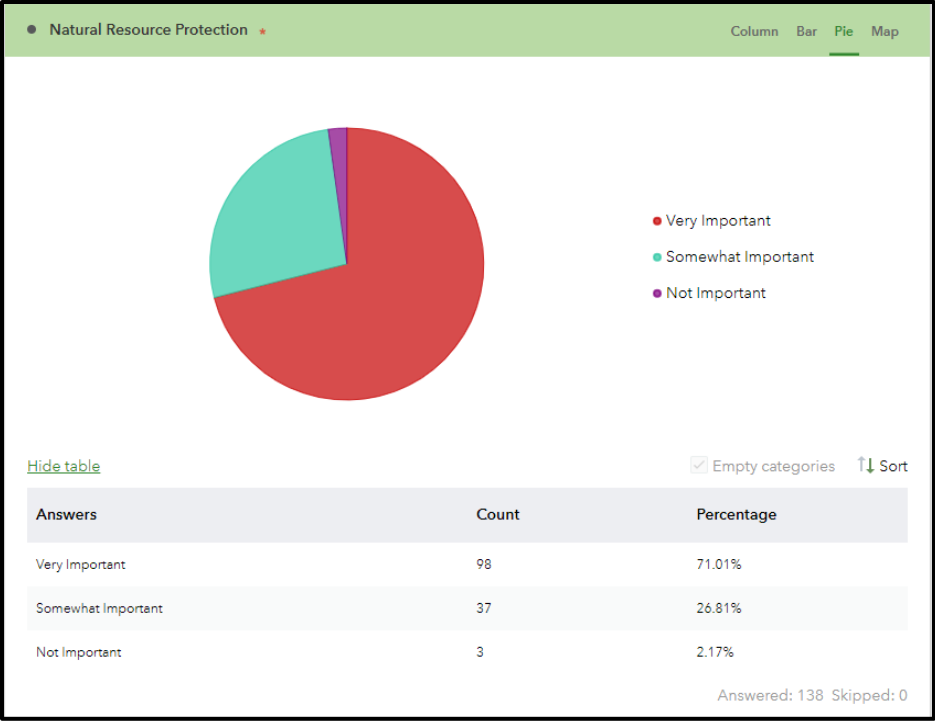
If there is extreme weather, hot or cold, were power is lost, there needs to be more locations were families could go for relief. Also, to be able to take our dogs with us.

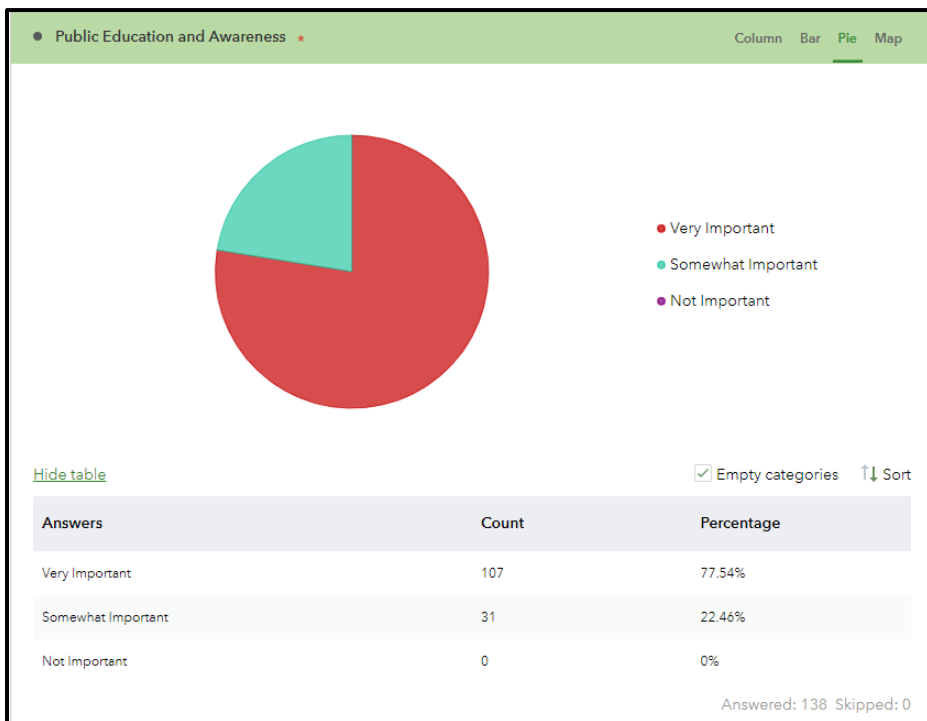
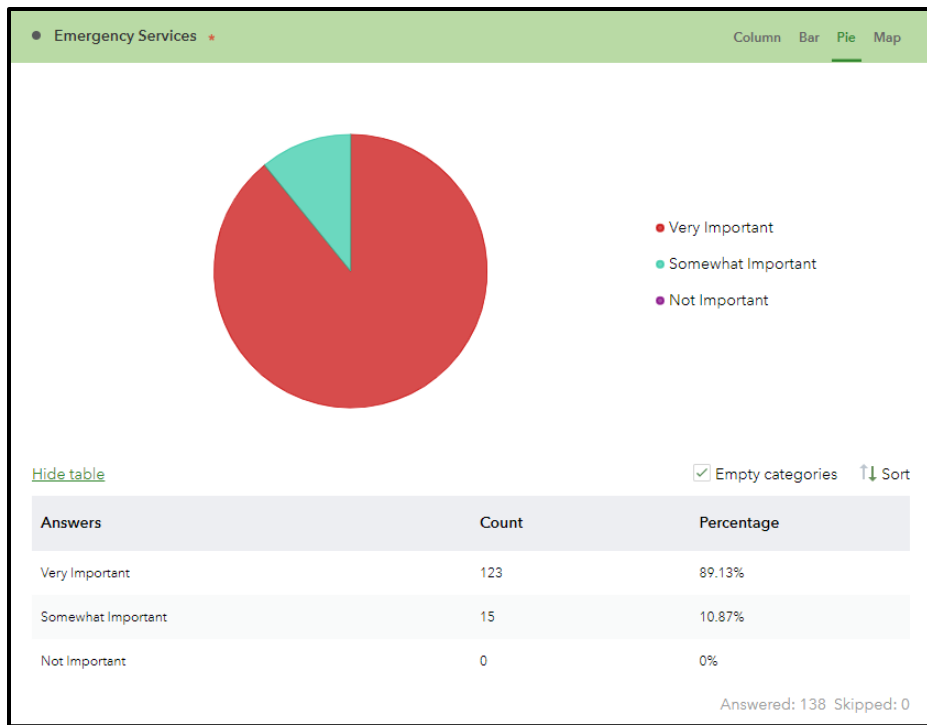
If/when we have another natural disaster, remote aid and information stations in neighborhoods would be helpful.

I think with natural disasters that caused any home damages to say the roof or fence, if the city can assist in some way because sometimes insurance won't cover it all or it's too expensive after the deductible.

**Q15:** A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important each one is for your community to consider pursuing.







## E. Neighboring Communities, Local and Regional Agency Participation

All,

The City of Garland's Office of Emergency Management and its Planning Team have been working on the Hazard Mitigation Action Plan (HazMAP) as a part of the five-year update. Throughout the process of updating the HazMAP, the Planning Team considered plans from Dallas County, the Council of Governments and other local municipal plans. At this time, we would like to provide you with the opportunity to review the City of Garland's HazMAP and provide feedback to enhance the plan. We appreciate your time and ask that all feedback be provided by April 8, 2022.

Thank you in advance and please let me know if you have any questions.

Brad Kavanaugh  
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[bkavanaugh@garlandtx.gov](mailto:bkavanaugh@garlandtx.gov)

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### **Our Mission**

*We are committed to preserve public trust, deliver quality services, promote economic growth, protect our community and enhance the quality of life for the good of our city and our future.*



**GARLAND**

## F. Planning Team Impact Assessment

| EVENT                                     | LOCATION                                                                                                                                            | PROBABILITY                                                                                       | SEVERITY = (MAGNITUDE - MITIGATION)                                                                                                                                            |                          |                       |                                                        |                                                                      | RISK             |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------|--------------------------------------------------------|----------------------------------------------------------------------|------------------|
|                                           |                                                                                                                                                     |                                                                                                   | HUMAN IMPACT                                                                                                                                                                   | BUSINESS IMPACT          | PREPAREDNESS          | INTERNAL RESPONSE<br>(The City of Garland)             | EXTERNAL RESPONSE<br>(Community Partners, Mutual Aid Staff/Supplies) |                  |
|                                           | Geographic Area Affected                                                                                                                            | Probability of Future Events in the next year                                                     | Possibility of death or injury                                                                                                                                                 | Interruption of services | Preplanning for event | Response time, effectiveness, resources available      | Response time, effectiveness, resources available                    | Relative threat* |
| SCORE                                     | 0 = Negligible: Less than 10%<br>1 = Limited: 10 to 25%<br>2 = Significant: 25 to 75%<br>3 = Extensive: 75 to 100%<br>* 10% of Garland = 5.71 sq mi | 0 = Unlikely: Less than 1%<br>1 = Occasional: 1-10%<br>2 = Likely 10-90%<br>3 = Highly Likely 90% | 0 = Unlikely: Less than 1%<br>1 = Occasional: 1-10%<br>2 = Likely 10-90%<br>3 = Highly Likely 90%<br>* 1% of Garlands population = 2355<br>* 1% of businesses in Garland = 118 |                          |                       | 0 = N/A<br>1 = High<br>2 = Moderate<br>3 = Low or none |                                                                      | 0 - 100%         |
| Active Shooter                            |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Aircraft Incident                         |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Biological Event                          |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Bomb Threat                               |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Civil Disturbance                         |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Communications Failure                    |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Dam Failure                               |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Drought                                   |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Earthquake                                |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Erosion                                   |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Expansive Soil                            |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Extreme Cold                              |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Extreme Heat                              |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Flood                                     |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Fuel Shortage                             |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
|                                           | Geographic Area Affected                                                                                                                            | Probability of Future Events in the next year                                                     | Possibility of death or injury                                                                                                                                                 | Interruption of services | Preplanning for event | Response time, effectiveness, resources available      | Response time, effectiveness, resources available                    |                  |
|                                           | 0 = Negligible: Less than 10%<br>1 = Limited: 10 to 25%<br>2 = Significant: 25 to 75%<br>3 = Extensive: 75 to 100%<br>* 10% of Garland = 5.71 sq mi | 0 = Unlikely: Less than 1%<br>1 = Occasional: 1-10%<br>2 = Likely 10-90%<br>3 = Highly Likely 90% | 0 = Unlikely: Less than 1%<br>1 = Occasional: 1-10%<br>2 = Likely 10-90%<br>3 = Highly Likely 90%<br>* 1% of Garlands population = 2355<br>* 1% of businesses in Garland = 118 |                          |                       | 0 = N/A<br>1 = High<br>2 = Moderate<br>3 = Low or none |                                                                      |                  |
| Hail                                      |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Hazardous Materials (Fixed and Transport) |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Information Systems Failure               |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Lightning                                 |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Plant Explosion                           |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Power Outages                             |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Railroad Incidents                        |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Severe Winter Weather                     |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Sewer Failure                             |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Subsidence                                |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Terrorism                                 |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Tornado                                   |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| VIP Situation                             |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Water Failure                             |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Wildfire                                  |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| Wind                                      |                                                                                                                                                     |                                                                                                   |                                                                                                                                                                                |                          |                       |                                                        |                                                                      | 0%               |
| AVERAGE SCORE                             | 0                                                                                                                                                   | 0.00                                                                                              | 0.00                                                                                                                                                                           | 0.00                     | 0.00                  | 0.00                                                   | 0.00                                                                 |                  |

## Definitions

| Parameter                                                           | Definition                                                                                                                                                                                                                     | One (1)                                                                 | Two (2)                                                                                           | Three (3)                                                                                                            | Four (4)                                                                                                                                                               | Five (5)                                                                                                                             |
|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Frequency</b>                                                    | How often has the hazard occurred in the past?                                                                                                                                                                                 | Never occurred locally                                                  | Once in past thousand years                                                                       | Once in past hundred years                                                                                           | Once in past 50 years                                                                                                                                                  | Nearly every decade                                                                                                                  |
| <b>Geographic Scope</b>                                             | Size of the affected area. Includes areas not damaged, but strongly affected by the incidents. For example, areas backed up by a transportation accident.                                                                      | Single site. One or two blocks.                                         | Single site/ multiple blocks                                                                      | Community specific (ex. Downtown)                                                                                    | City-wide                                                                                                                                                              | Regional                                                                                                                             |
| <b>Duration</b>                                                     | How long does the acute crisis part of the disaster last?                                                                                                                                                                      | Less than 24 hours                                                      | 1-3 days                                                                                          | 4-7 days                                                                                                             | 7-30 days                                                                                                                                                              | 30+ days                                                                                                                             |
| <b>Environment</b>                                                  | How damaging is the disaster for the natural environment                                                                                                                                                                       | No damage/ temporary minor damage                                       | Degradation of the ecosystem that will repair itself                                              | Degradation of ecosystem that requires intervention                                                                  | Functional loss of ecosystem, but restoration possible                                                                                                                 | Permanent loss of ecosystem                                                                                                          |
| <b>Heath Effects</b>                                                | How dangerous is the hazard to human health and safety?                                                                                                                                                                        | No deaths or injuries                                                   | 1-10 deaths and/or 1-100 injuries                                                                 | 11-50 deaths and/or 101-500 injuries                                                                                 | 51-500 deaths and/or 501-1500 injuries                                                                                                                                 | over 501 deaths and/or 1501 injuries                                                                                                 |
| <b>Displacement</b>                                                 | How likely is the hazard to negatively impact the exposed population in terms of displacement and personal property loss                                                                                                       | No displaced people/ minor inconveniences                               | Displaced people. Vulnerable populations begin to have problems with access to essential supplies | Displaced people. Vulnerable populations have serious difficulties. General population starting to have problems     | 251-1000 people displaced. 5-30% of population experiencing acute shortages of supplies                                                                                | 1000+ displaced people. More than 30% of population facing acute shortages of basic supplies and access to services                  |
| <b>Economic Impacts</b>                                             | How does the hazard affect the local economy?                                                                                                                                                                                  | No measureable impacts                                                  | No impacts to overall economy, but isolated businesses experience hardships                       | Entire sectors experiencing loss of revenue and capital                                                              | Sectors of economic base affected & unable to generate revenue; Losses range                                                                                           | Physical losses equal to 10% of assessed value. Loss of ability to generate revenue.                                                 |
| <b>Built Environment (Property, Facilities, and Infrastructure)</b> | How does the hazard affect buildings and physical infrastructure this includes Utilities                                                                                                                                       | No effects.                                                             | 1-10 structures damaged. Up to 25% loss of one utility                                            | 11-250 structures damaged. Multiple utilities affected up to 25% loss                                                | between 1- 10% of assessed value.                                                                                                                                      | 1000+ structures damaged. At least two major utilities degraded by 50%+loss                                                          |
| <b>Transportation</b>                                               | How does the hazard affect the ability of residents and workers to access the resources they need?                                                                                                                             | No effects on mobility                                                  | All critical services accessible, but delays reaching work or non-essential services.             | One critical service inaccessible. Major corridors open, but minor streets depredated or impassable                  | Many Critical Services inaccessible One major corridor inoperable                                                                                                      | Most critical services inaccessible Most major corridors impassible.                                                                 |
| <b>Critical Services (Includes COOP and Responders)</b>             | How likely is the hazard to reduce the ability of government business to provide critical services?                                                                                                                            | Little impairment on critical services                                  | Temporary degradation of 1 critical service                                                       | Temporary degradation of multiple critical services. Long-term degradation of 1 critical service                     | Temporary degradation of most critical services. Long-term degradation of multiple services.                                                                           | Unable to deliver the most critical services                                                                                         |
| <b>Confidence in Government</b>                                     | Would public's confidence in government be shaken?                                                                                                                                                                             | No                                                                      |                                                                                                   | Somewhat                                                                                                             |                                                                                                                                                                        | Yes                                                                                                                                  |
| <b>Cascading Effects</b>                                            | How severe and complex will the secondary effects be?                                                                                                                                                                          | Hazard unlikely to cause secondary hazards, and if they occur are minor | Secondary hazards may occur, but are likely to be minor compared to primary hazard                | Secondary hazards occur that extend the impact of the disaster and hamper response, but are not considered disasters | Secondary effects generated that significantly increase the magnitude of the disaster. Secondary impacts would be considered disasters if they occurred by themselves. | Secondary effects generated and rival or exceed primary hazard. Secondary impacts would be disasters if they occurred by themselves. |
| <b>Future Emphasis</b>                                              | How much is the level of emphasis in mitigating, planning for, and preparing for this hazard changed based on trends, increasing understanding of the hazard, and changing underlying conditions that give rise to the hazard? | Decreasing Emphasis                                                     |                                                                                                   | Emphasis Unchanged                                                                                                   |                                                                                                                                                                        | Increasing Emphasis                                                                                                                  |

## Planning Team Results

| Hazard                                    | OEM Results | Facilities Results | Fire Results | GP&L Results | Health Results | Neighborhood Vitality Results | Parks Results | Water Results | Police Results | Building Inspection Results | Engineering Results | RISK |
|-------------------------------------------|-------------|--------------------|--------------|--------------|----------------|-------------------------------|---------------|---------------|----------------|-----------------------------|---------------------|------|
| Extreme Heat                              | 32%         | 19%                | 32%          | 17%          | 29%            | 26%                           | 22%           | 8%            | 6%             | 12%                         | 6%                  | 19%  |
| Severe Winter Weather                     | 32%         | 39%                | 14%          | 17%          | 15%            | 17%                           | 24%           | 8%            | 15%            | 0%                          | 0%                  | 16%  |
| Hail                                      | 26%         | 26%                | 22%          | 17%          | 17%            | 15%                           | 32%           | 9%            | 2%             | 10%                         | 1%                  | 16%  |
| Wind                                      | 32%         | 13%                | 26%          | 11%          | 19%            | 9%                            | 26%           | 11%           | 2%             | 10%                         | 0%                  | 14%  |
| Extreme Cold                              | 29%         | 26%                | 14%          | 17%          | 29%            | 17%                           | 12%           | 8%            | 6%             | 0%                          | 0%                  | 14%  |
| Power Outages                             | 29%         | 17%                | 12%          | 15%          | 17%            | 10%                           | 11%           | 6%            | 15%            | 8%                          | 0%                  | 13%  |
| Tornado                                   | 19%         | 19%                | 11%          | 13%          | 6%             | 15%                           | 32%           | 5%            | 5%             | 11%                         | 0%                  | 12%  |
| Flood                                     | 19%         | 22%                | 11%          | 11%          | 22%            | 13%                           | 19%           | 4%            | 4%             | 0%                          | 4%                  | 12%  |
| Biological Event                          | 29%         | 45%                | 22%          | 0%           | 12%            | 0%                            | 12%           | 6%            | 0%             | 0%                          | 0%                  | 11%  |
| Drought                                   | 12%         | 3%                 | 17%          | 17%          | 13%            | 19%                           | 12%           | 13%           | 4%             | 13%                         | 1%                  | 11%  |
| Expansive Soil                            | 11%         | 0%                 | 29%          | 17%          | 28%            | 9%                            | 0%            | 4%            | 0%             | 17%                         | 1%                  | 11%  |
| Communications Failure                    | 12%         | 26%                | 0%           | 24%          | 15%            | 11%                           | 11%           | 6%            | 6%             | 0%                          | 0%                  | 10%  |
| Lightning                                 | 26%         | 2%                 | 19%          | 6%           | 15%            | 5%                            | 22%           | 11%           | 0%             | 0%                          | 1%                  | 10%  |
| Hazardous Materials (Fixed and Transport) | 5%          | 42%                | 29%          | 8%           | 0%             | 5%                            | 0%            | 5%            | 0%             | 0%                          | 0%                  | 9%   |
| Erosion                                   | 8%          | 0%                 | 8%           | 6%           | 22%            | 6%                            | 24%           | 4%            | 2%             | 0%                          | 2%                  | 7%   |
| Information Systems Failure               | 0%          | 35%                | 0%           | 10%          | 0%             | 12%                           | 0%            | 5%            | 9%             | 0%                          | 0%                  | 6%   |
| Fuel Shortage                             | 0%          | 22%                | 10%          | 12%          | 15%            | 11%                           | 0%            | 0%            | 0%             | 0%                          | 0%                  | 6%   |
| Plant Explosion                           | 0%          | 35%                | 0%           | 5%           | 0%             | 9%                            | 0%            | 0%            | 0%             | 0%                          | 0%                  | 4%   |
| Civil Disturbance                         | 0%          | 0%                 | 11%          | 13%          | 0%             | 5%                            | 8%            | 0%            | 5%             | 0%                          | 0%                  | 4%   |
| Active Shooter                            | 5%          | 15%                | 8%           | 6%           | 0%             | 3%                            | 0%            | 0%            | 4%             | 0%                          | 0%                  | 4%   |
| Bomb Threat                               | 9%          | 0%                 | 0%           | 6%           | 8%             | 3%                            | 5%            | 0%            | 3%             | 0%                          | 0%                  | 3%   |
| Terrorism                                 | 0%          | 24%                | 0%           | 0%           | 0%             | 0%                            | 0%            | 4%            | 0%             | 0%                          | 0%                  | 3%   |
| Earthquake                                | 0%          | 0%                 | 0%           | 13%          | 0%             | 0%                            | 12%           | 0%            | 0%             | 0%                          | 0%                  | 2%   |
| Water Failure                             | 0%          | 0%                 | 0%           | 5%           | 10%            | 0%                            | 0%            | 5%            | 0%             | 0%                          | 0%                  | 2%   |
| Sewer Failure                             | 0%          | 0%                 | 0%           | 5%           | 8%             | 0%                            | 0%            | 5%            | 0%             | 0%                          | 0%                  | 2%   |
| Wildfire                                  | 8%          | 0%                 | 0%           | 0%           | 0%             | 0%                            | 10%           | 0%            | 0%             | 0%                          | 0%                  | 2%   |
| VIP Situation                             | 0%          | 0%                 | 0%           | 6%           | 0%             | 0%                            | 0%            | 4%            | 6%             | 0%                          | 0%                  | 1%   |
| Railroad Incidents                        | 0%          | 0%                 | 0%           | 5%           | 0%             | 0%                            | 0%            | 3%            | 5%             | 0%                          | 1%                  | 1%   |
| Subsidence                                | 0%          | 2%                 | 0%           | 6%           | 0%             | 0%                            | 0%            | 0%            | 0%             | 0%                          | 0%                  | 1%   |
| Aircraft Incident                         | 0%          | 0%                 | 1%           | 0%           | 0%             | 0%                            | 0%            | 0%            | 0%             | 0%                          | 0%                  | 0%   |
| Dam Failure                               | 0%          | 0%                 | 0%           | 0%           | 0%             | 0%                            | 0%            | 0%            | 0%             | 0%                          | 0%                  | 0%   |

## G. Community Impact Assessment

### Sample Survey

|                                                    | Most Likely / Typical Scenario |          |                |              |                 |                      |                   |                |                   |                     |            |               |                        |                     |          |
|----------------------------------------------------|--------------------------------|----------|----------------|--------------|-----------------|----------------------|-------------------|----------------|-------------------|---------------------|------------|---------------|------------------------|---------------------|----------|
|                                                    | Geographic Scope               | Duration | Health Effects | Displacement | Economic Impact | Environmental Impact | Built Environment | Transportation | Critical Services | Confidence in Gov't | Base Score | Frequency (F) | Cascading Effects (CE) | Multiplier (F + CE) | Subtotal |
| Drought                                            |                                |          |                |              |                 |                      |                   |                |                   |                     | 0          |               |                        | 0                   | 0        |
| Earthquake                                         |                                |          |                |              |                 |                      |                   |                |                   |                     | 0          |               |                        | 0                   | 0        |
| Erosion                                            |                                |          |                |              |                 |                      |                   |                |                   |                     | 0          |               |                        | 0                   | 0        |
| Expansive Soil                                     |                                |          |                |              |                 |                      |                   |                |                   |                     | 0          |               |                        | 0                   | 0        |
| Extreme Heat                                       |                                |          |                |              |                 |                      |                   |                |                   |                     | 0          |               |                        | 0                   | 0        |
| Flood                                              |                                |          |                |              |                 |                      |                   |                |                   |                     | 0          |               |                        | 0                   | 0        |
| Hail                                               |                                |          |                |              |                 |                      |                   |                |                   |                     | 0          |               |                        | 0                   | 0        |
| Severe Thunderstorms / Wind /<br>Lightening        |                                |          |                |              |                 |                      |                   |                |                   |                     | 0          |               |                        | 0                   | 0        |
| Severe Winter Weather                              |                                |          |                |              |                 |                      |                   |                |                   |                     | 0          |               |                        | 0                   | 0        |
| Tornado                                            |                                |          |                |              |                 |                      |                   |                |                   |                     | 0          |               |                        | 0                   | 0        |
| Biological Event                                   |                                |          |                |              |                 |                      |                   |                |                   |                     | 0          |               |                        | 0                   | 0        |
| Communications Failure /<br>Infrastructure Failure |                                |          |                |              |                 |                      |                   |                |                   |                     | 0          |               |                        | 0                   | 0        |
| Power Outages                                      |                                |          |                |              |                 |                      |                   |                |                   |                     | 0          |               |                        | 0                   | 0        |
| Terrorism/Cyber Attacks                            |                                |          |                |              |                 |                      |                   |                |                   |                     | 0          |               |                        | 0                   | 0        |

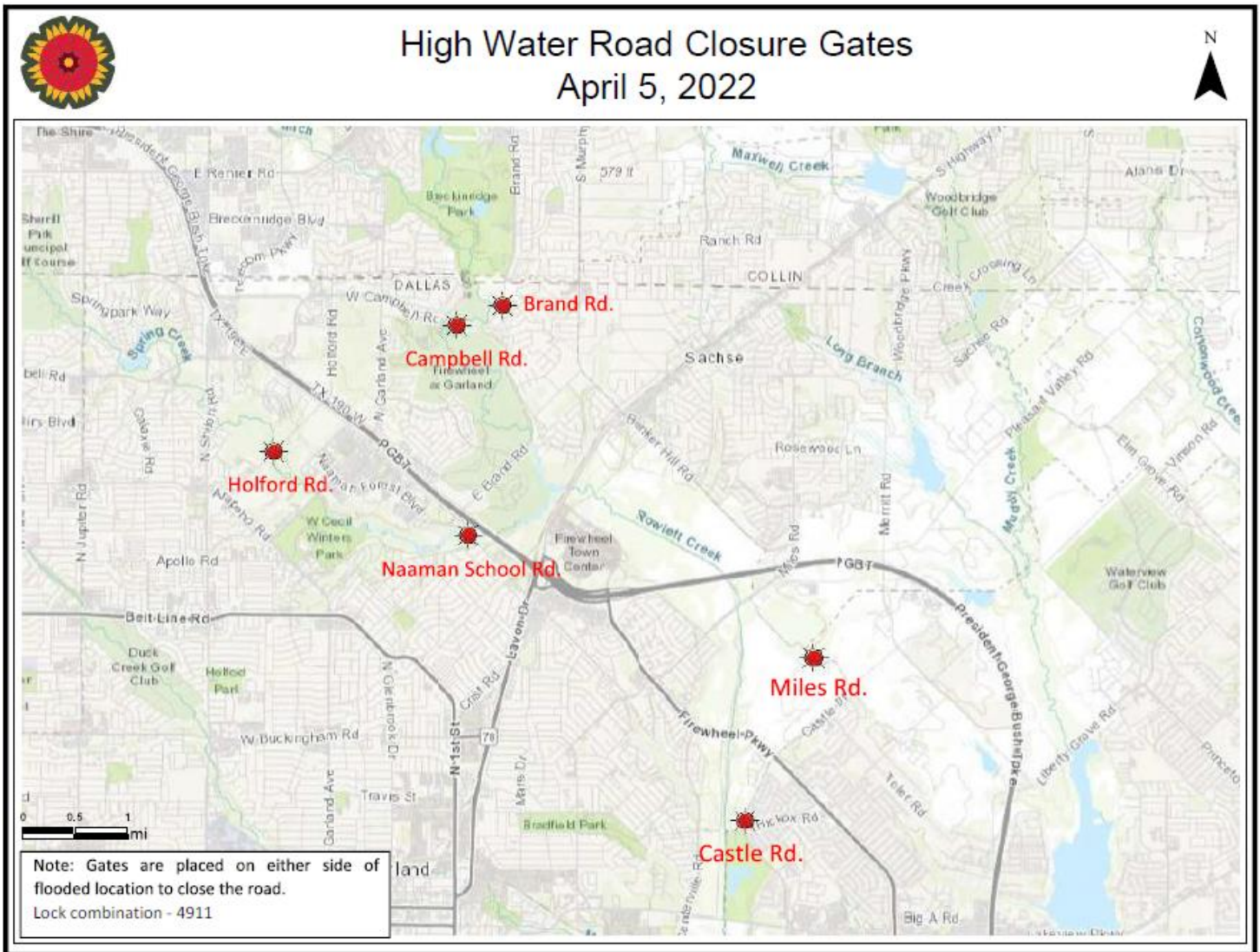
## Definitions

| Parameter                                                           | Definition                                                                                                                                                                                                                     | One (1)                                                                 | Two (2)                                                                                           | Three (3)                                                                                                            | Four (4)                                                                                                                                                               | Five (5)                                                                                                                             |
|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Frequency</b>                                                    | How often has the hazard occurred in the past?                                                                                                                                                                                 | Never occurred locally                                                  | Once in past thousand years                                                                       | Once in past hundred years                                                                                           | Once in past 50 years                                                                                                                                                  | Nearly every decade                                                                                                                  |
| <b>Geographic Scope</b>                                             | Size of the affected area. Includes areas not damaged, but strongly affected by the incidents. For example, areas backed up by a transportation accident.                                                                      | Single site. One or two blocks.                                         | Single site/ multiple blocks                                                                      | Community specific (ex. Downtown)                                                                                    | City-wide                                                                                                                                                              | Regional                                                                                                                             |
| <b>Duration</b>                                                     | How long does the acute crisis part of the disaster last?                                                                                                                                                                      | Less than 24 hours                                                      | 1-3 days                                                                                          | 4-7 days                                                                                                             | 7-30 days                                                                                                                                                              | 30+ days                                                                                                                             |
| <b>Environment</b>                                                  | How damaging is the disaster for the natural environment                                                                                                                                                                       | No damage/ temporary minor damage                                       | Degradation of the ecosystem that will repair itself                                              | Degradation of ecosystem that requires intervention                                                                  | Functional loss of ecosystem, but restoration possible                                                                                                                 | Permanent loss of ecosystem                                                                                                          |
| <b>Heath Effects</b>                                                | How dangerous is the hazard to human health and safety?                                                                                                                                                                        | No deaths or injuries                                                   | 1-10 deaths and/or 1-100 injuries                                                                 | 11-50 deaths and/or 101-500 injuries                                                                                 | 51-500 deaths and/or 501-1500 injuries                                                                                                                                 | over 501 deaths and/or 1501 injuries                                                                                                 |
| <b>Displacement</b>                                                 | How likely is the hazard to negatively impact the exposed population in terms of displacement and personal property loss                                                                                                       | No displaced people/ minor inconveniences                               | Displaced people. Vulnerable populations begin to have problems with access to essential supplies | Displaced people. Vulnerable populations have serious difficulties. General population starting to have problems     | 251-1000 people displaced. 5-30% of population experiencing acute shortages of supplies                                                                                | 1000+ displaced people. More than 30% of population facing acute shortages of basic supplies and access to services                  |
| <b>Economic Impacts</b>                                             | How does the hazard affect the local economy?                                                                                                                                                                                  | No measureable impacts                                                  | No impacts to overall economy, but isolated businesses experience hardships                       | Entire sectors experiencing loss of revenue and capital                                                              | Sectors of economic base affected & unable to generate revenue; Losses range                                                                                           | Physical losses equal to 10% of assessed value. Loss of ability to generate revenue.                                                 |
| <b>Built Environment (Property, Facilities, and Infrastructure)</b> | How does the hazard affect buildings and physical infrastructure this includes Utilities                                                                                                                                       | No effects.                                                             | 1-10 structures damaged. Up to 25% loss of one utility                                            | 11-250 structures damaged. Multiple utilities affected up to 25% loss                                                | between 1- 10% of assessed value.                                                                                                                                      | 1000+ structures damaged. At least two major utilities degraded by 50%+loss                                                          |
| <b>Transportation</b>                                               | How does the hazard affect the ability of residents and workers to access the resources they need?                                                                                                                             | No effects on mobility                                                  | All critical services accessible, but delays reaching work or non-essential services.             | One critical service inaccessible. Major corridors open, but minor streets depredated or impassable                  | Many Critical Services inaccessible One major corridor inoperable                                                                                                      | Most critical services inaccessible Most major corridors impassible.                                                                 |
| <b>Critical Services (Includes COOP and Responders)</b>             | How likely is the hazard to reduce the ability of government business to provide critical services?                                                                                                                            | Little impairment on critical services                                  | Temporary degradation of 1 critical service                                                       | Temporary degradation of multiple critical services. Long-term degradation of 1 critical service                     | Temporary degradation of most critical services. Long-term degradation of multiple services.                                                                           | Unable to deliver the most critical services                                                                                         |
| <b>Confidence in Government</b>                                     | Would public's confidence in government be shaken?                                                                                                                                                                             | No                                                                      |                                                                                                   | Somewhat                                                                                                             |                                                                                                                                                                        | Yes                                                                                                                                  |
| <b>Cascading Effects</b>                                            | How severe and complex will the secondary effects be?                                                                                                                                                                          | Hazard unlikely to cause secondary hazards, and if they occur are minor | Secondary hazards may occur, but are likely to be minor compared to primary hazard                | Secondary hazards occur that extend the impact of the disaster and hamper response, but are not considered disasters | Secondary effects generated that significantly increase the magnitude of the disaster. Secondary impacts would be considered disasters if they occurred by themselves. | Secondary effects generated and rival or exceed primary hazard. Secondary impacts would be disasters if they occurred by themselves. |
| <b>Future Emphasis</b>                                              | How much is the level of emphasis in mitigating, planning for, and preparing for this hazard changed based on trends, increasing understanding of the hazard, and changing underlying conditions that give rise to the hazard? | Decreasing Emphasis                                                     |                                                                                                   | Emphasis Unchanged                                                                                                   |                                                                                                                                                                        | Increasing Emphasis                                                                                                                  |

### Community Results

|                                                    | Most Likely / Typical Scenario |          |                |              |                 |                      |                   |                |                   |                     |            |               |                        |                     |          |
|----------------------------------------------------|--------------------------------|----------|----------------|--------------|-----------------|----------------------|-------------------|----------------|-------------------|---------------------|------------|---------------|------------------------|---------------------|----------|
|                                                    | Geographic Scope               | Duration | Health Effects | Displacement | Economic Impact | Environmental Impact | Built Environment | Transportation | Critical Services | Confidence in Gov't | Base Score | Frequency (F) | Cascading Effects (CE) | Multiplier (F + CE) | Subtotal |
| Drought                                            | 14                             | 14       | 6              | 5            | 8               | 10                   | 6                 | 6              | 5                 | 9                   | 8.3        | 9             | 6                      | 15                  | 124.5    |
| Earthquake                                         | 11                             | 4        | 6              | 8            | 8               | 8                    | 10                | 9              | 7                 | 5                   | 7.6        | 2             | 5                      | 7                   | 53.2     |
| Erosion                                            | 5                              | 11       | 3              | 5            | 5               | 9                    | 7                 | 4              | 3                 | 5                   | 5.7        | 10            | 4                      | 14                  | 79.8     |
| Expansive Soil                                     | 9                              | 12       | 3              | 3            | 5               | 9                    | 7                 | 6              | 3                 | 3                   | 6          | 10            | 3                      | 13                  | 78       |
| Extreme Heat                                       | 15                             | 12       | 10             | 6            | 8               | 9                    | 5                 | 5              | 4                 | 3                   | 7.7        | 10            | 4                      | 14                  | 107.8    |
| Flood                                              | 12                             | 7        | 6              | 9            | 6               | 10                   | 10                | 8              | 8                 | 7                   | 8.3        | 9             | 4                      | 13                  | 107.9    |
| Hail                                               | 9                              | 5        | 4              | 4            | 5               | 7                    | 8                 | 4              | 6                 | 3                   | 5.5        | 7             | 4                      | 11                  | 60.5     |
| Severe Thunderstorms / Wind /<br>Lightening        | 13                             | 6        | 4              | 4            | 9               | 7                    | 8                 | 4              | 6                 | 6                   | 6.7        | 8             | 4                      | 12                  | 80.4     |
| Severe Winter Weather                              | 15                             | 10       | 8              | 6            | 9               | 10                   | 12                | 7              | 10                | 9                   | 9.6        | 8             | 7                      | 15                  | 144      |
| Tornado                                            | 12                             | 7        | 9              | 10           | 7               | 13                   | 13                | 10             | 12                | 9                   | 10.2       | 9             | 7                      | 16                  | 163.2    |
| Biological Event                                   | 7                              | 12       | 11             | 10           | 8               | 5                    | 5                 | 4              | 5                 | 7                   | 7.4        | 6             | 3                      | 9                   | 66.6     |
| Communications Failure /<br>Infrastructure Failure | 11                             | 8        | 6              | 6            | 8               | 6                    | 6                 | 7              | 8                 | 11                  | 7.7        | 10            | 6                      | 16                  | 123.2    |
| Power Outages                                      | 12                             | 9        | 8              | 10           | 12              | 7                    | 11                | 10             | 12                | 13                  | 10.4       | 8             | 6                      | 14                  | 145.6    |
| Terrorism/Cyber Attacks                            | 11                             | 10       | 7              | 8            | 10              | 6                    | 6                 | 7              | 8                 | 12                  | 8.5        | 8             | 5                      | 13                  | 110.5    |

## H. Flood Gates





GARLAND



**GARLAND**  
**CITY COUNCIL ITEM SUMMARY SHEET**

**City Council Work Session Agenda**

**4. a.**

**Meeting Date:** July 5, 2022

**Item Title:** Interview for Appointment to the Texas Municipal Power Agency

**Submitted By:** Rene Dowl, City Secretary

---

**Summary of Request/Problem**

Council will conduct interviews with applicants and discuss the appointment/reappointment process for the City of Garland's representation on the Texas Municipal Power Agency. The term of Mr. Ratliff expires July 7, 2022.

Information was posted on the City's website for 21 days regarding the qualification for the TMPA Board Member in order to provide an opportunity for citizens to apply for the position. Qualified applicants were requested to submit a letter of interest and resume by May 31, 2022.

An application was received from James B. Ratliff and Gary Lynn Barnett.

**Recommendation/Action Requested and Justification**

Council will interview the applicant.

---

**Attachments**

James B. Ratliff - TMPA

Gary Barnett

---

# JAMES B. RATLIFF

7519 Spicewood Drive, Garland, Texas 75044-2572

May 19, 2022

Honorable Scott LeMay & City Council  
City of Garland  
P. O. Box 469002  
Garland, Texas 75046-9002



Re: Texas Municipal Power Agency Appointment

Dear Mayor LeMay and Council Members:

Please accept this letter as my formal notice that I would like to be considered for re-appointment to the Texas Municipal Power Agency's (TMPA) Board of Directors. As most of you are aware, TMPA has been in the process of significantly downsizing the Agency having disposed of the plant and mine properties over the last couple of years. The only remaining major assets of the Agency are its transmission assets. Eventually, based on asset return rates, these transmission assets should be transferred to the associated cities.

Currently the Agency is working through succession planning and financial issues associated with the agency downsizing. In the process of this transition, the agency and cities will be facing some major financial decisions regarding the transmission as well as financial asset dispositions that will need to be addressed in a timely manner. With my experience and institutional knowledge about the agency, and the industry in general, I hope the Council will give me the opportunity to serve an additional two year term.

As always, if you have any questions, comments or observations, I am available. Thank you for your consideration and your public service.

Respectfully,

A handwritten signature in dark ink, appearing to read 'James B. Ratliff', is written over a light blue horizontal line.

James B. Ratliff

## Vanover, Courtney

---

**From:** Dowl, Rene  
**Sent:** Thursday, May 19, 2022 7:31 AM  
**To:** Vanover, Courtney  
**Subject:** Fwd: [EXTERNAL] James Ratliff TMPA Reappointment  
**Attachments:** Ratliff Reappointment Letter 5-19-2022.pdf

Sent from my iPhone

Begin forwarded message:

**From:** james ratliff <viewoneinc@yahoo.com>  
**Date:** May 19, 2022 at 6:57:11 AM CDT  
**To:** "Dowl, Rene" <RDowl@garlandtx.gov>, "Cline, Darrell (GPL)" <DCline@gpltexas.org>  
**Subject:** [EXTERNAL] James Ratliff TMPA Reappointment

Ms Dowl, attached is a copy of my request for reappointment to the TMPA Board. If you have any questions or need additional information, please contact me. Thank you for your help and service to our city.

Jamie Ratliff

## Vanover, Courtney

---

**From:** Cline, Darrell <DCline@gpltexas.org>  
**Sent:** Tuesday, May 17, 2022 6:54 AM  
**To:** Vanover, Courtney  
**Subject:** RE: TMPA Interview

Thanks. Mr. Ratliff should be corresponding this week with the City Secretary's Office.

**From:** Vanover, Courtney  
**Sent:** Monday, May 16, 2022 3:02 PM  
**To:** Cline, Darrell <DCline@gpltexas.org>  
**Subject:** TMPA Interview

\*\*\*\*\* EXTERNAL email. Please be cautious and evaluate before you click on links, open attachments, or provide credentials. \*\*\*\*\*

Good afternoon,

Mr. Ratliff's term expires July 7, 2022.

There has not been any correspondence received from Mr. Ratliff to be considered for reappointment.

Interviews will be taking place for the TMPA at the Work Session on July 6, 2022.

Thank you,

***Courtney Vanover***

City Secretary's Office  
972-205-2406

---

### Our Mission

*We are committed to preserve public trust, deliver quality services, promote economic growth, protect our community and enhance the quality of life for the good of our city and our future.*



**GARLAND**



SERVING THE CITIES OF BRYAN, DENTON, GARLAND & GREENVILLE

April 27, 2022

Mr. Bryan Bradford, City Manager  
City of Garland  
P.O. Box 469002  
Garland, TX 75046

RE: TMPA Board Member Appointment

Dear Mr. Bradford:

Our records indicate that Jamie Ratliff's term as a Member of the Board of Directors of the Texas Municipal Power Agency expires on July 18, 2022. The City of Garland will need to reinstate Mr. Ratliff or select a new member to serve for the next 2-year term.

After the City Council reaches a decision on this matter, please send me a certified resolution or certified meeting minutes specifying the person selected to represent your City on the TMPA Board of Directors.

Your cooperation is appreciated.

Sincerely,

A handwritten signature in blue ink, appearing to read "Tracy Stracener".

Tracy Stracener  
Assistant Secretary  
TMPA Board of Directors

Cc: Jamie Ratliff  
Tom Jefferies  
Darrell Cline

**RECEIVED**

MAY 05 2022

**CITY OF GARLAND  
Administration**



CITY OF GARLAND  
RECEIVED  
MAY 04 2022

CITY SECRETARY

## Application for City of Garland Boards/Commissions/Committees

Return completed application to City Secretary's Office, 200 N. Fifth St., Garland, Texas 75040 | Email: [RDowl@GarlandTX.gov](mailto:RDowl@GarlandTX.gov)

**Please Type or Print Clearly:**

Date: 5/4/22

Name: Garry "Lynn" Barnett

Phone: [REDACTED]

Address: 3810 Chicosa Trail

Phone: [REDACTED]

City, State, Zip: 75043

Email: [REDACTED]

Resident of Garland for 51 years

Resident of Texas for 75 years

✓ Dallas County Voter Registration Number [REDACTED] Garland City Council District Number 3

Have you ever been convicted of a felony? ☐ Yes ☒ No

Have you ever been convicted of a Class A misdemeanor? ☐ Yes ☒ No

Please list any experience that qualifies you to serve in the areas you have indicated.

I was raised on a Farm and Ranch in Central Texas. After completing my education from Texas A&M - Commerce; I was a commercial carpenter for 6 years. I started my sales career in building materials that lasted 42 years. Since then, I have owned a handyman business specializing in kitchen and bath remodeling. +

If you have previously served on a City Board or Commission, please specify and list dates of service.

List civic or community endeavors with which you have been involved.

I coached soccer and baseball for my children.

What is your educational background?

BBA in Business from Texas A&M - Commerce. Lincensed carpenter. Leadership training with several companies I worked for; Stanley Works, Hunter Fan Company, US Fence, Thompson's and Formby.

What is your occupational experience?

Construction of tilt wall panels and concrete works. Sales and sales management for 42 years. First working the five state region of Texas, Oklahoma, New Mexico, Arkansas and Louisiana. Traveled nationally and +

I hereby affirm that all statements herein are true and correct.

|                                                                                     |                                                           |                                                                |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------|
| Board or Commission of first, second and third choice:                              |                                                           |                                                                |
| <input type="checkbox"/> Board of Adjustment                                        | <input type="checkbox"/> Garland Cultural Arts Commission | <input type="checkbox"/> Parks and Recreation Board            |
| <input type="checkbox"/> Citizens Environmental and Neighborhood Advisory Committee | <input type="checkbox"/> Garland Youth Council **         | <input type="checkbox"/> Plan Commission *                     |
| <input type="checkbox"/> Civil Service Commission                                   | <input type="checkbox"/> Library Board                    | <input type="checkbox"/> Senior Citizens Advisory Committee    |
| <input type="checkbox"/> Community Multicultural Commission                         | <input type="checkbox"/> Property Standards Board         | <input type="checkbox"/> Unified Building Standards Commission |

\*\* Garland Youth Council has a separate application

FOR OFFICE USE ONLY

Ad Valorem Tax Status  
Utility Account Status  
CSO Suit/Claim Filed

Current

Current

Yes

No

Past Due

Past Due

Date Appointed

Appointed By

Date Notified

Disclosure Form Filed

Clerk Signature & Date

*Courtney Vanover*

*5/5/22*

*\*North Texas Municipal Water District  
\*Texas Municipal Power Agency*

Revised 05/2021

## Vanover, Courtney

---

**From:** Daniel, Brenda  
**Sent:** Thursday, May 5, 2022 9:31 AM  
**To:** Vanover, Courtney; Kurth, Christine  
**Subject:** RE: Account Status

All good with Tax.

---

**From:** Vanover, Courtney  
**Sent:** Thursday, May 5, 2022 7:44 AM  
**To:** Daniel, Brenda <BDaniel@garlandtx.gov>; Kurth, Christine <CKurth@garlandtx.gov>  
**Subject:** Account Status

Good morning,

I need to check the account status for the following please:

Gary Lynn Barnett  
3810 Chicosa Trail

Thank you!

***Courtney Vanover***  
City Secretary's Office  
972-205-2406

---

### Our Mission

*We are committed to preserve public trust, deliver quality services, promote economic growth, protect our community and enhance the quality of life for the good of our city and our future.*



**GARLAND**

## Vanover, Courtney

---

**From:** Kurth, Christine  
**Sent:** Thursday, May 5, 2022 8:13 AM  
**To:** Vanover, Courtney; Daniel, Brenda  
**Subject:** RE: Account Status

Good Morning

Here you go ☺

Thank you

Christine Kurth  
Call Center Supervisor  
972-205-2677  
Email: [CKurth@garlandtx.gov](mailto:CKurth@garlandtx.gov)



**GARLAND**

---

**From:** Vanover, Courtney <[CVanover@garlandtx.gov](mailto:CVanover@garlandtx.gov)>  
**Sent:** Thursday, May 5, 2022 7:44 AM  
**To:** Daniel, Brenda <[BDaniel@garlandtx.gov](mailto:BDaniel@garlandtx.gov)>; Kurth, Christine <[CKurth@garlandtx.gov](mailto:CKurth@garlandtx.gov)>  
**Subject:** Account Status

Good morning,

I need to check the account status for the following please:

Gary Lynn Barnett---- Excellent/Current  
3810 Chicosa Trail

Thank you!

***Courtney Vanover***

City Secretary's Office  
972-205-2406

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### Our Mission

*We are committed to preserve public trust, deliver quality services, promote economic growth, protect our community and enhance the quality of life for the good of our city and our future.*



**GARLAND**

## Vanover, Courtney

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**From:** Dowl, Rene  
**Sent:** Wednesday, May 4, 2022 3:30 PM  
**To:** Vanover, Courtney  
**Subject:** Application for Boards and Commissions  
**Attachments:** Boards-and-Commissions-Application 040522.pdf

Courtney,

This applicant is interested in "outside" and City boards and commissions. Please note that we will have to invite him to the interviews for NTMWD and TMPA.

Thank you,

René

Eloyce René Dowl, TRMC, CMC  
City Secretary  
200 N. 5<sup>th</sup> Street  
4<sup>th</sup> Floor  
Garland, TX 75040  
P: 972-205-2404  
F: 972-205-2504  
[rdowl@garlandtx.gov](mailto:rdowl@garlandtx.gov)  
[www.garlandtx.gov](http://www.garlandtx.gov)

ATTENTION PUBLIC OFFICIALS! A "Reply to All" of this e-mail could lead to violations of the Texas Open Meetings Act. Please reply only to the sender.

**From** [REDACTED]  
**Sent:** Wednesday, May 04, 2022 3:15 PM  
**To:** Dowl, Rene <RDowl@garlandtx.gov>  
**Subject:** [EXTERNAL] Application for Boards and Commissions

see attached. I would be interested in The North Texas Municipal Water District, Texas Municipal Power Agency, or City boards and commissions.

--

Lynn Barnett  
[REDACTED]



## GARLAND

### **City Council Work Session Agenda**

**Meeting Date:** July 5, 2022

**Item Title:** Board and Commission Appointment

**Submitted By:** Courtney Vanover, Department Coordinator I, City Secretary

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#### **Summary:**

##### **Deputy Mayor Pro Tem Williams**

- Blanca Sanchez - Cultural Arts Commission
- Christine Lumpkin-Bell - Property Standards Board

##### **Council Member Lucht**

- Rich Aubin - Plan Commission
- 

#### **Attachments**

Blanca Sanchez

Christine Lumpkin-Bell

Rich Aubin

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# GARLAND

TEXAS, MADE HERE

**CITY OF GARLAND**  
**RECEIVED**  
JUN 23 2022

## Application for City of Garland Boards/Commissions/Committees

Return completed application to City Secretary's Office, 209 N. Fifth St., Garland, Texas 75040 | Email: [RDani@GarlandTX.gov](mailto:RDani@GarlandTX.gov)

Please Type or Print Clearly:

Date: 06-21-2022

Name: Blanca Sanchez Phone: [REDACTED]

Address: 209 Colonel Dr. Phone: [REDACTED]

City, State, Zip: Garland Email: [REDACTED]

Resident of Garland for 53 years Resident of Texas for 73 years

✓ Dallas County Voter Registration Number [REDACTED] Garland City Council District Number 4

Have you ever been convicted of a felony? ☐ Yes ☒ No

Have you ever been convicted of a Class A misdemeanor? ☐ Yes ☒ No

Please list any experience that qualifies you to serve in the areas you have indicated.

I have been on the Cultural Arts Commission for 21 yrs.

If you have previously served on a City Board or Commission, please specify and list dates of service.

Library Board, 10 yrs, 1990 - 2000

List civic or community endeavors with which you have been involved.

Garland Leadership Class XX

GISD Teacher 10yrs 1986 - 1996

What is your educational background? Bachelors Secondary Education

What is your occupational experience?

High School Teacher - 15yrs

Insurance Agent - 28yrs

Mortgage Broker - 10yrs

I hereby affirm that all statements herein are true and correct.

| Board or Commission of first, second and third choice:                            |                                                                                      |                                                                                       |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <input type="checkbox"/> Parks and Recreation                                     | <input checked="" type="checkbox"/> <u>1</u> <u>Garland Cultural Arts Commission</u> | <input checked="" type="checkbox"/> <u>3</u> <u>Parks and Recreation Board</u>        |
| <input type="checkbox"/> Economic Development and Neighborhood Advisory Committee | <input type="checkbox"/> <u>Garland Youth Council **</u>                             | <input type="checkbox"/> <u>Plant Conservation *</u>                                  |
| <input type="checkbox"/> City Center Commission                                   | <input type="checkbox"/> <u>Library Board</u>                                        | <input checked="" type="checkbox"/> <u>2</u> <u>Senior Citizen Advisory Committee</u> |
| <input type="checkbox"/> Regulatory/Multicultural Commission                      | <input type="checkbox"/> <u>Property Standards Board</u>                             | <input type="checkbox"/> <u>Unified Building Standards Commission</u>                 |

\*\* Garland Youth Council has a separate application

### FOR OFFICE USE ONLY

Ad Valorem Tax Status  
Utility Account Status  
CSO bills/Claims Filed

Current ☒  
Current ☒

Paid Due  
Paid Due

Date Appointed

Appointed By

Date Notified

Disclosure Form Filed

Clerk Signature & Date

Courtney Vanover  
6.27.22

Revised 05/2021



# GARLAND

TEXAS MADE HERE

**CITY OF GARLAND**  
**RECEIVED**  
JUN 23 2022  
**CITY SECRETARY**

## Application for City of Garland Boards/Commissions/Committees

Return completed application to City Secretary's Office, 200 N. Fifth St., Garland, Texas 75040 | Email: [RDowl@GarlandTX.gov](mailto:RDowl@GarlandTX.gov)

**Please Type or Print Clearly:**

Date: June 19, 2022

Name: Christine Lumpkin-Bell Phone: [REDACTED]

Address: 5317 Barcelona Dr. Phone: [REDACTED]

City, State, Zip: Garland TX 75043 Email: [REDACTED]

Resident of Garland for 30 years Resident of Texas for 45 years

✓ Dallas County Voter Registration Number [REDACTED] Garland City Council District Number 4

Have you ever been convicted of a felony? ☐ Yes ☒ No

Have you ever been convicted of a Class A misdemeanor? ☐ Yes ☒ No

Please list any experience that qualifies you to serve in the areas you have indicated.

Property and Homeowner

If you have previously served on a City Board or Commission, please specify and list dates of service.

Property Standards Board 2021-2022

List civic or community endeavors with which you have been involved.

Supported Special Olympics while Daughters volunteered at Special Olympics.. Supported Daughters as candy striper volunteers. Supported Daughters as the worked as 4th of July volunteers.

What is your educational background?

multiple college degrees.

What is your occupational experience?

Financial entrepreneur, restaurant owner, college educator.

*Christine Lumpkin-Bell*  
*C. Lumpkin-Bell*

I hereby affirm that all statements herein are true and correct.

|                                                                                     |                                                           |                                                                |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------|
| Board or Commission of first, second and third choice:                              |                                                           |                                                                |
| <input type="checkbox"/> Board of Adjustment                                        | <input type="checkbox"/> Garland Cultural Arts Commission | <input type="checkbox"/> Parks and Recreation Board            |
| <input type="checkbox"/> Citizens Environmental and Neighborhood Advisory Committee | <input type="checkbox"/> Garland Youth Council **         | <input type="checkbox"/> Plan Commission *                     |
| <input type="checkbox"/> Civil Service Commission                                   | <input type="checkbox"/> Library Board                    | <input type="checkbox"/> Senior Citizens Advisory Committee    |
| <input type="checkbox"/> Community Multicultural Commission                         | <input type="checkbox"/> Property Standards Board         | <input type="checkbox"/> Unified Building Standards Commission |

\*\* Garland Youth Council has a separate application

### FOR OFFICE USE ONLY

|                        |                                                                     |                                   |                       |
|------------------------|---------------------------------------------------------------------|-----------------------------------|-----------------------|
| Ad Valorem Tax Status  | Current <input checked="" type="checkbox"/>                         | Past Due <input type="checkbox"/> | Date Appointed        |
| Utility Account Status | Current <input checked="" type="checkbox"/>                         | Past Due <input type="checkbox"/> | Appointed By          |
| CSO Suit/Claim Filed   | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> |                                   | Date Notified         |
| Clerk Signature & Date | <i>Courtney Vanover</i><br><i>6.27.22</i>                           |                                   | Disclosure Form Filed |

Revised 05/2021



# GARLAND

TEXAS MADE HERE

**CITY OF GARLAND**  
**RECEIVED**  
JUN 29 2022  
**CITY SECRETARY**

## Application for City of Garland Boards/Commissions/Committees

Return completed application to: City Secretary's Office, 200 North Fifth Street, Garland, Texas 75040

Please Type or Print Clearly:

Date: June 29, 2022

Name: Rich Aubin

Phone: [REDACTED]

Address: 1229 Saturn Springs Dr.

Phone: [REDACTED]

City, State, Zip: Garland TX 75041

Email: [REDACTED]

Resident of Garland for 12 years

Resident of Texas for 30 years

✓ Dallas County Voter Registration Number [REDACTED] Garland City Council District Number 5

Have you ever been convicted of a felony? ☐ Yes ☒ No

Have you ever been convicted of a Class A misdemeanor? ☐ Yes ☒ No

Please list any experience that qualifies you to serve in the areas you have indicated.

Garland City Council, District Five, 2016-2022

If you have previously served on a City Board or Commission, please specify and list dates of service.

None.

List civic or community endeavors with which you have been involved.

City Council; RACES.

What is your educational background?

Boston University School of Law (JD, 1993); Georgetown University (BA, 1989); The Roxbury Latin School

What is your occupational experience?

I have been a practicing attorney for 29 years in civil litigation and appeals, including municipal litigation.

I hereby affirm that all statements herein are true and correct.

Rich E. Aubin Applicant

Board or Commission of first, second, and third choice:

☐ Board of Adjustment

☐ Garland Youth Council \*\*

☐ Parks and Recreation Board

☐ Citizens Environmental and Neighborhood Advisory Committee

☐ Property Standards Board

1 Plan Commission

☐ Community Multicultural Commission

☐ Library Board

☐ Senior Citizens Advisory Committee

☐ Garland Cultural Arts Commission

☐ Unified Building Standards Commission

\*\*Garland Youth Council has a separate application

### FOR OFFICE USE ONLY

Ad Valorem Tax Status  
Utility Account Status

Current ☒  
Current ☒

Past Due ☐  
Past Due ☐

Date Appointed \_\_\_\_\_

Appointed By \_\_\_\_\_

CSO Suit/Claim Filed  
Clerk Signature & Date

Yes ☐ No ☒

Courtney Vanover  
6.29.22

Date Notified \_\_\_\_\_

Disclosure Form Filed \_\_\_\_\_

Revised 03/2018