Chapter 2. Problem Description

2.1 Overbank Flooding

South Holland is subject to overbank flooding from three sources as shown in Figures 2-1 and 2-4. The Little Calumet River (Little Cal) flows through the center of the Village, from east to west. The Little Cal drains northeastern Illinois and northwestern Indiana via several tributaries. At South Holland, the river's watershed is over 200 square miles. A small tributary, Thorn Ditch, drains the central part of South Holland. Its overbank flooding is caused by backwater from the Little Cal.

Thorn Creek flows from the south and joins the Little Cal on the southeast side of town. Thorn Creek collects water from Deer, North, and Butterfield Creeks and Lansing Ditch. The Thorn Creek basin drains over 100 square miles, accounting for over half of the water that enters the Little Calumet at South Holland.

The third stream is the Calumet Union Drainage Ditch, a man-made ditch that drains 18 square miles of the Markham and Harvey areas to the west. It joins the Little Cal in the west part of the Village.

Most of the Village's overbank flood problem is in the Little Calumet River's floodplain. Because the area is so flat, the flooding of one stream is accompanied by flooding on the other two. Therefore, while there are three sources of overbank flooding, the problem will be treated as one floodplain.

2.2 Flooding History

Flooding has occurred along South Holland's streams since the last glacier left Illinois. Early settlers avoided building too close to the rivers. As late as the 1940's, large areas of the south suburbs remained vacant, primarily because it was too marshy to build on. These areas were used by the rivers to carry and hold excess rain runoff and snow melt.

Beginning in the late 1940's, this scene changed as the Chicago area's population expanded to the south. Urban development put pressure on the vacant land along the rivers. The floodplains were built up during the 1950's and 1960's, primarily with single family housing. It was not until the 1970's that local governments passed floodplain management regulations to require the elevation of new buildings in the floodplain. Since then, floodplain development has slowed down, but developers did fill certain floodprone areas for new homes or commercial properties.

In the 1920's, the Calumet-Sag Channel was completed and the Little Cal received an additional outlet. Instead of flowing into the Grand Calumet and Lake Michigan, most of its water now flows west through the Cal-Sag to the Des Plaines River. There are locks on both the Cal-Sag and the Grand Calumet to control low flows.

At the eastern end, Burns Ditch was connected to Lake Michigan in the 1920's. During high flows, the Indiana portion of the Little Cal drains west. These two diversions mark the northwest and eastern limits of the Little Cal's watershed in Figure 2-1.

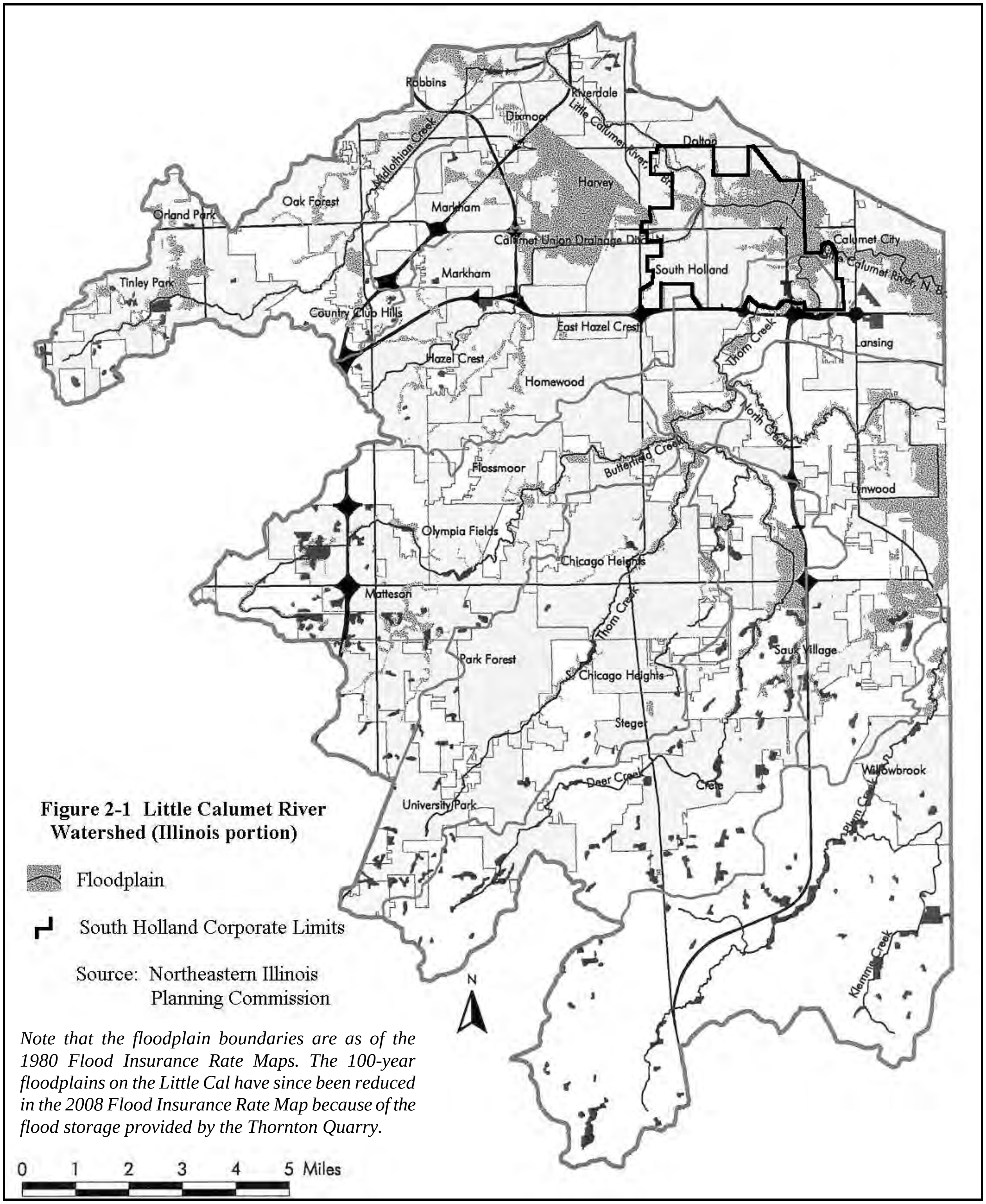


Figure 2-1 Little Calumet River Watershed (Illinois portion)

Floodplain

South Holland Corporate Limits

Source: Northeastern Illinois Planning Commission

Note that the floodplain boundaries are as of the 1980 Flood Insurance Rate Maps. The 100-year floodplains on the Little Cal have since been reduced in the 2008 Flood Insurance Rate Map because of the flood storage provided by the Thornton Quarry.

With post-war growth to the south of Chicago, farmlands were replaced with roofs, parking lots, streets, gutters, storm sewers, and more ditches. With this urban development, a greater volume of rainwater ran off the land and into the rivers and the runoff occurred at a faster pace. As with floodplain regulations, it was not until the 1970's that communities began stormwater management regulations that require developments to restrict their runoff.

In short, while the rivers of the Little Calumet basin flooded in the past, the problem has gotten worse since the 1940's. Until 1981, the worst flood on record for all three streams was in July 1957. Heavy summer storms caused widespread flooding in northeastern Illinois. The subsequent flood on the nearby Kankakee River was estimated at being a 750-year flood.

The 1957 flood was exceeded in 1981 by another flood caused by summer storms. While there was not as much rain as in 1957, the 1981 flood caused much more damage because there was more development. Because so many homes and businesses were affected, the June 1981 flood resulted in a Presidential Disaster Declaration for the area. Another Presidential declaration followed the December 1982 flood.

South Holland's worst flood on record occurred in late November 1990. Heavy local storms caused the Little Cal and its tributaries to rise almost half a foot higher than the 1981 record. Other floods are noted on Figure 2-2.

To reduce flooding in the Chicago suburbs, the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) instituted a major flood planning effort in the 1970's. The culmination of that effort in the South Suburbs came in 2015, when the Thornton Composite Reservoir became operational. The Thornton Quarry Reservoir has already successfully reduced flooding in South Holland and is described in Chapter 4.

2.3 Flood Data

<u>2.3.1 Flood Heights:</u> Flood heights have been recorded since 1947 on a river gage that is currently located at the Cottage Grove Avenue bridge over the Little Calumet. Recorded flood heights can be shown in stage or in elevation. Stage is measured in feet above an arbitrary starting point that was set when the gage was first installed. Elevations are in feet above sea level, using the National Geodetic Vertical Datum of 1929 (NGVD).

"Flood stage" is the elevation at which the river leaves its banks. In 2008, the National Weather Service set 15 feet as the "action stage" and 16.5 feet as the "flood stage" at Cottage Grove. The Weather Services defines "action stage" as the level "where the NWS or a partner/user needs to take some type of mitigation action in preparation for possible significant hydrologic activity". Yards and parks are flooded when the river reaches a stage of 15 feet or an elevation of approximately 590 feet above sea level. Buildings are affected at approximately stage 18.0 or 593 feet above sea level.

The history of flooding prior to the Thornton Transitional Reservoir becoming operational is shown graphically in Figure 2-2. This figure also shows the relation between historic flooding and the post-Thornton Quarry Reservoir 10-, 50- and 100-year floods. For example, the June 2, 1989, flood crested at a stage of 18.6 which is the same as 593.6 feet above sea level, just below the newly rated 100-year flood level.

With the 2008 FEMA Flood Insurance Rate Map, the 100-year flood at Cottage Grove would reach an elevation of 593.7 feet above sea level. The 500-year flood is predicted to crest at an elevation of 596.6, 2.9 feet higher than the 100-year flood. As the river flows from east to west, flood elevations are higher in the east and lower in the west.

Figure 2-2 River Stages: Little Calumet River at Cottage Grove Avenue

Elevation	Event
-- 596.0	Red Flood Response Level
-- 595.5	11/27/90
-- 595.2	6/14/81 and 9/14/2008
-- 595.1	7/14/57
-- 595.0	7/20/96 − Orange Flood Response Level
-- 594.6	12/3/82
-- 594.4	10/11/54
-- 594.2	4/6/47
-- 594.1	2/21/97
-- 594.0	Water reaches buildings on Drexel − Yellow Flood Response Level
− 593.7	12/25/65 and 12/31/72, 100-year Flood (2008 DFIRM)
-- 593.6	6/2/89 and 4/18/13
-- 593.3	5/13/2002
-- 593.2	10/10/54, 590.1 5/29/96
-- 593.0	Thorn Creek begins to cover 170th Street
-- 592.9	3/5/79 and 2/24/85, Water covers Riverview and Drexel
-- 592.7	12/27/65
− 592.5	50-year Flood (2008 DFIRM)
-- 592.0	Flood warning issued
-- 591.5	National Weather Service's "flood stage"
-- 590.9	10-year Flood (2008 DFIRM)
-- 590.0	Water enters Veterans Park, National Weather Service's "action stage"

Note: Elevations are in the National Geodetic Vertical Datum of 1929 (NGVD), to be consistent with past records and the National Weather Service gage. The 2008 Flood Insurance Study and Flood Insurance Rate Map use the North American Vertical Datum of 1988 (NAVD). In NAVD, the 100-year flood is 593.4 at Cottage Grove Avenue, but that converts to 593.74 NGVD.

2.3.2 Areas Affected: The Village experiences different levels of flooding. Unlike other hazards, it can be predicted where a flood will go. Five color-coded flood response levels are used. The levels and the impact of a flood at each level are shown in Figure 2-3, below.

The relation between the levels and past floods are shown in Figure 2-2. The red level is roughly one-half foot higher than the highest flood in recent memory, the flood of November 1990, which crested at an elevation of 595.5 feet. The Village has prepared flood stage forecast maps that show the different areas covered by different flood levels. Maps of each level are available in the Flood Assistance Coordinator's office and are shown in Figure 2-4.

Figure 2-3 Flood Response Levels

	Yellow	Orange	Red	Purple	Black
Stage	19.0	20.0	21.0	23.0	25.0
Elevation	594.0	595.0	596.0	598.0	600.0
Frequency (2000 FIS) *	10-year	1996	1990	100-year	
Frequency (2008 FIS) *	100-year			500-year	
Number of homes affected **	21	83	284	1,925	4,514
Other structures affected **	11	21	30	120	239
Critical facilities affected **	0	1	3	14	38
Streets to be closed **	32	57	84	170	193

* The flood response levels do not change when new studies produce new 100-year flood levels.

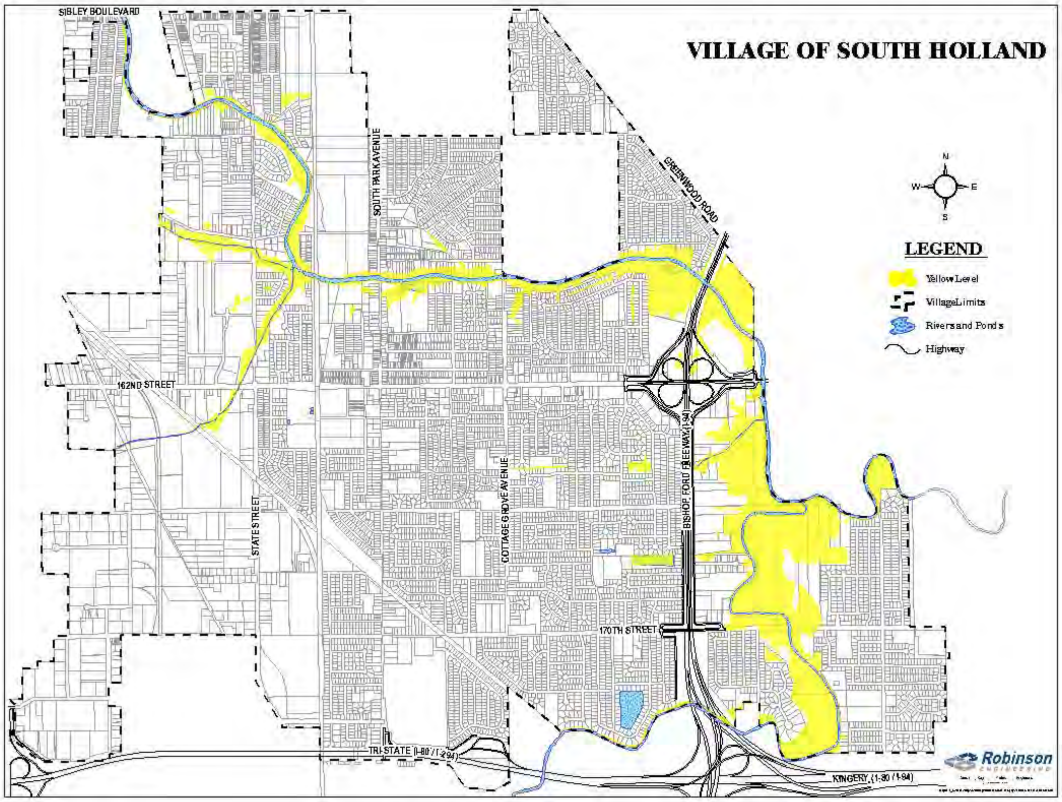
It should be noted that these levels are based on the elevation of flooding at the Cottage Grove gage. The Little Calumet River gage at Cottage Grove is used by the U.S. Geological Survey for recording river levels and by the National Weather Service for reporting predicted flood levels (which is discussed in Chapter 5).

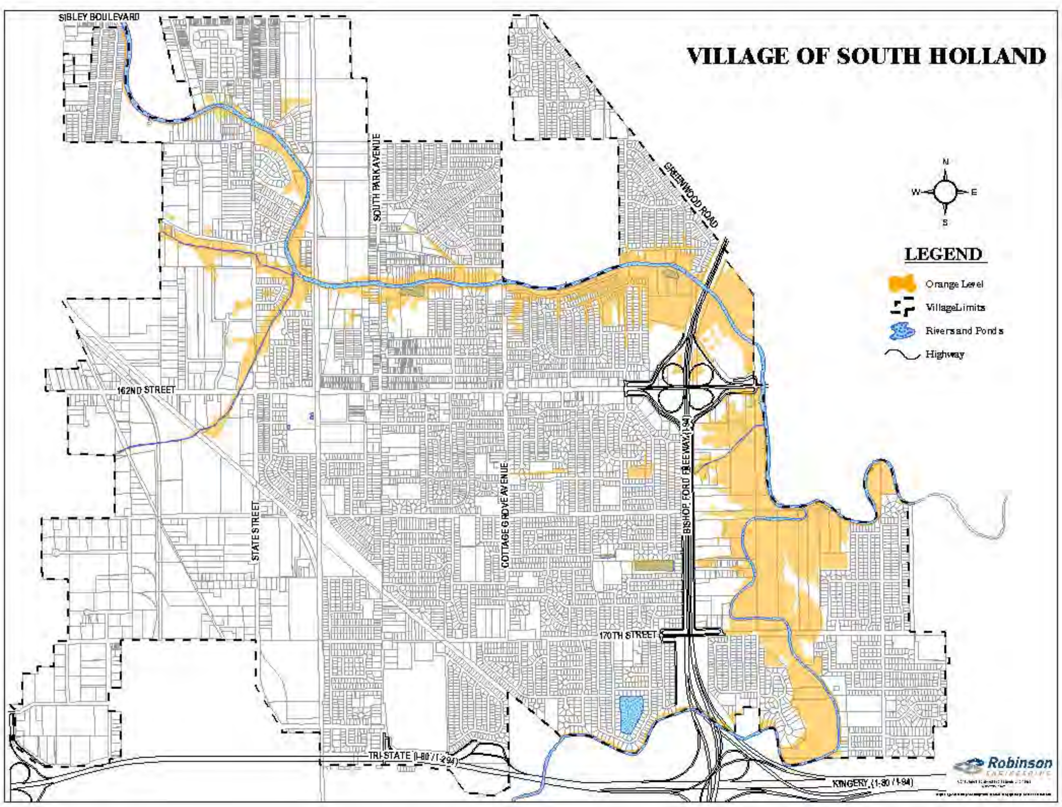
The area affected by the 100- year flood has been mapped on the 2008 Cook County Digital Flood Insurance Rate Map, effective August 19, 2008. The 2008 100-year floodplain falls between the area flooded by flood stage 18 and 19. The fact that the September 14, 2008 flood exceeded the 100-year flood level (and occurred after the Thornton Transitional Reservoir began operation) means that the Village should still pay attention to all possible hazards.

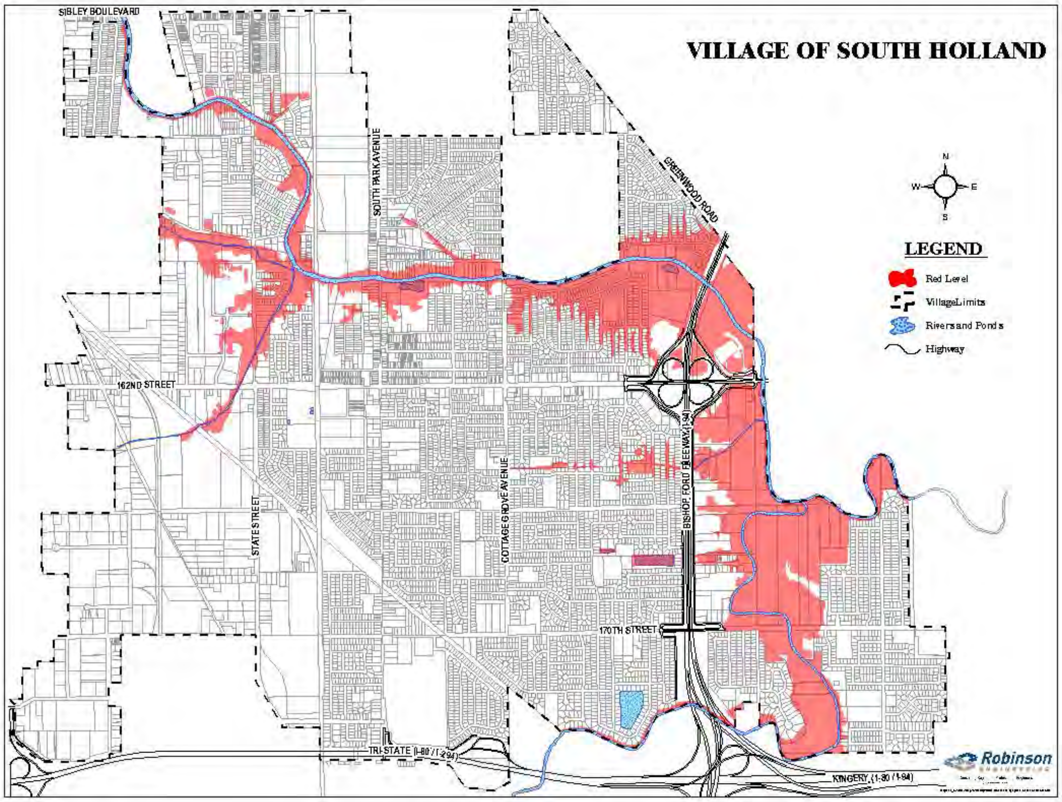
2.3.3 Velocities: Floods move slowly in this flat area. According to the South Holland Flood Insurance Study, the highest average floodway velocity during the 100-year flood is 2.5 feet per second. At most locations on the three streams, the 100-year velocities are less than two feet per second. On the Cal Union Ditch, velocities are less than one foot per second.

Velocity as a hazard is related to flood depth. For example, the common rule of thumb is that an adult can walk through a flooded area one foot deep and running at three feet per second or three feet deep moving at one foot per second. Most buildings can withstand velocities of up to five or six feet per second without structural damage. Therefore, the velocity hazard in South Holland is relatively low.

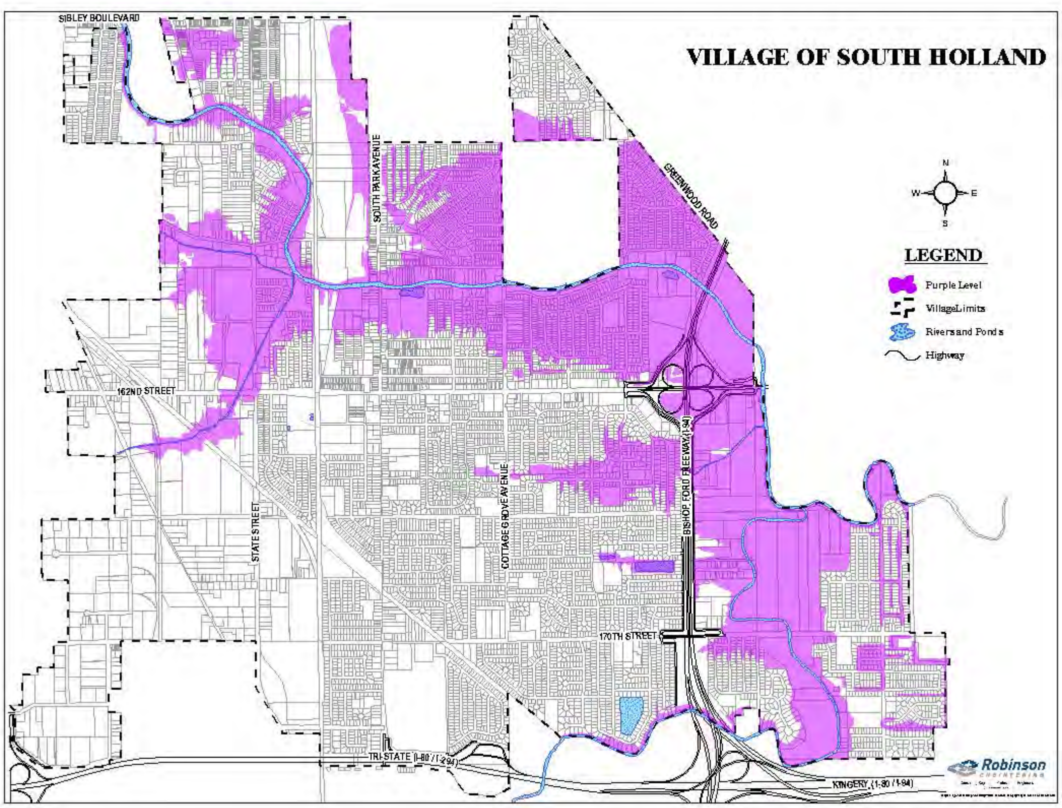
Figure 2-4 Yellow, Orange, Red, Purple, and Black Level Floodplains



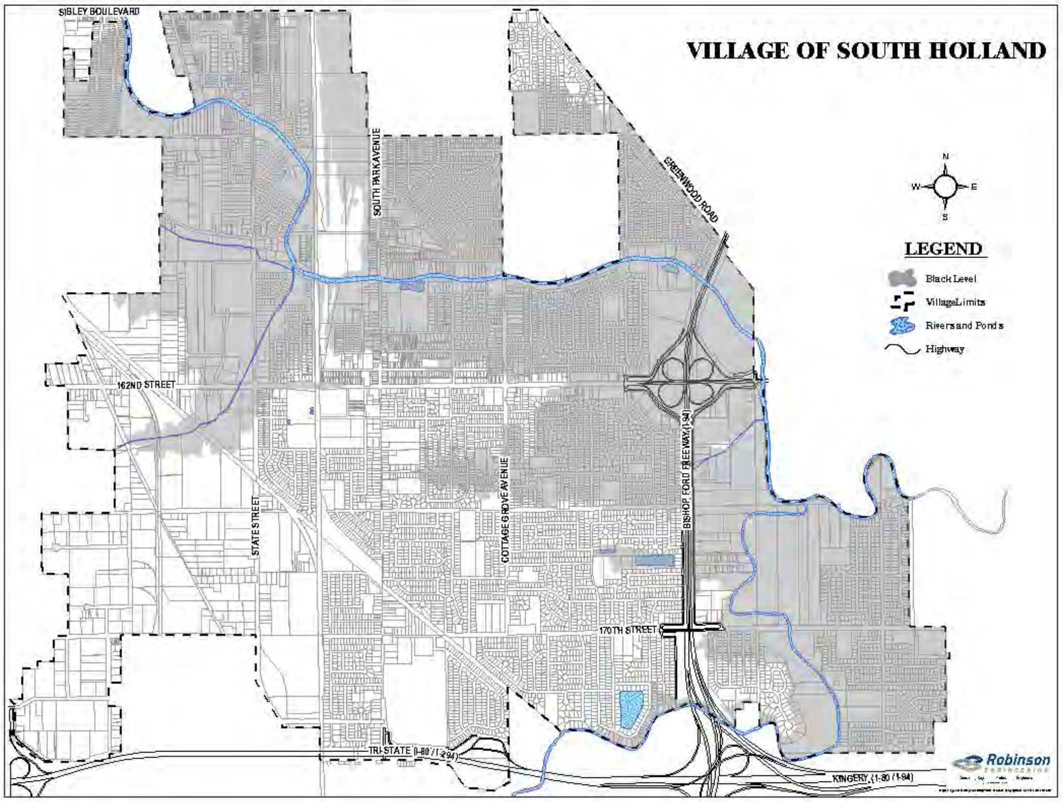




VILLAGE OF SOUTH HOLLAND
LEGEND
Red Level
Village Limits
Rivers and Ponds
Highway
SIBLEY BOULEVARD
SOUTH PARK AVENUE
GREENWOOD ROAD
162ND STREET
STATE STREET
COTTAGE GROVE AVENUE
BISHOP FORD FREEWAY (I-94)
170TH STREET
TRI-STATE (I-80 / I-294)
KINGERY (I-80 / I-94)
Robinson

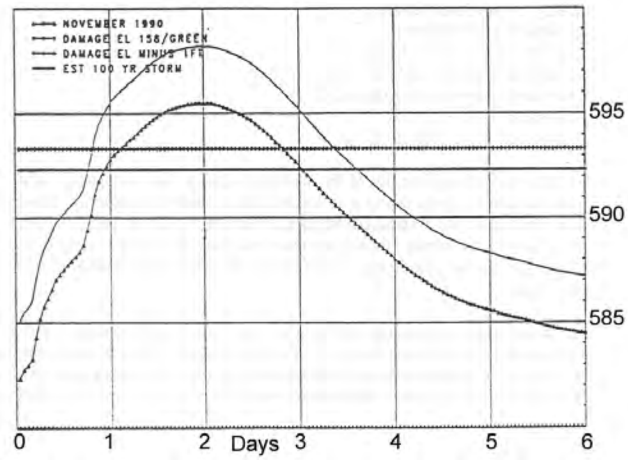


VILLAGE OF SOUTH HOLLAND
LEGEND
Purple Level
Village Limits
Rivers and Ponds
Highway
SIBLEY BOULEVARD
SOUTH PARK AVENUE
GREENWOOD ROAD
162ND STREET
STATE STREET
COTTAGE GROVE AVENUE
BISHOP FORD FREEWAY (I-94)
170TH STREET
TRI-STATE (I-80 / I-294)
KINGERY (I-80 / I-94)
Robinson


VILLAGE OF SOUTH HOLLAND
SIBLEY BOULEVARD
SOUTH PARK AVENUE
GREENWOOD ROAD
N
W
E
S
LEGEND
Black Level
Village Limits
Rivers and Ponds
Highway
162ND STREET
STATE STREET
COTTAGE GROVE AVENUE
BISHOP FORD FREEWAY (I-94)
170TH STREET
TRI-STATE (I-80 / I-294)
KINGERY (I-80 / I-94)
Robinson

2.3.4 Rate of Rise and Duration:
Because of the urbanized watershed, stormwater runs off quickly. Figure 2-5 is a hydrograph of the 1990 flood. It shows that the 1990 storm caused overbank flooding to reach buildings in less than 24 hours. The river kept rising for another 24 hours.

Figure 2-5 Little Calumet River Hydrograph
Source: Dolton-South Holland Flood Study, Appendix 1, Robinson Engineering Ltd., 1992



Because of the flat terrain, it takes a while for the waters to recede. After the Little Cal crested in 1990, it took 24 hours to stop flooding houses and 2-3 more days to get back in its banks. In other words, the river was out of its banks for a total of five days and in buildings for two of those days.

2.4 Impact of Flooding

2.4.1 Building Damage: Dependable damage data on historic flooding is hard to obtain. The 1990 flood affected an estimated 400-500 buildings. In 1996 a count of buildings in the mapped 100-year floodplain was enabled with the new Geographic Information System. It was found that there were approximately 2,000 properties in the 100-year floodplain, according to the 1980 FIRM. A count following the issuance of the 2008 DFIRM found 45 houses and no commercial structures in the mapped 100-year floodplain.

After a review of flood loss estimates in the area and adjusting for inflation, it is estimated that it costs $28,000 to repair a home with an unfinished basement that was flooded with one foot of water over the first floor. This figure accounts for debris removal, cleaning, repairing the floors, replacing walls, insulation, wooden doors, electrical services, furnace, washer, dryer, and contents. It assumes no damage to the foundation, the garage or landscaping.

Extrapolating on this figure, a 100-year flood would cause $1,260,000 in damage to the 45 residential buildings. There would also be damage to utilities and public facilities, such as streets and parks, and loss of business due to flooded streets.

Critical Facilities: “Critical facilities” are those properties that, if flooded, would result in severe consequences to public health and safety. The Village’s Flood Warning and Response Plan identifies no critical facilities in the post-2008 Special Flood Hazard Area. However, there are 33 such facilities in the different flood levels, up to Level Black. These are listed in Figure 2-6. This list is subject to updating as property uses change.

Some facilities are critical because of the need to safeguard their occupants. It is relatively easy to evacuate schools with several hours flood warning time. However, it is a major decision to evacuate a nursing home because the move can be perilous to the residents. Other facilities, such as gas stations (even vacant ones) may contain hazardous materials that would increase the health and safety danger to the community if it was flooded.

Figure 2-6 Floodprone Critical Facilities		
Flood Level	**Facility**	**Address**
Orange	Eisenhower School	16001 Minerva Avenue
Red	Love's Travel Stop	1533 East 162nd Street
Red	Arden Courts	2045 East 170th Street
Red	Christ Our Savior Catholic School	900 East 154th Street
Red	Family Life Child Development Center	15924 South Park Avenue
Red	Madison School	15656 Orchid Drive
Red	Manor Care Health Services	2145 East 170th Street
Red	Paarlberg's Inc	1840 East l72nd Street
Red	Phoenix Court Residence	17312 Clyde Avenue
Red	South Suburban College	15800 State Street
Red	Windmill Nursing Pavilion	16000 Wabash Avenue
Black	Accurate Dispersions Bldg #1	192 West 155th Street
Black	Accurate Dispersions Bldg #2	189 West 155th Street
Black	Accurate Dispersions Bldg #3	15530 LaSalle Street
Black	Accurate Dispersions Bldg #4	15600 LaSalle Street
Black	American Piping Products, Inc.	15801 Van Drunen Road
Black	BP Products North America, Inc.	951 East 162nd Street
Black	Calderone Roofing	15815 Van Drunen Road
Black	Calvary Academy	16300 State Street
Black	Calvary Academy Day Care	16360 State Street
Black	Calvin Christian School	528 East 161st Place
Black	E.C.H.O. School	350 West 154th Street
Black	First Step Day Care	15045 State Street
Black	Gas Depot	15 East Sibley Blvd.
Black	Gurtler Industries, Inc.	15475 LaSalle Street
Black	Holland Terrace	15175 State Street
Black	Marathon	1144 East 162nd Street
Black	Martin Produce	160 West 154th Street
Black	Midwest Transit Equipment, Inc.	16725 Van Dam Road
Black	Protestant Reformed Christian School	16511 South Park Avenue
Black	South Holland Gas Mini Mart, Inc.	16200 State Street
Black	South Holland Marathon	151 West Sibley Blvd.
Black	Zion Buds of Promise Christian Academy & Day Care	14875 Wallace Avenue
	Aim National Lease	16055 Van Drunen Road
	Greenwood School	16801 Greenwood Avenue
	Happy Days Child Care Center	831 East 162nd Street
	Grease Monkey	720 East 162nd Street
	Tibstra House	271 East 161st Street

Another type of critical facility are streets and bridges. There are two railroad and eight road bridges across the Little Cal and Thorn Creek, all of which would be under water during the red flood response level flood. In 1990, the Bishop Ford Expressway (Interstate 94) was flooded and had to be closed temporarily. Streets are flooded at many locations, often before the bridges themselves are under water. A count of streets that will be closed at each of the five colored flood response levels is included in Figure 2-3.

While these locations are critical to traffic flows, early warning can result in barricades and traffic control that minimize the actual danger to people and property. On the other hand, blocked streets can prevent access to properties by emergency vehicles, increasing the threat to flooded and isolated properties. The 1975 Little Calumet Plan put a dollar figure on the cost of traffic disruption. Based on the driver's lost work time and vehicle operating costs and updated for inflation, it is estimated that each vehicle detoured costs $40.00 per hour.

2.4.3 Indirect Impacts: Floods cause other problems that aren't so easy to identify or measure. They disrupt businesses which must be closed when they are flooded, they lose their inventories, people can't get to them or the employees are busy protecting or cleaning up their flooded homes. Several South Holland businesses closed temporarily after the floods. After the 1990 flood, one of them closed for good, primarily because of the cost of flooding to the building and inventory.

Besides the lost income, there are costs to fight the floods, find temporary housing, and clean up. Repetitively flooded areas tend to deteriorate over time and property values go down.

Three general types of health problems accompany floods. The first comes from the water itself. Floodwaters carry whatever was on the ground that the stormwater runoff picked up, including dirt, oil, and farm and industrial chemicals. In the 1990 flood, one nearby community found PCBs after the waters receded.

The second health problem comes after the water is gone. Stagnant pools become mosquito breeding grounds and wet, uncleaned, areas of a building breed mold and mildew. A house that is not thoroughly and properly cleaned becomes a health hazard, especially for small children and the elderly.

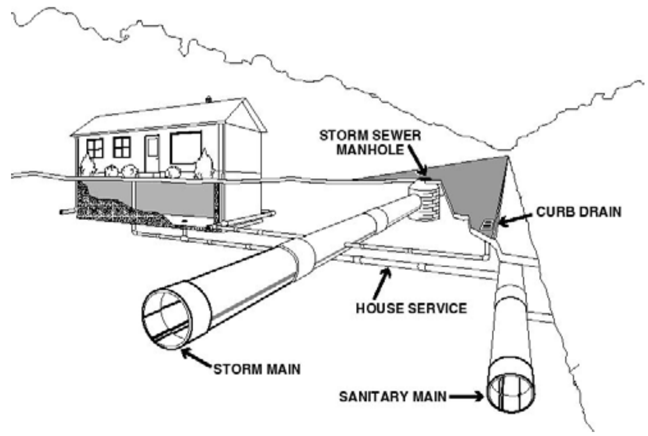
The third problem is the long term psychological impact of having been through a flood, seeing one's home damaged and irreplaceable keepsakes destroyed. The cost and labor needed to repair a flooded home puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated health and mental health problems.

2.5 Sewer Backup

2.5.1 Causes: Too much stormwater can overload a sewer. With no place to go, sewers back up and flow out of the lowest opening in the sewer line. Figure 2-7 shows that sanitary sewers back up into basements and storm sewers back up into streets.

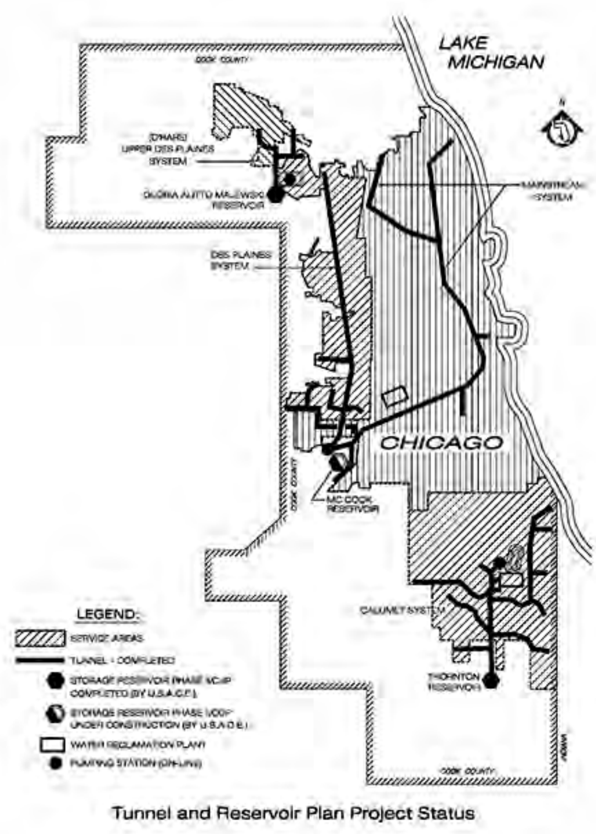
Most of South Holland is served by separate storm and sanitary sewers, as shown in Figure 2-7. Storm sewers are supposed to take stormwater. Too much stormwater backing up into the streets is a nuisance, but not a major problem. Sanitary sewers are not supposed to take stormwater. Increased flows in sanitary sewers increase the cost of treatment. Overloaded sanitary sewers backing up into basements are a major problem in property damage and health hazards.

Figure 2-7 Storm and Sanitary Sewer Schematic



Stormwater enters sanitary sewers through cracks in the pipes or manholes, deteriorating pipes and joints, breaks in nearby storm sewers, cross connections to storm sewers, and direct connections to downspouts, sump pumps, and driveway drains. "Infiltration" is groundwater entering the sewers through cracks. "Inflow" is stormwater directly entering the sanitary sewers from other sources. Infiltration and inflow ("I/I") results in flooded basements in those areas served by separate sewers.

Figure 2-8 Tunnel and Reservoir Plan Map



The older parts of South Holland are served by combined storm and sanitary sewers. Stormwater is supposed to enter the combined sewers but these systems can be overloaded also. Now that the Thornton Composite Reservoir portion of the Tunnel and Reservoir Plan (TARP) project is complete, the combined sewers should be better equipped to handle wet weather flows. The high flows are now stored in the Thornton Composite Reservoir and stormwater that has been diverted to this location is pumped to the Calumet Water Reclamation Plant for treatment.

2.5.2 Areas Affected: Sewer backups can occur during very localized storms in any part of the Village. While many basements were flooded during the November 1990 storm and flood, many have flooded at other times. Two separate storm events on July 29 and August 20 of 2016 resulted in over 100 properties experiencing flooding due to sewer backups. Although there have not been any major sewer improvement projects in the last 20 years, the Village has attempted to mitigate sewer backups through the flood protection rebate program. Through this program, the Village has funded projects that included the installation of overhead sewers or backup valves in Village homes.

2.5.3 Impact: Backed up sewers cause two types of damage. By getting items wet with dirty water, it can effectively destroy many basement contents. Finished basements, with carpeting and furniture, are especially susceptible to damage. Even in unfinished basements, water damages washing machines, dryers, furnaces, water heaters, etc.

The second type of damage comes from the sewage in the water. Backed up sewers create a significant health problem, even in empty basements. Clean up must be careful and thorough to ensure there are no lingering hazards. The health, mental health, and noneconomic impacts are similar to those described for overbank flooding in Section 2.4.3.

2.6 Local Drainage and Ponding

2.6.1 Causes: Stormwater flows downhill to the ditches and rivers. This is difficult to do in very flat areas. Rain runoff flows to the nearest depression and collects until it can evaporate or soak into the ground. Heavy rains or saturated grounds overload this drainage pattern and the water sits for hours or days. This is called “ponding” and is a common problem in flat Illinois.

Another source of local drainage problems is backed up storm sewers. Storm sewers are installed to drain streets and ponding areas. When they are blocked or overloaded by heavy rains, the drainage system is plugged. Again, stormwater sits for hours or days, waiting for the sewers to clear. Both of these types of drainage problems occur throughout the Village. They are not limited to the floodplain.

2.6.2 Areas Affected: As with sewer backups, ponding can occur during very localized storms in any part of the Village.

2.6.3 Impact: Many consider flooded streets and yards as nuisance flooding. Generally, the water does not reach or damage a building. In some cases, yard ponding will cause or aggravate basement flooding. Street ponding is usually not severe enough to close a street to traffic, at least not to emergency vehicles.

2.7 Flood Insurance Claims and Repetitive Losses

2.7.1 Flood Insurance Claims: The National Flood Insurance Program (NFIP) provided the Liaison Committee with a list of insurance claims for the period 1978-2016. During that time, FEMA has paid 482 claims for a total of $2,319,000. The amount of claim payments ranged from $20 to $52,000. The average payment was $4,800.

The number of claims and average payments for the major floods are shown in Figure 2-9. Note that the height of the floods did not differ much. However, the average payment for the floods with a stage of 20 or higher went up. This reflects the rising cost of flood damage over the years. The increase in the number of claims for these floods is also significant. It reflects the increased amount of flood insurance coverage, which is likely due in part to the Village's public information efforts, since the floodplain boundary did not change from 1980 to 2008.

Figure 2-9 Flood Insurance Claim Payments

Flood	Flood Stage	Claims Paid	Average Payment
June 1981	20.2	16	$2,812
December 1982	19.6	14	$4,096
July 1983		11	$3,268
November 1990	20.5	38	$5,304
July 1996	20.0	49	$4,452
July 2003		48	$3,337
October 2006		15	$3,665
January 2008		13	$4,687
September 2008	20.2	159	$6,465
April 2013	18.4	14	$5,850

2.7.2. Repetitive Losses: A "repetitive loss property" is one which has received two flood insurance claim payments for at least $1,000 each over any ten-year period since 1978. These properties are important to the National Flood Insurance Program (NFIP) because almost $12.5 billion have been paid to repetitive loss properties. Currently, repetitive loss properties are approximately 1% of all policies, but they account for about 25-30% of all NFIP claims.

South Holland has 17 repetitive loss properties. The number of repetitive loss properties has decreased from 40 to 17 since the last Plan update.

The 17 properties have been grouped into 15 repetitive loss areas, which are listed in Figure 2-10. The addresses of the repetitive loss properties cannot be made public due to the Privacy Act. However, there is a need to plot the areas around the repetitive loss properties, including those properties that are similarly situated, but for whatever reason have not made it to FEMA's list (e.g., no flood insurance policy at the time of the first flood).

Figure 2-10 Repetitive Loss Areas

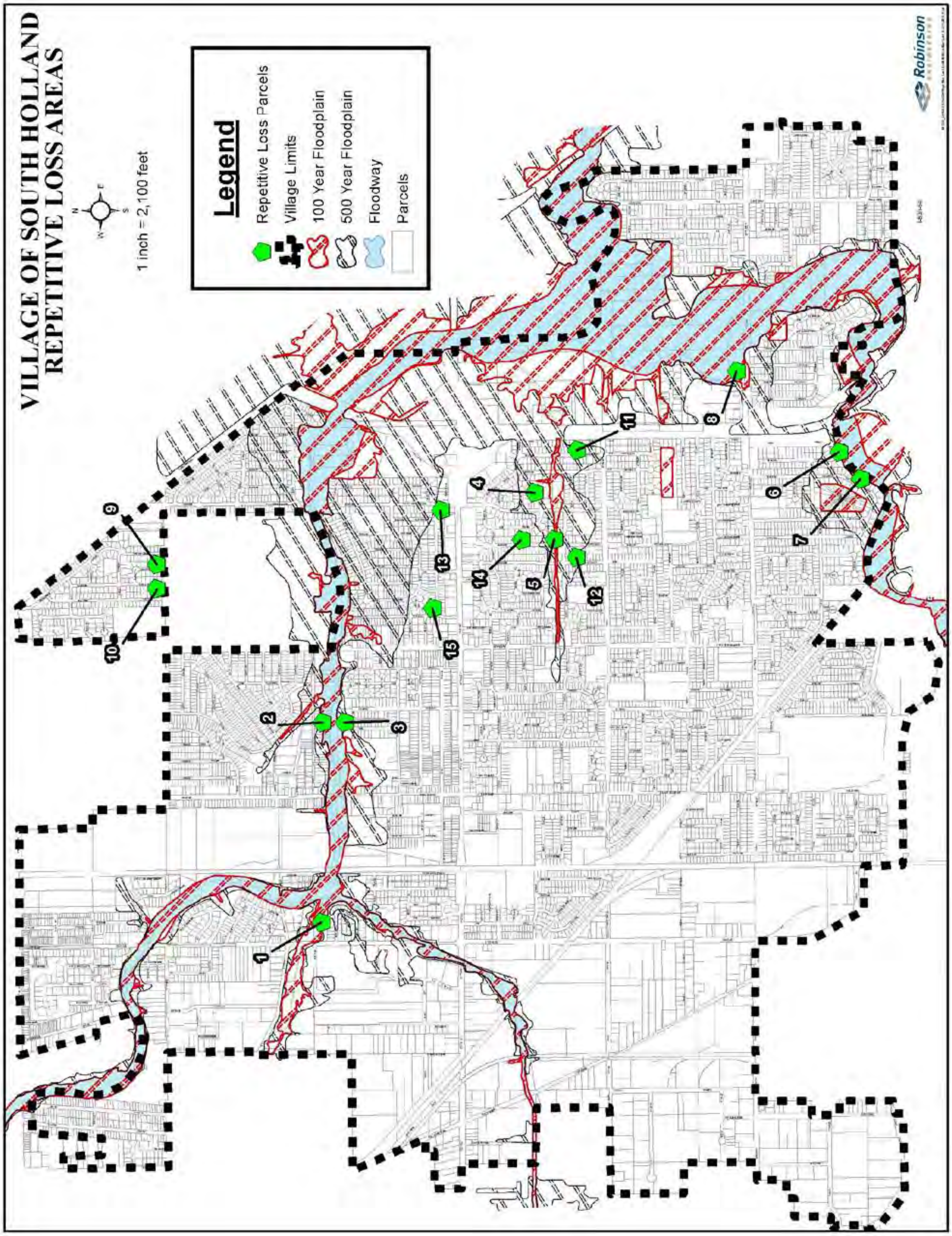


Figure 2-11 includes the 17 FEMA repetitive loss properties, neighboring properties that have had claims (but do not meet the threshold required for a repetitive loss property designation), and other nearby properties with similar flooding conditions.

In all, there are 84 properties in South Holland's 15 repetitive loss areas. 5 of the 15 areas have only one property, as the building is particularly low or otherwise exposed to flooding that does not reach its neighbors.

Figure 2-11 Repetitive Loss Areas

Map #	Cause of repetitive flooding	Number of Properties			
		FEMA List	Other Claims	Neigh-boring	Total
1	Overbank from Little Calumet River	1			1
2	Overbank from Little Calumet River	1	8	8	17
3	Overbank from Little Calumet River	1	2	4	7
4	Local drainage/overbank from Thorn Ditch	3	2	5	10
5	Local drainage/overbank from Thorn Ditch	1	8	1	10
6	Overbank from Thorn Creek	1	1	2	4
7	Overbank from Thorn Creek	1		7	8
8	Overbank from Thorn Creek	1		1	2
9	Local drainage/sewer backup	1			1
10	Local drainage/sewer backup	1			1
11	Local drainage/overbank from Thorn Ditch	1		5	6
12	Local drainage/overbank from Thorn Ditch	1	5	6	12
13	Local drainage/sewer backup	1	2		3
14	Local drainage/sewer backup	1			1
15	Local drainage/sewer backup	1			1
	Total Unmitigated Properties	17	28	39	84

Table 2-12 summarizes the repetitive loss data by source of flooding.

Figure 2-12 Repetitive Flooding Sources

Flooding Source	Areas	Properties
Overbank from Little Calumet River	3	22
Overbank from Thorn Creek	3	11
Local drainage/overbank from Thorn Ditch	6	32
Local drainage/sewer backup (outside floodplain)	5	2
Total (unmitigated)	17	67

The Department of Planning, Development and Code Enforcement has the complete list of addresses, which cannot be included in this plan because of the Privacy Act. A requirement of participating in the Community Rating System is that all 84 properties be sent a notice each year that advises the occupant of the repetitive flood hazard and provides ideas on how the property can be protected.

<u>2.7.3. Repetitive Loss Mitigation:</u> It should be noted that the Village has worked diligently to mitigate the damage caused by repetitive flooding. The major projects have been the Thornton

Transitional Reservoir, which has reduced flooding on Thorn Creek and the Little Calumet River (covered in Chapter 4) and the Flood Assistance Program and rebate which focuses on reducing shallow drainage and sewer backup problems (covered in Chapter 7). This *Floodplain Management Plan* is, in effect, a repetitive loss mitigation plan.

2.8 Conclusions and Planning Considerations

Chapter 2 summarizes South Holland's three types of flood problems. The summary is based on available information. While some of the data regarding ponding may be incomplete, the information does show some patterns that are important to the design of a floodplain management plan. The key considerations are:

a. South Holland is subject to several different types of surface and sewer flooding problems during and after storms. These problems result in property damage, economic disruption, and health and mental health repercussions. A comprehensive floodplain management program should address all three types of problems.

b. While flooding affects areas throughout the Village, those closest to the Little Calumet River and its two tributaries are subject to the deepest flooding. Therefore, a flood protection program should put those properties shown in the Yellow flood response level floodplain in Figure 2-4 as a high priority.

c. While it is not as damaging to property, sewer backup flooding is more frequent and presents just as great a health hazard. Therefore, a flood protection program should put sewer backup protection as a high priority.

d. The severity of the next flood cannot be predicted. Therefore, to provide a sufficient level of protection and to be consistent with other programs, the Village should prepare a plan based on protecting property to the 100-year flood level. Critical facilities should be protected to the 500-year flood level, which equates to the purple level of flooding.

e. South Holland's floods have a short and long-term impact on physical health and mental health. A flood protection program should address these concerns in addition to protecting buildings, streets, and public facilities.

f. Flooding in South Holland should not be a life-threatening situation. However, people have died during floods in neighboring communities due to carelessness. A flood protection program should include an information or education element to prepare people for the threat to life.

g. A flood protection program should include measures to protect new construction from increased damage expected from future flooding.

h. Repetitive flooding is a problem for both the Village and the National Flood Insurance Program. This *Floodplain Management Plan* should be considered as the official repetitive loss plan needed for Community Rating System recognition.

2.9 References

- Dolton-South Holland Flood Study, Robinson Engineering, Ltd. 1992.
- Flood insurance claims records, Federal Emergency Management Agency, 2016.
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