

**COOK COUNTY  
MULTI-JURISDICTIONAL  
HAZARD MITIGATION PLAN  
VOLUME 2 - Municipal Annexes**

**Calumet City Annex**

**FINAL**

July 2019

Prepared for:



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## Hazard Mitigation Point of Contact

<b>Primary Point of Contact</b>	<b>Alternate Point of Contact</b>
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## Jurisdiction Profile

The following is a summary of key information about the jurisdiction and its history:

- **Date of Incorporation:** 1893
- **Current Population:** 36,240 (2018 US Census Bureau)
- **Population Growth:** According to the US Census Bureau, the 2010 population was 37,116 and decreased by 1.03 percent to 36,732 by 2016. The population growth rate is much lower than the state of Illinois average rate of 3.31% and is much lower than the national average rate of 9.71%. The Calumet City population density is 5,067.44 people per square mile, which is much higher than the state average density of 221.55 people per square mile; and is much higher than the national average density of 81.32 people per square mile.
- **Location and Description:** The City of Calumet City (commonly known as Cal City) is located within the state of Illinois and County of Cook. In addition to being bordered to the east by Hammond, Indiana, the City is also bordered by the City of Burnham and City of Chicago to the north, City of Lansing to the south, and Cities of South Holland and Dolton to the west. The City encompasses a total of 7.31 square miles (approximately 7.18 sq. mi of land and 0.12 sq. mi. of water).
- **Brief History:** The region’s earliest inhabitants, the Indians, were a semi-nomadic people who came from Asia across the land bridge now drowned by the Bering Strait. These prehistoric Indians were known to have passed through the region in order to migrate to warmer climates. Memories of the “City of West Hammond,” as Calumet City used to be known, include everything from people who sparked community spirit to the bootleggers who defied prohibition to run illegal drinking parlors along State Street. Calumet City was shaped by memorable people such as the Schrum Family, who were among the first settlers, and Faith Bailey, a nurse who was a crusader in public health. A second fire department was established in order to protect the entire Calumet City territory, and one of the greatest improvements was the construction of an electric light plant that was expanded to provide street and incandescent lighting. After the great fire of 1901 that destroyed the only major industry in West Hammond at the time, the G.H. Hammond Meat Packing Plant, other industries had to step up to fill the economic gap left behind. Some of the businesses that helped the community recover included the Hirsch Stein Starch Company, Bernard J Burczyk’s Printing Company and the West Hammond Brewing Company. Calumet City also progressed in the areas of real estate, construction, public safety and industry. In the early 1900s, the population more than doubled. Land was acquired to build a two-story brick building that still houses City Hall today.
- **Climate:** The climate in Calumet City, Illinois, is classified as humid continental, with all four seasons distinctly represented: wet springs; hot, often humid summers; pleasant autumns; and cold winters. The average rainfall is 35 inches, and the average amount of days with precipitation are 118. Annual precipitation is average - reaching its lowest points in the months of January and February and peaks in the months of May and June. Winter proves quite variable - seasonal snowfall in the City has ranged from 9.8 inches (1920–21) up to 89.7 inches (1978–79).

- **Governing Body Format:** Calumet City uses a Home-Rule Charter, Council-Mayor form of government, and is located in the Illinois 2nd Congressional District. Local elected officials (Mayor, Treasurer, City Clerk, and seven Aldermen) run for election every four years. This body will assume the responsibility for the adoption and implementation of this plan. Department heads (which can be found on the City’s website) report directly to the Mayor. Department heads include: Community & Economic Development/Housing; Engineering; Community Schools & Churches; Department of Ethics and Professional Standards; Department of Inspectional Services; Department of Law; Emergency Services and Disaster Agency; Fire Department; Office of the Health Commissioner; Office of Independent Inspector General; Parks & Recreation; Police Department; Public Works; and Purchasing/Personnel.
- **Development Trends:** The City of Calumet City has taken a very assertive approach in redefining the business community by establishing and implementing various economic tools including Tax Increment Financing (TIF), Enterprise Zone, Cook County Tax Incentives, Special Service Districts, and securing various other funding resources relative to business and economic development. In addition, the City of Calumet City has Home Rule Status, as previously noted. The business community serves not only those who reside in Calumet City, but also hundreds of thousands who reside in the 15-mile radius that make Calumet City’s mega shopping districts their destination. Calumet City has a rich cultural history with successful implementation of community, beautification and city marketing programs. The community is located just south of the City of Chicago and borders Northwest Indiana with highway access to I-94/ I-80 and minutes from Interstates 294, I-57 and I-55. These routes give ready access to Chicago and Chicago’s northwest and western suburbs, along with central Illinois, Wisconsin, Indiana and Michigan. Additionally, rail and waterway accessibility is predominant within the industrial business districts. The City of Calumet City supports and follows the planning recommendations of CMAP (Chicago Metropolitan Agency for Planning) – the GO TO 2040 Plan.

## Capability Assessment

The assessment of the jurisdiction’s legal and regulatory capabilities is presented in the *Legal and Regulatory Capability Table* below. The assessment of the jurisdiction’s fiscal capabilities is presented in the *Fiscal Capability Table* below. The assessment of the jurisdiction’s administrative and technical capabilities is presented in the *Administrative and Technical Capability Table* below. Information on the community’s National Flood Insurance Program (NFIP) compliance is presented in the *National Flood Insurance Program Compliance Table* below. Classifications under various community mitigation programs are presented in the *Community Classifications Table* below.

<b>TABLE: LEGAL AND REGULATORY CAPABILITY</b>					
	<b>Local Authority</b>	<b>State or Federal Prohibitions</b>	<b>Other Jurisdictional Authority</b>	<b>State Mandated</b>	<b>Comments</b>
<b>Codes, Ordinances &amp; Requirements</b>					
Building Code	Yes	No	No	Yes	Calumet City Municipal Code, Sec. 14-22, adopted: 2007
Zonings	Yes	No	No	Yes	Calumet City Municipal Code, Appendix B Sec II, adopted: 1983
Subdivisions	Yes	No	No	No	Calumet City Municipal Code, Appendix A, adopted: 1980
Stormwater Management	Yes	No	Yes	Yes	State regulates industrial activity from Construction sites 1 acre or larger under section 402 CWA. Calumet City Municipal Code, Sec. 34-64. Erosion and sediment control, adopted: 10-12-2000
Post Disaster Recovery	No	No	No	No	
Real Estate Disclosure	No	No	Yes	Yes	(765 ILCS 77/) Residential Real Property Disclosure Act.

Growth Management	Yes	No	No	No	Calumet City Municipal Code, Sec. 18, adopted: 2001
Site Plan Review	Yes	No	No	No	Calumet City Municipal Code, Sec. 34-35, adopted: 2000
Public Health and Safety	No	No	Yes	Yes	Cook County Board of Health.
Environmental Protection	Yes	No	No	No	Calumet City Municipal Code 2-161 adopted: 1980 Calumet City Municipal Code Chapter 26
<b>Planning Documents</b>					
General or Comprehensive Plan	Yes	No	No	No	
<i>Is the plan equipped to provide linkage to this mitigation plan?</i>					It will
Floodplain or Basin Plan	No	No	No	No	Sec. 33-34
Stormwater Plan	No	No	MWRD	No	Regional stormwater impacts are managed by MWRD. The Village lies within the Little Calumet River watershed planning area of MWRD's comprehensive Stormwater Master Planning Program
Capital Improvement Plan	Yes	No	No	No	Calumet City CIP
<i>What types of capital facilities does the plan address?</i>					Detention ponds, fresh water, booster station, water tanks, pumping station, 6 million gallon reservoir.
<i>How often is the plan revised/updated?</i>					On a yearly basis.
Habitat Conservation Plan	Yes	No	No	No	Calumet City Municipal Code Sec. 34-65, Adopted 2000

Economic Development Plan	No	No	Yes	Yes	The Economic Development Commission is charged with reviewing all economic development related programs and incentives including tax incentives offered through the Cook County 6b program
Shoreline Management Plan	No	No	No	No	
<b>Response/Recovery Planning</b>					
Comprehensive Emergency Management Plan	No	No	Yes	Yes	Cook County DHSEM
Threat and Hazard Identification and Risk Assessment	No	No	Yes	No	Cook County DHSEM Preparing THIRA
Terrorism Plan	No	No	Yes	Yes	Cook County DHSEM
Post-Disaster Recovery Plan	No	No	No	No	
Continuity of Operations Plan	No	No	Yes	No	Cook County DHSEM
Public Health Plans	No	No	Yes	No	Cook County DPH

<b>TABLE: FISCAL CAPABILITY</b>	
<b>Financial Resources</b>	<b>Accessible or Eligible to Use?</b>
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes



Incur Debt through Private Activity Bonds	No
Withhold Public Expenditures in Hazard-Prone Areas	No
State Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	No

<b>TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY</b>		
<b>Staff/Personnel Resources</b>	<b>Available?</b>	<b>Department/Agency/Position</b>
Planners or engineers with knowledge of land development and land management practices	Yes	City Engineer
Engineers or professionals trained in building or infrastructure construction practices	Yes	City Engineer
Planners or engineers with an understanding of natural hazards	Yes	City Engineer
Staff with training in benefit/cost analysis	Yes	City Treasurer
Surveyors	Yes	City Engineer
Personnel skilled or trained in GIS applications	Yes	Cook County GIS Consortium
Scientist familiar with natural hazards in local area	No	Emergency Service & Disaster Agency
Emergency manager	Yes	Emergency Service & Disaster Agency
Grant writers	Yes	Economic Development Department

<b>TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE</b>	
What department is responsible for floodplain management in your jurisdiction?	Emergency Services and Disaster Agency
Who is your jurisdiction’s floodplain administrator? (department/position)	Leonard Chiaro, Director Emergency Services and Disaster Agency
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date of adoption of your flood damage prevention ordinance?	August 14, 2008

When was the most recent Community Assistance Visit or Community Assistance Contact?	September 25, 2013
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? (If no, please state why)	Yes
Does your floodplain management staff need any assistance or training to support its floodplain management program? If so, what type of assistance/training is needed?	No
Does your jurisdiction participate in the Community Rating System (CRS)? If so, is your jurisdiction seeking to improve its CRS Classification? If not, is your jurisdiction interested in joining the CRS program?	Yes ongoing

<b>TABLE: COMMUNITY CLASSIFICATIONS</b>			
	<b>Participating?</b>	<b>Classification</b>	<b>Date Classified</b>
Community Rating System	Yes	6	April 2011
Building Code Effectiveness Grading Schedule	Yes	Unknown	April 2011
Public Protection/ISO	No	N/A	N/A
StormReady	Yes	Gold (Countywide)	2014
Tree City USA	No	N/A	N/A

## Jurisdiction-Specific Natural Hazard Event

The information provided below was solicited from the jurisdiction and supported by NOAA and other relevant data sources.

The *Natural Hazard Events Table* lists all past occurrences of natural hazards within the jurisdiction. Repetitive flood loss records are as follows:

- Number of FEMA-Identified Repetitive Loss Properties: 28
- Number of FEMA-Identified Severe Repetitive Loss Properties: 1
- Number of Repetitive Flood Loss/Severe Repetitive Loss Properties That Have Been Mitigated: 17

TABLE: NATURAL HAZARD EVENTS			
Type of Event	FEMA Disaster Number (if applicable)	Date	Preliminary Damage Assessment
Severe Weather	-	2/28/2017	\$500 in property damage
Flood and Hail	-	5/20/2014	-
Hail	-	1/28/2013	-
Severe Winter Storm and Snow	DR-1960	3/17/2011	-
Thunderstorm Wind	-	9/21/2010	-
Severe Storms, Flooding	DR-1935	8/7/2010	-
Severe Storms, Flooding	DR-1800	10/3/2008	-
Levee Break	-	2008	-
Lightning	-	7/23/2001	-
Severe Winter Storm	EM-3161	1/17/2001	-
Hail and Thunderstorm Wind	-	5/18/2000	-
Winter Snow Storm	EM-3134	1/8/1999	-

Flood	DR-1188	9/17/1997	-
Flood	DR-1129	7/25/1996	-
Severe Storms, Flood	DR-997	7/9/1993	-
Severe Storms, Flood	DR-798	8/21/1987	-
Severe Storms, Flood	DR-776	10/7/1986	-
Severe Storms, Tornadoes, Flood	DR-643	6/30/1981	-
Blizzards, Snowstorms	EM-3068	1/16/1979	-
Severe Storms, Tornadoes, Flood	DR-509	6/18/1976	-
Flood	DR-373	4/19/1973	-
Flood	DR-351	9/4/1972	-
Tornado	DR-227	4/25/1967	-

### Jurisdiction-Specific Hazards and Impacts

Hazards that represent a county-wide risk are addressed in the Risk Assessment section of the 2019 Cook County Multi-Jurisdictional Hazard Mitigation Plan Update. This section only addresses the hazards and their associated impacts that are **relevant** and **unique** to the municipality.

**Dam/Levee Failure:** The community requires levee maintenance along the southern border of Calumet City on the Little Calumet River. Maintenance should include debris maintenance and animal damage. There are thousands of trees growing on the Calumet City levee. These trees pose a severe threat to the stability of this levee. The levee suffered a break in 2008 at parcels 30-29-201-062/063 on Shirley Ave.

**Flood:** The community requires maintenance of the Yates Ave. retention area. In addition, the community would benefit from providing knowledge to residents on backup prevention and program., and flash flood prevention.

**Severe Weather:** In order to protect the City's residents and infrastructure during high wind events, the City requires tree maintenance near power line easements citywide.

**Severe Winter Weather:** The community would benefit from residents being provided knowledge on the importance of clearing snow and not narrowing streets during snowstorms. Previously, these incidents have caused plows and emergency vehicles to not fit down streets. Similar to the case of snowstorms,

the community would benefit from blizzard/heavy snow preparedness education. This could prevent travel future travel issues for plows and emergency vehicles.

## Hazard Risk Ranking

The *Hazard Risk Ranking Table* below presents the ranking of the hazards of concern. Hazard area extent and location maps are included at the end of this chapter. These maps are based on the best available data at the time of the preparation of this plan, and are considered to be adequate for planning purposes.

<b>TABLE: HAZARD RISK RANKING</b>		
<b>Rank</b>	<b>Hazard Type</b>	<b>Risk Rating Score (Probability x Impact)</b>
1	Severe Weather	54
2	Severe Winter Weather	54
3	Tornado	54
4	Flood	24
5	Earthquake	12
6	Drought	4
7	Dam Failure	0

## Mitigation Strategies and Actions

The heart of the mitigation plan is the mitigation strategy, which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy describes how the community will accomplish the overall purpose, or mission, of the planning process. In this section, mitigation actions/projects were updated/amended, identified, evaluated, and prioritized. This section is organized as follows:

- New Mitigation Actions - New actions identified during this 2019 update process
- Ongoing Mitigation Actions - Ongoing actions with no definitive end or that are still in progress. During the 2019 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.
- Completed Mitigation Actions - An archive of all identified and completed projects, including completed actions since 2014.

The *Hazard Mitigation Action Plan Matrix Table* below lists the actions that make up the jurisdiction’s hazard mitigation plan. The *Mitigation Strategy Priority Schedule Table* identifies the priority for each action.

TABLE: HAZARD MITIGATION ACTION PLAN MATRIX							
Status	Hazards Mitigated	Objectives Met	Lead Agencies	Estimated Cost	Sources of Funding	Timeline/Projected Completion Date (a)	Included in Previous Plan?
<b>Action C1.1</b> —Continue using the Floodplain Management Committee as hazard advisory board to the City Council. Collect information, report to City Council, participating offices, and the public on Plan implementation.							
Ongoing	Flooding	3, 4, 5, 6, 8, 10, 12, 13	Emergency Services and Disaster Agency	Low	City, General Revenue	Short-term ongoing	Yes
<b>Action C1.2</b> —Continue participation in CRS and Program Reviews; Building code review to improve Building Code Effectiveness Grading Schedule classification, community assistance visit by FEMA, cycle verification visit for the CRS.							
Ongoing	Flooding	3, 10, 11	Emergency Services and Disaster Agency	Low	City, General Revenue	Short-term ongoing	Yes
<b>Action C1.3</b> —Floodplain Regulations; review and enforcement.							

Ongoing	Flooding	1, 3, 4, 9, 10, 12, 13	Floodplain Management Committee, Dept. of Inspectional Services	Low	City, General Revenue	Short-term ongoing	Yes
<b>Action C1.4</b> —Flood Response Plan: Flood stage forecast map and new flood response procedures.							
Ongoing	Flooding	1, 5, 8, 9, 12	Emergency Services and Disaster Agency	Medium	City, General Revenue	Short-term	Yes
<b>Action C1.5</b> —Mitigation of Floodplain Properties: Properties exposed to flood damage shall be protected through property protection measures where regional structural projects are not feasible.							
Ongoing	Flooding	1, 2, 6, 7, 9, 10	Department of Inspectional Services	High	City, General Revenue, Grants	Ongoing	Yes
<b>Action C1.6</b> —The Department of Inspection Services will continue to administer the rebate program to encourage and assist property owners with protecting their properties from sewer backup. For every dollar spent by City, \$2 will be spent to protect a property from damage.							
Completed	Flooding, Severe Weather	2, 7, 9	Department of Inspectional Services	\$30,000; Medium	City, General Revenue	Completed	Yes
<b>Action C1.7</b> —Investigation of Critical Facilities to determine if buildings/facilities are located in hazardous locations.							
Ongoing	All Hazards	1, 2, 7	Emergency Services and Disaster Agency	\$100,000; High	City, General Revenue, Grants	Long-term Depending on funding	Yes
<b>Action C1.8</b> —Critical Facilities Emergency Response Plans. Provide advice and assistance on developing emergency response plans for the interested critical facilities regarding appropriate hazards.							
Ongoing	Multi-Hazard	1, 2, 7	Emergency Services and Disaster Agency	Low	City, General Revenue	Short-term	Yes



<b>Action C1.9</b> —Levee Evaluation: Continue to mow and inspect levee on regular basis. Pursue advice from the Army Corps of Engineers as to the long term rehabilitation of the levee. An analysis using the Corps’ Levee Owner’s Manual for Non-Federal Flood Control Works should be conducted.							
Completed	Flooding	1, 2, 3, 8, 9, 12	City Engineer	Low	City, General Revenue	Completed	Yes
<b>Action C1.10</b> —Stormwater System Maintenance: Continue to maintain drainage channels and the Little Calumet River levee.							
Completed	Flooding/Sewer Backup	1, 2, 9, 12	City Engineer and Sewer and Water Department	Medium	City Water Capitalization Program. CDBG Disaster Recovery like Program.	Completed	Yes
<b>Action C1.11</b> —Safe Rooms and Sheltering: Residences, businesses, critical facilities, health care facilities and schools should be considered. As needs are identified, construction of safe rooms should be considered.							
Ongoing	Tornado, Severe Weather, Severe Winter Weather	1, 3, 6, 8, 12	Emergency Services and Disaster Agency	High	City, General Revenue, Grants	Long-term	Yes
<b>Action C1.12</b> —Promotion of Flood Insurance: Property owners in 100-year and 500-year floodplain should be encouraged to purchase and maintain flood insurance.							
Ongoing	Flooding	4, 6	Department of Inspectional Services	Low	City, General Revenue	Ongoing	Yes
<b>Action C1.13</b> —Outreach Projects to receive CRS credit: Mail newsletters, handouts, public access TV, personal permit advising, on site visits and drainage reviews, internet based information, and public library references to convey hazard mitigation information.							
Ongoing	All Hazards	6,8,11	Department of Inspectional Services	Low	City, General Revenue	Ongoing	Yes
<b>Action C1.14</b> —Special Public Information Projects: Additional public information projects.							

Ongoing	All Hazards	6, 8, 11	Emergency Services and Disaster Agency, Floodplain Management Committee	Low	City, General Revenue	Ongoing	Yes
<b>Action C1.15</b> —Staff Training: Pursue training seminars and conferences conducted by Illinois Association of Floodplain and Stormwater Management, Illinois Dept. of Natural Resources, Metropolitan Water Reclamation District of Greater Chicago and FEMA.							
Completed	Flooding	1, 4, 6, 8, 10	City Dept. of Inspectional Services	Low	City, General Revenue	Completed	Yes
<b>Action C1.16</b> —Maintain good standing under the National Flood Insurance Program by implementing programs that meet or exceed the minimum NFIP requirements. Such programs include enforcing an adopted flood damage prevention ordinance, participating in floodplain mapping updates, and providing public assistance and information on floodplain requirements and impacts.							
Completed	Flooding	4, 6, 9	Emergency Services and Disaster Agency	Low	City, General Revenue	Completed	No
<b>Actions C1.17</b> —Where feasible, implement a program to record high water marks following high-water events.							
Ongoing	Flooding, Severe Weather	3, 6, 9	Calumet City	Medium	City, General Revenue; FEMA Grant Funds (Public Assistance)	Long-term	No
<b>Action C1.18</b> —Integrate the hazard mitigation plan into other plans, programs, or resources that dictate land use or redevelopment.							
Ongoing	All	3, 4, 6, 10, 13	City Council	Low	City, General Revenue	Short-term	No
<b>Action C1.19</b> —Continue to support the countywide actions identified in this plan.							

Completed	All	All	Calumet City	Low	City, General Revenue	Completed	No
<b>Action C1.20</b> —Actively participate in the plan maintenance strategy identified in this plan.							
Completed	All	3, 4, 6	DHSEM (Calumet City)	Low	City, General Revenue	Completed	No
<b>Action C1.21</b> —Expand Action C1.13 - Outreach to include prevention measures for citizens to use to reduce flood risk and damage.							
New	Dam/Levee Failure, Flood	6, 9	ESDA	\$20,000; High	406 fund	Unknown	No
<b>Action C1.22</b> —City of Calumet City - Green Infrastructure.							
New	Flood	13	MWRD	Unknown	Unknown	Unknown	No
(a) Ongoing indicates continuation of an action that is already in place. Short-term indicates implementation within five years. Long-term indicates implementation after five years.							

TABLE: MITIGATION STRATEGY PRIORITY SCHEDULE							
Action Number	Number of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Priority (a)
1	8	Medium	Low	Yes	No	Yes	High
2	3	Medium	Low	Yes	No	Yes	High
3	7	Medium	Low	Yes	No	Yes	High
4	5	High	Medium	Yes	Yes	Yes	High
5	6	High	High	Yes	Yes	No	Medium
6	3	Medium	Medium	Yes	No	Yes	High
7	3	High	High	Yes	Yes	No	Medium
8	3	Medium	Low	Yes	Yes	Yes	High
9	6	Medium	Low	Yes	No	Yes	High
10	4	Medium	Medium	Yes	No	Yes	High
11	5	High	High	Yes	Yes	No	Medium

12	2	Low	Low	Yes	No	Yes	High
13	3	Low	Low	Yes	No	Yes	High
14	3	Low	Low	Yes	No	Yes	High
15	5	Medium	Low	Yes	No	Yes	High
16	3	Medium	Low	Yes	No	Yes	High
17	3	Medium	Medium	Yes	Yes	No	Medium
18	5	Medium	Low	Yes	No	Yes	High
19	13	Medium	Low	Yes	No	Yes	High
20	3	Low	Low	Yes	Yes	Yes	High
21	2	High	High	Yes	Yes	No	High
22	1	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

(a) See Chapter 1 for explanation of priorities.

## New Mitigation Actions

The following are new mitigation actions created during the 2019 update.

**Action C - 1.21**

<b>Mitigation Action</b>	Expand Action C1.13 - Outreach to include preventative measures for citizens to use to reduce flood risk and damage.
<b>Year Initiated</b>	2019
<b>Applicable Jurisdiction</b>	City of Calumet City
<b>Lead Agency/Organization</b>	ESDA
<b>Supporting Agencies/Organizations</b>	Fire Department
<b>Applicable Goal</b>	<ul style="list-style-type: none"> <li>• Develop and implement sustainable, cost-effective, and environmentally sound risk-reduction (mitigation) projects.</li> <li>• Protect the lives, health, safety, and property of the citizens of Cook County from natural hazards</li> <li>• Involve stakeholders to enhance the local capacity to mitigate, prepare for, and respond to the impacts of natural hazards</li> <li>• Promote public understanding of and support for hazard mitigation.</li> </ul>
<b>Applicable Objective</b>	<ul style="list-style-type: none"> <li>• Use the best available data, science and technologies to educate the public and to improve understanding of the location and potential impacts of natural hazards, the vulnerability of building types and community development patterns, and the measures needed to protect life safety.</li> <li>• Provide or improve flood protection on a watershed basis with flood control structures and drainage maintenance plans.</li> </ul>
<b>Potential Funding Source</b>	406 fund
<b>Estimated Cost</b>	\$20,000
<b>Benefits (loss avoided)</b>	Prevention of flooding through preventative measures
<b>Projected Completion Date</b>	
<b>Priority and Level of Importance (Low, Medium, High)</b>	High Priority
<b>Benefit Analysis (Low, Medium, High)</b>	High - Project will provide an immediate reduction of risk exposure for life and property.
<b>Cost Analysis (Low, Medium, High)</b>	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).
<b>Actual Completion Date</b>	

Recommended Mitigation Action/Implementation Plan and Project Description	
<b>Action/Implementation Plan and Project Description:</b>	

Mitigation Action and Project Maintenance		
Year	Status	Comments
2019	New	
2020		
2021		
2022		
2023		

Mitigated Hazards	
	<b>All Hazards</b>
X	Dam/Levee Failure
	Drought
	Earthquake
X	Flood
	Extreme Heat
	Lightning
	Hail
	Fog
	High Wind
	Snow
	Blizzard
	Extreme Cold
	Ice Storms
	Tornado
	Epidemic or pandemic
	Nuclear Power Plant Incident
	Widespread Power Outage
	Coastal Erosion
	Secondary Impacts from Mass Influx of Evacuees
	Hazardous Materials Incident

**Action C - 1.22**

<b>Mitigation Action</b>	City of Calumet City - Green Infrastructure
<b>Year Initiated</b>	2019
<b>Applicable Jurisdiction</b>	Calumet City
<b>Lead Agency/Organization</b>	MWRD
<b>Supporting Agencies/Organizations</b>	Calumet City
<b>Applicable Goal</b>	<ul style="list-style-type: none"> <li>Develop and implement sustainable, cost-effective, and environmentally sound risk-reduction (mitigation) projects.</li> </ul>
<b>Applicable Objective</b>	<ul style="list-style-type: none"> <li>Encourage hazard mitigation measures that result in the least adverse effect on the natural environment and that use natural processes.</li> </ul>
<b>Potential Funding Source</b>	Unknown
<b>Estimated Cost</b>	Unknown
<b>Benefits (loss avoided)</b>	Unknown
<b>Projected Completion Date</b>	Unknown
<b>Priority and Level of Importance (Low, Medium, High)</b>	Unknown
<b>Benefit Analysis (Low, Medium, High)</b>	Unknown
<b>Cost Analysis (Low, Medium, High)</b>	Unknown
<b>Actual Completion Date</b>	Unknown

Recommended Mitigation Action/Implementation Plan and Project Description	
<b>Action/Implementation Plan and Project Description:</b>	

Mitigation Action and Project Maintenance		
Year	Status	Comments
2019	New	
2020		
2021		
2022		
2023		

Mitigated Hazards	
	All Hazards
	Dam/Levee Failure
	Drought
	Earthquake
X	Flood
	Extreme Heat



	Lightning
	Hail
	Fog
	High Wind
	Snow
	Blizzard
	Extreme Cold
	Ice Storms
	Tornado
	Epidemic or pandemic
	Nuclear Power Plant Incident
	Widespread Power Outage
	Coastal Erosion
	Secondary Impacts from Mass Influx of Evacuees
	Hazardous Materials Incident

### Ongoing Mitigation Actions

The following are ongoing actions with no definitive end or that are still in progress. During the 2019 update, these "ongoing" mitigation actions and projects were modified and/or amended, as needed.

**Action C - 1.1**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.1	Continues using the Floodplain Management Committee as a hazard advisory board to the City Council. Collect information, report to City Council, participating offices, and the public on Plan implementation.	
Status Description: Yes	The Floodplain management Committee meets annually.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.2**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.2	Continue participation in CRS and Program Reviews; Building code review to improve Building Code Effectiveness Grading Schedule classification, community assistance visit by FEMA, cycle verification visit for CRS.	
Status Description: Yes	The Calumet City CRS verification was received on October 1, 2017	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.3**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.3	Floodplain Regulations; review and enforcement.	
Status Description: Yes	The City continues to review and enforce development in the floodplain.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.4**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.4	Flood Response Plan: Flood stage forecast map and new flood response procedures.	
Status Description: No	No new procedures have been implemented.	X
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.5**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.5	Mitigation of Floodplain Properties: Properties exposed to flood damage shall be protected through property protection measures where regional structural projects are not feasible.	
Status Description: No	No new properties have been mitigated.	X
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.7**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.7	Investigation of Critical Facilities to determine if buildings/facilities are located in hazardous locations.	
Status Description: No	No new actions taken.	X
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.8**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.8	Critical Facilities Emergency Response Plans. Provide advice and assistance on developing emergency response plans for the interested critical facilities regarding appropriate hazards.	
Status Description: No	No new actions taken.	X
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.11**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.11	Safe rooms and Sheltering: Residences, businesses, critical facilities, health care facilities and schools should be considered. As needs are identified, construction of safe rooms should be considered.	
Status Description: Yes	The City advertises shelter locations on their website and facebook accounts.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.12**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.12	Promotion of Flood Insurance: Property owners in 100-year and 500-year floodplain should be encouraged to purchase and maintain flood insurance.	
Status Description: Yes	The City encourages the purchase of flood insurance in their annual newsletters.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.13**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.13	Outreach Projects to receive CRS credit: Mail newsletters, handouts, public access TV, personal permit advising, on site visits and drainage reviews, Internet-based information, and public library references to convey hazard mitigation information.	
Status Description: Yes	The City continues to send out newsletters, hosts a flood awareness week, emergency preparedness month and the library maintains references.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.14**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.14	Special Public Information Projects: Additional Public information projects.	
Status Description: Yes	The City continues to send out news letters, hosts a flood awareness week and emergency preparedness month.	O
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.17**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.17	Where feasible, implement a program to record high water marks following high-water events.	
Status Description: No	No new actions taken.	X
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		



**Action C - 1.18**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.18	Integrate the hazard mitigation plan into other plans, programs, or resources that dictate land use or redevelopment.	
Status Description: No	No new actions taken.	O
<p style="text-align: center;">Completion status legend:</p> <p style="text-align: center;"><b>N</b> = New    <b>O</b> = Action Ongoing toward Completion  <b>C</b> = Project Completed    <b>R</b> = Want Removed from Annex    <b>X</b> = No Action Taken</p>		

### Completed Mitigation Actions

The following section represents completed mitigation actions, and serves as an archive of identified and completed projects.

**Action C - 1.6**

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.6	The Department of Inspection Services will continue to administer the rebate program to encourage and assist property owners with protecting their properties from sewer backup. For every dollar spent by the City, \$2 will be spent to protect property from damage.	
Status Description: Yes	Eight properties participated in the rebate program.	C
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.9**

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.9	Levee Evaluation: Continue to mow and inspect levee on a regular basis. Pursue advice from the Army Corps of Engineers as to the long term rehabilitation of the levee. An analysis using the Corps' Levee Owner's Manual for Non-Federal Flood Control Works should be conducted.	
Status Description: Yes	Public works inspects the levees annually. Additionally, the City contracted with Robinson Engineering to survey the levee in May of 2018.	C
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.10**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.10	Storm-water System Maintenance: Continue to maintain drainage channels and the Little Calumet River levee.	
Status Description: Yes	Public Works inspects drainage system.	C
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.15**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.15	Staff Training: Pursue training seminars and conferences conducted by Illinois Association of Floodplain and Storm-water Management, Illinois Department of Natural Resources, Metropolitan Water Reclamation District of Greater Chicago and FEMA.	
Status Description: Yes	The City Engineer attends the IAFSM conference annually.	C
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.16**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.16	Maintain good standing under the National Flood Insurance Program by implementing programs that meet or exceed the minimum NFIP requirements. Such programs include enforcing the adopted flood damage prevention ordinance, participating in floodplain mapping updates, and providing public assistance and information on floodplain requirements and impacts.	
Status Description: Yes	The City is current in good standing with the NFIP.	C
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.19**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.19	Continue to support the county-wide actions identifies in this plan.	
Status Description: Yes	The City continues to support this plan.	C
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

**Action C - 1.20**

<b>TABLE: ACTION PLAN MATRIX</b>		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# C—1.20	Actively participate in the maintenance of this plan.	
Status Description: Yes	The City continues to participate in the maintenance of this plan.	C
Completion status legend: <b>N</b> = New <b>O</b> = Action Ongoing toward Completion <b>C</b> = Project Completed <b>R</b> = Want Removed from Annex <b>X</b> = No Action Taken		

## Future Needs to Better Understand Risk/Vulnerability

No needs have been identified at this time.

## Additional Comments

No additional comments at this time



### HAZUS-MH Risk Assessment Results

CALUMET CITY EXISTING CONDITIONS	
2010 Population	37,042
Total Assessed Value of Structures and Contents	\$17,245,287,353
Area in 100-Year Floodplain	338.42 acres
Area in 500-Year Floodplain	925.68 acres
Number of Critical Facilities	81

HAZARD EXPOSURE IN CALUMET CITY						
	Number Exposed		Value Exposed to Hazard		Total	% of Total Assessed Value Exposed
	Population	Buildings	Structure	Contents		
<b>Dam Failure</b>						
Buffalo Creek	0	0	\$0	\$0	\$0	0.00%
U. Salt Cr. #2	0	0	\$0	\$0	\$0	0.00%
Touhy	0	0	\$0	\$0	\$0	0.00%
U. Salt Cr. #3	0	0	\$0	\$0	\$0	0.00%
U. Salt Cr. #4	0	0	\$0	\$0	\$0	0.00%
<b>Flood</b>						
100-Year	1,349	415	\$108,299,162	\$67,434,142	\$175,733,304	1.02%

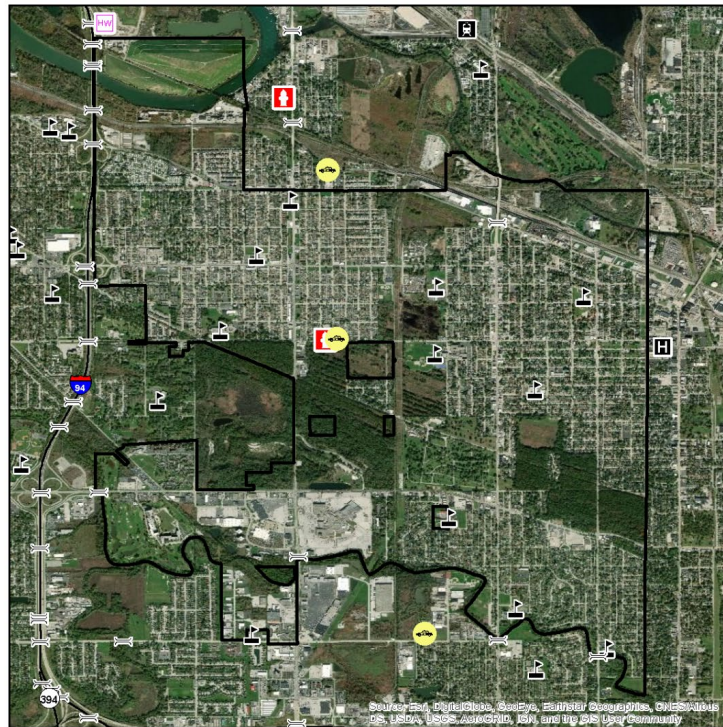
500-Year	7,163	2,204	\$593,717,025	\$367,387,972	<b>\$961,104,997</b>	5.57%
<b>Tornado</b>						
100-Year	—	—	\$791,554,649	\$679,781,954	<b>\$1,471,336,603</b>	8.53%
500-Year	—	—	\$2,483,082,643	\$2,275,785,509	<b>\$4,758,868,152</b>	27.60%

**ESTIMATED PROPERTY DAMAGE VALUES IN CALUMET CITY**

	Estimated Damage Associated with Hazard			% of Total Assessed Value Damaged
	Building	Contents	Total	
<b>Dam Failure</b>				
Buffalo Creek	\$0	\$0	<b>\$0</b>	0.00%
U. Salt Cr. #2	\$0	\$0	<b>\$0</b>	0.00%
Touhy	\$0	\$0	<b>\$0</b>	0.00%
U. Salt Cr. #3	\$0	\$0	<b>\$0</b>	0.00%
U. Salt Cr. #4	\$0	\$0	<b>\$0</b>	0.00%
<b>Earthquake</b>				
1909 Historical Event	\$73,455,285	\$19,041,974	<b>\$92,497,260</b>	0.54%
<b>Flood</b>				
10-Year	\$110,083	\$180,339	<b>\$290,422</b>	0.00%
100-Year	\$8,316,345	\$8,042,832	<b>\$16,359,176</b>	0.09%
500-Year	\$43,471,094	\$30,925,812	<b>\$74,396,906</b>	0.43%

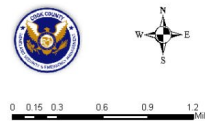
<b>Tornado</b>				
100-Year	\$79,155,465	\$67,978,195	<b>\$147,133,660</b>	0.85%
500-Year	\$362,530,066	\$332,264,684	<b>\$694,794,750</b>	4.03%

# Hazard Mapping

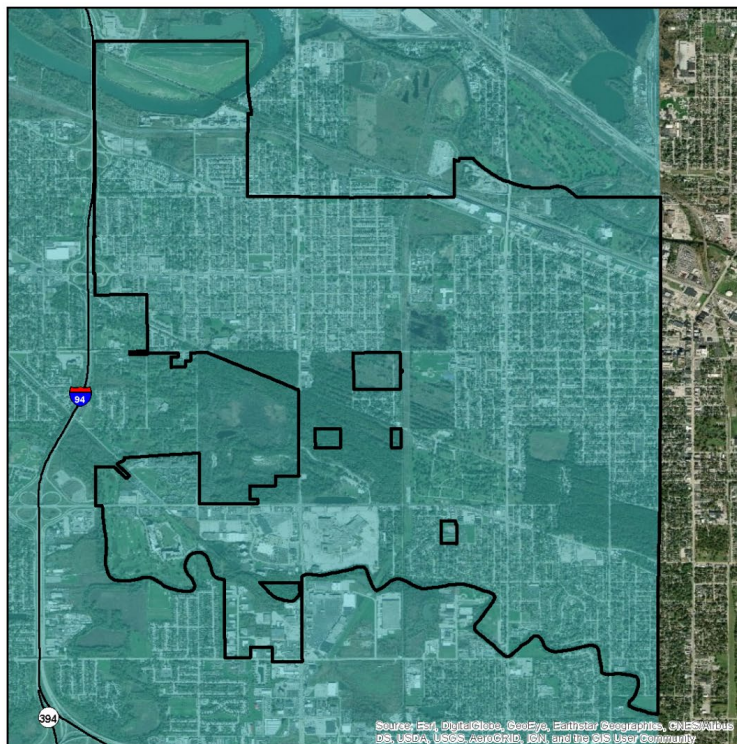


- CITY OF CALUMET CITY**
- CRITICAL INFRASTRUCTURE**
- Oil Facilities
  - Transit Centers
  - Military Facilities
  - Police Stations
  - Fire Stations
  - Hazardous Waste
  - Airports
  - Hospitals
  - Highway Bridges
  - Warming Centers
  - Cooling Centers
  - Schools
  - Railroad Stations

Base Map Data Sources:  
Cook County, ESRI



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**CITY OF CALUMET CITY**

**PEAK GROUND ACCELERATION FOR A 100 YEAR EARTHQUAKE EVENT**

**Mercalli Scale, Potential Shaking**  
II-III Weak

Data provided by the USGS Earthquake Hazards Program and Cook County.

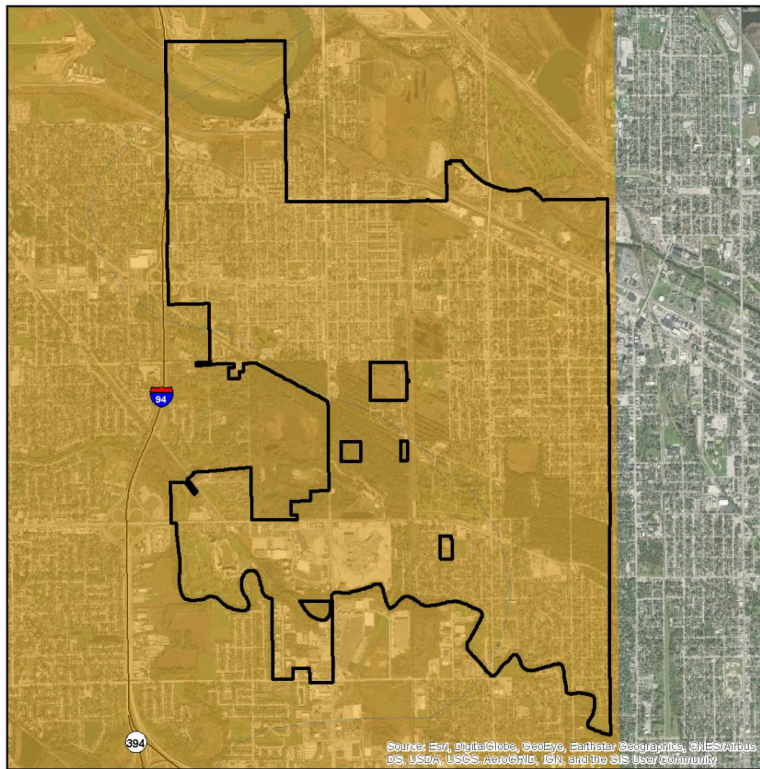
Probabilistic seismic-haz and maps were prepared for the conterminous United States for 2014 portraying peak horizontal acceleration and horizontal spectral response acceleration for 0.2- and 1.0-second periods with probabilities of exceedance of 10 percent in 50 years and 2 percent in 50 years. All of the maps were prepared by combining the hazard derived from spatially smoothed historical seismicity with the hazard from fault-specific sources. The acceleration values contoured are the random horizontal component. The reference site condition is firm rock, defined as having an average shear-wave velocity of 760 m/s in the top 30 meters corresponding to the boundary between NEHRP (National Earthquake Hazards Reduction Program) site classes B and C.

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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





**CITY OF CALUMET CITY**  
**NATIONAL EARTHQUAKE HAZARD REDUCTION PROGRAM (NEHRP) SOIL CLASSIFICATION**

**TYPE**

- C - Very Dense Soil, Soft Rock
- D - Stiff Soil
- F - Site Specific Evaluation

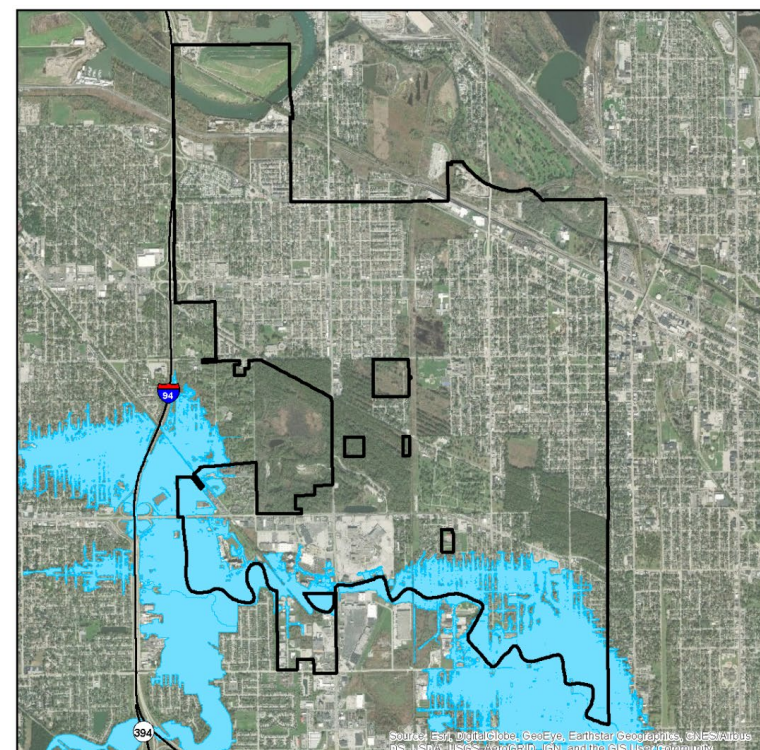
Data provided by the Illinois State Geological Survey and Cook County.

The Central United States Earthquake Consortium (CUSEC) State Geologists produced a regional Soil Site Class map (NEHRP Soil Profile Type Map), a Liquefaction Susceptibility Map and a Soil Response Map for the 8 states to be used in the FEMA New Madrid Catastrophic Planning Initiative Phase I work. The USGS Geologic Investigation Series I-2789 Map of Surficial Deposits and Materials in the Eastern and Central United States (East of 102 degrees West Longitude) by David S. Fullerton, Charles A. Bush and Jean H. Pennell (2003) was the base map used for this work. Each State Geological Survey produced its own state map version of the Soil Site Class and Liquefaction Susceptibility maps. The procedures outlined in the NEHRP provisions (Building Seismic Safety Council, 2004) and the 2003 International Building Codes (International Code Council, 2002) were followed to produce the soil site class maps. CUSEC State Geologists used the entire column of soils material down to bedrock and did not include any bedrock in the calculation of the average shear wave velocity for the column, since it is the soil column and the difference in shear wave velocity of the soils in comparison to the bedrock which influences much of the amplification.

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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



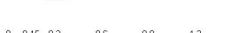
**CITY OF CALUMET CITY**  
**COOK COUNTY MWRDGC 100-YEAR INUNDATION AREA**

100-year Inundation Area

MWRDGC Data provided by Metropolitan Water Reclamation District of Greater Chicago and Cook County.

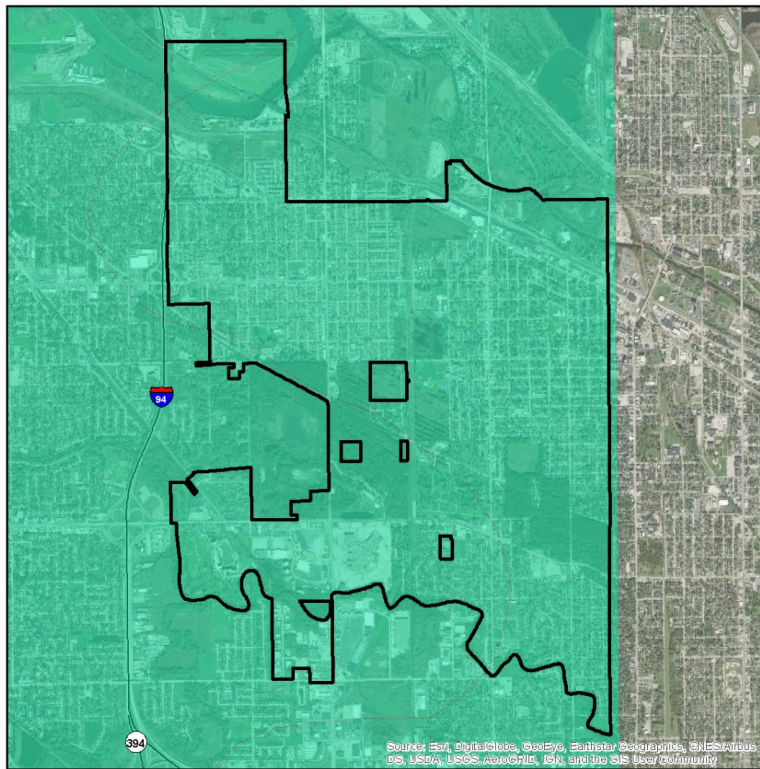
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**DISCLAIMER:** The Cook County MWRDGC 100-year Inundation Map is provided to show general flood risk information regarding floodplains and inundation areas. This map is not regulatory. Official FEMA Flood Insurance Study information and regulatory maps can be obtained from <http://www.fema.gov>.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





**CITY OF CALUMET CITY**  
**LIQUEFACTION SUSCEPTIBILITY**

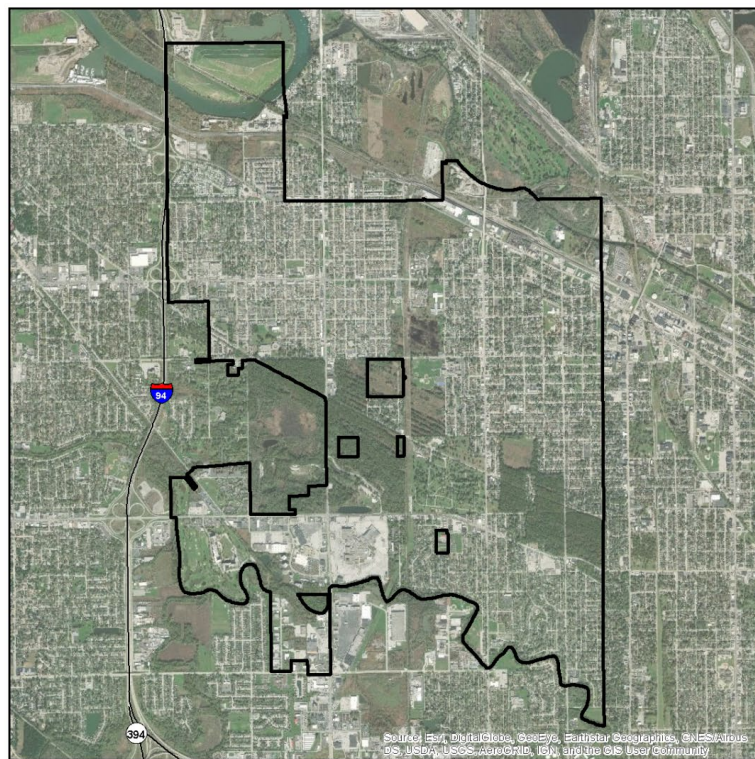
**LIQUEFACTION SUSCEPTIBILITY**

- high
- low
- very low

Data provided by the Illinois State Geological Survey and Cook County.

The Central United States Earthquake Consortium (CUSEC) State Geologists produced a regional Soil Site Class map (NEHRP Soil Profile Type Map), a Liquefaction Susceptibility Map and a Soil Response Map for the 8 states to be used in the FEMA New Madrid Catastrophic Planning Initiative Phase I work. The USGS Geologic Investigation Series I-2789 Map of Surficial Deposits and Materials in the Eastern and Central United States (East of 102 Degrees West Longitude) by David S. Fullerton, Charles A. Bush and Jean H. Pennel (2003) was the base map used for this work. Each State Geological Survey produced its own state map version of the Soil Site Class and Liquefaction Susceptibility maps. The procedures outlined in the NEHRP provisions (Building Seismic Safety Council, 2004) and the 2003 International Building Codes (International Code Council, 2002) were followed to produce the soil site class maps. CUSEC State Geologists used the entire column of soils material down to bedrock and did not include any bedrock in the calculation of the average shear wave velocity for the column, since it is the soil column and the difference in shear wave velocity of the soils in comparison to the bedrock which influences much of the amplification.

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**CITY OF CALUMET CITY**  
**100- AND 500- YEAR TORNADO EVENTS**

**Magnitude**

- 4 (100 year event)
- 5 (500 year event)

Historic tornado data provided by NOAA/NWS showing the initial points and paths of all F4 and F5 events observed from 1950 to 2017.

