

Exhibit/ Attachment	Phase 2	Document/Filename	Page(s)
Exhibit A	Crosswalk Checklist/Table of Contents	moore2atta.pdf	i–iii
Exhibit A	Executive Summary	moore2exhibita.pdf	1–4
Exhibit B	Threshold Narrative	moore2exhibitb.pdf	5–8
Exhibit B	General Section	moore2exhibitb.pdf	5–8
Exhibit B	Eligible Applicant	moore2exhibitb.pdf	5
Exhibit B	Eligible County	moore2exhibitb.pdf	5
Exhibit B	Most Impacted and Distressed Target Area	moore2exhibitb.pdf	5–6
Exhibit B	Eligible Activity	moore2exhibitb.pdf	6
Exhibit B	Proposal Incorporates Resilience	moore2exhibitb.pdf	6–7
Exhibit B	National Objective	moore2exhibitb.pdf	7
Exhibit B	Overall Benefit	moore2exhibitb.pdf	7
Exhibit B	Tie-back	moore2exhibitb.pdf	7–8
Exhibit B	One application per Applicant	moore2exhibitb.pdf	5
Exhibit B	Certifications	moore2exhibitb.pdf	8
Exhibit C	Factor 1 – Capacity	moore2exhibitc.pdf	9–37
Exhibit C	Subfactor: Past experience	moore2exhibitc.pdf	11–33

Exhibit/ Attachment	Phase 2	Document/Filename	Page(s)
Exhibit C	Subfactor: Management structure	moore2exhibitc.pdf	30–36
Exhibit D	Factor 2 – Need	moore2exhibitd.pdf	38–57
Exhibit D	Subfactor: Target area/unmet needs	moore2exhibitd.pdf	38–49
Exhibit D	Subfactor: Resilience need	moore2exhibitd.pdf	50–54
Exhibit D	Subfactor: Best actions	moore2exhibitd.pdf	54–57
Exhibit E	Factor 3 – Soundness of Approach	moore2exhibite.pdf	58–83
Exhibit E	Subfactor: Project/frame correspond	moore2exhibite.pdf	60–77
Exhibit E	Subfactor: Increases resilience	moore2exhibite.pdf	58–77
Exhibit E	Subfactor: Model/replicable/holistic	moore2exhibite.pdf	78–79
Exhibit E	Subfactor: Schedule	moore2exhibite.pdf	79–80
Exhibit E	Subfactor: Budget	moore2exhibite.pdf	80–82
Exhibit E	Subfactor: Plan consistency	moore2exhibite.pdf	82–83
Exhibit F	Factor 4 – Leverage	moore2exhibitf.pdf	84–85
Exhibit G	Factor 5 – Long-Term Commitment	moore2exhibitg.pdf	86–90

Exhibit/ Attachment	Phase 2	Document/File name	Page(s)
Attachment A	Partner Documentation for Each Partner	moore2atta.pdf	1–43
Attachment B	Leverage Documentation	moore2attb.pdf	1–15
Attachment D	Consultation Summary	moore2attd.pdf	1–7
Attachment E	Optional Maps, Drawings, Renderings	moore2atte.pdf	3–28
Attachment G	Waiver Requests	moore2attg.pdf	1–5
Attachment F	Benefit-Cost Analysis	moore2attf.pdf	1–79
Exhibit A	Crosswalk Checklist	moore2exhibita.pdf	i–iii
Attachment C	SF-424	moore2attc.pdf	1–4
Attachment B	Sources and Uses of Funds	moore2attb.pdf	15
Attachment D	Comment Summary by Topic, List of Comments, and Applicant Response	moore2attd.pdf	1–7

Exhibit A:

Executive Summary

City of Moore, OK

Filename: moore2exhibita.pdf



The City of Moore, Oklahoma (City), is committed to building a more resilient community by working with our major partners—The City of Oklahoma City (OKC) and the University of Oklahoma (OU)—to engage all of our stakeholders, particularly our most vulnerable populations, to understand their needs, and to implement innovative and science-based solutions that will increase our resiliency and allow our regional community to bounce back quickly from future disasters. Our current needs stem from the devastating May 2013 F5 tornado that cleared a path of destruction 17.5 miles long and up to 1.3 miles wide through the City from west to east. The tornado destroyed more than 1,000 single-family homes, 94 duplexes, 53 mobile homes, and affected two apartment complexes. It caused more than \$2 billion in housing, economic, public facility, and infrastructure losses—\$142 million of which remains an unmet need. This disaster underscored our community’s continuing vulnerability to severe thunderstorms and accompanying tornadoes. The damage to our water lines also exposed weaknesses in the water infrastructure that must be addressed if the City and region hope to thrive in a geographic area that is already prone to tornadoes and drought.

The City resides at the nexus of powerful climate change dynamics that produce constant vulnerability from tornadoes, droughts, and earthquakes. Few other cities in the United States face such recurring threats from multiple hazards. Since 1893, the City has received a direct hit from tornadoes on 16 different occasions. Even more troubling, the frequency of occurrence for the most severe tornadoes is increasing. Of the *six* tornadoes that have hit the City since 1999, four have been at the F4 or F5 level. This alarming trend is likely to continue. [Elsner \(2014\)](#) found that more tornadoes occur on the same day and that the number of days with multiple tornadoes has been increasing. Elsner states, “The risk of big tornado days featuring densely concentrated tornado outbreaks is on the rise.” This trend indicates that the City and other



communities in tornado-prone areas are facing the increasing risk of days with large tornado outbreaks. In addition, the recent drought in Oklahoma is, according to data from the National Oceanic and Atmospheric Administration (NOAA), the worst since 1956, and its effects conjure up memories of the legacy of the 1930s Dust Bowl. Drought trends (See [Figure 7 in Attachment E](#)) indicate that issues of water insecurity exacerbated by the tornadoes will be an ongoing concern in the region for decades to come.

To build a stronger, safer Moore, we propose an integrated evidence-based approach designed to create a broad culture of resiliency. We seek to reduce our vulnerability to recurring hazards in a holistic fashion by building the necessary resilience to allow us to anticipate, absorb, adapt to, and recover from future catastrophic events. Within the context of our current recovery needs, our focus is four integrated projects that can be accomplished with the help of our partners and \$84 million in grant funds applied for through the National Disaster Resilience Competition (NDRC). Our proposed projects are as follows: 1) upgrading the Lake Stanley Draper Water Treatment Plant (DWTP), 2) installing residential smart meters, 3) developing regional resiliency impact strategies, and 4) building a resiliency center to serve as a hub for promoting those strategies through public outreach and community education.

Through these four projects, we will improve the resilience of our water infrastructure; improve the resilience of our human infrastructure through education about hazards and innovative resilience strategies; engage our vulnerable populations (e.g., seniors, disabled, low income, linguistically isolated) to ensure that we understand their resiliency needs; and improve the efficiency of our region's water usage, thus conserving our most precious physical resource.

The first two projects directly address unmet needs from the 2013 tornado. Led by OKC, **DWTP Upgrades** will provide immediate conservation resiliency to the region by reducing



leakage linked to the Qualifying Disaster and by hardening (strengthening) a critical piece of the water system's infrastructure. The project will construct four new clear wells and upgrade the necessary infrastructure for the water treatment and delivery system.

The **Smart Meter** infrastructure project will also address damage to the water distribution system by replacing approximately 25,000 water meters in the City with remotely controllable meters. The City will be able to detect leakage meter by meter and shut down specific meters in the event of a future disaster so that water can be made available where it is needed most. The meters will also permit customers to monitor their own usage, which, when coupled with community education, will encourage water conservation. Water conservation efforts by Moore will benefit the entire region, which is interconnected by a limited and shared water supply.

The second two projects focus on the science-based and forward-looking risk analyses that inform future resilience strategies and provide a mechanism for sharing those strategies with the community. **Regional Resiliency Impacts (RRI)** is a small region climate assessment that will use science and innovation to address our specific regional climate and hazard vulnerabilities. The RRI will be developed by OU and its partners to understand fully the interactions and feedback between the climate system and vulnerable populations in the 600-square-mile region defined by the membership of the Association of Central Oklahoma Governments (ACOG). This project will use data from the smart meters and DWTP to help answer research questions such as, "How do residents and their communities respond to decreases in water supply resulting from drought conditions?" and "What initiatives can successfully reduce water consumption while maintaining local governance and leadership?" Once sufficient data has been accumulated, OU will pilot a web-based, decision-support portal to help communities formulate adaptive resilience measures that most effectively address their challenges.



Finally, the **Resiliency Center** is our core effort to build a culture of resiliency in the region. The Center will serve as a model for water- and tornado-resilient construction and drought-resistant landscaping methods while also serving as a community space for outreach and educational classes. It will also serve as a public library—an information source trusted by the public and a critical component to effective targeting and outreach to vulnerable populations. The Center will work with OU, Moore public schools, and others in the region to establish a water and tornado resiliency curriculum for student and adult learners. The Center will also share data collected on the effectiveness of the outreach and educational efforts with the research community—thus informing future resiliency strategies. See [Figures 18–20 in Attachment E](#).

Replacing a Cycle of Disaster and Recovery

We live in a region stressed by ongoing drought conditions and an increasing demand for water. We survived an F5 tornado that caused \$2 billion losses including damage to the water system infrastructure. Studies inform us that drought conditions and tornadoes are likely to cause a repetitive cycle of loss in the decades to come. We could accept this future, knowing that many families and businesses will likely choose to live in a milder environment, and take pride in the fact that residents who remain are tough and capable. Instead, we have engaged our community to develop solutions that address both the infrastructure damage and a way to leverage the strengths of our scientific community to replace the cycle of disaster and recovery with a cycle of continuous improvement and improved resiliency. Future events will provide data to refine our strategies and help us create innovative new solutions. The ripple effect of increasing hazard and resiliency awareness coupled with regionally-scaled science will lead to economic and social benefits—benefits that will make Moore an attractive and safe place to live and raise a family.