

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

South Holland Annex

FINAL

July 2019

Prepared for:



Cook County
Department of Homeland Security and Emergency Management
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Hazard Mitigation Point of Contact

Primary Point of Contact	Alternate Point of Contact
Brian Kolosh, Fire Chief South Holland Fire Department 16230 Wausau Ave. South Holland, IL 60473 Telephone: 708-331-3123 Email Address: bkolosh@southholland.org	Frank Knittle, Director of Planning and Development 16240 Wausau Ave. South Holland, IL 60473 Telephone: 708-210-2915 Email Address: fknittle@southholland.org

Jurisdiction Profile

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

- **Date of Incorporation:** 1894
- **Current Population:** 21,503 as of the 2018 U.S. Census population estimates.
- **Population Growth:** Shortly after WWII ended South Holland experienced a growth in population from approximately 3,200 (1950 (census) to almost 25,000 (1980 census), to the current population of 22,030 (2010 census). Since then growth has been relatively flat with a slight decrease in population.
- **Location and Description:** South Holland is a south suburb of Chicago in Cook County, approximately 19 miles south of downtown Chicago and 4 miles from the Illinois/Indiana border to the east. Both Interstate I-94 and I-80 have interchanges in South Holland. Suburbs adjacent to South Holland include: Dolton to the north, Thornton to the south, Harvey to the west, and Calumet City, and Hammond, IN to the east. According to the U.S. Census Bureau, South Holland has a total land area of 7.28 square miles. South Holland is an anomaly in Chicago Southland because of its laws. All businesses (except travel-related establishments such as hotels, restaurants, and gas stations) are closed on Sunday. South Holland is a “dry” municipality; that is, no alcohol is sold anywhere within the village limits. Additionally, the sale or rental of pornographic material is prohibited in South Holland. The village’s franchise agreements with cable television providers restrict adult-oriented programming. These laws are a remnant of the village’s religious roots as a settlement of conservative Dutch Reformed immigrants. Even today, South Holland’s motto is “A Community of Churches”.
- **Brief History:** In 1847, Hendrik de Jong purchased 300 acres of land in Thornton Township, with his wife Geertje (de Vries) and 12 children and established the area as De Laage Prairie. Antje Paarlberg also settled here later in the year. In 1870, the U.S. Government recognized the town and its name was changed to South Holland. In 1894, South Holland was incorporated into a Village under the statutes of the State of Illinois. South Holland was predominately an agricultural community once being named as the “Onion Set Capital of the World”. The end of WWII ended that era and today it is a thriving community with retail and industrial businesses. In October 2007, Forbes.com declared South Holland to be the “Most Livable Metro-Area suburb” of the Chicago metropolitan area.
- **Climate:** The climate for the Village of South Holland is classified as humid continental, with all four seasons distinctly represented: wet springs; hot and often humid summers; pleasant autumns; and cold winters. Annual precipitation is average, and reaches its lowest points in the months of January (2.05” / 11.6” of snow) and February (1.93” / 9.6” of snow), and peaks in the months of May (4.12”) and June (4.06”). Annual temperature averages are lowest in January (16.5 F degrees) and are highest in July (84.1 F degrees).
- **Governing Body Format:** The Village of South Holland is Home-Rule and operates under the Village President/Trustee form of government. The legislative body consists of the Village President, Board of six Trustees and Village Administrator. The Village President and Board of Trustees serve a term of four years. This body of Government will assume the responsibility for

the adoption and implementation of this plan. The Village Administrator is responsible for day-to-day operation of the Village and oversees 9 departments including the Village Administrators Office, Economic Development, Recreational Services, Finance Department, Building Department, Fire Department, Police Department, ESDA and Public Works Department.

- **Development Trends:** Population growth has been flat for the past few years due to the downturn in the economy. However this has not prevented the business climate from steady growth. Through the establishment of 2 TIF districts and special zoning districts the village has attracted several new prominent retail businesses with more to come in the near future. Our “Vision 2022” is bringing Responsive and Progressive Leadership to future planning. It is anticipated that our Town Center and Interstate Zoning districts will boost the business and industrial growth by twenty to thirty percent creating numerous of new job opportunities. An update in 2017 indicated that TIF programs have helped South Holland retain and attract new business by redeveloping outdated buildings, upgrading infrastructure and paying for other public improvement projects that business owners look for when deciding to invest in a community.

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.

TABLE: LEGAL AND REGULATORY CAPABILITY					
	Local Authority	State or Federal Prohibitions	Other Jurisdictional Authority	State Mandated	Comments
Codes, Ordinances & Requirements					
Building Code	Yes	No	Yes	Yes	South Holland Municipal Code, Ord. Sec. 6-16 Adoption of Building Code Ordinance Number 2018-16
Zonings	Yes	No	Yes	Yes	(65 ILCS 5/) Illinois Municipal Code South Holland Municipal Code. Ord. Appendix A “Zoning Ordinance” Original Ordinance No. 95-2, January 16, 1995. Last updated Ord. No. 2012-23
Subdivisions	Yes	No	Yes	No	South Holland Municipal Code. Ord. 95-24
Stormwater Management	Yes	No	Yes	Yes	State regulates industrial activity from Construction sites 1 acre or larger under section 402 CWA. South Holland Municipal Code. Ord. 2010-5
Post Disaster Recovery	Yes	No	No	No	Ch. 14 Article II & III

Real Estate Disclosure	No	No	Yes	Yes	(765 ILCS 77/) Residential Real Property Disclosure Act. State Law
Growth Management	No	No	No	No	N/A
Site Plan Review	Yes	No	No	No	South Holland Municipal Code. Ord. 95-24 adopted 1995
Public Health and Safety	Yes	No	Yes		South Holland Municipal Code. 18 2018-16
Environmental Protection	Yes	No	Yes	Yes	South Holland Municipal Code. 18 2018-16
Planning Documents					
General or Comprehensive Plan	No	No	No	No	
<i>Is the plan equipped to provide linkage to this mitigation plan?</i>					No
Floodplain or Basin Plan	Yes	No	Yes	Yes	Ord 2008-6 & 2008-13
Stormwater Plan	Yes	No	Yes	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 Ord 2001-14 & 2008-6
Capital Improvement Plan	Yes	No	No	No	Plan is updated annually or as funds become available. It includes buildings, water main, sewers, roads, bridges, and vehicles.
<i>What types of capital facilities does the plan address?</i>					Municipal
<i>How often is the plan revised/updated?</i>					Yes
Habitat Conservation Plan	Yes	No	No	No	South Holland Municipal Code. Ord. 2012-10 adopted 2012
Economic Development Plan	Yes	No	No	Yes	South Holland Municipal Code. Ord. 2012-10 adopted 2012

Shoreline Management Plan	No	No	No	No	N/A
Response/Recovery Planning					
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	No	Cook County DHSEM
Post-Disaster Recovery Plan	Yes	No	No	No	Emergency Oper. Plan
Continuity of Operations Plan	Yes	No	Yes	No	Emergency Oper. Plan
Public Health Plans	No	No	Yes	No	Cook County DPH

TABLE: FISCAL CAPABILITY	
Financial Resources	Accessible or Eligible to Use?
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	Yes
State Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes

TABLE: ADMINISTRATIVE AND TECHNICAL CAPABILITY		
Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Director Planning, Development & Code Enforcement
Engineers or professionals trained in building or infrastructure construction practices	Yes	Robinson Engineering, Village Engineer
Planners or engineers with an understanding of natural hazards	Yes	Robinson Engineering
Staff with training in benefit/cost analysis	Yes	John Hilsen, Robinson Engineering
Surveyors	Yes	Robinson Engineering
Personnel skilled or trained in GIS applications	Yes	Cook County GIS Consortium
Scientist familiar with natural hazards in local area	No	
Emergency manager	Yes	Patricia Mahon, Deputy Village Administrator
Grant writers	Yes	Julia Heisman

TABLE: NATIONAL FLOOD INSURANCE PROGRAM COMPLIANCE	
What department is responsible for floodplain management in your jurisdiction?	Dept. of Planning, Development & Code Enforcement
Who is your jurisdiction’s floodplain administrator? (department/position)	Brian Smith, Code Officer, Ord. # 92-6
Are any certified floodplain managers on staff in your jurisdiction?	Yes, John Hilsen Robinson Engineering
What is the date of adoption of your flood damage prevention ordinance?	Ord. #92-6, March 17, 1992
When was the most recent Community Assistance Visit or Community Assistance Contact?	2018
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, Class 5

TABLE: COMMUNITY CLASSIFICATIONS			
	Participating?	Classification	Date Classified
Community Rating System	Yes	5	2010
Building Code Effectiveness Grading Schedule	Yes	3	2012
Public Protection/ISO	Yes	3	2011
StormReady	Yes	Gold (countywide)	2014
Tree City USA	Yes	N/A	2010 thru 2013

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: 14
- Number of FEMA-Identified Severe Repetitive Loss Properties: 0
- Number of Repetitive Flood Loss/Severe Repetitive Loss Properties That Have Been Mitigated: 4

TABLE: NATURAL HAZARD EVENTS			
Type of Event	FEMA Disaster Number (if applicable)	Date	Preliminary Damage Assessment
Hail	-	7/13/2015	-
Severe Weather	-	6/30/2014	-
Severe Storms	DR-4116	4/26/2013	-
Severe Winter Storm	DR-1960	3/17/2011	-
Severe Storms/Flooding	DR-1935	7/19/2010	-
Severe Storms/Flooding	DR-1800	9/13/2008	-
Severe Storms/Flooding	DR-1729	8/20/2007	-
Severe Winter Storm	EM-3136	12/11/2000	-
Snow Storm	EM-3134	1/1/1999	-
Flooding	DR-1188	8/16/1997	-
Flooding	DR-1129	7/17/1996	-
Flooding/Storms	DR-997	4/13/1993	-
Severe Storms/Flooding	DR-798	8/13/1987	-
Severe Storms/Flooding	DR-776	9/21/1986	-

Severe Storms/Flooding	DR-643	6/30/1981	-
Blizzards/Snowstorms	EM-3068	1/16/1979	-
Severe Storms/Flooding	DR-509	6/18/1976	-
Severe Storms/Flooding	DR-373	4/26/1973	-
Severe Storms/Flooding	DR-351	9/4/1972	-

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.

Flood: Overbank flooding properties adjacent to the Little Calumet River and Thorn Creek are subject to flooding- in 2008 record flooding occurred along the Little Calumet River and its tributaries in northeast Illinois and northwest Indiana. Also, the combined sewer is in the Village's older reserve stations.

Lightning: A wide range of the Town is vulnerable to the impacts of lightning.

Hail: A wide range of the Town is vulnerable to the impacts of hail. A weak surface trough dropped across northern Illinois during the evening of June 28th. Triple digit heat led to extreme instability over the area, and explosive growth of thunderstorms occurred as they moved across the Chicago Metro area dropping large hail.

High Wind: A wide range of the Town is vulnerable to the impacts of high wind. The Village has also experienced severe straight-line winds. Strong north winds blew down the entire fetch of Lake Michigan causing high waves and damaging winds along the south shore of the lake. The high winds also blew down tree limbs, power lines and signs.

Snow: The whole Village, including I-80, I-294, I-394, and I-94, is subject to the impacts of snow as well as the potential for stranded motorists. A synoptic system brought 2 to 5 inches of snow across portions of northern Illinois; however semi-organized lake effect snow bands resulted in snow totals reaching 6 to 8 inches across portions of the Chicago metro area. Storm total snow report were 7.0 inches in South Holland.

Blizzards: The whole Village, including I-80, I-294, I-394, and I-94, is subject to the impacts of snow as well as the potential for stranded motorists.

Extreme Cold: The whole Village is vulnerable to the impacts of extreme cold.

Ice Storms: The whole Village is vulnerable to the impacts of ice storms.

Tornado: The whole Village is vulnerable to the impacts of tornadoes.

Winter Weather: Freezing drizzle developed during the early morning of December 29th and continued through late morning. A light glaze of ice accumulated on many roads causing numerous accidents and spin outs. One man was killed after exiting his vehicle which had spun out and being struck by another vehicle near South Holland.

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.

TABLE: HAZARD RISK RANKING		
Rank	Hazard Type	Risk Rating Score (Probability x Impact)
1	Severe Weather	54
2	Severe Winter Weather	54
3	Earthquake	32
4	Tornado	27
5	Flood	18
6	Drought	2
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)
Action S7.1 —Continue using the flood management committee as hazard advisory to the Village Board and public.						
Ongoing	Flooding	3, 4, 5, 6, 8, 10, 12, 13	Building Department	Low	General Revenue	Short-term
Action S7.2 —Consider or maintain participation in incentive-based programs such as the Community Rating System, Tree City, and StormReady.						
Ongoing	All	3, 4, 5, 6, 7, 9, 10, 11, 13	Building Department	Low	General Revenue	Short-term
Action S7.3 —Review floodplain regulations to identify feasible enhancements to reduce future risk to flooding.						
Ongoing	Flooding	1, 3, 4, 9, 10, 12, 13	Building Department	Low	General Revenue	Short-term
Action S7.4 —Update flood response plan annually.						

Ongoing	Flooding, Severe Weather	1, 5, 8, 9, 12	Building/Fire Department	Low	General Revenue	Short-term
Action S7.5 —Provide mitigation rebates.						
Ongoing	Flooding-Sewer Backup, Severe Weather	2	Building Department	Medium	General Revenue	Short-term
Action S7.6 —Complete street and sewer repairs and conduct storm water system maintenance.						
Ongoing	Flooding	1, 2, 9, 12	City Engineer	High	General Revenue-Grants	Long-term
Action S7.7 —Complete special information projects.						
Ongoing	All	6	Building Department-Fire Department-Public Works	Low	General Revenue-Grants	Short-term
Action S7.8 —Provide additional staff training.						
Ongoing	All	1, 4, 6, 8, 10	Building Department-Fire Department-Public Works	Low	General Revenue-Grants	Short-term
Action S7.9 —Where appropriate, support retrofitting, purchase, or relocation of structures in hazard-prone areas to prevent future structure damage.						
Ongoing	All	7, 13	Village of South Holland	High	FEMA Hazard Mitigation Grants	Long-term
Action S7.10 —Continue to support the county-wide actions identified in this plan.						
Ongoing	All	All	Village of South Holland	Low	General Fund	Short-and long-term
Action S7.11 —Actively participate in the plan maintenance strategy identified in this plan.						
Ongoing	All	3, 4, 6	DHSEM, Village of	Low	General Fund	Short-term

			South Holland			
Action S7.12 —Maintain good standing under the National Flood Insurance Program by implementing programs that meet and exceed the minimum NFIP requirements.						
Ongoing	Flooding	4, 6, 9	Village of South Holland	Low	General Fund	Short-term and ongoing
Action S7.13 —Where feasible implement a program to record high water marks following high-water events.						
Ongoing	Flooding, Severe Weather	3, 6, 9	Village of South Holland	Medium	General Fund; FEMA Grant Funds (Public Assistance)	Long-term
Action S7.14 —Integrate the Hazard Mitigation Plan into other plans, programs, or resources that dictate land use or redevelopment.						
Ongoing	All	3, 4, 6, 10, 13	Planning and Development Director	Low	General Fund	Short-term
Action S7.15 —Enhance Tornado Warning System.						
New	Tornado	5	Fire Department	\$50,000; Medium	Grants, Federal Fund	Short-Term
Action S7.16 —Increase drainage capacity to Elm St., Cherry St., Park Ln, and Maple St.						
New	Flood	2, 9	Public Works	\$1,800,000; High	General Fund/Grants	Long-Term
Action S7.17 —Increase flowage of stormwater on 170th Street between Cottage Grove and Parkside.						
New	Flood	2, 9, 12	Public Works	\$700,000; High	General Funds/Grants	Long-Term
Action S7.18 —Reconstruction of Thorn Ditch and Pioneer Park to allow increase of water flowage and capacity of water retention.						
New	Flood	2, 9, 12	Public Works	\$650,000; High	General Funds/Grants	Long-Term
Action S7.19 —Remove all asphalt at Gouwens Park and replace with easy drainage material (drain-thru).						
New	Flood	3, 13	Public Works	\$600,000; High	General Funds/Grants	Long-Term

Action S7-20—Increase storm capacity and reroute storm drainage to larger detention area. In the area of East 160th Pl. and University Ave.

New	Flood	2, 3, 9, 10, 13	Public Works	\$500,000; High	General Fund/Grants	Long-Term
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(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	9	Medium	Low	Yes	No	Yes	High
3	7	Medium	Low	Yes	No	Yes	High
4	6	High	Medium	Yes	Yes	Yes	High
5	1	High	Medium	Yes	Yes	Yes	High
6	4	High	High	No	Yes	No	High
7	1	Medium	Low	Yes	Yes	Yes	High
8	5	Medium	Medium	Yes	Yes	Yes	High
9	2	High	High	Yes	Yes	No	Medium
10	13	Medium	Low	Yes	No	Yes	High
11	3	Medium	Low	Yes	Yes	Yes	High
12	3	Medium	Low	Yes	No	Yes	High
13	3	Medium	Medium	Yes	Yes	No	Medium
14	5	Medium	Low	Yes	No	Yes	High
15	1	Medium	Medium	Yes	Yes	Yes	High
16	2	High	High	Yes	Yes	Yes	High
17	3	High	High	Yes	Yes	Yes	High
18	3	High	High	Yes	Yes	Yes	High
19	2	High	High	Yes	Yes	Yes	High

20	5	High	High	Yes	Yes	Yes	High
(a) See Chapter 1 for explanation of priorities.							

New Mitigation Actions

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

Action S7-15

Mitigation Action	Enhance Tornado Warning System
Year Initiated	2019
Applicable Jurisdiction	Village of South Holland
Lead Agency/Organization	Fire Department
Supporting Agencies/Organizations	Village of South Holland
Applicable Goal	<ul style="list-style-type: none"> Protect the lives, health, safety, and property of the citizens of Cook County from the impacts of natural hazards.
Applicable Objective	<ul style="list-style-type: none"> Develop, improve, and protect systems that provide early warnings, emergency response communications, and evacuation procedures.
Potential Funding Source	Grants, General Fund
Estimated Cost	\$50,000
Benefits (loss avoided)	Enhance coverage of tornado warning system
Projected Completion Date	2020/2021
Priority and Level of Importance (Low, Medium, High)	High Priority
Benefit Analysis (Low, Medium, High)	Medium - Project will have a long-term impact on the reduction of risk exposure for life and property, or project will provide an immediate reduction in the risk exposure for property.
Cost Analysis (Low, Medium, High)	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
Actual Completion Date	

Recommended Mitigation Action/Implementation Plan and Project Description	
Action/Implementation Plan and Project Description:	Conduct study of current warning system placement within the Village. Update warning system with current technology available. Find locations for additional sirens if needed.

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

2023		
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Mitigated Hazards	
	All Hazards
	Dam/Levee Failure
	Drought
	Earthquake
	Flood
	Extreme Heat
	Lightning
	Hail
	Fog
	High Wind
	Snow
	Blizzard
	Extreme Cold
	Ice Storms
X	Tornado
	Epidemic or pandemic
	Nuclear Power Plant Incident
	Widespread Power Outage
	Coastal Erosion
	Secondary Impacts from Mass Influx of Evacuees
	Hazardous Materials Incident

Action S7-16

Mitigation Action	Increase drainage capacity to Elm St., Cherry St., Park Ln, and Maple St.
Year Initiated	2019
Applicable Jurisdiction	Village of South Holland
Lead Agency/Organization	Public Works
Supporting Agencies/Organizations	Village Engineer and Water Reclamation
Applicable Goal	<ul style="list-style-type: none"> • Develop and implement sustainable, cost-effective, and environmentally sound risk-reduction (mitigation) projects. • Protect the lives, health, safety, and property of the citizens of Cook County from the impacts of natural hazards. • Protect public services and critical facilities, including infrastructure, from loss of use during natural hazard events. • Involve stakeholders to enhance the local capacity to mitigate, prepare for, and respond to the impacts of natural hazards. • Develop, promote, and integrate mitigation action plans. • Promote public understanding of and support for hazard mitigation.
Applicable Objective	<ul style="list-style-type: none"> • Increase the resilience of (or protect and maintain) infrastructure and critical facilities. • Provide or improve flood protection on a watershed basis with flood control structures and drainage maintenance plans.
Potential Funding Source	General Fund/Grants
Estimated Cost	\$1,800,000
Benefits (loss avoided)	Alleviate stormwater flooding
Projected Completion Date	TBD
Priority and Level of Importance (Low, Medium, High)	High Priority
Benefit Analysis (Low, Medium, High)	High - Project will provide an immediate reduction of risk exposure for life and property
Cost Analysis (Low, Medium, High)	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).
Actual Completion Date	

Recommended Mitigation Action/Implementation Plan and Project Description	
Action/Implementation Plan and Project Description:	

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

Action S7-17

Mitigation Action	Increase flowage of stormwater on 170th Street between Cottage Grove and Parkside.
Year Initiated	2019
Applicable Jurisdiction	Village of South Holland
Lead Agency/Organization	Public Works Department
Supporting Agencies/Organizations	Village Engineer and Water Reclamation
Applicable Goal	<ul style="list-style-type: none"> • Develop and implement sustainable, cost-effective, and environmentally sound risk-reduction (mitigation) projects. • Protect the lives, health, safety, and property of the citizens of Cook County from the impacts of natural hazards. • Protect public services and critical facilities, including infrastructure, from loss of use during natural hazard events. • Involve stakeholders to enhance the local capacity to mitigate, prepare for, and respond to the impacts of natural hazards. • Develop, promote, and integrate mitigation action plans. • Promote public understanding of and support for hazard mitigation.
Applicable Objective	<ul style="list-style-type: none"> • Increase the resilience of (or protect and maintain) infrastructure and critical facilities. • Provide or improve flood protection on a watershed basis with flood control structures and drainage maintenance plans. • Reduce natural hazard-related risks and vulnerability to potentially isolated populations within the planning area.
Potential Funding Source	General Fund/Grants
Estimated Cost	\$700,000
Benefits (loss avoided)	Alleviate stormwater flooding
Projected Completion Date	TBD
Priority and Level of Importance (Low, Medium, High)	High Priority
Benefit Analysis (Low, Medium, High)	High - Project will provide an immediate reduction of risk exposure for life and property

Cost Analysis (Low, Medium, High)	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).
Actual Completion Date	

Recommended Mitigation Action/Implementation Plan and Project Description	
Action/Implementation Plan and Project Description:	

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

Action S7-18

Mitigation Action	Reconstruction of Thorn Ditch and Pioneer Park to allow increase of water flowage and capacity of water retention.
Year Initiated	2019
Applicable Jurisdiction	Village of South Holland
Lead Agency/Organization	Public Works Department
Supporting Agencies/Organizations	Village Engineer and Water Reclamation
Applicable Goal	<ul style="list-style-type: none"> • Develop and implement sustainable, cost-effective, and environmentally sound risk-reduction (mitigation) projects. • Protect the lives, health, safety, and property of the citizens of Cook County from the impacts of natural hazards. • Protect public services and critical facilities, including infrastructure, from loss of use during natural hazard events. • Involve stakeholders to enhance the local capacity to mitigate, prepare for, and respond to the impacts of natural hazards. • Develop, promote, and integrate mitigation action plans. • Promote public understanding of and support for hazard mitigation.
Applicable Objective	<ul style="list-style-type: none"> • Increase the resilience of (or protect and maintain) infrastructure and critical facilities. • Provide or improve flood protection on a watershed basis with flood control structures and drainage maintenance plans. • Reduce natural hazard-related risks and vulnerability to potentially isolated populations within the planning area
Potential Funding Source	General Fund/Grants
Estimated Cost	\$650,000
Benefits (loss avoided)	Alleviate stormwater flooding
Projected Completion Date	TBD
Priority and Level of Importance (Low, Medium, High)	High Priority

Benefit Analysis (Low, Medium, High)	High - Project will provide an immediate reduction of risk exposure for life and property
Cost Analysis (Low, Medium, High)	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).
Actual Completion Date	

Recommended Mitigation Action/Implementation Plan and Project Description

Action/Implementation Plan and Project Description:	
--	--

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
--	------------------------------

Action S7-19

Mitigation Action	Remove all asphalt at Gouwens Park and replace with easy drainage material (drain-thru).
Year Initiated	2019
Applicable Jurisdiction	Village of South Holland
Lead Agency/Organization	Public Works Department
Supporting Agencies/Organizations	Village Engineer
Applicable Goal	<ul style="list-style-type: none"> • Develop and implement sustainable, cost-effective, and environmentally sound risk-reduction (mitigation) projects. • Protect the lives, health, safety, and property of the citizens of Cook County from the impacts of natural hazards. • Protect public services and critical facilities, including infrastructure, from loss of use during natural hazard events. • Involve stakeholders to enhance the local capacity to mitigate, prepare for, and respond to the impacts of natural hazards. • Develop, promote, and integrate mitigation action plans. • Promote public understanding of and support for hazard mitigation.
Applicable Objective	<ul style="list-style-type: none"> • Consider the impacts of natural hazards on future land uses in the planning area, including possible impacts from climate change. • Encourage hazard mitigation measures that result in the least adverse effect on the natural environment and that use natural processes.
Potential Funding Source	General Fund/Grants
Estimated Cost	\$600,000
Benefits (loss avoided)	
Projected Completion Date	TBD
Priority and Level of Importance (Low, Medium, High)	High Priority
Benefit Analysis (Low, Medium, High)	High - Project will provide an immediate reduction of risk exposure for life and property

Cost Analysis (Low, Medium, High)	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).
Actual Completion Date	

Recommended Mitigation Action/Implementation Plan and Project Description

Action/Implementation Plan and Project Description:	
--	--

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

Action S7-20

Mitigation Action	Increase storm capacity and reroute storm drainage to larger detention area. In the area of East 160th Pl. and University Ave.
Year Initiated	2019
Applicable Jurisdiction	Village of South Holland
Lead Agency/Organization	Public Works
Supporting Agencies/Organizations	Village Engineer
Applicable Goal	<ul style="list-style-type: none"> • Develop and implement sustainable, cost-effective, and environmentally sound risk-reduction (mitigation) projects. • Protect the lives, health, safety, and property of the citizens of Cook County from the impacts of natural hazards. • Protect public services and critical facilities, including infrastructure, from loss of use during natural hazard events. • Involve stakeholders to enhance the local capacity to mitigate, prepare for, and respond to the impacts of natural hazards. • Develop, promote, and integrate mitigation action plans. • Promote public understanding of and support for hazard mitigation.
Applicable Objective	<ul style="list-style-type: none"> • Increase the resilience of (or protect and maintain) infrastructure and critical facilities. • Consider the impacts of natural hazards on future land uses in the planning area, including possible impacts from climate change. • Provide or improve flood protection on a watershed basis with flood control structures and drainage maintenance plans. • Strengthen codes and land use planning and their enforcement, so that new construction or redevelopment can avoid or withstand the impacts of natural hazards. • Encourage hazard mitigation measures that result in the least adverse effect on

	the natural environment and that use natural processes.
Potential Funding Source	General Fund/Grants
Estimated Cost	\$500,000
Benefits (loss avoided)	Alleviate stormwater flooding
Projected Completion Date	TBD
Priority and Level of Importance (Low, Medium, High)	High Priority
Benefit Analysis (Low, Medium, High)	High - Project will provide an immediate reduction of risk exposure for life and property
Cost Analysis (Low, Medium, High)	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).
Actual Completion Date	

Recommended Mitigation Action/Implementation Plan and Project Description	
Action/Implementation Plan and Project Description:	

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 S7-1

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# S7—1	Continue using the flood management committee as hazard advisory to the Village Board and public	
Status Description: Yes	Committee meets on an annual basis	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action S7-2

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# S7—2	Maintain participation in incentive-based programs such as CRS, Tree Center and StormReady.	
Status Description: Yes	The Village continues to review and update building codes as needed.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action S7-3

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# S7—3	Review floodplain regulations to identify feasible enhancements to reduce future risk to flooding.	
Status Description: Yes	The Village continues to review and enforce development in the flood plan.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action S7-4

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# S7—4	Update flood response plan annually.	
Status Description: Yes	Continue to make changes in our flood response plan as needed.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action S7-5

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# S7—5	Provide mitigation rebates	
Status Description: Yes	The Village has committed increased funds to continue to provide flood proofing single family residence. This increase in funding has allow more residence to take advantage of our split the cost program on flood proofing.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action S7-6

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# S7—6	Complete street and sewer repairs and conduct storm water system maintenance.	
Status Description: Yes	Continue to make improvements as funding dictates. Village has replaced and improved storm the storm drainage in certain high hazard areas of the community. We also continue to partner with the MWRD on studies to continue improving our drainage system within the Village.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action S7-7

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# S7—7	Complete special information projects	
Status Description: Yes	In conjunction with the Village Comprehensive Plan we continue to discuss ways to better our info structure through capital improvements.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action S7-8

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# S7—8	Provide additional staff training	
Status Description: Yes	The Village has continued to fund the needed training to employees involved in maintaining our Village Flood Plan.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action S7-9

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# S7—9	Where appropriate, support retrofitting, purchasing, or relocation of structures in hazard-prone areas to prevent future structure damage.	
Status Description: Yes	The Village continues to make recommendations when and where they are needed.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action S7-10

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# S7—10	Continue to support the county-wide actions identified in this plan.	
Status Description: Yes	The Village continues to support CCDHS and this joint effort plan.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action S7-11

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# S7—11	Actively participate in the plan maintenance strategy identified in this plan.	
Status Description: Yes	The Village is committed to updating and following through with this plan.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action S7-12

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# S7—12	Maintain good standing under the National Flood Insurance Program by implementing programs that meet and exceed the minimum NFIP requirements.	
Status Description: Yes	The Village continues to evaluate and implement programs when needed.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action S7-13

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# S7—13	Where feasible implement a program to record high water marks following high-water events.	
Status Description: Yes	The Village actively monitors river gauges located on the Little Calumet River in South Holland and Thorn-Creek in Thornton.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Action S7-14

TABLE: ACTION PLAN MATRIX		
Action Number Action Taken Y/N	Action Item Description	Status (X, O, C, R, N)
# S7—14	Integrate the Hazard Mitigation Plan into other plans, programs, or resources that dictate land use or redevelopment.	
Status Description: Yes	The plan has been integrated in all strategic planning within the Village. Most recently it has been introduced into our Villages Comprehensive Plan.	O
Completion status legend: N = New O = Action Ongoing toward Completion C = Project Completed R = Want Removed from Annex X = No Action Taken		

Completed Mitigation Actions

South Holland has no completed actions at this time.

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

SOUTH HOLLAND EXISTING CONDITIONS	
2010 Population	22,030
Total Assessed Value of Structures and Contents	\$7,021,570,083
Area in 100-Year Floodplain	463.84 acres
Area in 500-Year Floodplain	977.73 acres
Number of Critical Facilities	79

HAZARD EXPOSURE IN SOUTH HOLLAND						
	Number Exposed		Value Exposed to Hazard		Total	% of Total Assessed Value Exposed
	Population	Buildings	Structure	Contents		
Dam Failure						
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%
Flood						
100-Year	42	13	\$27,768,059	\$31,762,580	\$59,530,639	0.85%

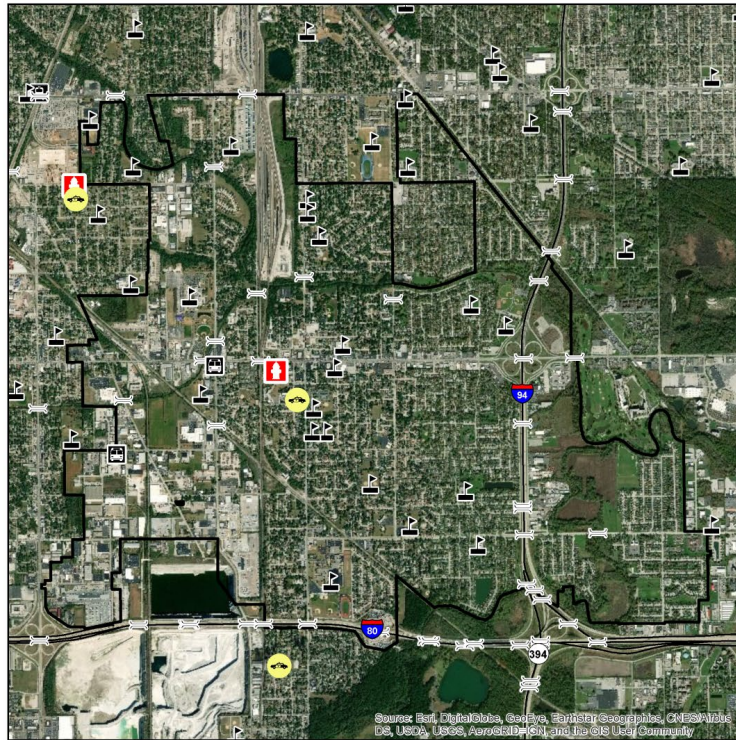
500-Year	3,081	948	\$356,689,883	\$259,978,669	\$616,668,552	8.78%
Tornado						
100-Year	—	—	\$338,381,277	\$240,919,392	\$579,300,669	8.25%
500-Year	—	—	\$1,377,030,578	\$1,199,592,139	\$2,576,622,717	36.70%

ESTIMATED PROPERTY DAMAGE VALUES IN SOUTH HOLLAND

	Estimated Damage Associated with Hazard			% of Total Assessed Value Damaged
	Building	Contents	Total	
Dam Failure				
Buffalo Creek	\$0	\$0	\$0	0.00%
U. Salt Cr. #2	\$0	\$0	\$0	0.00%
Touhy	\$0	\$0	\$0	0.00%
U. Salt Cr. #3	\$0	\$0	\$0	0.00%
U. Salt Cr. #4	\$0	\$0	\$0	0.00%
Earthquake				
1909 Historical Event	\$54,372,501	\$15,431,477	\$69,803,977	0.99%
Flood				
10-Year	\$326,731	\$584,950	\$911,681	0.01%
100-Year	\$846,357	\$2,395,893	\$3,242,251	0.05%
500-Year	\$14,145,607	\$19,887,115	\$34,032,722	0.48%

Tornado				
100-Year	\$33,838,128	\$24,091,939	\$57,930,067	0.83%
500-Year	\$201,046,464	\$175,140,452	\$376,186,917	5.36%

Hazard Mapping

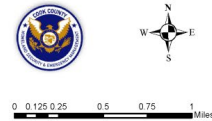


VILLAGE OF SOUTH HOLLAND

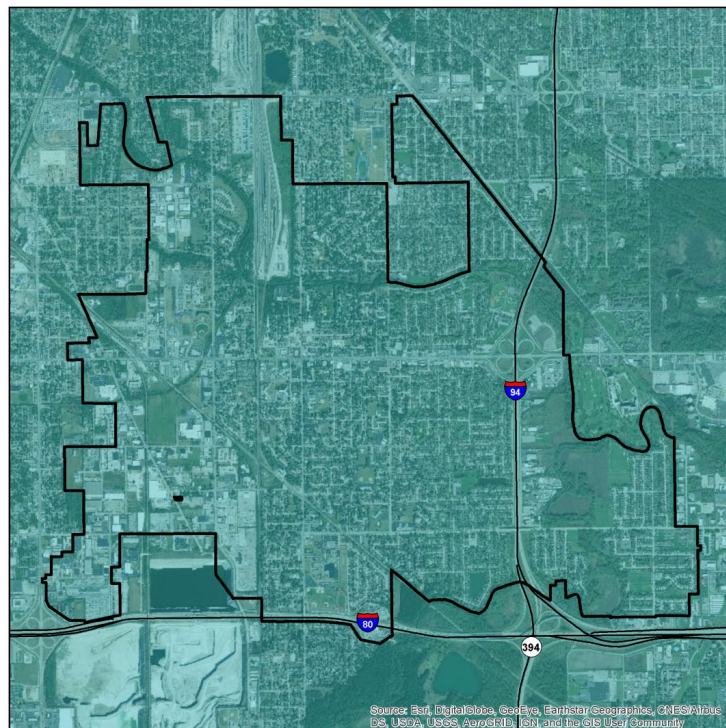
CRITICAL INFRASTRUCTURE

- 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



VILLAGE OF SOUTH HOLLAND

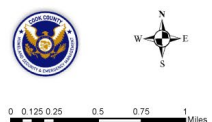
PEAK GROUND ACCELERATION FOR A 100 YEAR EARTHQUAKE EVENT

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

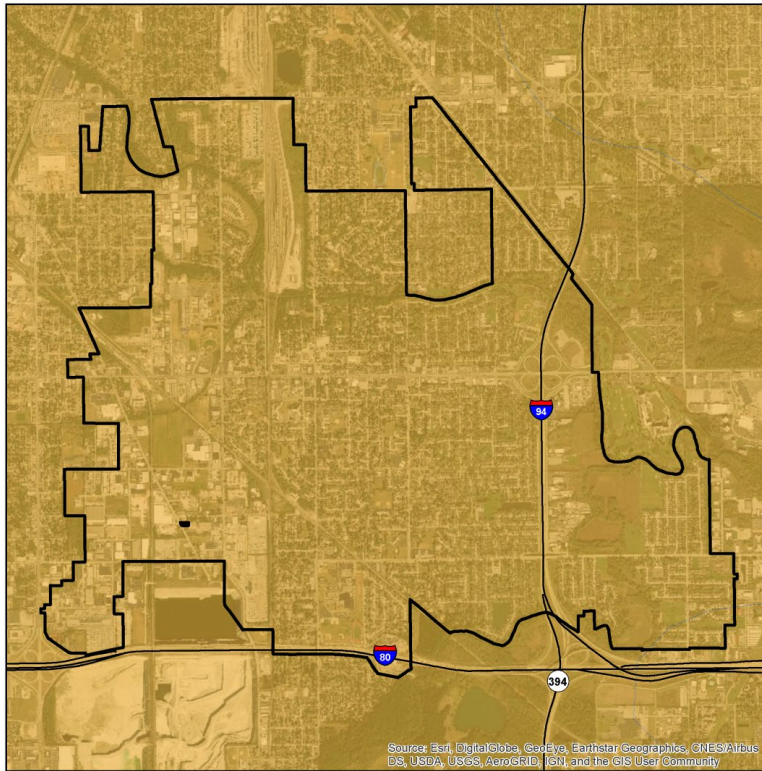
Data provided by the USGS Earthquake Hazards Program and Cook County.

Probabilistic seismic-hazard 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 750 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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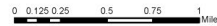
VILLAGE OF SOUTH HOLLAND
NATIONAL EARTHQUAKE HAZARD REDUCTION PROGRAM (NEHRP) SOIL CLASSIFICATION

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

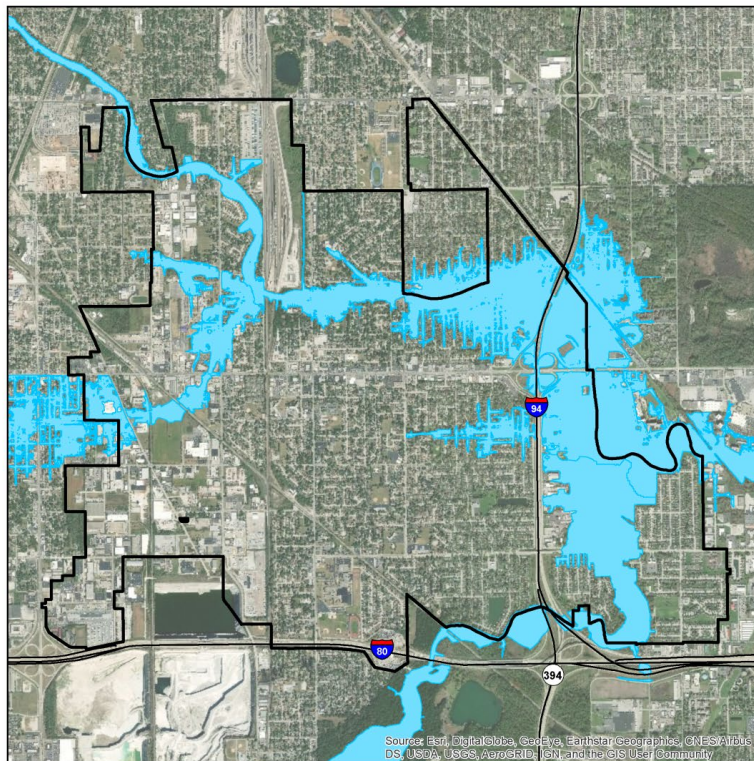
Data provided by the Illinois State Geological Survey and Cook County.

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 II 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 N. Hennell (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



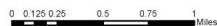
VILLAGE OF SOUTH HOLLAND
COOK COUNTY MWRDGC 100-YEAR INUNDATION AREA

COOK COUNTY MWRDGC 100-YEAR INUNDATION AREA

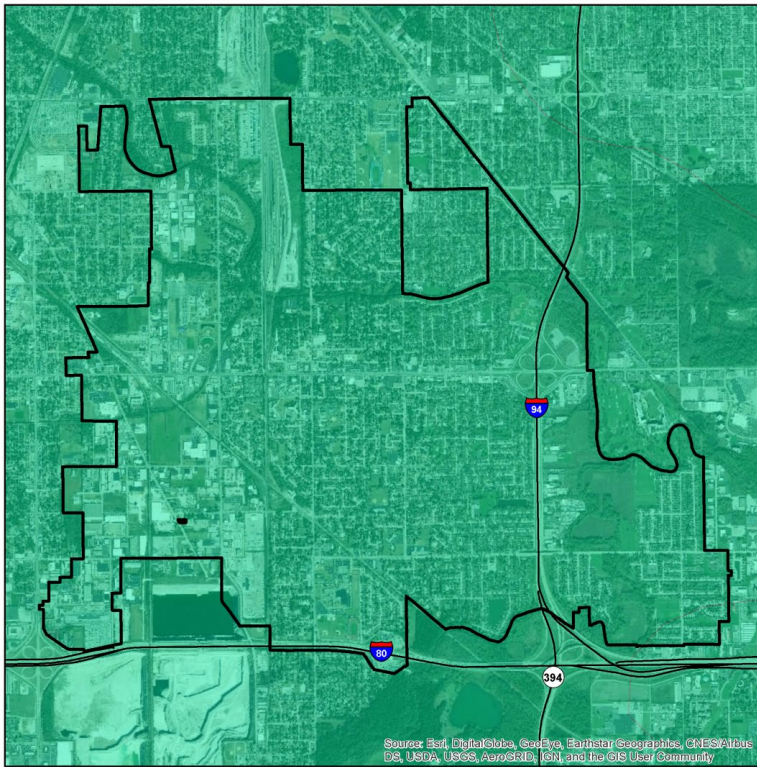
- 100-year Inundation Area

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

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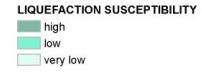


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



VILLAGE OF SOUTH HOLLAND

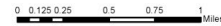
LIQUEFACTION SUSCEPTIBILITY



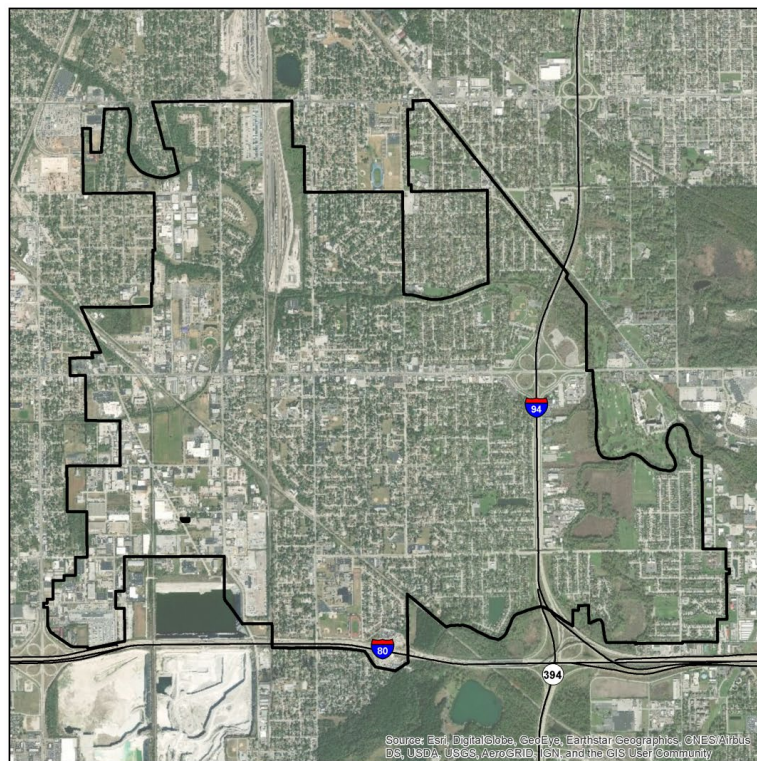
Data provided by the Illinois State Geological Survey and Cook County.

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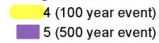
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



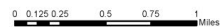
VILLAGE OF SOUTH HOLLAND

100- AND 500- YEAR TORNADO EVENTS

Magnitude



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



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