Threshold Requirement

Impact of storm events and geographic impact and distressed area to meet the threshold requirement

The state of Alabama has been documented as being impacted by the "Worst" tornadoes in United States of America with the state being struck by 25 tornadoes since February 19, 1884. Jefferson County Alabama have endured five (5) or 24% of these deadly tornadoes since 1956, which caused many fatalities and critical injuries.

The county was struck by an EF-4 tornado on April 27, 2011 killing 65 people and injuring over 1,000. On January 23, 2012, an EF-3-2 tornado produced fatalities and injured many citizens. Although out of the time period covered by this grant competition, Jefferson County was also struck by a massive tornado in 2014, which severely injured many persons. All of these storm events caused significant property damage and had a devastating impact on the county's economy.

The Science of Tornados (2015) states:

A tornado is a violently rotating column of air which descends from a thunderstorm to the ground. No other weather phenomenon can match the fury and destruction power of tornadoes. Tornadoes can be strong enough to destroy large buildings, leaving only the bare concrete foundation, or lift 20-ton railroad cars from the tracks. A tornado might not have a visible funnel until it picks up debris from the ground. The strength of a tornado is measured by Enhanced Fujita scale.

Tornadoes form under a certain set of weather conditions in which three very different types of air comes together in a certain way. Near the ground lies a layer of warm and humid air, along with strong south winds. Colder air and strong west or southwest winds lie in the upper atmosphere. Temperatures and moisture differences between the surface and upper levels create what is called instability, a necessary ingredient for tornado formation. The change in wind speed and direction with height is known as wind shear. The wind is linked to eventual development of rotation from which a tornado may form (p. 1-2).

Jefferson County has experienced six (6) deadly tornadoes going back to 1956 and has been struck three (3) years out of the past four (4) years as can be seen below:

Tornado Event	Fatalities	Severe Injuries
1. April 1956	25	200
2. April 1977	22	130
3. April 1998	32	258
4. April 2011	65	1,000
5. April 2012	2	100
Total	**146**	**1,688**

The Jefferson County Commission received $7,847,084.00 in 2012 CDBG-DR funds and $9,142,000.00 in 2013 CDBG-Disaster Recovery funds for a total of $16,989,084.00 relating to the EF-4 April 27, 2011 tornado. During the public hearings held for the disaster funding, a majority of the citizens impacted by the storm considered dual purpose storm shelters to be a significant priority. These impacted citizens have become extremely fearful of these storm events based on fatalities and severe injuries mentioned above.

As can be seen above, the county was impacted by an EF-2 tornado in January 2012, which produced fatalities and severe injuries. Moreover, in April of 2014, Jefferson County was struck by a tornado that injured many citizens and caused major property damage.

The geographic areas of the tornadoes that occurred in 2011 and 12 included the western, eastern and northern portion of Jefferson County (see attached geographic map).

Although the safety that will be provided by the dual purpose storm shelters is a community necessity for safety, housing is also a critical need since lower income persons normally live in older substandard housing.

The Department has received 18 new housing rehabilitation applications from citizens who have received direct damage from the April 27, 2011 tornado **(see housing damage)** and requests for this assistance is continuing to grow. The approved amendment increases the budget the rehabilitation case to $70,000.00 and includes the rehabilitation of the home, a safe room and program delivery. The additional applications, which are documented, to have been damaged by the April 27, 2011 tornado would require an additional $1,260,000.00.

Due the continued request of dual purpose storm shelters and a recent bid that gives the county an indication of future construction bids and professional services fees, we are now in a position to better gage the cost. The total budget for the storm shelter, which is similar in size of other facilities being proposed, is $976,400.00.

It is reasonable to assume that the estimate in our 2012 CDBG-DR project slightly under estimated from the received bid mentioned above and the more accurate amount for the budget would be $881,531.00. Adger storm shelter budget is more likely to come in at $600,000.00. We have received additional storm shelter applications from Fultondale, Vestavia, and Tarrant, which will bring the public facilities budgets up to $5,889,186.00.

There will be additional demolition cost for 25 cases, which are estimated at $5,000.00 per case for a total of $125,000.

We have assisted a beneficiary in purchasing a home that was destroyed by the storm at a price of $80,000.00

The total administration cost is $784,708.00

The total amount of funds needed to implement the projects described above is $8,138,894.00, which is $291,810.00 and would require the county to reduce the housing cases by four (4).

Jefferson County received $9,142,000.00 in additional CDBG-DR funds. As mentioned above, there has been a significant request for dual purpose storm shelters for this allocation of funds due to the increasing number of tornadoes that have struck the county.

Based on the recent bid received on the Warrior storm shelter, the Department feels that $881,531.00 is a good estimate for the remaining storm shelters that have been requested and the previously estimated cost for the facilities should be increased. The Concord and North Smithfield Storm Shelter will need fewer funds since the balance to achieve the amount mentioned above will come from FEMA hazard Mitigation funds.

Jefferson County has received applications two (2) Hueytown, which is a spread out city that need to provide it lower income citizens in the south and north section with a level of protection. The McCalla community also needs a shelter for the protection of these citizens located in unincorporated Jefferson County. In addition, Fultondale, Alabama like several other communities will need an additional shelter for lower income citizens in two (2) sections of the community.

The proposed public facilities projects are $6,991,067.00. The proposed storm drainage project is estimated to cost $1,300,000.00. The additional demolition and clean-up projects total $120,000.00 and the administration budget is $914,200.00. The additional seven (7) housing rehabilitation cases budget is $490,000.00. Program delivery is estimated at $199,061.00. Therefore, the total estimated budget to achieve the projects is $10,014,328.00, which is $872,328.00.00 above our budget and would require the county not to have sufficient funding to address new housing rehabilitation cases.

Comprehensive Risk Approach Analyzing Need for Proposed Program

A comprehensive risk approach used in analyzing the need for the proposed program consisted of historical data that speaks to tornadoes impacting Jefferson County, as well as literature supporting the fact that more extreme weather is predicted in the future.

Furthermore, the analysis of risk consisted of data provided by the Jefferson County Emergency Management Agency (JCEMA), which shows the county has been struck by three (3) major tornados over the last four (4) years, which supports the literature that Jefferson County will in all likelihood continue to experience more extreme weather in the future.

Bases on the lives lost; severe injuries to citizens; personal property lost and negative impact on the local economy, the proposed project will provide the most vulnerable in the Jefferson County with safety, improved quality of life, and economic prosperity.

Historical impacts and forward looking analysis of risk and hazards from peered reviewed information

As previously mentioned, Alabama has been impacted by 25 deadly tornadoes since February 19, 1884. Jefferson County has experienced six (6) tornados been impacted by deadly tornadoes going back to 1956. Below an overview of the tornadoes that have historically Jefferson County:

Tornado Event

1. April 1956
2. April 1977
3. April 1998
4. April 2011
5. April 2012
6. April 2014

The scientific literature speaks of "Tornado Alley" as a summation of tornado prone regions in the country and one (1) of those prone areas has been deemed "Dixie Alley". Doyle Rice (2011) states "According to a new study led by meteorologist Grady Dixon of Mississippi State, residents of the so called Dixie Alley may witness the most tornados, since tornados tend to be on the ground longer in the south (p. 1).

The states normally referred to as "Dixie Alley" include Arkansas, Tennessee, Mississippi, Louisiana, and Alabama. In 2005, Broyles and Crosbie investigated the frequency of long track violent tornados in the America. Researchers (Gagan, Gerald and Gordon, 2010) studied this research and revealed "two of the most prominent tornado alleys were located in central

Mississippi and an area extending from western Tennessee into northern portions of Mississippi and Alabama (p. 147).

Figure 1

The frequency of the tornados striking Jefferson County since the EF-4 tornado on April 27, 2011 is causing great fear from citizens who have experienced these massive storms multiple times. Jefferson County has experienced three (3) tornadoes out of the last four (4) years, which confirms prediction cites previously from scientists about Dixie Alley. Although, the April 2014 tornado is not in Presidential Declaration of this grant competition, it demonstrates the frequency of these type storms. As can be seen in the figure below this was one of the most powerful tornadoes to ever strike Jefferson County.

Figure II

The scientific community is still attempting to determine if there is a correlation of tornadoes and extreme tied to climate change. Joe Romm (2013) in his research states the following:

For decades, scientist have predicted that if we keep pouring increasing amounts of heat-trapping greenhouse gases into the atmosphere, we would change the climate. They specifically predicted that many key aspects of the weather would become more extreme, more heat waves, more intense droughts, and stronger deluges.

As far back as 1995, analysis by NOAA's National Climate Data Center (led by Tom Karl) showed that over the course of the 20th century, the United States had suffered a statistically increase in a variety of extreme weather events, the very ones you expect from global warming, such as more and more intense precipitation. That analysis concluded that chances were only "5 to 10 percent" this increase was due to factors other than global warming, such as "natural climate variability". And since 1995, the climate has gotten measurably more extreme (p. 6).

Based on the scientific data presented above and the frequency of tornadoes impacted Jefferson County over the past four (4) years, it reasonable to assume, the county will experience more frequent tornadoes and extreme weather events in the future.

Evaluation of public and safety impacts; direct and indirect economic impacts, social impacts and impacts that include a quantitative and qualitative measure that recognizes inherent uncertainty in predictive analysis

The tornado activity in Jefferson County has led to a significant amount of persons losing their live, as well as many persons being severely injured. According to Jefferson County EMA, the information below is a summary of the fatalities and injuries caused by tornados striking the county:

Tornado Event	Fatalities	Severe Injuries
6. April 1956	25	200
7. April 1977	22	130
8. April 1998	32	258
9. April 2011	65	1,000
10. April 2012	2	100
Total	**146**	**1,688**

The characteristic of the April 27, 2011 tornado, which killed 65 people and severely injured approximately 1,000 people, is described by the National Weather Service Weather Forecast Office follows:

- Rating: EF-4
- Estimated Maximum: 190 mph
- Injured/Fatalities: 1,500 Injuries/65 Fatalities
- Maximum Path Width 80.68 miles

The January 23, 2012 tornado is described by the National Weather Service Weather forecast Office as follows:

- Rating: EF-3-23
- Estimated Maximum: 150 mph (Center Point) 130 mph (Oak Grove)
- Injured/Fatalities: 76/2 Fatalities
- Maximum Path Width 15.69 miles (Center Point) 0.56 miles (Oak Grove) (p. 1).

The communities impact of the tornadoes mentioned above include:

1. Concord Community
2. Pleasant Gove, Alabama
3. Hueytown, Alabama
4. North Smithfield Manor Community
5. Fultondale Alabama
6. Adger Community
7. McCalla/McAdory Community
8. Warrior, Alabama
9. Vestavia Hills, Alabama
10. Tarrant, Alabama
11. Center Point, Alabama
12. Clay, Alabama
13. Trussville, Alabama
14. Oak Grove Community

Note: Communities 1-10 was impacted by the April 27, 2011 tornado. Ten through 14 are communities impacted by the 2012 tornado.

Economic Impact

The April 27, 2011 tornado as a whole did significant damage to the state of Alabama. Therefore a brief overview of the storm's impact from a state perspective is presented below and will be followed by the economic impact of the storm on Jefferson County. According to Addy and Ijaz (2011):

The state of Alabama was hit by dozens of tornadoes on April 27, 2011 mainly in central and northern parts of the state that resulted in 240 lives lost and more than 2, 200 injured to date. The resulting damage was so severe that 43 of the state's 67 counties have been declared federal disaster areas. Several communities had major damage and a few had almost complete devastation. Nearly 14,000 homes were either totally destroyed or have been declared uninhabitable.

Major assumptions are in the analysis are that:

1. Economic damages only occur in 2011
2. Cleanup and assistance spending will total $1.6 billion ($10 billion for cleanup and $600 million for assistance) and be completed in 2011; assistance will mainly be for accommodations.
3. Rebuilding spending will range from $2.6-4.2 billion with 1.0 billion spent in 2011 and the remainder in 2012 (p.p. 1-2).

Characteristics and location of the larger area

Jefferson County, which is the largest county in the state of Alabama and as demonstrated above, very susceptible to violent tornadoes. The City of Birmingham, Bessemer, and Hoover, Alabama, as well as the areas mentioned in the Jefferson County Consortium have all been devastated by tornadoes.

Information used to identify risk and why the information is considered the best data in the geographic area

The information used to conduct the tornado risk analysis for Jefferson County came from peer reviewed research articles from leading meteorologist publications; Jefferson County's EMA, which is required to conduct an immediate assessment after national disaster, as well as operate within it FEMA Hazard Mitigation Plan, consultation of the National Weather Service Weather Forecast Office, local meteorologist, and a Ph.D. level meteorologist deemed to be subject matter experts on tornados, the Department of Community and Economic Development who serves as the administrator Jefferson County's HUD Entitlement program by information gathered during a variety public hearing for the county's Community Development Block Grant-Disaster Recovery program, public hearings held for this proposed project, and the input from the stakeholders involved in the development Jefferson County's Phase I of the CDBG National Disaster Resiliency proposal.

Overview of the history of the region with Climate Change projections and demographics & development needs as it relates to the risk of the community

The Jefferson County's Local Emergency Management Agency (JCEMA) did an assessment of homes damage by the April 27, 2011 tornado in Jefferson County and identified 4,903 homes were damaged. Of the total homes damaged, 929 homes were totally destroyed and 2,038 home were received major damage with 1,291 of the homes being non-habitable. A breakdown of the homes destroyed and severely damaged from this storm event within the Jefferson County's Consortium is presented below:

Name	Home Destroyed	Homes with Major Damage
1. Concord	61	37
2. Fultondale	24	27
3. McDonald Chapel	28	10
4. North Smithfield	57	28
5. Pleasant Grove	358	202
6. Vestavia Hills	6	48
Total	**534**	**352**

Overview of uninsured and the under-insured and factors affecting individuals and the community decision about purchasing and maintaining insurance will also be addressed.

Insurance Claims - According to the Alabama Department of Insurance, the April 2011 tornadoes were the worst event in State history in terms of insured losses. The State of Alabama does not require insurance companies to report claims paid out by County; however, the Alabama Legislature in the most recent session passed a bill requiring that in two years insurance companies must report claims paid by zip code. Though not helpful at this time, that information will be invaluable in the event of future disasters.

The Insurance Information Institute based in New York said in April 2012 that nationally there was a total of $7.3 billion in insurance payouts from the storms of April 22 – 28 of last year. Alabama had $2.925 billion in insurance claim payouts – about 40% of all claims from the tornadoes. The Institute further stated that the tornadoes also accounted for the overwhelming majority – almost $3 billion of $3.2 billion – of the money Alabama insurers paid out last year to their auto, home and business policyholders for catastrophe losses. According to the Institute, these natural disasters were not only the deadliest but also the costliest in terms of property damage and business interruption.

In its presentation "One Year Later: Update on Claim Payouts to Alabama Policyholders *Insurance and Economic Recovery in the Wake of the April 2011 Tornadoes*" the Insurance Information Institute illustrates the trend in catastrophe losses in Alabama from 1998 – 2011. It states that, "The number of catastrophe losses in Alabama is high relative to the size of the State's economy and population." That graphic is displayed on the following page. The Institute further states that, "Insured catastrophe losses to homes in Alabama are volatile and are trending upward." The average homeowner's catastrophe claim reached a new record of $15,989 in 2011, more than double the average of $6,069 (+163%) from 1998 to 2010 according to the Institute.

Seriousness of the Risk

As can be seen in the data and information presented above tornados are a significant risk for Jefferson County Alabama. The county experienced three (3) significant tornadoes that killed and severely injured many persons, as well as caused significant damage to the local economy.

The frequency of tornadoes since the April 27, 2011 EF-4 tornado killed and severely injured many persons and caused a significant negative impact on Jefferson County's economy. We are now seeing tornado activity on a frequent basis, with storm event nine (9) months after the massive 2011 tornado on January 23, 2102 and another tornado in 2014, which is outside the year eligible for this grant competition. All of the tornadoes took live and severely injured the county's citizens.

Based on the frequency of tornados striking Jefferson County over the last few years, it is reasonable to forecast that more tornados will probably hit the county in the future.

Overview of how the risk of tornadoes impact the vulnerable or protected class of the community along with how the proposed project will be helped by the community recovers effort.

Low and moderate income persons and senior citizens are the vulnerable class of citizens in the Jefferson County HUD Entitlement Consortium. These citizens normally live in housing that is not in standard condition as defined by the International Building Code. Moreover, in many cases, these citizens don't have the financial resources to maintain their housing so they don't fall into substandard condition.

Based on the projection that the county will continue to be struck by EF-2 and larger tornadoes, these vulnerable citizens will be a greater risk of severe injury or even death since their homes are least able to withstand the high winds.

Overview of how the vulnerable of the community is disproportionately impacted by tornadoes and how the proposed project will create economic revitalization through resiliency to improve the vulnerable citizen's quality of life

The vulnerable of the community that were disproportionately impacted by the April 27, 2011 tornado are lower income persons who typically live on substandard housing. Although no home would be safe from the direct strike of an EF-4 tornado, tornadoes with less wind would negatively impact homes of lower income persons.

The proposed project is designed to create economic revitalization for the vulnerable of the community. The proposed sustainable community will have access to broadband, which will allow for Internet Access in a proposed resource room in the community. The technology will allow the residents to access to a variety services that will lead to job opportunities.

First, the Department of Community and Economic Development oversees the WIA Workforce Development program that provides core, intensive training services to job seekers. Should the eligible client qualify for training service, the program will provide a one (1) time grant up to $13,000.00 for training in a high demand field.

The program is now transitioning to Workforce Innovation Opportunity Act or WIOA, which will require the staff to work with major employers to determine their employment training need, as well as learn about potential job openings.

The county will be in a position train the clients potential and have the opportunity to know where available jobs exist. The credential or license is received through the county's Workforce development job.

These opportunities will be available via Internet and county employee will visit the site to speak about training and job opportunities.

In addition, the county has partnered with the Innovation Depot, which oversees the business incubator program. The Director of the program will also share with the county job opportunities.

The county will also offer the citizens job readiness seminars where we will invite professionals in Human Resources to come and speak to the residents on topics such as how to dress on an interview, how to dress on the job, how to interact with other employees, and getting to work on time, etc.

Jefferson County's

Existing conditions that exacerbate vulnerabilities for protected classes

Overview of action taken to address risk from tornadoes that impact the vulnerable of the community