

Cook County, Illinois
HUD National Disaster Resilience Competition

PHASE I SUBMISSION

March 27, 2015

Exhibit A – Executive Summary

Cook County is part of the Northeastern Illinois Resilience Partnership's (the Partnership) unprecedented regional effort to build resilience. This multi-jurisdictional, bipartisan Partnership - led by Cook County, City of Chicago, DuPage County, and the State of Illinois in coordination with the Chicago Metropolitan Agency for Planning (CMAP) - formed in response to the severe, repetitive, and chronic effects of flooding. National resilience is largely dependent on the resilience of northeastern Illinois, located between the Great Lakes and Mississippi River watersheds, and steward of 84% of the country's freshwater. The region's strengths are its geography and natural assets, and it is uniquely poised to bridge the divide across watersheds and lead a new water culture, starting with local resilience-building. While the region does not have well-known mega-storms, even small storms pose significant risk and there is a growing frequency of high volume events, resulting in flooding and polluted runoff. The resulting economic, environmental, and social toll of this flooding and other hazards stems from vulnerabilities across social, natural, and built systems and disproportionately impacts low- and moderate income communities and vulnerable households who have less capacity to financially and administratively contend with such disasters.

Cook County is at the heart of the Chicago metropolitan region, comprising more than half of its population, jobs, and businesses. It is the second most populous county in the U.S., a regional and national transit hub, and anchors the nation's third largest metropolitan economy with 2.6 million jobs and \$308 billion in annual output.¹ Despite its many assets, the County also has a disproportionate share of vulnerabilities, regionally and nationally. Industrial decline and shrinking job opportunities coupled with the foreclosure crisis in recent years have contributed to the increasing suburbanization of poverty, particularly in south suburban Cook County.² The County has also experienced multiple

¹ <http://blog.cookcountyil.gov/economicdevelopment/wp-content/uploads/2014/10/Appendix-B-Partnering-for-Prosperity.pdf>

² <http://confrontingsuburbanpoverty.org/the-communities/south-cook-co-chicago/>

hazard events over the last few decades and currently leads the nation in disaster fatalities.³ Given the confluence of these challenges and opportunities, Cook County is well positioned to drive and implement resilience within its suburban communities, starting with a south suburban pilot area, and contribute to regionwide resilience efforts in a way that builds upon existing partnerships and enhances current planning and programming initiatives. The County’s approach is to focus on building the capacity for resilience: the physical capacity, individual capacity, and governmental capacity.

The Partnership brings together a diverse network of public, non-profit, and private partners to develop detailed resilience plans for most impacted and distressed communities that address three types of flooding - overbank, overland, and urban/basement. Each plan will be informed by extensive community engagement designed to deeply understand how flooding impacts residents and businesses; determine where underlying vulnerabilities lie; and identify priority interventions that build resilience at community scale. Cook County, and the broader Partnership, will develop and implement a regional resilience framework that maintains and improves the quality of life by minimizing exposure, reducing sensitivity, and increasing the built, natural, and social systems adaptive capacity to current and future hazards, stressors, and shocks. The Partnership will also expand the scope beyond flooding to encompass an “all-hazards” approach to resilience that addresses extreme heat, drought, economic competitiveness, and ecological and social vulnerability. Related data-driven, systemic solutions will deliver multiple benefits in an innovative and cost effective manner; effectively engage local stakeholders and the public including vulnerable populations; and create lasting benefits. Successful interventions will be replicated throughout the region and over time, local communities will forge a new, healthy, empowered relationship with water.

³ Spatial Hazards Events and Losses Database for the U.S. -- <http://hvri.geog.sc.edu/SHELDUS/>

Exhibit B – Threshold Requirements

B.1. General Section

In May 2013, Cook County received a Disaster Declaration due to flooding from severe storms (DR-4116). HUD determined all of Cook County to be most impacted and distressed. This series of storms, overwhelmed the County's stormwater system, resulting in widespread flooding and inundation of over 30,000 basements. FEMA Verified Loss totaled \$62.7 million. Of nearly 34,000 FEMA inspected households, 35% had income less than \$30,000; 19% were over the age of 60; and 6% had flood insurance coverage. As an indication of the magnitude of flooding, 6,675 households had high water on the first floor of their residence (20%), and 304 had basement flooding in excess of 4 feet. While the County has obtained \$130.5 million in direct funding and other resources, unmet housing need totals \$904.6 million and affects an estimated 25,768 units. Unmet infrastructure needs also remain.

B.2 Eligible Applicant

Cook County was identified by HUD as eligible for the CDBG-NDR Competition.

B.3. Eligible County

Cook County, the area primarily benefitting from the proposed CDBG-NDR assisted activities, experienced flooding from severe storms in 2013 resulting in a Presidentially-declared major disaster declaration (DR-4116) under the Stafford Act (PL-113).

B.4. Most Impacted and Distressed Target Area

In response to DR-4116, all of Cook County was determined by HUD to be most impacted and most distressed. It has Unmet Recovery Needs, or those that have not been addressed by Federal, State, or other sources, and remains most impacted and distressed as outlined below. Note: all data provided is for suburban Cook County only and is not inclusive of the City of Chicago.

Unmet Housing Need: FEMA and SBA assistance, National Flood Insurance Program (NFIP) payouts, and CDBG-DR funds are inadequate for addressing repair needs, and per HUD guidance, the County doesn't currently run a qualifying housing recovery program. Table 1 summarizes Cook

County’s total housing recovery need, funding sources, and unmet need for DR-4116. Unmet need totals \$904,624,696, equal to 25,768 households, that will not be served by existing programs due to inadequate funding.

TABLE 1 – Unmet Recovery Needs Threshold Calculation		
Recovery Need		
FEMA Verified Loss	\$62,788,506	33,940 units
[times 10] Housing Impact Multiplier	\$627,885,060	
[add \$12,000 per unit] Cost of Resilient Measures	\$407,280,000	
Total Recovery Need	\$1,035,165,060	
Funding Sources		
FEMA Individual & Household Assistance ⁴	\$40,781,653	17,597 units
National Flood Insurance Program	\$37,064,011	1,800 units
Cook County CDBG-DR	\$27,000,000	
SBA Disaster Assistance Loan Program – Housing	\$25,694,700	1,112 units
Total Funding	\$130,540,364	
Total Unmet Recovery Need	\$904,624,696	25,768 units⁵

Total documented FEMA Verified Loss for DR-4116 in Cook County was \$62,788,506. A housing impact multiplier is applied to the FEMA Verified Loss to capture damage that may not have been identified during the FEMA inspection process and account for those who didn’t apply for or were denied assistance. The multiplier is based on the average value of the SBA award divided by the

⁴ Includes owner-occupied real property and personal property in rental units; personal property is a proxy for real property since rental housing is not inspected by FEMA for unit damage.

⁵ Assumes per unit repair cost of \$35,106 (average value of SBA award plus cost of resilient measures).

average value of the FEMA Housing Assistance award. As Table 2 illustrates, this yields a housing impact multiplier of 10.0.

Table 2 – Housing Impact Multiplier			
	Total \$	Units	Average
SBA Assistance	\$25,694,700	1,112	\$23,106
FEMA Housing Assistance	\$40,781,653	17,597	\$2,318
Multiplier	10.0	Housing Impact	\$627,885,060

An additional per home cost of \$12,000 is added for each FEMA inspected household for a total of \$407,280,000 to reflect costs of resilient measures not completed as part of standard repairs.

Funding sources to assist with housing recovery include the County’s CDBG-DR housing program which will allocate \$27,000,000 for this purpose and is still being established. Additional sources include FEMA, SBA, and NFIP. To date, Cook County has identified and pursued the award of \$130,540,364 in recovery-related resources.

Cook County has determined that more than 20 homes are still damaged from DR-4116. A windshield survey of 29 randomly selected census blocks was conducted in March, 2015 in the communities of Blue Island and Calumet City, areas known to have significant flood damage based on FEMA Verified Loss data. In total, 159 homes were surveyed, of which 58 had flood-related damage. Subsequent resident surveys confirmed that 17 housing units with damage have unmet need resulting from DR-4116.

Infrastructure: While significant infrastructure damage occurred, Cook County didn’t meet the FEMA Public Assistance (PA) threshold, lacked a Hazard Mitigation Plan then, and was denied assistance. A FEMA estimate of eligible PA, excluding categories A and B, exceeded \$2.1 million for DR-4116, yet no funding was provided. For example, the Lyons Levee crest was overtopped

during the qualifying 2013 flood event. Implementation of recent temporary flood protection improvements raised the levee crest to elevation 602.0 in 2014, approximately 0.3 feet higher than previous in the areas where overtopping occurred. In order to repair the levee more resiliently, MWRD estimates a cost of \$6.5 million to raise the levee to provide flood protection for events up to the 100-year flood. Regarding sources and uses, a specific MWRD contract has not yet been finalized and approved for funding, Cook County expects to provide no more than \$2 million in CDBG-DR resources to the project, and no other sources of funding have been identified for this project. Therefore, an unmet need of \$4.5 million exists to repair this damaged infrastructure.

B.5. Eligible Activity

Cook County will ensure that all Phase II activities achieve specific disaster-related purposes, as defined by HUD and directly relate to disaster relief, long-term recovery, restoration of infrastructure and housing, and economic revitalization in most impacted and most distressed areas.

B.6. Resilience Incorporated

Cook County has demonstrated its commitment to resilience via its plan to design, test, and scale a model approach to disaster resiliency. Potential activities, including private property retrofits, restoration of ecosystems, and public infrastructure investments, will improve the County's resilience to current and future threats and hazards, including climate change. To support long-term resilience, Cook County commits to promote enrollment in the Community Rating System (CRS); adopt a cumulative substantial improvement and substantial damage threshold; and evaluate ways to incorporate resilience measures in future public facilities, infrastructure, and roadway projects.

B.7. Meet a National Objective

Cook County will ensure that all selected Phase II activities meet a national objective to benefit low- and moderate-income persons, aid in the prevention or elimination of blight, and/or meet urgent community development needs.

B.8 Overall Benefit

Using a comprehensive risk approach, Cook County selected a pilot area, described in Exhibit D, p. 21, to be used in the design and testing of a model approach to disaster resiliency that will provide successful examples and can be taken to scale across the County. The County will prioritize investments in the pilot area, which is comprised of 57% low- and moderate-income households. At least 50% of the funds requested in this application will benefit low- and moderate-income households.

B.9 Establish Tie-Back

Cook County's proposed activities and investments to reduce flooding risk and increase resilience directly tie back to DR-4116. Funds will be expended in suburban areas that experienced flooding following DR-4116, leading to unmet recovery needs in housing and infrastructure.

B.10 One Application per Applicant

This application from Cook County is part of the Northeastern Illinois Resilience Partnership's regional effort to build resilience. While Cook County is participating in this regional effort, the County (as well as the three other eligible government applicants in the Partnership) is applying individually for its own jurisdiction.

B.11 Certifications

Please see Attachment C - CDBG-NDR Certifications for all required certifications.

Exhibit C - Capacity

C.1 General Management Capacity

The Cook County Department of Planning and Development (DPD), whose mission is to develop and sustain viable communities, can drive and implement resilience within the County and contribute to regionwide resilience efforts in a way that builds upon existing partnerships and enhances current planning and programming initiatives. DPD effectively administers its Federal funds in a timely and compliant manner and has become a model HUD grantee in the region. DPD has historically managed over \$530 million in Federal funding from the U.S. Department of Housing and Urban Development (HUD) including annual entitlement CDBG, HOME, and ESG allocations as well as singular resources such as NSP, HPRP, Section 108 Loan Guarantee, and CDBG-R. Recently, DPD was awarded \$83.6 million in CDBG-DR funds to address impacts from 2013 flooding. To guide its investments, DPD recently completed an innovative and collaborative strategic planning initiative, *Planning for Progress*,⁶⁷ in partnership with CMAP. Encompassing the City of Chicago, over 130 suburban municipalities, and unincorporated areas, this process incorporated an extensive and multi-faceted outreach and engagement strategy spanning 15 months. *Planning for Progress* resulted in a combined Consolidated Plan and Comprehensive Economic Development Strategy to guide investments and partnerships around housing, community, and economic development. It promotes resilience, particularly for benefit to low- and moderate-income and vulnerable populations, and aligns County resources, including Federal funds, for expanded community impact.

Through *Planning for Progress* and continuing with this resilience effort, DPD has engaged County agencies with relevant expertise to align efforts and foster new collaborations aimed at making the County more resilient. An interagency team has met weekly while developing this application and will continue to do so. This application is led by DPD's Deputy Directors of Community Development and

⁶ <http://www.cmap.illinois.gov/programs-and-resources/ita/cook-county>

⁷ <http://blog.cookcountyil.gov/economicdevelopment/planning-for-progress/>

Housing, and *the application is written by DPD staff with informational support from other partners.*

Based on its track record with HUD funding, DPD is well suited to administer CDBG-NDR funds on behalf of the County and has the legal authority and capacity to competitively procure vendors for program design and implementation.

A critical partner is the Metropolitan Water Reclamation District of Greater Chicago (MWRD), the County's stormwater management agency, which regulates development through its regional watershed management ordinance. MWRD's protects the health and safety of the residents and the quality of the water supply source, improves the quality of water in watercourses, protects businesses and homes from flood damages, and manages water as a vital resource. Additional partners with expertise and support bolstering local capacity include the Cook County Forest Preserve District, Departments of Public Health, Transportation and Highways (DOTH), Environmental Control (DEC), Homeland Security and Emergency Management (DHSEM), Chicago Cook Workforce Partnership, Cook County and South Suburban Land Bank Authorities, Housing Authority of Cook County, Center for Neighborhood Technology (CNT), and the U.S. Army Corps of Engineers (USACE).

C.2 Cross-Disciplinary Technical Capacity

The Partnership enables cross-disciplinary technical capacity across the region. Given the range of partners and their sector expertise, the capacity will still be retained if an individual partner reduces their participation. Various workgroups, convening subject matter experts, further enhance capacity. Please see Exhibit E for details.

Comprehensive Planning: The four regional applicants - Cook County, the City of Chicago, DuPage County and the State of Illinois (the Applicants) - have extensive experience developing and implementing comprehensive plans and complex programs. CMAP developed GO TO 2040, adopted in 2010 as the region's comprehensive plan for land use, transportation, and economic development

assistance to 280+ northeastern Illinois communities.⁸ Cook County's *Planning for Progress* further demonstrates this capacity. DHSEM recently completed the first-ever Cook County Hazard Mitigation Plan (HMP) - the largest multi-jurisdictional all hazards mitigation plan in the U.S. - which identifies cost-effective actions for risk reduction; focuses resources on the greatest risks and vulnerabilities; builds partnerships; increases awareness of hazards and risk; communicates priorities; and aligns risk reduction with community objectives. MWRD is also piloting stormwater master plans in five Cook County communities, including one within the pilot area, that identify green and gray solutions to mitigate flooding and provide guidance on how communities can re-imagine urban drainage. The Forest Preserves District of Cook County recently launched their Next Century Conservation Plan and DOTD is developing a Long Range Transportation Plan.

Data and Science-Based Analysis: Partners and leading research institutions in the region - Argonne National Laboratory, Illinois State Water Survey, and Midwestern Regional Climate Center - have experience collecting and analyzing climate data, including modeling and downscaling, and have conveyed the input of potential future conditions to the Partnership. CMAP, the repository for regional datasets, facilitates access to science-based information. CNT has a nationally recognized data analysis team (responsible for developing HUD's Location Affordability Index) with the expertise to integrate transport and housing data with landscape permeability, remote sensors, and weather forecasting.

Community Development & Housing: DPD continues to strategically plan for and administer related significant Federal funding. The Chicago Area Fair Housing Alliance and CMAP analyzed regional disparities through a Fair Housing Equity Assessment for HUD. CNT brings knowledge of community-based flood resiliency through their RainReady initiative, helping communities upgrade properties and public rights-of-way to mitigate flooding.

⁸ <http://www.cmap.illinois.gov/about/2040>

Design, Engineering, and Maintenance: The Applicants all plan, design, and maintain components of the region's built environment, including buildings, streets, sewers, and green stormwater infrastructure. In coordination with private design and engineering consultants, the Partnership has the technical capacity to formulate and refine proposed physical interventions to reduce hazard exposure and build resilience. MWRD utilizes a traditional benefit-to-cost analysis (i.e. using USACE methodology and flood depth-damage curves) and also a cost per benefitting structure to assess project feasibility which would also be applied to CDBG-NDR projects. Design, engineering, and maintenance services would be procured by DPD as applicable. In conjunction with the Partnership, DPD will participate in a series of open-source design studios that will solicit the input and ideas of the community of world-class design firms located in the region. These studios will be designed with the assistance and input of the Illinois Chapter of the U.S. Green Building Council and Rebuild By Design.

Technology and Product Innovation: Cook County is a hub of creative technological and design innovation, such as Design for America, an award-winning nationwide network of interdisciplinary student teams and community members using design for local, social impact. UI Labs is a Chicago-based research and commercialization collaborative uniting universities, industry, and government to define problems, develop partnerships, and deliver scalable solutions. CNT is another innovation center, having designed tools funded and promoted nationally by EPA, including Green Infrastructure Portfolio Standard, Value of Green Infrastructure Guide, and Green Values.

Environment: Several partners are focused on enhancing environmental quality, including land managers involved in active restoration and research, advocacy organizations promoting institutional and behavioral changes, and state and county regulators who safeguard natural resources. Forest Preserve Districts across the region manage over 180,000 acres of open space (a significant portion of which is within the regulatory floodplain in Cook County) that absorbs rainfall and cushions adjacent municipalities from overbank flooding. Chicago Wilderness (CW), a 300+ member coalition,

developed the Green Infrastructure Vision to identify priority landscape conservation areas and their resulting ecosystem services. The Natural Resources Defense Council (NRDC) are experts on public policies related to stormwater, water quality, and resilience. Locally, the DEC is responsible for County environmental regulatory functions and sustainability and has managed \$14.5 million in Federal funding related to air quality, pollution, asbestos, energy efficiency, solar energy, and brownfields programming. MWRD manages a Green Infrastructure Program supporting projects with the greatest potential to reduce flooding and/or basement backups. Potential projects are vetted based on the number of structures to benefit, cost per gallon infiltrated, visibility of the location, and the area's socioeconomic characteristics. The Calumet Stormwater Collaborative (CSC), which focuses on stormwater management in the Calumet watershed in south Cook County, has engaged multi-jurisdictional resiliency stakeholders in integrating downscaled climate data into infrastructure design and investments as well as implementing site-specific green infrastructure projects. The County has been an active CSC participant and wants to foster capacity-building initiatives like the CSC. DPD's south suburban pilot area (see Exhibit D) specifically builds on the work of the CSC.

Civic and Philanthropic: The Metropolitan Planning Council (MPC), CNT, Delta Institute, and Foresight Design Initiative excel in coalition-building and community engagement; they convened consultation working groups and assisted Applicants' public outreach. The Chicago Community Trust, Grand Victoria Foundation, and other funders have provided feedback and resources on how to strategically advance the region's capacity to prepare for a range of hazards.

C.3 Community Engagement

DPD effectively engaged stakeholders and the public through *Planning for Progress*, its strategic planning initiative spanning 15 months. An array of outreach methods were deployed including 20+ formal presentations, 3 interactive sub-regional workshops, web-based surveys, 30+ focus groups, and 4 open house events resulting in input from over 2,000 participants regarding local needs, resources,

and opportunities for affordable housing, community, and economic development. Additionally, DPD regularly solicits input regarding program design and operations through annual strategic plans and performance reports. In relation to specific flood impacts and recovery needs, DPD solicited input from municipalities and social service providers in developing its CDBG-DR action plan. All DPD outreach efforts comply with the County's Citizen Participation Plan, updated and adopted in 2012, and ensure sufficient advance notice via newspaper publication, website posting, and electronic email blast of public review/comment opportunities including public hearings. DPD regularly makes presentations and announces initiatives and related input opportunities to local stakeholder groups and commissions. Since DPD's programs largely target low- and moderate-income and other vulnerable populations, DPD coordinates with stakeholder agencies serving these groups. Contingent on local needs, meeting notices, surveys, and summaries are made available in both English and Spanish. Additionally, individuals with disabilities or limited English proficiency are able to request special accommodations. DPD's Economic Development Advisory Committee meets bi-monthly and offers opportunity for public comment.

Other Partners also have a strong track record for community engagement. DHSEM engaged 155 public and private partners and over 1,800 residents in developing the HMP. Through its pilot stormwater plans and other programs, MWRD focuses on education in target communities, engages neighborhood institutions, and establishes public/private partnerships. CNT deploys a grassroots, community-based strategy that helps residents organize around flood resiliency and takes them through a structured process of awareness, education, involvement, and collaboration. Engagement methods include flyer distribution, resident training for rainfall measurement, walking tours, home upgrade block parties, storytelling, and public space rapid transformation pop-up events.

DPD and its partners are well-versed in best practices to solicit and synthesize input from a wide array of stakeholders and members of the public, particularly when they represent competing interests.

DPD is employing similar outreach and engagement modalities specific to resilience with an emphasis on households, institutions, and communities most affected by DR-4116, and most importantly, more likely to be impacted by and vulnerable to future threats and hazards including those resulting from climate change. This outreach is creating and empowering formal and informal leaders on stormwater management and broader resilience topics. For example, CNT supports multiple resident action groups active in promoting flood mitigation and resilience. Outreach has already begun under this application as detailed in Exhibit E, has been incorporated in the conceptual strategy under Phase 1 and lays the groundwork for continuing outreach that sustains awareness, involvement, and implementation of resiliency efforts through Phase II.

C.4 Regional Capacity

Cook County has achieved national recognition for effective collaboration and coordination with public agencies regionally. President Toni Preckwinkle initiated and regularly convenes County leaders throughout the region to share information and resources. DPD also led a successful regional effort to apply to the Federal Economic Development Administration for an Investing in Manufacturing Communities Partnership designation.

The Northeastern Illinois Resilience Partnership will serve as the regional coordinator of resiliency activities. A regional approach is particularly appropriate for addressing shared threats and risks, such as flooding and climate change, and ensures that local actions to mitigate flooding don't exacerbate downstream problems. Carrying out pilot and regional activities under the umbrella of the Partnership will lay a foundation for strategic implementation of resiliency planning. The Partnership taps into the expertise and capacity of existing organizations, many of which have regional or multi-government capacity, to focus on resilience to flooding. The Partnership will also expand the scope to encompass an "all-hazards" approach to resilience that addresses extreme heat, drought, economic competitiveness, and ecological and social vulnerability.

CMAP has extensive experience connecting local implementation to regional change, as well as building broad-based coalitions to tackle cross-cutting issues, particularly through GO TO 2040. Implementing GO TO 2040, CMAP created a local technical assistance (LTA) program to provide planning support at no cost to local communities that aligns local decision-making with regional priorities. Initially funded through a \$4.25 million HUD Sustainable Communities Regional Planning grant, LTA's effectiveness led it to become a permanent program. Cook County will be using its CDBG-DR funding to support a focus on stormwater management and resilience in the LTA program over the next several years. CMAP produced a Climate Adaption Guidebook for municipalities, which was recently highlighted by HUD as a key outcome of the Sustainable Communities Initiative.

Like flooding, complex social vulnerabilities cross jurisdictional boundaries and are best addressed through regional coordination. Factors that contribute to social vulnerability – access to transportation, affordable housing, and/or economic opportunities, age, veteran status, social isolation, and poverty - manifest differently in localities, but are regionally interconnected. The Partnership's framework allows Applicants to relate local vulnerabilities in their pilot areas to the larger economic, ecological, and infrastructural systems that support the entire region. For instance, local resiliency planning can provide project-specific workforce opportunities for the neighborhood, but those activities will be connected to regional efforts to develop workforce training programs and create market demand for green infrastructure, among other initiatives. This will allow solutions to benefit vulnerable populations in the pilot areas and regionally. While DPD will be responsible for complying with HUD grant requirements and implementing pilot projects from the grant received, the Partnership will provide over-arching coordination between the Applicants' activities, as well as the broader range of crosscutting resilience activities that affect the region. The Partnership is exploring the opportunity to involve Rebuild By Design to advise on regional coordination to ensure that local resiliency activities are carried out in a concerted manner and scaled appropriately across the region.

Exhibit D - Need

D.1 Unmet Needs

In May 2013, severe storms from DR-4116 resulted in widespread flooding. As detailed in Exhibit B, p.6, FEMA verified loss totaled \$62,788,506. Though Cook County has obtained more than \$130.5 million in resources, unmet housing need totals \$904.6 million and affects an estimated 25,768 housing units. The disaster also led to \$2.1 million in FEMA documented public infrastructure damage (though no FEMA funding) and MWRD-documented unmet infrastructure needs total \$4.5 million for the Lyons Levee. Additionally, MWRD has over 50 stormwater management projects in their pipeline with an estimated construction cost of \$330 million. MWRD's recent bond sale and DPD's CDBG-DR funds will support \$57.5 and \$30 million of this cost respectively leaving a gap of \$242 million. Based on MWRD's current capital improvements financing structure, additional bonding would be required to implement these projects over a timeline driven by its debt repayment schedule and bonding authority. Local municipalities have also reported economic losses for local businesses and the Cook County Forest Preserves District noted environmental degradation impacting water quantity and quality and/or structural damage along the Lower Des Plaines River, Salt, Plum, and Thorn Creeks.

DR-4116 is characteristic of flooding in Cook County and not a one-time event. Since 1972, 13 Presidential-declared flood events have caused \$628.5 million in property damage. Three types of flooding are common: overbank of streams and creeks; localized overland; and urban or basement backups. Over the past 20 years, urban flooding has become the principal cause of flood loss in the County. Nearly 8% of land - containing \$22 billion of property - is located in 100-year floodplains, though damage increasingly affects other areas. From 2007 to 2011, flood claims were submitted in 97% of Cook County ZIP codes. ZIP codes with highest concentrations of payouts had no land area within floodplains.⁹ Chronic flooding is a worsening challenge.

D.2. Most Impacted and Distressed

⁹ CNT. "The Prevalence and Cost of Urban Flooding." May 2013.

In Phase I and continuing in Phase II, DPD will focus -on identifying prospective activities that have a regional perspective; a long-term vision with a clear and convincing short-term goal; and an innovative approach with identifiable co-benefits. The County is working collaboratively with the Partnership to assess risk and design a scalable program that comprehensively reduces regional risk from flooding and other hazards. All of Cook County was determined by HUD to be most impacted and most distressed following DR-4116. To identify a pilot area for which activities could be scaled and replicated, the County developed and employed a comprehensive risk analysis approach beginning with DHSEM's HMP. The HMP was used to identify occurrences of hazards within each jurisdiction, rank hazards using a risk rating score (probability times impact), identify at-risk infrastructure and property, and assess jurisdictions' institutional capacity.¹⁰ The HMP incorporates Illinois Climatologist Office models and emission scenarios to examine future precipitation changes through 2100 and to inform a qualitative assessment of the impact of climate change on hazard risks. Information from the HMP was supplemented with FEMA Individual and Household Assistance data from DR-4116 (dollar amount and number of claims) and overlaid with low- to moderate-income data. When mapped together, several areas within the County were highlighted as having both a large portion of claims and low income residents (Figures A, B, C, D)¹¹. To finalize the pilot area, an assessment of the social and economic environment was completed, including unemployment rates, age/race distribution, public health/safety issues, economic trends, and community relationships.

Using this science-based risk approach, Cook County identified a pilot area in the south suburbs containing the cities of Blue Island and Calumet City and the villages of Calumet Park, Dolton, Riverdale, and Robbins, home to 110,000 residents (Figure E). Spanning two watersheds, the area was filled with wetlands and marshes before Chicago was settled. After railroads traversed the marshes,

¹⁰ <http://www.cookcountyhomelandsecurity.org/hazard-mitigation-plan/>

¹¹ All referenced Attachment E – Maps and Figures available at <https://www.dropbox.com/sh/2vd61ojrw5031rg/AAB3HNQFFYcwDUVabwQk0ZSIa?dl=0>

industry moved in and residential development followed. The area quickly became an economic engine, but industrial decline beginning in the 1980s has since led to significant economic decay.

The HMP identifies severe weather as the number one natural hazard for the pilot area. At particular risk are 965 acres located within 100-year floodplains and 265 critical facilities and infrastructure. Yet analysis finds that government capacity is limited - the area's tax capacity is 25% below the regional median - and maintenance of the aging stormwater infrastructure has not been performed, exacerbating flooding and basement backups.¹² DR-4116 impacted more than 10% of households in 3 of the pilot communities (as measured by FEMA claims), and 3,650 FEMA household assistance applications were submitted (Figures F, G, H). FEMA verified loss for the pilot area totaled over \$13 million. Additionally, nearly 60% of the population has income below 80% of area median income, and vulnerabilities exist for persons over 65 living alone (9%), residents receiving social security income (27%) female-headed households with children (16%), and HACC housing voucher holders (7%). The area is largely African American (72%).¹³ A fifth of residents have no health insurance, and the mortality rate in Robbins is more than double that in other areas in the County.¹⁴

Regional Geographic Perspective

While the unmet needs from DR-4116 described above qualify Cook County and its partner Applicants for CDBG-NDR, aggregate losses from repetitive flooding in the region tell the fuller picture of shared risk. Disasters in northeastern Illinois are typically not well-known mega-events but rather smaller-scale, repetitive events that cumulatively result in significant damages to health, housing, infrastructure, the economy, and ecosystems. Flooding stands as the primary hazard facing the region, accounting for 41% of disaster losses statewide and resulting in over \$195 million in FEMA

¹² CMAP analysis of Illinois Department of Revenue and ACS 2008 – 2012 five-year estimates.

¹³ 2010 U.S. Census

¹⁴ Illinois Department of Public Health, 2000 to 2008.

NFIP payments to the region since 1978.⁹ The pilot areas serve as case studies of the three types of flooding impacting the region and are also representative of the spectrums of social, ecological, and built conditions and vulnerabilities found across the region. Together, they allow the region to learn from distinct but coordinated solutions that address different mixes of vulnerabilities (see Figure I). The impacts of flooding are exacerbated by four regional factors. First, the severity and frequency of flooding will increase with climate change, as discussed in the following section. Second, analyses of the region's infrastructure show that it is aging and not built to accommodate the frequency or intensity of rainfall events the region is experiencing.¹⁵ Third, urbanizing development patterns are increasing imperviousness, resulting in increased runoff (Figure J). Fourth, communities facing concentrated vulnerability in income, age, race, educational attainment, English proficiency, medical condition, and transportation access are those hit hardest by flooding. Studies of equity indicate the geospatial distribution of vulnerable populations across the region (Figure K).

D.3 Response to Questions

1. Threats, Hazards, and Vulnerabilities: Cook County has a disproportionate share of vulnerabilities. It leads the nation in disaster fatalities, with 1,158 deaths in the last 50 years—over twice that of the second highest jurisdiction, Orleans Parish, and more in 2012 than those from Superstorm Sandy. The County has experienced 19 Federally-declared disaster events since 1967, and an additional 729 hazard events caused monetary or human loss.¹⁶ Its capacity to adapt and respond to natural hazards is limited by several key vulnerabilities: an aging and insufficient infrastructure; a poverty rate that is nearly double that of its neighbors; and a lack of local government capacity.

¹⁵ <http://www.isasce.org/report-card/>

¹⁶ The Spatial Hazard Events and Losses Database for the United States (SHELDUS), University of South Carolina. Accessible at <http://hvri.geog.sc.edu/SHELDUS/>.

2. Data Utilized: The HMP was used to understand the historical prevalence and future risk of natural hazards. Seven MWRD and USACE Detailed Watershed Plans provided a summary of stormwater-related areas of concern (solicited from Watershed Planning Councils, Federal and state agencies, and stakeholders) and a list of potential capital improvement projects. Hydrologic models generated for each watershed for various flood events identified structures at risk of flooding and estimates of property damage. Data from CNT based on surveys, interviews, and flood damage payouts, along with FEMA, SBA, and NFIP data for DR-4116 and data from resident surveys, municipal meetings, and community workshops held by the County, was also utilized. Collectively, these reveal that the impact of flooding is greatest in the south and west Cook County. Finally, in order to assess vulnerabilities in health, housing, and socioeconomic conditions – also found to be most pronounced in these areas – the County utilized data from the U.S. Census and American Community Survey (ACS); State of Illinois Departments of Public Health and Revenue; and CMAP. The selected data is comprehensive, recent, and locally informed, making it the best available source to inform the proposed program.

3. Primary Risks Faced: Climate change in particular poses a growing risk. Precipitation in the Midwest increased 37% over the last 54 years, and the National Climate Assessment projects further increases in extreme rainfall events and flooding, heat wave intensity and frequency, and a range of risks to the Great Lakes, the region’s drinking water supply.¹⁷ Most Midwest Regional Climate Center and Illinois State Climatologist models project that annual precipitation will increase by as much as 20% by 2100, with a significant portion from more frequent heavy rainfalls. Heavy downpours are already occurring 35% more frequently since the 1980s, a particular challenge given that rainfall events of 2.5 inches or more in 24 hours already cause flooding in the region.¹⁸ In addition, increases

¹⁷ 2014 National Climate Assessment Report. www.globalchange.gov

¹⁸ Walsh, J. et al. 2014. Ch. 2: Our Changing Climate. Climate Change Impacts in the United States. Melillo, J.M. et al. Eds., U.S. Global Change Research Program, 19-67.

in very hot and extremely hot days are projected to increase heat wave intensity and frequency, leading to an increase of between 166 and 2,217 excess deaths per year from heat wave-related mortality in the City of Chicago by 2081 to 2100.¹⁹ Similar patterns apply in suburban Cook County. In addition to shared hazards, Cook County's pilot area experiences frequent overbank and urban flooding due to its flat topography and high level of urbanization. The risks from these hazards are exacerbated by the vulnerabilities described earlier and in Question 7, p. 26.

4. Risk Due to Un-Insured and Under-Insured Property: In Illinois, the past half century has produced \$2.5 billion in flood loss (41% of overall disaster loss from all hazards), but total NFIP payments since 1978 total just under \$500 million, leaving a significant gap between insured and uninsured losses. Suburban Cook County has 16,352 flood insurance policies providing \$3.2 billion in coverage, but this represents just 1.8% of households and does not fully cover \$22 billion of property located in 100-year floodplains. Within the County's pilot area, there are 632 NFIP policyholders, 75% of which are subsidized; minimal resources exist to restore properties, much less add resiliency measures.²⁰ Within the 20 communities out of 134 that participate in the CRS, there are 1,571 FEMA repetitive loss properties. While the number of uninsured properties experiencing repeated flooding is unknown, the risks are likely to be greatest for vulnerable populations, as detailed in Question 6, p. 26.

5. Addressing Threats & Hazards: Addressing the identified hazards will address existing and future recovery need in housing, infrastructure, and economic revitalization, ensure that near-term recovery efforts are successful, reduce vulnerabilities, and revitalize communities. Investments in infrastructure and the natural environment will increase physical capacity and preparedness for hazards that are increasingly more frequent and significant, as well as improve the quality of place. Improvement to the

¹⁹ Peng, R.D. et al. 2011. Toward a Quantitative Estimate of Future Heat Wave Mortality under Global Climate Change. *Environmental Health Perspectives*, 119, 701-706.

²⁰ CMAP "Brownfields Redevelopment Strategy." March, 2009.

socioeconomic environment - addressing stressors among low-income, aging, and minority populations, particularly as related to job loss and economic disinvestment - will generate household-level resources to address unmet recovery need and incorporate resiliency measures. Increased capacity and collaboration among local governments will support resident needs, increase resiliency through new investments in the built and natural environment, enhance economic opportunity through site redevelopment and job creation, and build stronger, healthier, and more vibrant communities.

6. *Disproportionate Effects on Vulnerable Population Groups:* See Question 7, p. 26 for the prevalence of vulnerable populations. In general, vulnerable groups – low-income, aging, veteran, and minority populations – are more impacted by flooding. Cook County ZIP codes with the highest number of insurance payouts have median household incomes below the County average; several communities in the pilot area are in the top quartile of households with the highest number and dollar amount of claims (Figure L).²¹ The impact may be more pronounced, as access to private insurance is related to income. Mobility issues disproportionately affect vulnerable populations. Repetitive flooding reduces property values as higher-income residents and businesses move to less hazardous areas.

7. *Existing Conditions which Exacerbate Vulnerability:* Outmoded & Aging Infrastructure: The region’s infrastructure is designed based on outdated precipitation and design standards. Though the 100-year storm is used to design flood protection measures, the ‘rare’ 100-year storm has been met or exceeded 3 times in the County since the 1980s.²² Exacerbating issues include an older housing stock with combined sewer systems (backups lead to health concerns) and limited to no municipal resources to maintain infrastructure. Strained Environment: Suburban Cook County’s population may rise by 15 percent over the next 30 years, leading to a spread of impervious surfaces (already 42% of land is impervious; Figure M), increased stormwater runoff, and greater incidence of urban flooding due to

²¹ CNT. “A RainReady Nation”. January 2015.

²² CMAP. “Climate Adaptation Guidebook for Municipalities in the Chicago Region”, 2013.

limited capacity of drainage systems.^{23,24} These impacts are exacerbated by climate change. While the magnitude of population growth is unknown, environmental risk is high if not proactively addressed.

Environmental Contamination: Waste materials from years of manufacturing have dramatically altered land and water. More than a quarter of Lake Calumet has been filled in with manufacturing waste, and contamination at former industrial sites remains, including 6 brownfields, 46 leaking underground storage tanks, and 11 Illinois EPA Site Remediation Program (SRP) sites in Riverdale alone.²⁵ Most of

the region's brownfield sites are in Cook County. From 1996 to 2007, more than 2,250 sites (74% of the region's total) totaling more than 11,125 acres in the County were enrolled in SRP.²⁰ Segregation

of Low-Income & Minority Populations: From 2000 to 2012, the poverty rate in the City of Chicago was constant (around 20%) but increased in suburban Cook County (from 6% to 10%) -- a

'suburbanization of poverty'.²⁶ Households in south and west Cook are far less affluent than the regional average. The County is becoming increasingly more segregated by income and race and ethnicity, and the risk that growth perpetuates segregation is high.²⁷ Disparity in Housing Markets:

Suburban Cook County's almost 1 million housing units and the housing markets they comprise vary significantly. Affordable housing is a challenge: half of renters pay at least 30% of their income on rent, with concentrations in the west and south of cost-burdened households. Given anticipated population increases, additional housing units will be needed for those earning less than \$50,000.

Seniors will comprise a majority of this increase. Job Loss & Economic Disinvestment: Cook County lost 60,000 jobs, primarily in its suburbs, while the region gained jobs between 2004 and 2013.

²³ CMAP. GO TO 2040 projections.

²⁴ NOAA. "Estimating Impervious Surface Area." December 2009.

²⁵ Illinois Environmental Protection Agency.

²⁶ <http://confrontingsuburbanpoverty.org/the-communities/south-cook-co-chicago/>

²⁷ 2000 and 2010 U.S. Census

Businesses in the County face higher taxes than in surrounding counties due to a weakened tax base, tax structure, and cost of special taxing districts. The pilot area suffers from disinvestment; 7% of land is vacant, including 310 industrial parcels and 700 commercial parcels.²⁸ Decline is likely to continue without new investment. Government Fragmentation: While sub-regional entities like the South Suburban Mayors and Managers Association (SSMMA) facilitate some shared services, fragmentation presents challenges, and each jurisdiction maintains its own stormwater/sanitary sewer systems.

8. Actions Taken & Barriers to Address Risks: Many efforts to address risks have been driven by an active citizenry (analysis of ‘flooded basements’ on Google Correlate shows that Illinois ranked first among all states). Since 2011, CNT has participated in 200 events in the County, provided grants to thousands of homeowners, trained a network of volunteers, and established Resident Action Groups. CNT’s RainReady is piloting home upgrade and community planning services for public rights-of-way; and is designing a flood warning system. RainReady is available in several Cook County suburbs, but funds are needed for full expansion which DPD is exploring supporting with CDBG-DR resources.

A number of planning and infrastructure improvements have been completed. WPCs for Little Calumet and Cal-Sag are developing a Stormwater Master Plan that overlaps with the County’s pilot area. This plan will incorporate resilient measures and is part of the Detailed Multi-Hazard Resiliency Plan, described in Exhibit E, p. 34. Even through MWRD’S work to maximize the use of public lands for stormwater storage, repurpose infrastructure, and floodplain restoration, there is still – and will be – a significant excess runoff. Though MWRD has constructed 35 regional storage reservoirs in the County and has permitted thousands of detention facilities, it is still challenged with addressing recent weather patterns through traditional infrastructure improvements. In early 2015, Cook County added a preference for resilient infrastructure proposals in its CDBG program. A final barrier to a complete solution is a lack of regional coordination limiting the effectiveness of locally-scaled solutions.

²⁸ CMAP Land Use Inventory for Northeast Illinois, 2010.

Exhibit E – Soundness of Approach

E.1 Stakeholder Consultation

Cook County led community engagement among residents and businesses to better understand flooding impacts, unmet needs, responses, needed resources, and resilience opportunities (See Figure N). Within the pilot area, DPD developed and distributed a survey with regional and County-specific components, as well as a flyer detailing public meetings and input opportunities in hard copy handouts in local municipal halls and public libraries as well as electronically via website posting and electronic email blast to 80+ stakeholder groups. Outreach targeted the general public, municipal leadership, local public housing authorities, social service providers, land banks, and Continuum of Care leadership. DPD met with 25 representatives from the planning, public works, and storm water departments of the pilot area which included an interactive mapping exercise. This meeting was the kick-off of a joint resilience planning effort of Cook County and MWRD, supported by ARCADIS and CNT. Three local public meetings were held to gather and share information through a mapping exercise and a framing discussion (For maps, please see Figures O, P, Q, R, S, T). These meetings were community-led conversations about how Cook County can reduce impacts, increase adaptability, create opportunities, and build regional resilience capacity. DPD also conducted public hearings through its EDAC in January and March 2015 which included informational presentations on DPD's resilience efforts and offered opportunities for public comment. The draft proposal was also available for a 15 day public comment period which was advertised electronically via website posting and e-blast distribution to 2,000+ stakeholders.

Through the engagement process, Cook County developed a thorough understanding of regional and local vulnerabilities and compounding interactions, unmet recovery needs, current and future risks, and existing/emerging tools and resources for building resilience. Feedback received through *Planning for Progress*, CDBG-DR strategy development, HMP, strategic plans developed by the Forest Preserves District and Department of Transportation and Highways, and MWRD's open project call have further

informed DPD's approach. Consultations provided insights regarding potential focus areas for Phase II and the need to: 1) Prioritize vulnerable communities and meet them where they are with information, technology, and resources; 2) Reduce single-points of failure by creating redundancies through decentralized systems; 3) Leverage existing community engagement efforts; 4) Improve trust between residents and public agencies; 5) Balance efforts between recovery with long-term proactive actions; 6) Consider flexible policies encouraging improvement through recovery, rather than return to previous states; 7) Evolve resilience-building strategies with future forces of change (i.e., technology, market demand, shifting hazards, etc.); 8) Strike a balance between gray and green infrastructure and consider them holistically. 9) Capitalize on high interest related to economic growth and job creation.

The Partnership has convened over 275 non-resident stakeholders through 27 meetings held between November 2014 and March 2015 representing 41 units of government, 35 non-profit and community-based organizations, 15 research institutions, 8 foundations, and 61 businesses. It employed a four-pronged approach to engagement: 1) Expert consultation; 2) Engagement of local leaders and stakeholders; 3) Community engagement meetings; and 4) Partnership coordination meetings. Expert consultation efforts have occurred in primarily two formats, Work Groups and Resilience Roundtables, broadening the conversation with thought leaders across the public, private, non-profit, philanthropic, and academic sectors.

Five Work Groups, each comprised of 10-20 representatives, were convened to inform the region's resilience framework for action, particularly as it relates to cumulative impacts. Work Groups and their respective conveners include: Design & Engineering (NRDC); Financing the Future (Enterprise Community Partners); Using Technology to Impact Behavior (CNT); Economic Transformation and Opportunity (MPC); and Multiplying the Benefits (the Delta Institute). Over 60 Work Group-recommended resilience building actions covering planning and policy, research and modeling, financing, infrastructure, and adaptive capacity informed this proposal and will be explored in Phase II.

Partnership members have sponsored other regional-scale events to inform this proposal. MPC has devoted time at five monthly meetings of the Calumet Stormwater Collaborative to discuss regional resilience. In December, NRDC hosted a meeting with staff from Rebuild By Design to introduce the Partnership to that process, and several follow-up discussions have occurred. In February, the Symposium on Urban Flooding, organized by the State and CNT, allowed specific discussion of the State's role in promoting resilience and a focus on the unique challenges related to urban flooding that is prevalent in suburban Cook County. In March, Foresight Design Initiative hosted a meeting where the Applicants presented proposals and responded to audience questions.

Resilience Roundtables, convened by MPC, are larger, monthly meetings open to the public which feature national experts speaking on resilience issues and best practices and will continue monthly over the next two years. The first Roundtable, held in January, 2015, featured speakers from two winning Rebuild By Design teams. Future Roundtables will cover social vulnerability, adapting management and decision-making approaches within local government, accounting for sub-regional climate variations in regional resilience planning, and leveraging citizen data collection.

The Partnership has met weekly to share information, strengthen institutional networks, and build new relationships between public agency representatives from various departments, including economic development, natural resource management, public health, and emergency management. The Partnership has met with the region's largest environmental funders to generate support for Phase II.

Consultation will continue through and beyond Phase II as the Partnership continues to convene its membership for coordination, best practices sharing, and progress reporting. The Partnership will seek to solicit innovative ideas from designers by convening a series of open-source design studios which provide an opportunity for designers to work in teams with other stakeholders and industry experts to develop site-level solutions within the pilot areas. In addition to connecting and creating collaboration among a diversity of interests, the events will leverage high-level concepts to help engage and educate

local policy makers and the public. The design studio events will be promoted and planned with input from the Illinois Chapter of the U.S. Green Building Council and Rebuild By Design, organizations with extensive experience working with industries tied to sustainability and the built environment. Each event, tied to a different pilot area, will include resiliency experts to educate the design community, design workshops for designer teams, and a public reception for local officials, the public, and stakeholders. Local leaders and stakeholders serving vulnerable populations will continue to be included in planning activities. DPD, in coordination with CNT and MWRD, will continue to gather information, deploy surveys, conduct outreach, and share information through in person meetings and electronic distribution. Quick install, high visibility demonstration and place-making projects will make solutions tangible and provide a sense of momentum. The State, through its participation in the Partnership, has secured the participation of 18 state agencies in a new State Resiliency Team, which will support Applicants.

E.2 Ideas/Concept

The Partnership seeks to build regional resilience to current and future hazards, stressors, and shocks by addressing factors of vulnerability: physical exposure, population sensitivity, and adaptive capacity. Resilience to flooding will be a focus, particularly urban flooding associated with intense rainfalls that overwhelm stormwater infrastructure. Based on the philosophy that preparedness for *any* disaster builds capacity to respond to *every* disaster, the ideas proposed broadly improve resilience including other natural hazards such as extreme heat and drought and chronic stresses like economic decline and unemployment. Resilience will be approached based on local needs and can be divided into three categories as follows. The County will carry this out, building on RainReady and CSC work.

Detailed Multi-Hazard Resilience Plans

Cook County will design and test a model approach to disaster resiliency that will provide successful examples and can be taken to scale across the County. This planning process will be launched in the

pilot area in the form of a Detailed Multi-Hazard Resilience Plan (Plan). This Plan will focus on addressing unmet needs and other needs identified through future public engagement. The Plan will result in recommendations for local capital investments and policy or institutional changes and will be prepared by a design team of contractors, including architects, landscape architects, engineers, urban planners, outreach specialists, and other technical experts in consultation with local residents and community leaders. MWRD's Stormwater Master Plan pilot study for the Little Calumet River and Cal-Sag Channel will be part of the pilot area's Detailed Multi-Hazard Resiliency Plan, identifying green and gray solutions to flooding of structures and basement backups from severe rainfall events.

In response to the unique conditions of the pilot area described in Exhibit D, p. 21, DPD's approach will focus on: 1) improving physical capacity to handle stormwater in innovative ways and create economic and environmental co-benefits, 2) increasing the capacity of residents and businesses to respond to flooding and other shocks, and 3) building the capacity of local governments. The Plan will create partnerships to use resources more productively and will focus on innovation.

While DPD will refine its approach in Phase II, potential solutions that build the above capacity will be evaluated against three goals: 1) reducing the risk of vulnerabilities, especially to the core flooding challenge, 2) enhancing quality of life and quality of place, and 3) creating economic opportunity.

Possible solutions that address physical, individual, and governmental capacity are:

Public Infrastructure Investment: **Maximize public infrastructure** by prioritizing resilient solutions on the public right of way (transportation infrastructure, primarily), within parks and other publicly-owned facilities, and on vacant, publicly-owned land (a lower priority due to maintenance concerns) that create economic, recreational or environmental co-benefits. **Implement innovative approaches to the stormwater management requirements of redevelopment efforts**, including brownfields, that ease that hurdle to economic development and create community amenities and buffers between residential and commercial/industrial land uses. **Gray infrastructure retrofits** that resize built

stormwater infrastructure to handle the storms the region will experience in the future and address “choke points”. **Investigate levee rehabilitation and realignment** to create additional floodplain and floodway conveyance. Restoring Ecosystem Services: **Deploy green infrastructure** including projects that infiltrate, intercept, delay, and detain rainwater before it can reach stormwater drains and pipes. **Enhance natural functions** through the restoration of wetlands, riparian corridors, and forested areas in areas where they can best alleviate vulnerability to flooding, reversing the transformation of the region’s landscape and hydrology over the past 150 years. **Restore tree canopy and urban forestry**, as many of the pilot project areas have little or no tree canopy, planting trees will enhance the capacity of urban soils to retain stormwater and decrease the quantity of excess runoff through transpiration and evaporation. This will also create shade thereby reducing heat islands and can also help clean the air. Private Property Buyouts: **Floodplain buyouts** of properties that have been repeatedly flooded or substantially flooded, or are at risk of damage as climate change effects precipitation patterns. **Sewer-shed buyouts** for areas impacted by relatively small rainfall events or located in “choke points” where stormwater often backs up; purchase properties to eliminate flood risk and create new spaces for green and grey infrastructure and restoration of natural systems. **Basement-to-Cistern conversions** for flood-prone properties that are bought out, including removal of above-grade structures and engineering analyses to determine if pre-existing basements can be used for in-ground detention, retrofitting formerly vulnerable basements into an integrated component of a functioning stormwater management system. Individual Education and Skill-Building: **Private property retrofits** achieved through RainReady, a community-centered program that facilitates stormwater retrofits and educates residents and business owners. **Connecting pilot area residents to existing workforce training** to improve their economic situation. **Build off newer environmentally-focused job training programs** such as High Bridge, a transitional jobs and social enterprise focused on the installation and maintenance of green infrastructure using local residents. Support and Technical Assistance for Our

Suburbs: **Exploring shared municipal services** to keep up with sewer maintenance and other needs.

Provide planning support for stormwater challenges or other issues via CMAP's LTA program (which the County will be funding via CDBG-DR) or direct assistance to the community. **Share expertise and guidelines about incorporating resilient measures** into local investments. **Provide stormwater modeling capability** to all municipalities to make better informed infrastructure decisions. **Reduce infiltration and inflow (I/I) in the local sanitary system** by assisting communities through identification, testing, and correction of I/I problems.

DPD will develop and implement a Plan driven by the following core solution principles: 1) Easy Replication; 2) Community-Wide Relief; 3) Evidence- and Market-Based Investment Prioritization; 4) Inclusiveness; 5) Leveraging for Multiple Benefits; 6) No Downstream Impacts; 7) Nature-Based; 8) Transparency; and 9) Prevention and Intervention. As a result, Cook County and the Partnership will establish an innovative and lasting planning approach to tackling vulnerabilities that can be shared regionally and bring wider benefits to the communities including economic development, community cohesiveness, recreation, health, improved transportation, and natural resource protection.

Regional Scaling and Replicability

While DPD will manage and administer the preparation of its own Plan, it will coordinate closely with other members of the Partnership, recognizing the benefit of scale and uniformity across jurisdictions. The County's design team will regularly communicate with the design teams contracted by other Applicants via small, focused settings. Expert advisers that formed the design and engineering work group will be brought in to meet with DPD and other partners to tour and discuss the pilot areas and potential approaches. Each design team will also participate in regional educational and coordination efforts that involve researchers, climate scientists, groups representing vulnerable populations, and others. Resilience Roundtables are one example of this regional coordination.

The benefits of coordination include: 1) Peer review and feedback from regional experts on each Plan to inform design teams about the impacts on climate change and best practices involving vulnerable populations. 2) A mechanism to examine the impact of each Plan on a broader geography, including adjacent areas. Regional coordination will avoid problematic approaches, like making infrastructure investments that simply push flooding problems downstream. The “regional scaling” process provides an opportunity for other jurisdictions to be involved; beyond the Partnership, adjacent units of government have expressed willingness to cooperate, as well. Ultimately, the pilot areas are meant to create a model for Detailed Multi-Hazard Resiliency Plans that can be used regionally. This approach allows resilience concepts to be applied beyond the timeframe of the CDBG-NDR grant, providing a lasting, long-term commitment to address resilience. This element of the proposal was inspired by Rebuild By Design, with further emphasis on regional collaboration between design teams.

At the local level, DPD will establish an approach to resiliency planning and implementation that can be taken to scale across the County. Replication and scalability requires an approach that is simple and systematic; adaptable to a wide range of settings; and able to leverage the resources needed for expansion. It also requires the following suite of activities: 1) **Leadership development and training:** DPD will continue to contribute to Resilience Roundtables for 2 years and will reconvene Expert work groups – particularly those focused on design and engineering, and financing – and others as required. 2) **Process documentation:** DPD will formalize an interagency team to gather information, initiate process planning, and evaluate meetings and processes. 3) **Citizen engagement and communications:** The County has an active network of Resident Action Groups and will establish a Citizens Engagement Network to provide opportunities to meet and share experiences, help them log and record their experiences (through film, story-telling, photographic displays, social media and events), and support resiliency planning in their communities. 4) **Monitoring and impact evaluation:** Several tools will be applied as an integrated suite in pilot communities -- MWRD and CNT’s *Green Infrastructure*

Portfolio Standard, a methodology for planning, prioritizing, implementing, and recording progress in the installation of multiple green projects; the *Value of Green Infrastructure Guide*, a tool for evaluating additional economic benefits derived; and CNT's risk model for evaluating the impact of RainReady Home upgrades. **5) Replication roadmap:** DPD will create a roadmap for identifying priority communities, engaging with community leaders, and carrying out mapping/planning activities.

Regional Resilience Framework

The Partnership will analyze relevant plans, policies, and practices that influence the risk of all types of flooding and other hazards with the full input of stakeholders and members of the Partnership's workgroups. In Phase II, it will identify and prioritize the amendment and creation of policies and guidance, where practicable. An initial scan of existing resources identified several opportunity areas:

Data, Modeling, and Research: The Partnership proposes to integrate disconnected data sets, modeling efforts, and other decision-making tools to build an integrated regional tool for watershed and sewershed management and infrastructure optimization, a priority project of the CSC. This will enable the capability of assessing upstream and downstream impacts of a variety of intervention decisions.

Planning: The Partnership will integrate resilience into local plans and regulations, including zoning ordinances, comprehensive plans, watershed plans, hazard mitigation plans, and capital improvement plans, allowing interdependent solutions to be explored. CMAP will integrate resilience as a regular part of its planning efforts including the LTA program, using its 2013 Climate Adaptation Guidebook as a starting point. MWRD will follow a similar approach in its planning initiatives. The Partnership also proposes to integrate two distinct types of watershed planning - those funded through the IEPA that covers stream quality and permits use of 319 funds, in line with the Clean Water Act, and those prepared by stormwater management agencies focused on flood reduction.

Policy and Regulatory Change: Zoning ordinances and development regulations set requirements for lot coverage, use of permeable pavement, and tree diversity, among others; small changes to

ordinances can have major impacts on the built environment and can be accomplished via training of local staff or provision of technical assistance. Innovative and effective design practices from the pilot Plans can also be integrated into infrastructure design standards. The State of Illinois proposes to enact regulatory changes to enable resiliency planning and design. The Illinois Department of Natural Resources (IDNR) will implement recommendations of the Urban Flood Awareness Act for areas outside of floodplains with chronic flooding due to basement backups and limited sewer capacity.

Economic and Workforce Opportunities: Public agencies and workforce entities will train and connect the local workforce with projects such as the construction, design, and maintenance of green infrastructure. The region already boasts examples of environmentally-focused workforce programs, including the Calumet Green Manufacturing Partnership, led by OAI, Inc. and SSMMA and Chicago's Greencorps program, that can be scaled to create programs for vulnerable populations. South Cook County's rail infrastructure also offers the opportunity to foster investment by bringing industrial sites to the private sector in a way that reduces flood risks and enhances recreational spaces. This work can be scaled through a partnership among SSMMA, OAI, CNT, and MWRD.

Capacity Building and Education: The Partnership will hold workshops through CNT's RainReady initiative that educate residents and businesses about flooding resilience strategies, connect them to funding, and increase preparedness for a range of hazards. The Partnership will organize local resiliency ambassadors to lead tours that showcase resiliency planning and design in action. CMAP will devote one year of its nationally-recognized Future Leaders in Planning program, which educates high school students about planning and policy, to the concept of resilience. In order to integrate resilience into local decision-making, the Partnership will also host trainings for elected leaders, municipal staff, and public works officials. Capacity building workshops for designers will ensure that resilient infrastructure designs can be replicated in public and private sector developments.

Exhibit F - Leverage

F.1 Outcomes

The County's Detailed Multi-Hazard Resilience Plan will identify methods that address disaster recovery and mitigation and are evaluated by a set of performance metrics that will be refined/finalized during Phase II and will be contingent upon related funding and timing. These performance measures will prioritize solutions that provide co-benefits and that can be implemented in an environmentally and financially sustainable way, with a consideration for vulnerable populations. For example, a grey infrastructure solution may provide only flood reduction benefits, while a green infrastructure solution can provide access to open space and recreational assets; environmental and ecosystem benefits, particularly when connected with broader networks of open space; and workforce and training opportunities for lower-skill workers in its maintenance. Measurement of outcomes will occur quantitatively and qualitatively. Many benefits can be assessed using quantitative performance measures - like new acres of parkland created, or volume of runoff reduced. Others, like improved social cohesion created by an engaging and responsive planning process, are more difficult to measure numerically. Therefore, stakeholders and experts will be involved, through the regional scaling up process to assess the performance of each alternative against these factors. The scaling up process will also be used to review and improve the measures through intensive peer review. Regionally-led **local stakeholder advisory committees** in vulnerable areas will increase the likelihood of success in crafting resiliency projects that provide co-benefits and help economically revitalize distressed areas. DPD will also explore feasibility of implementation and cost effectiveness (project cost per benefiting structure) for projects under design and completed. Solutions with positive impacts on neighboring jurisdictions and the ability to be applied in other parts of the region will be prioritized.

The County envisions a mixture of solutions requiring differing levels of long term maintenance, and we are working with partners to build the workforce to perform this maintenance and to secure the funding to pay for the maintenance. Cook County, particularly the pilot area, has significant

unemployment, blight and underutilized land; our investments in resilience will include a focus on redevelopment and skill-building to activate this human capital and development potential. Locally, success will be measured by: the number of households and stakeholder agencies engaged in the planning process, the number of communities where the resilience framework is adopted, the number of communities enrolled in CRS, the percentage of individuals reporting increased physical and/or mental health, the number of increased recreational opportunities, the number of increased open space or green space acreage, the number of new green jobs created or existing jobs retained, the number of communities focused on green infrastructure receiving DPD support, the reduction in the number of flood property damage incidents/claims, the reduction in the value of flood property damage incidents/claims, the reduction in the number of homes with basement flooding during a 100 year storm, the percentage of completion of routine stormwater system maintenance by local jurisdictions, the number of brownfield cleanups, the increase in number of urban agricultural enterprises, the number of trees planted, the number of property stormwater retrofits completed, the number of DPD-funded capital or housing projects incorporating resilience features, and the number of DOTH-funded transportation projects incorporating resilience features.

Regional or statewide success metrics include: the number of government units that address resilience and climate change in comprehensive plans, zoning ordinances, and capital improvement plans, and the total population and total land area covered by such plans; the number of stand-alone Detailed Multi-Hazard Resilience Plans adopted, and the percentage of the population that resides in areas with a Plan; the number of government units using optimization tools (such as stormwater models) to plan for infrastructure needs; an increase in connectivity and partnerships between Partnership members; the number of project applications to the State for green infrastructure and urban stormwater; and the dollars of State loan funding awarded to projects for green infrastructure and urban stormwater.

F.2 Leverage Narrative

The “Financing the Future” work group engaged banks and insurance companies to explore new revenues to fund resilience efforts, with a focus on green infrastructure. To leverage existing housing and transportation resources for stormwater management, the group suggested ranking preferences in LIHTC application processes for resilient design and working with CDFIs to underwrite home improvements. It identified potential new streams of revenue for resiliency planning activities, including stormwater fees, social impact bonds, and value-capture mechanisms similar to TIF.

The insurance industry has been a key player in identifying leverage for resilience. As part of the 2014 Urban Flooding Awareness Act, IDNR collected NFIP and private insurance data for flood damage claims from 2007-2014 which shows that 89% of all claims were located within urban areas. The final study in June 2015 will identify potential revisions to flood insurance programs and update regulations to support innovative and cost-effective stormwater management, providing a roadmap for FEMA, private insurers, and governments to incentivize long-term changes to improve preparedness.

Private and non-profit partners are committing their resources to leverage new public investments in resiliency. Openlands, is mobilizing its staff and 2,000 volunteers to assist with resiliency-building projects throughout the region conferring long-term cost savings. Public-private partnerships are forming and can generate large co-funding opportunities such as Space to Grow, a collaborative effort to transform schoolyards into learning spaces with green infrastructure solutions. Private partners like Openlands and the Healthy Schools Campaign engage communities, mobilize volunteers, and accept donated services, land, etc. Public partners, such as MWRD and schools, contribute pass-through funding and provide permitting assistance.

In Illinois, there is an opportunity to direct the Clean Water State Revolving Fund for resiliency-building green infrastructure projects. Many states use these funds to encourage green infrastructure through additional rate reductions, closing fee waivers, and longer loan terms. State legislation is pending to create a revolving loan fund exclusively for projects for addressing urban flooding.

Cook County is also exploring options for new revenues, reprioritization of existing resources, and leverage from other financial assets in order to secure capital for project development, operation, and maintenance. The County, via MWRD, has the ability to levy real estate taxes for stormwater management. DPD has already included resilience ranking preferences starting in its 2015 CDBG funding cycle, and through the implementation of *Planning for Progress* over the next 5 years, DPD will further incorporate resilience features in programming and special initiatives. CDBG-DR funding is being provided to CNT for RainReady and CMAP for LTA stormwater planning. Additionally, DPD is in discussion with USACE about joint funding of a soil study that would inform investment decisions. DPD continues to coordinate with other County agencies to bring additional financing and expertise to the table in the name of resilience based upon anticipated co-benefits. For example, DOTD and MWRD are also considering enhancements that promote resilience in their investments. MWRD, in particular has significant resources at their disposal for stormwater management, buyouts, and green infrastructure. The University of Illinois also received a \$3 million planning grant to look at resiliency planning in suburban Cook County's transportation system. In the pilot area, Blue Island is receiving a \$1.1 million Illinois Green Infrastructure Grant to implement stormwater best management practices, and \$235,295 for green infrastructure installation from the Chi-Cal Rivers Fund. Robbins, Blue Island, and Calumet Park will share in \$260,000 from the Great Lakes Restoration Initiative. The CSC also has significant participation and demonstrates commitment from local and regional partners to implement ongoing solutions.

F.3 Leverage Commitments

MWRD, a unit of general local government partner, procured the services of ARCADIS, valued at \$600,000, for outreach and engineering for the Cook County pilot area. This serves as the County's commitment of direct financial assistance for this application. But as noted above, additional resources will also be deployed.

Exhibit G – Long-Term Commitment

Regardless of the outcome of its Applications, both Cook County and the Partnership firmly commit to activities to enhance resilience in northeastern Illinois. These activities, as outlined below, will be implemented within one year of Phase II results in the most impacted and distressed areas. Local Commitments: Cook County and the Partnership will look at ways to promote enrollment in the Community Rating System (CRS). *Metric/Goal*: Enroll 5 additional communities in CRS. *Baseline*: 20 communities are currently enrolled; only 1 in the pilot area. Additionally, the County is aligning the implementation of the *HMP* (adopted 9/2014), *CDBG-DR Strategy Plan* (adopted 1/2015), *Planning for Progress* (adopted 1/2015), and the *Long Range Transportation Plan* (under development) and related investment strategies to promote resilience. DPD's CDBG-DR investments in CNT's RainReady and CMAP's LTA initiatives are one such example. In February 2015, DPD added a preference for resilience measures in CDBG infrastructure funding requests. Additionally, DPD is in talks regarding expanding Greencorps and the Conservation Corps and with the United Way and other partners regarding the possible launch of a countywide 211 system which could also aid disaster recovery. *Metric/Goal*: 3 DPD or DOTH-funded infrastructure, public facilities, transportation, housing, and services programs/projects with resilient features protecting 1,000 persons. *Baseline*: 0 - new preference. Regional Commitments: CMAP's role in developing a range of local plans -- comprehensive plans, zoning ordinance updates, capital improvement plans, and watershed plans -- provides a platform for ensuring that plans are updated according to the latest climate and natural hazard information and aligned with regional resiliency goals. Currently, no zoning, local land use, or infrastructure plans developed through CMAP's LTA program account for climate change. CMAP firmly commits to incorporating climate considerations into the plans developed through the LTA program. This best practice will add two major elements to its existing planning process: climate vulnerability assessments of infrastructure, facilities, and policies will be incorporated into the summary of existing community conditions; and plan recommendations will be based upon the latest

downscaled climate projections. Infrastructure, land use, economic development, and conservation, and natural resource management recommendations will be developed according to updated climate models. The Midwest Regional Climate Center, Illinois State Water Survey, and Illinois State Climatologist, all members of the Partnership, will be the primary providers of best available climate data. *Metric:* The Partnership will measure regional outcomes by the number and total cost of initiated local plans that incorporate climate considerations, as well as the total population and total land area covered by such plans. *Baseline:* No CMAP plans currently consider climate change directly. State Commitments: This year the Illinois EPA is expected to finalize regulations that will make low interest financing available through its Clean Water State Revolving Fund (CWSRF) for the first time ever for urban stormwater, green infrastructure, water efficiency and projects intended to make water infrastructure more resilient. Legislation enacted in 2014 expanded the list of eligible projects that could access the CWSRF. This new eligibility also comes at a time when Illinois EPA is contemplating expansion of CWSRF resources through the sale of bonds. *Metric:* Number of project applications to the CWSRF for green infrastructure and urban stormwater; Dollars of loan funding awarded to projects for green infrastructure and urban stormwater. *Baseline:* Currently, no CWSRF financing can be used toward green infrastructure and urban stormwater projects, with the exception of projects for the abatement of combined sewer overflows. To advance mitigation actions in flood prone Illinois communities, IDNR is committed to expand the implementation of a GIS database of flood hazard risk for every structure located within or near a designated floodplain. Success will be measured in number of structures assessed and prioritized for mitigation action with a goal to complete the assessment of all 1000 structures by September 2016 and implement at least 10 appropriate mitigation actions in the most distressed portions of the watershed by December 2016. *Metrics:* number of assessed structures throughout Illinois; number of homes directly acquired due to assessments. *Baseline:* Related data does not currently exist.