



RainReady Calumet Corridor, IL

Plan

CNT



RainReady Calumet Corridor, IL Plan



**US Army Corps
of Engineers®**

**PREPARED BY
THE CENTER FOR NEIGHBORHOOD TECHNOLOGY
AND THE U.S. ARMY CORPS OF ENGINEERS**

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EXECUTIVE SUMMARY

Purpose of the RainReady Plan

From more intense storms and chronic urban flooding to economic constraints and aging infrastructure, communities across the nation must find ways to thrive in the midst of shocks and stresses.

In April 2013, Cook County experienced a massive shock in the form of a severe rain and wind storm that resulted in severe damages to housing and infrastructure. One of the hardest hit parts of the county is an area referred to as the Calumet Corridor, which includes the communities Blue Island, Calumet City, Calumet Park, Dolton, Riverdale, and Robbins. The purpose of the RainReady Calumet Corridor Plan is to articulate a shared vision to put these six communities on a path towards greater resilience through improved stormwater management, sustainable economic development, and integrated planning.

The RainReady Calumet Corridor Plan represents the collective vision of over 2,100 residents, business owners, and municipal staff, elected representatives, regional leaders, and non-governmental organizations that all have a shared interest in strengthening the homes, neighborhoods, communities throughout the Calumet Corridor. Each of the six Calumet Corridor communities has a unique path ahead and this plan will support that journey by:

- Establishing a shared understanding of the scope, severity, and type of flooding risks across each community in the Calumet Corridor
- Identifying and prioritizing—through a collaborative planning process—RainReady solutions that provide multiple benefits to the community
- Providing municipal and community leaders with a clear roadmap for plan implementation
- Advancing existing planning and development priorities that align with the general principles of a RainReady community



“Urban Resilience is the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience.”

- www.100resilientcities.org

Building on the success of the RainReady Community Planning model in the Village of Midlothian, the Center for Neighborhood Technology (CNT) partnered with the U.S. Army Corps of Engineers (USACE) to lead this planning process beginning in February of 2016.

Urban Flooding happens when water inundates property in a built environment, particularly in more densely populated areas, caused by rain overwhelming the capacity of local drainage systems, such as storm sewers (CNT, 2015). Urban flooding occurs when homes, yards, or streets are inundated with water from heavy rains or melting snow, damaging property, and making travel difficult and dangerous. It also results from sewer water backing up through pipes into basements, and from water seeping through foundation walls.

The Problem

The Calumet Corridor is facing a set of complex and interrelated challenges. The area is vulnerable to big storms, as in April 2013, as well as the pervasive, chronic impacts of urban flooding.

Urban flooding is the inundation of property in a built environment, particularly in more densely populated areas, caused by rain overwhelming the capacity of local drainage systems, such as storm sewers (CNT, 2015). Urban flooding occurs when homes, yards, or streets are inundated with water from heavy rains or melting snow, damaging property, and making travel difficult and dangerous. It also results from sewer water backing up through pipes into basements, and from water seeping through foundation walls.

Flooding in the Calumet Corridor can generally be attributed to four primary factors:

- The region's flat, low-lying, and naturally wet topography
- Historical patterns of land development that covered natural lands with impervious surfaces
- A changing climate, characterized by high-intensity storms
- Aging and undersized infrastructure throughout the region

In addition to the physical factors that contribute to urban flooding, there are also social, economic, and operational roadblocks that complicate the process of

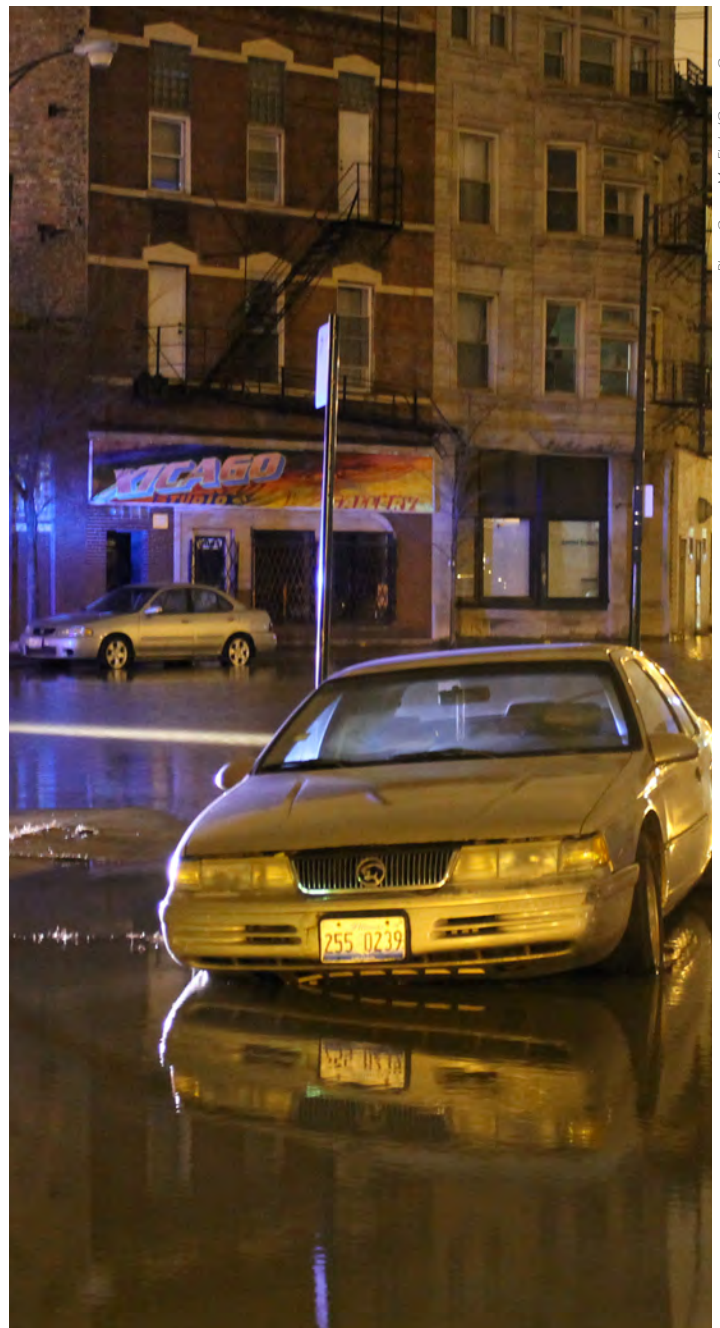
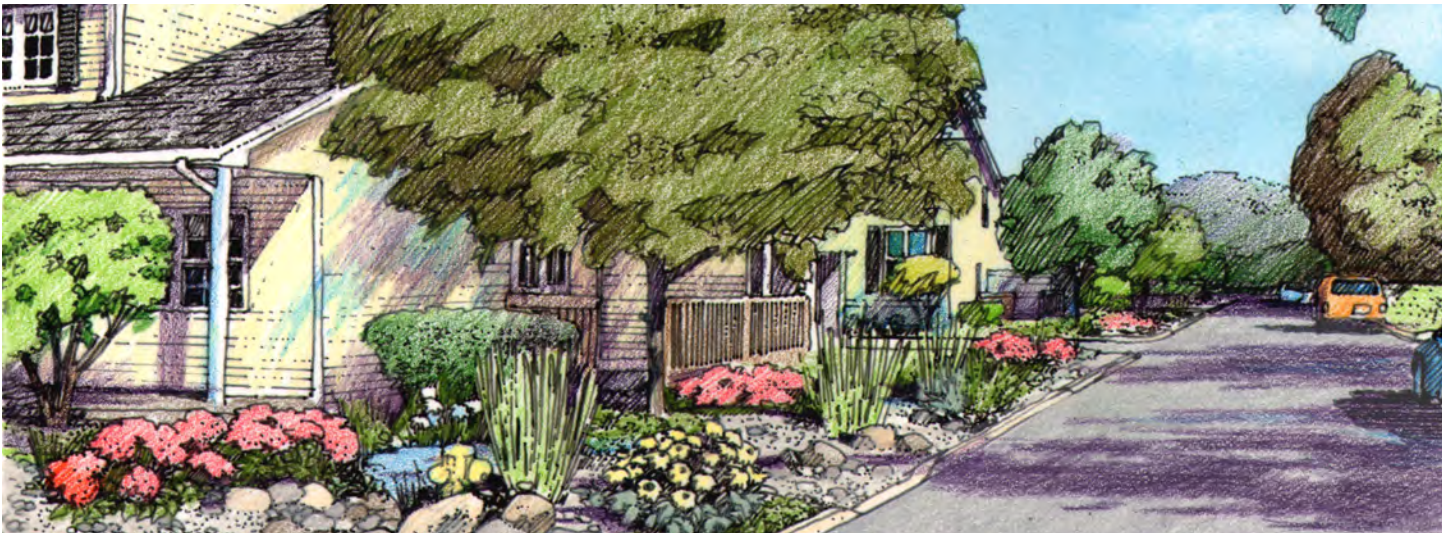


Photo: Connie Ma, Flickr/Creative Commons

planning and implementing effective solutions. These roadblocks include, among others: the high costs associated with understanding how water flows in an urban environment and designing effective flooding solutions; barriers to collaboration within and between communities; fiscal and capacity constraints; and local policies that may not be aligned with the goals of building more resilient communities.

This plan takes into account both the physical drivers of urban flooding, as well as the complex factors that either enable or impede a path towards greater community resilience.



The Path Ahead

A RainReady future for the Calumet Corridor is well within reach. Although this plan was prompted by the *problem* of urban flooding, the path ahead will build upon—and strengthen in turn—each community’s unique strengths, or *assets*. In fact, each of the six communities in the Calumet Corridor possesses the foundational community assets, strengths, and know-how necessary to mitigate flooding and achieve broader community goals.

By bringing flooding challenges and solution opportunities into the light, creating venues for collaboration, and outlining a clear roadmap for implementation, this plan—and the planning process through which it was developed—aims to support each community’s path towards a resilient revitalization.

We have organized our recommendations in this plan into a framework for action across scales and institutions. “The Three R’s” of resilience are:

- **Reorient communities.** Put communities on a path towards greater resilience by reorienting day-to-day operations and long-term planning.
- **Repair existing infrastructure.** Establish modernized infrastructure systems that allow communities to survive and thrive no matter what shocks and stresses they face.
- **Retrofit the landscape.** Create beautiful communities by converting underutilized impervious surfaces into natural landscapes, installing concentrated and integrated green-grey infrastructure, and restoring natural areas.

For each of the “Three R’s,” specific strategies and actions can be led by:

- Local residents and business owners
- Municipal staff
- Elected representatives
- Regional stakeholders

Similarly, these actions are designed to be implemented across scales:

- A Home or business
- A Neighborhood
- A Community
- A Region

As well as across geographies:

- Homes and neighborhoods
- Shopping areas and business districts
- Industrial centers and transportation corridors
- Open space and natural lands
- Community-wide

The vision for resilience articulated in this plan document was developed through a one-year collaborative planning process, which included extensive on-the-ground community engagement.

How to Use this Plan

This plan is organized into three chapters: 1) Introduction and Regional Context; 2) The RainReady Solutions, and 3) the RainReady Plans for each community.

Part 1: Defines the problem to be addressed, provides a broad vision for the future of the Calumet Corridor, and describes a path forward.

Part 2: Describes RainReady Solutions, which is organized according to the “Three R” Framework. This section provides a suite of general strategies and actions.

Part 3: Includes each of the six RainReady Plans for the six communities of the Calumet Corridor. Each of these RainReady plans includes a Citizen’s Guide, a brief snapshot of community context, a summary of findings from our flooding risk and resilience opportunity assessment, and—perhaps most importantly—an action plan outlining the specific actions to be taken.

The plan is intended to be read and used by several distinct audiences. Here are some places to focus your attention and ways use this plan:

• If you are a local resident or business owner:

- Read the Citizen’s Guide for a quick summary and to learn some easy steps to make your home or business more resilient to storms
- Read through the Action Plan for your community and see which actions you can take on your own property or within your neighborhood or business corridor
- Consider joining your community’s Steering Committee to take a more active role in helping to make your community more RainReady

• If you are a municipal staff person or elected representative:

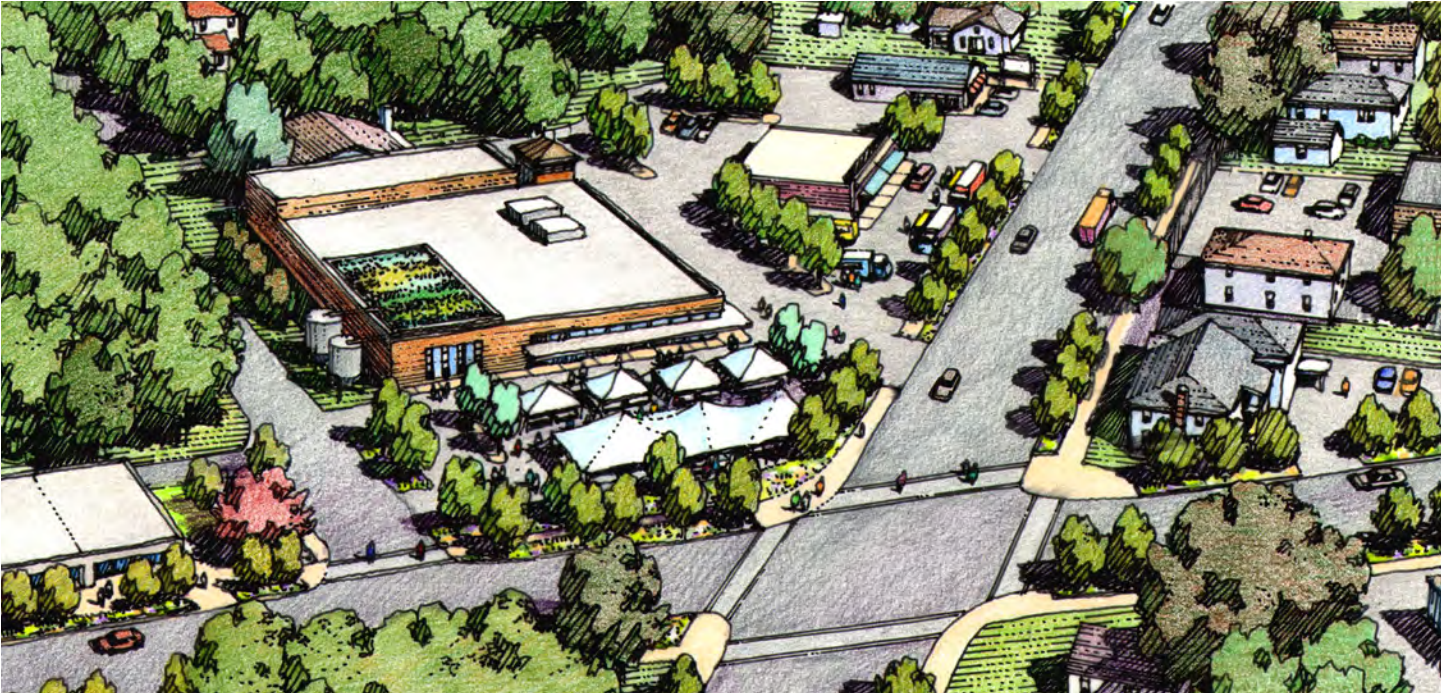
- Familiarize yourself with your community’s RainReady Plan
- Adopt the plan* and refer to it when making decisions for capital improvement projects (CIPs) and ongoing operations and maintenance (O&M) activities
- Refer to your community’s Action Plan when you are exploring grants and reviewing your capital budget

• If you are a regional stakeholder:

- Read the Regional Context to see how this plan builds upon and supports other ongoing regional planning and implementation efforts
- Review the Action Plans for the communities in which your organization or agency is active; identify opportunities to collaborate with local partners to refine and implement specific recommendations
- Continue to partner with other organizations; coordinate your efforts through regional collaboratives like the Calumet Stewardship Initiative (CSI), Millennium Reserve, Calumet Heritage Partnership (CHP), and through the various councils, committees, and work groups active in the area; identify recommendations in this plan that could be incorporated into the work plan of these regional collaboratives

**This plan outlines a path forward towards a more resilient Calumet Corridor, but implementation of specific recommendations will have to occur at the local level. Adopting this plan demonstrates your municipality’s commitment to considering these recommendations during capital planning and decision-making efforts and implementing the recommendations as necessary resources become available. The action plans outlines the actions and associated implementation steps, relative priority, estimated timeline, and potential project leads and resources needed. Further analysis is needed to estimate the costs of most recommendations.*

INTRODUCTION



The Vision

WHAT WOULD A RAINREADY CALUMET CORRIDOR LOOK LIKE?

It would be a region where residents and businesses receive relief from flooding in a way that also creates more beautiful neighborhoods, new jobs, more education and recreation opportunities for people of all ages and walks of life, more commercial activity, and healthier natural areas. In a RainReady Calumet Corridor, schoolyards capture rainwater and create more active spaces for children to learn and play; homeowners have access to expert guidance on home flooding solutions that work; and new businesses frequently pop up along revitalized commercial streets where native flowers bloom in spring. New green infrastructure installations are maintained by local graduates of green job training programs.

This vision is possible. The Calumet Corridor – and the broader Calumet region – benefits from a tremendous legacy of industrial leadership, abundant natural

resources, and an inspired network of individuals and groups committed to working together to build more livable communities.

This plan represents the collective vision of over 2,100 residents, business owners, municipal employees, elected representatives, regional leaders, and non-governmental organizations. It outlines a coordinated plan to build community *resilience*, which is the capacity of individuals and communities to survive, adapt, and thrive no matter what shocks and stresses they may encounter.

Building community resilience requires coordinated action across different scales. The solutions outlined in the RainReady Calumet Corridor Plan are organized by the scale of: homes and neighborhoods; business districts and shopping centers; industrial centers and transportation corridors; and open space and natural areas.

THE PROBLEM



The 2013 floods left Loretta Broughton with little hope for ever keeping her basement dry. That April night, she sat in her kitchen for hours watching smelly water creep from her first floor bathroom. The power was out, the sump pump had failed, and the rain showed no signs of slowing.

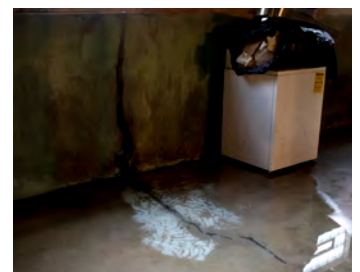
Ms. Broughton has spent thousands of dollars rodding pipes, sealing her foundation, and installing a drain tile around her building, but the flooding continues. Meanwhile, her insurance premiums rise. Around that time, Ms. Broughton gave up use of her basement, and began making plans to move, “I know that there’s nothing I can do about it. I don’t have the finances to do what needs to be done.”

“Every time it rains now, honestly, when they say rain, I’m like, Oh God please, Jesus please, don’t let the lights go out, because if the lights go out the power goes out and the sump pump will not work.”

Ms. Broughton loves her house, but the floods make it feel much less like home.

Ms. Broughton is not alone in her fight against flooding. Her experience is shared by millions of Illinois residents who, although they may live outside of a federally-designated “floodplain,” nonetheless could potentially experience flooding in their homes and communities. In fact, the average amount that Calumet Corridor residents spent on flood-related damages (amongst survey respondents who flooded at least once since 2006, n=396) is \$4,623. Flooding is a major problem in the Calumet Corridor and can affect homes, businesses, neighborhoods, and infrastructure systems in several ways:

- **Overland Flow** in which stormwater ponds or pools, in streets and yards and then enters buildings through windows, doors or other openings
- **Overbank/Riverine** in which rising floodwaters “overbank” from rivers and streams
- **Sewer Backups** in which combined stormwater and sewage backs up through floor drains, bathtubs, toilets, and sinks
- **Seepage** in which water enters structures through cracks in foundation walls and basement floors





Did You Know?

Many people think that flooding only occurs in places near rivers, lakes, or ocean coastlines. However, it can flood anywhere it rains. In fact, recent research has shown that 92% of flooding in Illinois occurs outside of the mapped *floodplain*. Flooding that happens outside of a floodplain in an urban area is called *urban flooding*. CNT defines urban flooding as “the inundation of property in a built environment, particularly in more densely populated areas, caused by rain overwhelming the capacity of drainage systems, such as storm sewers” (CNT, 2015). Urban flooding occurs when homes, yards, or streets are inundated with water from heavy rains or snow melt, damaging property, and making travel difficult and dangerous. It also results from sewer water backing up through pipes into basements, and from water seeping through foundation walls. CNT is involved in policy and advocacy efforts that seek to bring more awareness to the issue of urban flooding nation-wide.

In an effort to better understand where flooding occurs throughout the Calumet Corridor, the type of flooding, and the impact of flooding, the RainReady Community Team sent a survey to all 41,529 homes in the six community planning area. Through the RainReady Planning process we collected 550 resident surveys from across the Calumet Corridor. Here are some key findings from the RainReady Community Survey:

- **Basement backup** from the local sewer system and damaged private lateral lines, impacting several parts of town
- **75%** of survey respondents said they experience some type of flooding when it rains
- **95%** of survey respondents who experienced flooding live outside of a mapped floodplain
- **64%** of survey respondents experienced water seeping in through cracks in foundation walls, **50%** experienced sewer backups, and **31%** experienced both
- **54%** of survey respondents flooded **five or more times** since April 2006
- On average, respondents who have experienced flooding have spent **\$4,623** for flood repairs
- On average, survey respondents are willing to invest **\$2,164** to reduce future flooding risk
- **49%** think their local governments are not at all prepared to address flooding issues



Statistics like those on the previous page are important because they help planners understand the problem and potential solutions. Resident stories are another powerful way to create shared understanding of the problem, reveal that people are not alone, and to mobilize people to work towards a coordinated solution. Here are just a few excerpts taken from numerous conversations with residents:

- "It's been horrible," she said. "I'll be honest. When I bought the home, I was told I wasn't in a flood zone, so I didn't get the flood insurance. So I had to take a loss."—Calumet City Resident
- "When it rains real bad [sewage] comes up," she said. A local contractor told her it would cost \$10,000 to install a sump pump, "I wish I had known about all that before I bought here."—Calumet City Resident
- "I have to put wood pallets down to help the kids get off the bus when it's raining"—Dolton Resident
- "Every year the water gets closer and closer to flooding our church. We can't use our yard sometimes because the area is flooded, or the ground is too soft, or the mosquitos."—Dolton Resident
- "We have three sump-pumps that are constantly running, even when it's not raining. I want to use our church basement for our youth group and other gatherings, but we're worried it's going to flood"—Robbins Resident
- "We just finished our basement—pool table and all. And last week we had over two feet of [sewage] back up. It was a mess!"—Dolton Resident

- "The water gets so high it floods the street, my yard, and comes in through my basement window"—Blue Island Resident
- "I did a backflow check valve system, installed by a plumber. That supposedly would stop anything from coming back up into my house from the sewers," she says. "I did that last year or two years ago, but I still have had flooding."—Blue Island Resident
- The pump cost one Robbins' resident more than \$1,000 to purchase and install. "I paid industrial money," she says. She still avoids her basement at all costs, "because of the mold."—Robbins Resident
- "I used to have just a little water seeping in, but not like it does now. My basement was finished and I had carpet, but I had to tear it up."—Riverdale Resident
- "If it wasn't for the standing water, I probably could put a chair and table in my backyard and sit. But right now I have to sit in my driveway where the pavement is."—Robbins Resident
- "I love my home. I want to get this fixed."—Riverdale Resident
- "We tried so many things over the years. We put in an ejector pipe system; it still doesn't help 100% but it does make it better. I don't expect anything will ever be 100%."—Blue Island Resident
- "Sometimes the water gets two feet high in the streets and we have to move our cars or else they will get flooded"—Dolton Resident



Taken together, the various flooding data, stories, and maps that were collected, created, and analyzed through this process paint a clear picture: communities in the Calumet Corridor frequently experience flooding—even during small storms. Flooding—whether it’s a little bit of water that seeps into your basement after a small rain or three feet of sewage that backs up during a large storm—becomes especially problematic when it occurs in vulnerable communities that are still recovering from past storms and that have limited economic resources with which to prepare for and bounce back from future storms. Unfortunately, this is also the case for the Calumet Corridor region, as demonstrated by the following statistics gathered from Cook County’s application to the U.S. Department of Housing and Urban Development’s National Disaster Resilience Competition (NDRC) and other sources:

- The **April 2013 storm event** that occurred between April 16th and May 5th, 2013, resulted in a major disaster declaration (DR-4116)
- In Cook County, this Presidentially-declared disaster cost a total of **\$962,083,374** in damages
 - **\$627,885,060** = costs for private residents (this number is estimated by applying a Housing Impact Multiplier of 10 to FEMA Verified Losses in order to capture unidentified damages and account for those who did not apply or were denied assistance)

- **\$203,657,950** = costs for private insurance companies
- **\$130,540,364** = costs for public agencies/programs (i.e., FEMA, NFIP, CDBG-DR, and SBA)

- **12,720 insurance claims** were made in the zip codes areas covering the Calumet Corridor and **\$33,153,384** were paid out from public and private insurance providers (NOTE: these figures were gathered for the zip code areas that extend to some areas outside of the Calumet Corridor planning area) (CNT, 2012)
- The Calumet Corridor is considered by Cook County to be the **most impacted and distressed area** from DR-4116
- As of October 2015, there were still unmet recovery needs in housing and infrastructure
- Nearly **23%** of the population of the Calumet Corridor are living below the poverty line. Most of the residents in the Calumet Corridor live within areas of high social vulnerability

In sum, the Calumet Corridor faces: 1) chronic urban flooding issues, 2) a beleaguered recovery from the April 2013 presidentially-declared disaster, and 3) the threat of future rain storms—both small and large. This RainReady Calumet Corridor Plan thus aims to deliver an action plan for addressing this three-pronged flooding problem that is sensitive to other structural roadblocks and capacity potholes (See Page RainReady-16).

CAUSES AND IMPACTS OF URBAN FLOODING

Just as there are several distinct types of flooding affecting the Calumet Corridor, there are multiple factors contributing to rising floodwaters in the area. The precise cause(s) of flooding in any particular neighborhood or site will depend on site-specific conditions; however, flooding in the Calumet Corridor can generally be attributed to four primary factors:

- Flat, low-lying, and naturally-wet topography
- Increasing impervious surfaces
- Changing climate
- Aging and undersized infrastructure

NOTE: more community-specific discussions of flooding risk are provided in each of the community-specific plans.

FLAT, LOW-LYING TOPOGRAPHY

The Calumet Corridor is located in a generally flat, low-lying, and naturally wet part of Northeastern Illinois (of course, the glacial ridge that gave Blue Island its name is one notable exception).

We have the glaciers to thank for the topography of the Calumet Corridor. These impressive, earth-moving forces—the last of which melted away about 16,000 years ago—left behind an extraordinarily flat landscape (see Figure RR-2). Due to the flat landscape, rivers and streams in the Calumet Corridor flow with gentle currents. This makes for easy canoeing and kayaking, but presents challenges for flood control and stormwater management. Since municipal sewer systems rely heavily on gravity to move stormwater within suburban areas, this flatness often causes water to back up in streets and sewers.

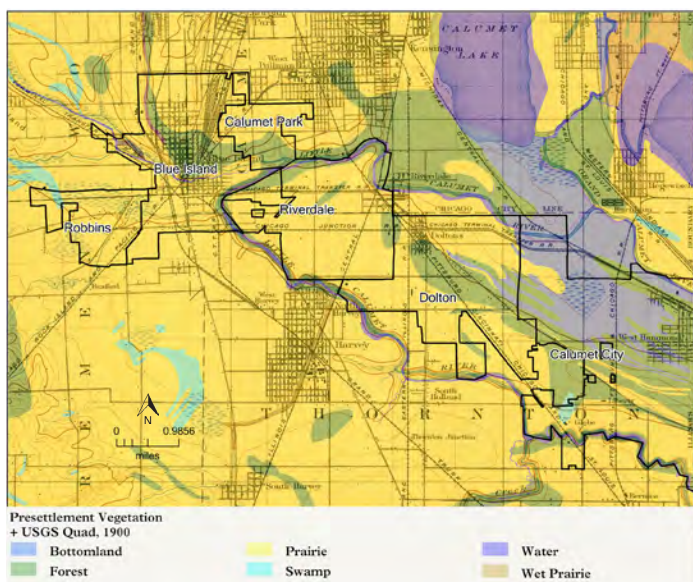


FIGURE RR-1:
Low, Flat, and Wet

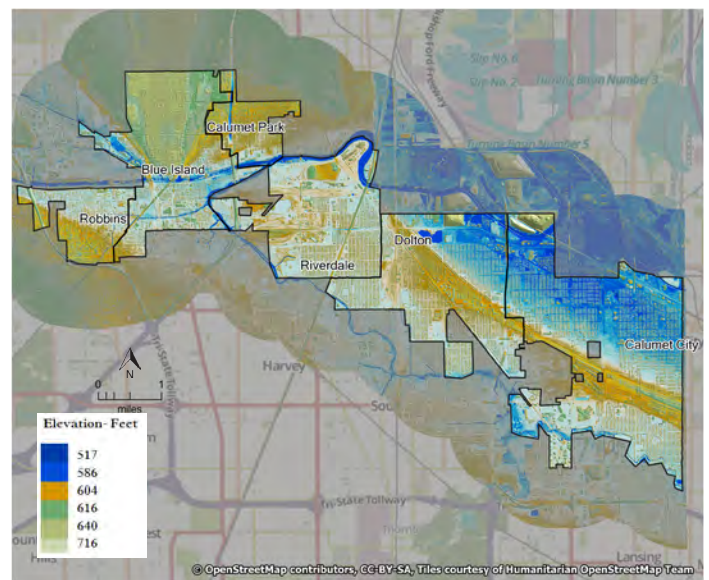


FIGURE RR-2:
Topography of the Calumet Corridor

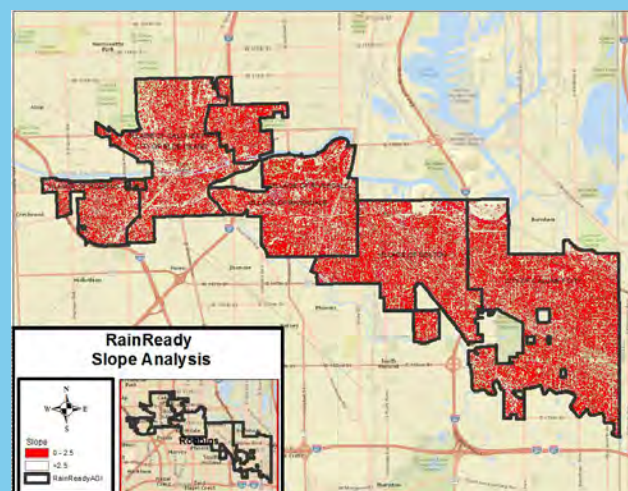
Another challenge inherent to the Calumet Corridor relates to the region's soils. Those same glaciers that flattened the landscape also left behind clay-rich soils, which are known for their poor drainage attributes. Sandy soils, in contrast, tend to drain faster, allowing water to pass through and flow deeper underground. When rain falls on clay-rich soils, however, it has trouble *infiltrating* – the process by which water enters the ground – and instead pools on the surface or runs off to flood other areas.

There are some notable exceptions within the Calumet Corridor, like Calumet City, which actually has sandy and well-drained soils. In general, however, the region's flat topography and predominantly clay-rich and poorly draining soils increase the Calumet Corridor's risk of urban flooding.

INCREASING IMPERVIOUS SURFACES

Historical and ongoing land development in the Calumet Corridor contributes to flooding and impacts downstream water quality. These days, rainwater that falls within the Calumet Corridor is likely to hit an *impervious surface*, such as a street, rooftop, or parking lot, rather than a *permeable surface*, like a forest, wetland, or prairie. The result is an increase in *stormwater runoff*, which is rain water that “runs” off of surfaces and must be managed by local sewers and drainage systems.

Prior to European settlement in the early 19th century, the Calumet region comprised of prairies, wetlands, forests, and open water (See Figure RR-1). These generally wet landscapes created diverse habitats that supported rare communities of plants and animals. This *biodiversity* (meaning the variation of different ecosystems, habitats, and species) made for abundant trading, hunting, and fishing opportunities for Indigenous people, as well as early explorers and settlers (i.e., before the 1830s). Today, however, this biodiversity and local ecosystems are highly threatened.



Did You Know?

Who remembers high school geometry? The average slope of the Calumet Corridor area is only 2.2%. This means that if you walk 100 feet horizontally you may only move up or down 2.2 feet in elevation. This is not a lot of elevation change, and this is the average slope across the entire six-community Calumet Corridor area; many areas are much flatter. Engineers generally consider areas that have a slope of +2.5% as having a sufficient slope to drain stormwater and prevent flooding. Since the majority of the Calumet Corridor is naturally flatter than what engineers recommend, infrastructure must be carefully designed to ensure proper drainage.



FIGURE RR-3:
Impermeable vs. Permeable Land Cover

A Brief History of the Calumet Region

- 1500 -1650s** Algonquian tribes inhabit the region
- 1570** Formation of the Iroquois League as Iroquois are pushed westward by European colonization
- 1650s** Algonquian tribes are forced westward as the Iroquois raids become more common place
- 1673** Europeans arrive in the Calumet region
- 1754-1763** The French and Indian War - French defeated, Great Britain gains control over the lands
- 1805** Little and Grand Calumet River become one river due to an overflow of the Grand Calumet banks
- 1818** Illinois becomes a state with a northern boundary set to include the mouths of the Calumet River and Chicago River
- 1830** Extinction of the bison in the Midwest
- 1848** The Illinois-Michigan Canal is completed
- 1848** The 1st railroad shipment of cargo arrives in Chicago
- 1869** The construction of the Calumet Harbor is approved by Congress
- 1871** The Great Chicago Fire
- 1880s** A heavy steel industry starts to dominate the region
- 1901-1908** Construction of the South Shore Line begins, making the dunes and lakeshore area more accessible
- 1913** Lincoln Highway - The first transcontinental highway passes through the Calumet area along the Old Sauk Trail
- 1920s** Ford Motor Company begins construction of its second biggest assembly plant in the U.S. along the Calumet River
- 1922** Calumet Sag-Channel is built as a response to pollution levels in Lake Michigan
- 1940s** Landfills begin to appear in the area
- 1940s-1950s** The Great Migration accelerates
- 1972** The Tunnel and Reservoir Plan (TARP) is adopted to mitigate combined sewer overflows; completion anticipated in 2029
- 1980s-1990s** Major steel plants begin to shut down
- 1985** People for Community Recovery block proposed expansion of Waste Management's CID landfill
- 1992** The fight against the Calumet Lake Airport is won
- 1998** National Park Service releases the Calumet Ecological Park Feasibility Study and recommends the creation of a National Heritage Area
- 2006** Phase I of TARP tunnel systems completed; the tunnel systems were put into service little by little as completed, starting in 1985
- 2012** Millenium Reserve Plan enacted



Did You Know?

The Calumet Corridor is home to eight natural areas of statewide significance. The Forest Preserve District of Cook County (FPDCC) has preserved over 800 acres of critical habitats that harbor unique communities of plants and animals. Alongside a few sites just across the Indiana border, these particular natural communities cannot be found anywhere else in the world! These sites are also home to a number of rare animal species, including prairie insects, reptiles, herons, and otters. A walk through these sites will also unveil marshlands, sand savannahs, sand prairies, sedge meadows, wet prairies, springs and seeps, mesic prairies, swamps, shrub prairies, and mesic woodlands—and the rich array of plant and animal life that these habitats support.

These natural areas not only preserve biodiversity—which is critical for maintaining the long-term health of our land and freshwater resources—but also act like sponges and soak up the rain that falls on them, thus reducing flooding risk in surrounding areas. They also can provide outdoor recreation, environmental education, and volunteer stewardship opportunities for nearby residents and visitors to the area. In light of the numerous benefits they provide, which are also called *ecosystem services*, the natural treasures found in the Calumet Corridor and broader Calumet region should be stewarded, protected, connected, and made more accessible to communities. Doing so would not only help alleviate flooding, but also make people healthier and communities more livable.

FIGURE RR-4:
A Brief History of the Calumet Region



Did You Know?

In 1970, 85% of polluted U.S. waterways were the result of a single source of pollution, or *point source pollution* (e.g., an effluent pipe from a factory). The remaining 15% of polluted waterways were caused by runoff from agricultural land and urban areas, or *nonpoint source pollution*. Today, due to significant advances in environmental regulation and water treatment technologies, these values have flipped. 85% of polluted waterways are now the result of nonpoint source pollution and urban stormwater discharges. The Environmental Protection Agency's (EPA) first administrator, William Ruckelshaus, pointed to this fact in a 2010 *Wall Street Journal* opinion article where he called stormwater runoff "the water quality issue of the day" (WEF, 2015: 9).

During the 19th and 20th centuries, community and industrial development resulted in a dramatic alteration of the pre-settlement landscape (See Figure RR-4). Open areas were rapidly replaced by impervious surfaces to support human settlement, trade, and industry. Although impervious surfaces, like rooftops and roads, are byproducts of our human need for shelter, transportation, and commerce, they prevent the natural processes of *infiltration* (i.e., water soaking into the ground) and *evapotranspiration* (i.e., water evaporating back into the atmosphere through plants and trees). Consequently, rain—instead of being used as a valuable resource—becomes stormwater runoff, a waste product that contributes to local flooding and environmental issues.

Even small storms can generate a large amount of stormwater runoff. For example, a storm that drops one inch of rainfall on a one-acre impervious surface (e.g., a parking lot) would generate 27,154 gallons of stormwater runoff (Note: storms of this size or bigger occurred 13 times in Northeast Illinois in 2016). This is enough runoff to fill over eight backyard swimming pools (at 12 feet round and 48" deep). Put another way, one inch of rainfall on a 1,000 square foot roof will yield approximately 600 gallons of runoff. Although it may be hard to see, rain events (even small ones) produce a lot of stormwater runoff!

Just as problematic as the volume of stormwater runoff, however, are the pollutants this runoff collects as it flows across an urban landscape. Urban surfaces are littered with sediments, debris, oils, road salts, and toxic chemicals. When stormwater runoff transports these pollutants into rivers, streams, and other waterways—

which happens often in urban areas—they can degrade aquatic habitats, contaminate water supplies, and prevent safe swimming or water sports.

Today, 33.79% of the total land area of the Calumet Corridor is comprised of impervious surfaces, and this percentage is increasing. As more open land is developed and converted into impervious surfaces, the amount of permeable land decreases. The resulting increases in stormwater runoff cause a variety of problems, such as *combined sewer overflows* (CSOs), polluted waterways, "flashy"—or flood-prone streams, and urban flooding. The negative environmental impacts of land development are now detected when a *watershed* (i.e., the area of land that drains into a waterbody) has a total impervious cover as low as 5-10% (Scheueller et al. 2008). This means the streams that flow through Calumet Corridor (e.g., the Little Calumet River, Midlothian Creek, Cal-Sag Channel) are degraded or impaired due, in part, to the impacts of urban stormwater runoff. Put simply, when rainfall cannot find its way into the soil, local water bodies, or back into the atmosphere through the natural water cycle, it could pollute waterways, backup into basements, pool in streets, seep through walls, and overflow over the top of riverbanks. Local stormwater ordinances—like the Metropolitan Water Reclamation District's (MWRD) Watershed Management Ordinance (WMO)—require that new developments incorporate systems that control the volume and rate at which stormwater runs off from a site. Incorporating green infrastructure best management practices (BMPs) into new developments and redevelopments can greatly reduce the impacts of impervious surfaces.

CHANGING CLIMATE

Many residents in the Calumet Corridor have observed an increase in precipitation in recent years. In fact, interviews with residents and public works staff have anecdotally supported various climate change models that have projected more frequent high-intensity, short-duration storms. According to the 2014 National Climate Assessment (i.e., a report compiled by a team of over 300 experts) heavy downpours have been increasing nationally, especially over the last three to five decades (Melilo et al., 2014). In the Midwest and Northeast in particular, the heaviest rainfall events have become

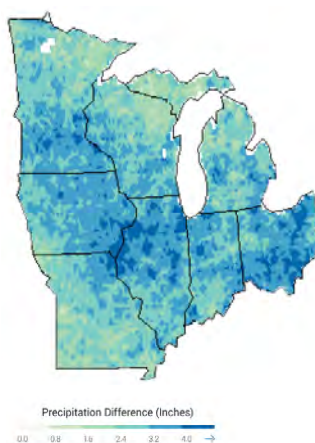
heavier and more frequent. The maps below depict climate projections for the Midwest. They show an anticipated increase in the number of days with heavy rain, and the amount of rain during big storms.

These big storms—paired with the increase in impervious surfaces in the Calumet Corridor—place a heavy burden on local sewer systems, which must manage huge and sudden volumes of water at once. As residents and municipal staff of the Calumet Corridor know all too well, current systems are often not up to the challenge.

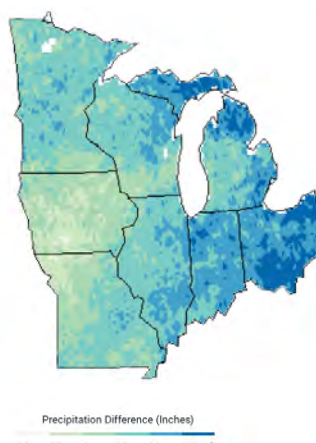
Did You Know?

Global climate change is expected to increase the total amount of water falling each year, as well as the frequency of short, intense storms like the April 2013 storm. These maps show projected changes in climate for the 21st century (2041-2070) relative to the late 20th century (1971-2000) across the Midwest.

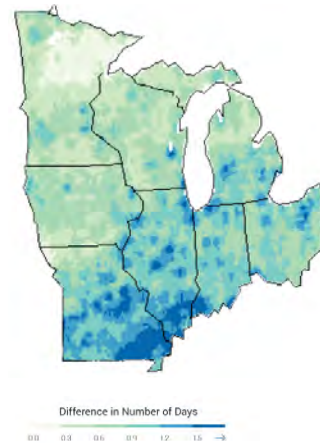
From left to right: the change in average total precipitation over the year. Across the Midwest, the total amount of water from rainfall and snowfall is projected to increase; increase in the number of days each year with very heavy rain or snow fall (top 2% of all rainfalls each year); increases in the amount of rain falling in the wettest 5-day period over a year. Both (far right and middle) indicate that big storms will increase in intensity and frequency across the Midwest. (Figure source: NOAA NCDC/CICS-NC).



**AVERAGE
PRECIPITATION**



**HEAVY
PRECIPITATION**



**WETTEST
5-DAY TOTAL**

AGING AND LIMITED INFRASTRUCTURE

The sewer systems that serve the Calumet Corridor communities vary significantly in terms of their age, size, type (e.g., combined sewers, separate storm and sanitary sewers) and condition (See Figure RR-7). This variation, the lack of up-to-date and accurate information on local sewers and drainage systems (e.g., accurate GPS locations of system components, details on condition of local sewers), and the cost of collecting this information is a challenge in itself. However, in light of the age of the Calumet Corridor communities, their historical development patterns, and their known flooding problems, it is safe to say that the storm sewers and drainage systems in the Calumet Corridor are generally aging and limited. Moreover, the majority of the sewer systems in the Calumet Corridor are “combined sewer systems,” which is a legacy design that has fallen out of favor in the civil engineering community. Each of these infrastructure-related factors contributes to stormwater management challenges in the Calumet Corridor, discussed briefly below.

First, as sewer systems age, pipes may collapse, crack, or clog, causing issues with local drainage. If not properly repaired or continually maintained, these degraded sewers—including both private lateral lines that connect individual buildings to the mainline sewer, as well as the public sewer itself—can cause stormwater and raw sewage to backup into homes, yards, and the public right-of-way (ROW).

Second, Calumet Corridor sewers were designed for a different time. When they were originally constructed, many local sewer systems were not designed to handle the increased stormwater flow from new development and impervious surfaces. Also, these older sewer systems were sized based on historical rainfall data that did not take into account the impacts of climate change, such as more frequent high-intensity storms. As a result, many of the local sewers throughout the Calumet Corridor are simply too small to handle the volume of water they now receive.



FIGURE RR-5:
Aging and Limited Infrastructure



FIGURE RR-6:
Degraded Sewers

Third, communities in the Calumet Corridor struggle with the legacy design of combined sewers. Combined sewer systems were a popular stormwater management approach in the mid-to-late 19th century. Combined sewer systems are called such because they “combine” stormwater and sewage from buildings in the same sewer, which transports the water from where it enters the system to where it is treated (e.g., Calumet Water Reclamation Plant) and ultimately discharged (as “effluent”) back into a local waterbody (e.g., Little Calumet River). In contrast, many municipalities are gradually transitioning to “separate system” systems, which maintain separate systems to transport stormwater and sewage.

During dry days and small rain events, the combined sewers generally function properly. However, during large storms events—which are becoming increasingly

frequent—the capacity of local sewers are often exceeded. This often results in water pooling in streets, yards, and public spaces, as well as sewer backup into basements.

The increased risk of urban flooding is not the only problem associated with aging combined sewer systems. Combined sewers typically include overflow points or “outfalls” into local rivers and lakes. These combined sewer outfalls allow (untreated) stormwater and sewage to “overflow” directly into local waterbodies when sewers reach their capacity during a large storm in order to prevent flooding in developed areas.

These *combined sewer overflows* (CSOs), can have a devastating effect on aquatic health and drinking water supply. A recent report published by U.S. Environmental Protection Agency (EPA), reported that 22 billion gallons of untreated wastewater discharged from CSOs flowed

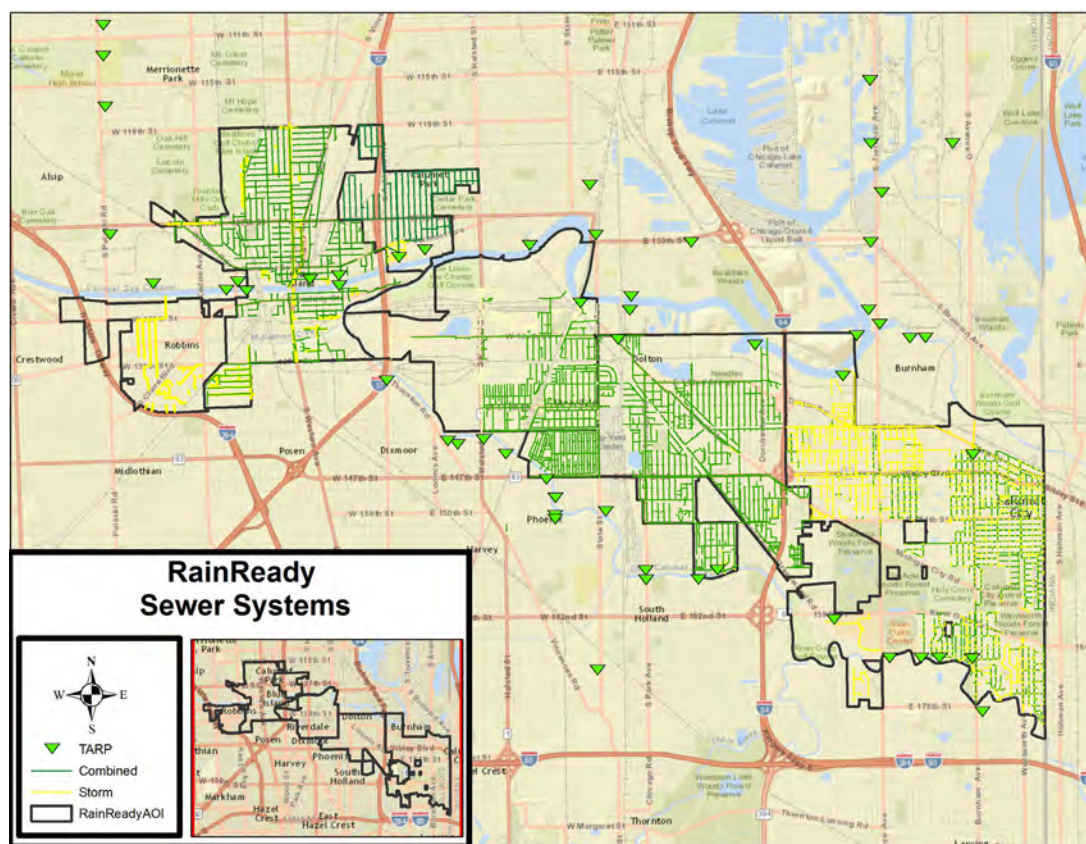


FIGURE RR-7:
Sewer Systems in the Calumet

into the Great Lakes Basin in 2014 (USEPA, 2016). This is extremely problematic, because the Great Lakes Basin holds 84% of North America’s surface freshwater and recent events, like Toledo’s 2014 water crisis, has revealed that human activity (e.g., agriculture and urban development) can render these great resources unusable.

For this reason, combined sewer overflows are considered one of the primary causes for water pollution today. Currently, 772 U.S. cities and water utilities face CSO issues, and many are spending billions of dollars under legally-binding consent decrees to reduce CSO frequency and volume, including the MWRD. For reference, the same EPA report stated that there were 41 CSO events from the MWRD’s Tunnel and Reservoir Plan (TARP) in 2014.

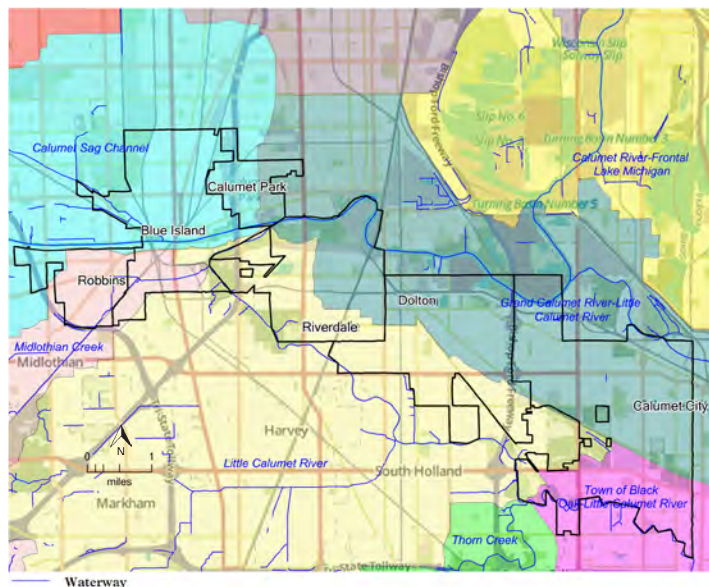


FIGURE RR-8:
Waterways and Watersheds



Photo: Jose M. Osorio, Chicago Tribune

Did You Know?

A popular approach to controlling combined sewer overflows (CSOs), basement backups, and other stormwater management issues is to build underground tunnels and reservoirs that temporarily store wastewater until it can be directed to a wastewater treatment facility. In essence, the tunnels provide a place to hold large volumes of stormwater and sewage while the treatment plants “catch up” with the storm. These tunnels can be miles long, up to 60 feet in diameter, and cost billions of dollars to construct. The Metropolitan Water Reclamation District of Great Chicago (MWRD)—the regional stormwater utility that serves the City of Chicago and 40 other suburban communities—has taken this approach to managing flooding and combined sewer overflows. Upon completion in 2029, the MWRD’s Tunnel and Reservoir Plan (TARP) will consist of 109.4 miles of tunnels and three reservoirs. The Tunnel will collectively provide 20.6 billion gallons of storage capacity for combined sewage and stormwater to the MWRD’s 352-square-mile service area, which includes the Calumet Corridor. Although TARP has already proven to be effective in reducing CSOs and improving water quality, the system’s full potential to mitigate local flood issues is still largely unrealized. This is not due to a flaw in the design of TARP, but rather, limitations of local municipal sewer systems that transport wastewater from homes and neighborhoods to TARP drop shafts and regional interceptor sewers. In other words, there may be bottlenecks in local sewer systems that obstruct or even prevent water from flowing from neighborhoods to TARP drop shafts, which may cause local flooding issues.



THE APRIL 2013 STORM

The devastating rain and wind that hit Northeast Illinois in April 2013 demonstrates what can happen when a large storm descends upon a region that is not prepared to handle it. All of these factors—climate change impacts, limited and aging stormwater and drainage sewer systems, a highly urbanized (i.e., impervious) landscape—conspired to produce a Presidentially-declared Disaster.

The storms that occurred between April 16th and May 5th, 2013 resulted in \$962,083,374 of damage in Cook County alone. One of the storms dropped five inches of rain overnight. This storm caused the widespread closure of expressways, flooded viaducts, downed trees, the forced evacuation of residences and nursing homes near rivers due to rising flood-stage levels, and power outages for about 24,000 ComEd customers.

In the Calumet Corridor and nearby communities, ten students had to be rescued by rafts after a school bus got stuck on a flooded street in Dolton, and a sinkhole on Chicago's South Side swallowed up to three cars and hospitalized one person. Flooding also caused severe delays on Metra and the cancellation of at least 400 flights at Chicago's O'Hare International Airport.

A reflection of the April 2013 storms reveals a number of mediating factors that contributed to the damage that resulted:

- **It was large.** The April 17th-18th storm that resulted in the deluge of five inches of rain within a 24-hour period is considered to be a 25-year, 24-hour storm event. A storm of this size has a 4% chance of occurring in any given year. Although this storm is not as big as the infamous 100-year storms that many communities are preparing for, which have a 1% chance of occurring in any given year, it is certainly large enough to cause significant flooding and damages.
- **The rain was constant.** The constant rainfall in the days leading up to the 25-year storm on April 17th caused soils to become saturated and local and regional sewer systems to reach their capacity. This led to a situation in which the rainfall between April 17th and 18th had nowhere to go, so it ended up flooding homes, businesses, and public right-of-ways all across Northeastern Illinois.
- **The region's flat, low-lying, and naturally-wet topography; impervious surfaces; and aging and undersized infrastructure.** See above.

The April 2013 storms caused a great degree of damage within the Calumet Corridor and across the broader Chicago Metropolitan Region. What's more, storms of this magnitude—and larger—are likely to hit the region



in the future (NCA, 2014). In light of this, it is imperative that communities take strategic steps now to prepare for, mitigate, and avoid the damage that could be caused by future storms. One only needs to look back at that damage caused by the April 2013 storms to understand the costs of inaction and not being sufficiently prepared.

THE AVERAGE STORM

The economic, social, and environmental impacts of the April 2013 storms were immense. However, communities in the Calumet Corridor frequently flood from much smaller storms as well. For example, some neighborhoods may experience widespread overland flooding during a 2-year 24-hour storm event. These storms rarely prompt major disaster declarations or even coverage in the local media; however, they have significant impacts in terms of a community's quality of life, business disruptions, and environmental quality.

Interviews with residents, survey responses, and meetings with municipal staff and engineers have revealed that even small storms can result in economic losses and a high degree of stress for Calumet Corridor residents and public works' staff alike. These small storms often go under the radar in public discussions, but can wreak

havoc on families and residents. For example, the family with two feet of raw sewage in their newly finished basement, or the newly employed resident who is late to work due to street closures.

Given the more hidden and more diffuse nature of urban flooding (e.g., basement backups, seepage, street flooding), it is sometimes difficult to mobilize the economic resources and political capital necessary to implement solutions to this chronic and widespread problem. However, CNT/RainReady has been committed to bringing the problem of urban flooding to light at all scales of government—from local governments to the federal government—as well as working with local communities to plan and implement effective solutions.

Urban flooding can manifest in a community and region either as an intense shock (e.g., the April 2013 storms) or chronic stresses (e.g., basement backups, street flooding). In light of this, the strategies and actions put forth in this plan aim to enhance community resilience so that individuals, businesses, infrastructure systems, and governments in the Calumet Corridor can survive and thrive no matter what rain-related shock and stress they encounter.

Government Capacity and Funding Potholes:

In addition to these structural roadblocks, local governments also face a variety of capacity and funding potholes that make it difficult to plan, design, and implement flooding solutions. These *capacity potholes*—although complex in nature—are less deeply rooted than *structural roadblocks* and can potentially be resolved through strategic short-term (one - two years) and medium-term (two - six years) actions.

The following capacity and funding potholes affect local governments in the Calumet Corridor:

- A general lack of the funding, time, personnel, equipment, and technical expertise that is necessary to implement and manage flood mitigation projects and programs
- Lack of time to consider creative financing and project implementation strategies

- It is often difficult to identify and secure funding and financing for priority projects
- Lack of political support to raise taxes and/or adopt fees necessary to invest in stormwater-related capital improvement projects and ongoing operations and maintenance (O&M) activities
- Federal funds are not always user-friendly, coordinated, or flexible, and are increasingly scarce and uncertain
- Support from foundations or non-governmental organizations—although critical—may provide short-term or one-time only assistance to jump start a project, but fails to build the local capacity necessary to maintain or manage a project in perpetuity
- Program- and theme-specific funding from external sources may not always align with the needs of a local community; for example, there may be ample funding available to catalyze an innovative project, program, or partnership that builds climate resilience, but funding for preliminary engineering, construction, community outreach and education, and ongoing support for operations and maintenance is hard to come by

Photo: D. Dohler, Flickr/Creative Commons



Communities must take strategic, concerted, timely, and appropriately-scaled actions to overcome these roadblocks and capacity potholes. Without intervention, infrastructure systems will continue to degrade and the (mutual) relationship between residents and municipal staff could become increasingly stressed, and urban flooding problems will increase in their frequency and magnitude.

It is apparent that some residents and municipal staff throughout the Calumet Corridor suffer from hopelessness and frustration at the growing urban flooding crisis. However, experience from previous CNT/ RainReady planning efforts has shown that it is possible to counteract hopelessness and reorient frustrations by channeling them through solution-oriented and collaborative planning processes that cultivate and leverage community action that drive effective flooding solutions. This RainReady Calumet Corridor Plan provides a roadmap to resilience that is achievable, inclusive, and urgent.

The RainReady Team recognizes the magnitude of the task ahead. Overcoming the physical factors that contribute to urban flooding in the midst of structural roadblocks and capacity potholes will take a significant investment of financial, social, and political capital. It will also require a willingness on the part of residents, staff, and elected representatives to reconcile past disagreements (e.g., instances when residents were excluded from important decisions; instances where projects that would have benefited an entire community were thwarted by one individual's or group's political ambitions) and to work together towards a shared vision. When these groups come together, however, the restoration of the Calumet Corridor to a healthy, vibrant, connected, and beautiful place will set an example for the whole region.



THE PATH FORWARD



...okay, enough about the problem. We know we have a flooding issue.

What can we do?

A RainReady future for the Calumet Corridor is well within reach. In fact, each of the six communities in the Calumet Corridor possess the foundational community assets, strengths, and know-how necessary to mitigate flooding AND achieve broader community goals.

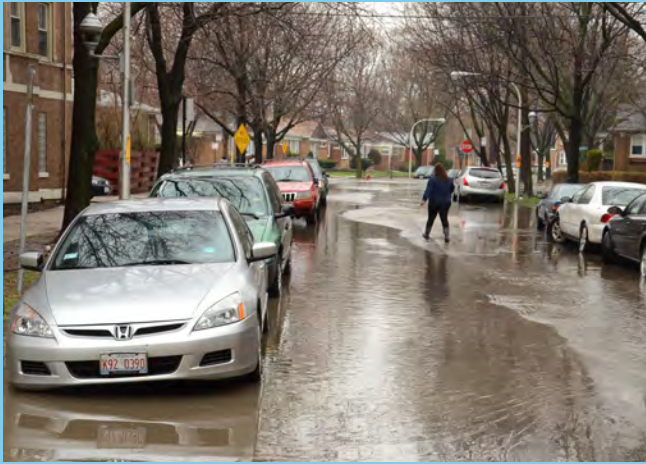
Through this planning process, the RainReady team discovered that residents, municipal staff, and elected representatives are more aligned in their shared desire to resolve local flooding issues than previously thought. We also learned that many local planners and community leaders have been implementing creative resilience-building projects for years, which other communities around the nation could learn from. Perhaps most encouraging, we learned that—in spite of chronic urban flooding issues (and other community concerns) and seemingly intractable roadblocks and potholes—residents in the Calumet Corridor continue to have an unwavering desire to improve the communities they call home. This individual resilience and drive will serve as the foundation on which all the other strategies and actions in this plan will build upon.

RAINREADY SOLUTIONS THAT DRIVE GREATER COMMUNITY RESILIENCE

Although focused on mitigating urban flooding, the RainReady solutions (i.e., goals, strategies, actions) presented in this plan are designed to address more than just flooding.

For example, streets and alleyways can be resurfaced in a way that not only reduces the wear-and-tear on cars and provides multiple transportation options (e.g., driving, walking, biking, transit), but also reduces street flooding. Front yards can be landscaped in way that not only beautifies the neighborhood and increases property values, but also reduces the risk of basement backups. Commercial corridors can be activated in a way that not only brings more shoppers (and tax revenue), but also reduces the stress on local sewers and creates a ‘sense of place’ that cultivates community pride. Industrial centers can be redeveloped in a way that not only creates new jobs, but also reduces flooding in the surrounding neighborhoods. The list goes on.

Put broadly, RainReady solutions build community resilience.



Defining Resilience

Resilience may mean different things to different people. For the purpose of this plan, we adopted the definition of resilience published by *100 Resilient Cities*, which defines *Urban Resilience* as “the capacity of individuals, communities, institutions, businesses, and systems within a city to survive and thrive no matter what kinds of chronic stresses and acute shocks they experience.”

Let’s break this definition down a bit. *Individuals* could include you (the reader of this plan), your neighbors, your work colleagues, your elected representatives, and other people who are somehow involved in your community. Community is a term that is thrown around quite a bit in urban planning (and in this plan). *Communities* are a group of people living in the same place or having a particular characteristic in common. Communities may be geographically based and include things like your block, your neighborhood, your municipality, and your region. Or a community may be socially defined and include things like your church community, your garden club, or your sports team. *Institutions* may include entities such as churches, schools, your local government, veteran’s organizations, and other local organizations and social networks. Businesses may include local and family-owned businesses, regional industries, as well as national chains. Lastly, systems are an interconnected set of elements that are coherently organized in a way to achieve some function or purpose. Systems are all around us and enable communities to survive and thrive. Systems include, among others: sewer systems, transportation systems, energy systems, and communication systems.

There are many individuals, communities, businesses, institutions, and systems that will be involved in implementing this RainReady Calumet Corridor Plan and building community resilience. Moreover, resilience is a very broad planning concept and encompasses a very wide array of dimensions and possible paths forward. The CNT/RainReady project team therefore developed a simple way to think about RainReady solutions and how they may drive greater community resilience, the *Three R’s Approach*.

The *Three R’s Approach* frames the goal of achieving greater community resilience—in the midst of urban flooding, structural roadblocks, and capacity potholes—in terms of these three broad goals:

- **(Re)orient communities.** Put communities on a path towards greater resilience by reorienting day-to-day operations and long-term planning.
- **Repair existing infrastructure.** Establish modernized infrastructure systems that allow communities to survive and thrive no matter what shocks and stresses they face.
- **Retrofit the landscape.** Create beautiful communities by converting impervious surfaces into natural landscapes, installing new green, grey, and green-grey infrastructure, and restoring natural areas.

Ultimately, this RainReady Calumet Corridor Plan is a road map to a more resilient future that can be used by community residents, municipal staff, elected officials, and regional partners. This plan can help mobilize the necessary financial, technical, political, and community resources necessary to achieve each community’s goals. *What* exactly a resilient future looks like was defined by the communities. The RainReady project team simply helped outline *how* to get there.

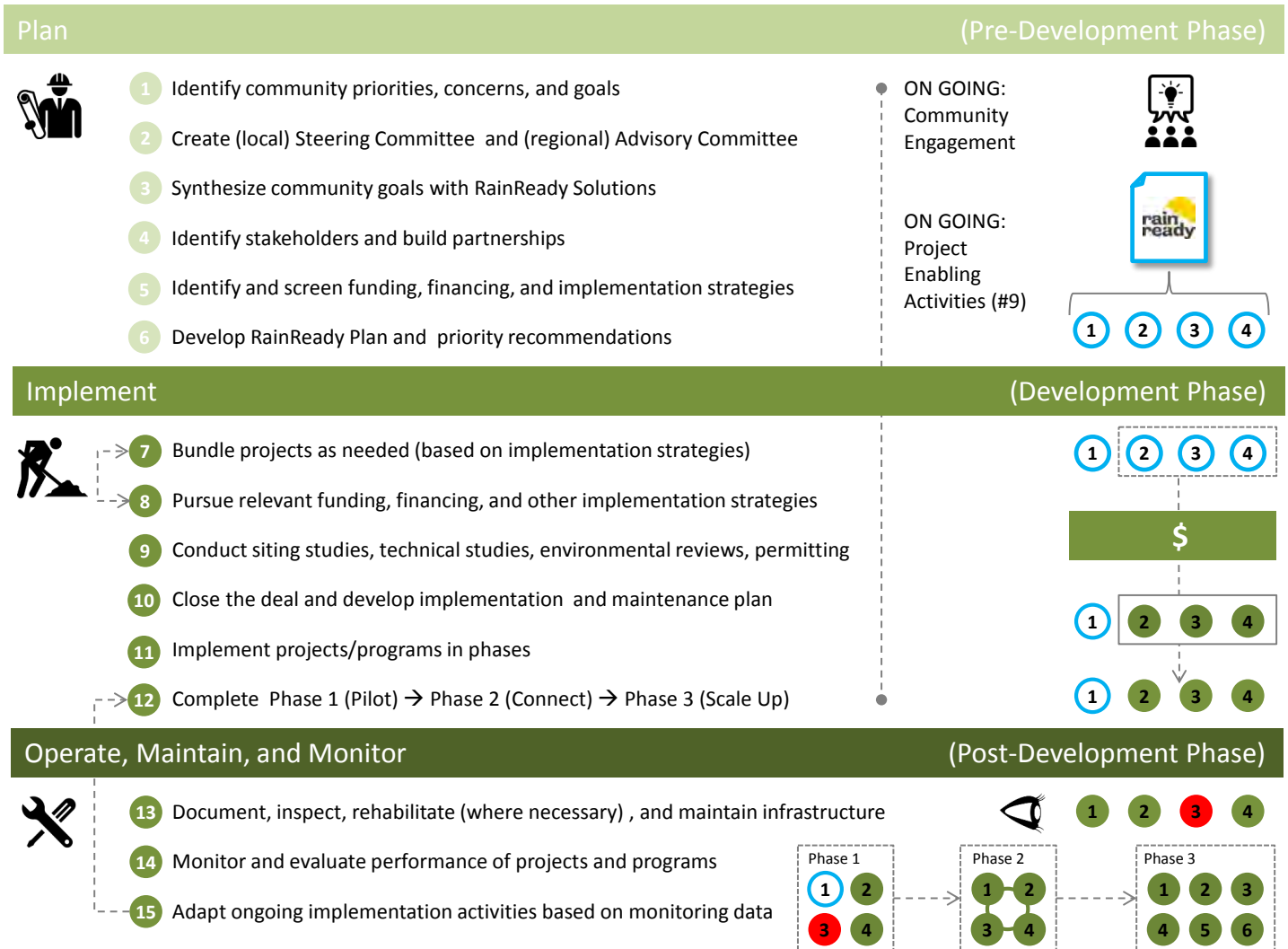


FIGURE RR-9:
The Path Towards Resilience

How to Approach Financing RainReady Communities

A CORRIDOR OF MODERATE INCOME COMMUNITIES HAS ASSETS

The path forward for resilience in the Calumet Corridor requires a new look at assets within each community.

Median single family home property values in the Calumet Corridor range from \$71,900 in Robbins to \$118,800 in Blue Island; median income ranges from \$23,614 per household per year in Robbins to \$47,050 in Calumet Park; mean income from \$37,568 in Robbins to \$55,753 in Dolton; and land area ranges from 734 acres in Calumet Park to 4,675 acres in Calumet City. Most dwellings are in either single family or two to four unit buildings with a relatively high homeownership rate.

These communities clearly vary in land coverage, in household income, and in the value of their property. In the aggregate, residential property alone has a market value of at least \$4.67 billion. Aggregated household income is on the order of \$1.92 billion.

How can these resources help secure funding for flood protection in the Calumet Corridor communities?

THE COST OF A TYPICAL RESIDENTIAL DEAL

Typical residential flood protection retrofits cost \$8,000 per dwelling unit. Given the typical incomes in the Calumet Corridor towns and villages, it is not likely that households have the savings and ability to pay cash to get the necessary green infrastructure and plumbing work done. If home equity financing is available, the cost to amortize \$8,000 presuming a 5 percent interest rate and a 15-year term is \$63.27 per month. This amount would cost the average Dolton homeowner 1.4 percent of their monthly income, but in Robbins that would be 2 percent or more. It is also more likely that a lender would be willing to extend such credit in Dolton or in Calumet Park than in Robbins or Blue Island, given the typical property values and incomes. If credit cards are an option, most households in these income ranges are likely to take five years to pay off the principal and interest; the monthly expense in these cases could range from \$190 at 15% interest to \$216 at 21%, respectively.

While the cost of damages per flood event in Cook County is around \$4,272 ([RainReady Nation](#), CNT 2015), the risk of repeat flooding is high, and without

FIGURE RR-10:
Summary of Housing and Land in the Calumet Corridor

	Land Area (square miles)	Land Area (acres)	Blocks	Total Number of Housing Units	% 1-4 Units	Median Property Value	Mean Household Income
Blue Island	4.157	2660.48	697	9816	72.9	\$118,800	\$48,435
Calumet City	7.305	4675.2	1088	16120	75.2	\$100,100	\$49,293
Calumet Park	1.148	734.72	260	3403	78.4	\$105,800	\$54,625
Dolton	4.685	2998.4	609	8945	91	\$95,200	\$55,753
Riverdale	3.75	2400	412	6184	74.1	\$86,300	\$47,550
Robbins	1.449	927.36	211	2242	87.6	\$71,900	\$37,568
Totals	22.494	14396.16	3277	46710			

intervention could amount to six to seven such events per decade. Denominated in aggregate damages, the payback for avoiding flood damages is deceptively attractive—but acquiring the resources to invest in the necessary protection could be an insurmountable barrier in such moderate income communities. In other words, homeowners may lack the upfront capital to invest in preventative solutions.

Our Calumet Corridor survey found average willingness to invest in flood protection at \$2,210. Excluding for those homeowners who are unwilling or unable to pay at all, the median rises to \$4,110. Beyond these figures, supplemental resources are needed.

There are several options for lowering the cost of flood protection and increasing access to credit.

MINI-BONDS

Municipal bonds are typically sold in denominations of \$5,000 or more. A neighborhood in Denver, CO needed to raise \$12 million for a combination of road, water main, and sewer improvements, and had just missed the deadline for the city's every-five-years general bond issue. Neighborhood leaders suggested the City lower the face value of the bonds needed to \$500 and sell them to the community itself. The city agreed to an experiment, offering an internet auction for one week only. The "opening bell" was rung on Monday morning at 8:30 am, and the entire issue sold out in 10 minutes. Mini-bonds were pioneered many years ago to make local improvements in conjunction with the Plan of Paris, and have been used in communities around the United States.

SPECIAL SERVICE AREAS

Various kinds of special service areas can be created by cities, towns and villages in Illinois. Such districts can be used for a wide range of purposes. Special service area (SSA) financing is a taxing mechanism used

by a municipality or a county to finance additional services, improvements, or facilities desired in a certain portion of its jurisdiction (35 ILCS 200/27-5 (1994)). A municipality may have an unlimited number of special service areas, which may overlap entirely or partially. There are no minimum or maximum physical size requirements, although a special service area cannot consist of the entire jurisdiction of a governmental entity.

The nine steps required to establish an SSA are: adopt an ordinance proposing the establishment of the special service area; adopt a resolution at a public hearing to determine if and when a public hearing will take place to create the SSA; provide notice of the public hearing; conduct a hearing by the governing board; observe a 60-day waiting period to allow for petitions to block implementation; adopt the final ordinance; implement special service area; file documents with the County Clerk and Recorder within 60 days; and, if necessary, alter the special service area.

Once a special service area has been created, the preceding procedures may be utilized to enlarge the area, change the tax or debt limitations, alter the type of tax authorized for debt retirement, or extend the life of the special service area if it was limited to a fixed number of years.

ON-BILL FINANCING

Twenty five states, including Illinois, authorize the operation of Property Assessed Clean Energy or PACE financing for energy efficiency improvements.

We suggest here a variant, whereby municipalities borrow funds on behalf of local property owners and receive repayment over a period similar to the term of the bond, say 30 years. At a 5 percent interest rate, \$8,000 on these terms would cost a property owner \$42.95 per month.

This could be collected on either the water bill or on the property tax bill.



DUE-ON-SALE FINANCING

Park Forest, IL and other area municipalities offer home improvement loans with payment deferred until time of resale. Community Development Block Grant funds can be used for this purpose, as can the other financing sources listed in this section. The advantage to the borrower is that the benefit of flood protection is received immediately, while the repayment would occur out of property sale proceeds at time of settlement.

50-50 FINANCING

A typical arrangement for financing sidewalk repair is to split the cost between property owners and a municipality. The value to the property owner is accelerated repair. This method can be combined with any of the financing programs listed here. For example, the property owner's share could be financed through on-bill repayment, lowering the cost to \$23 per household per month in the example provided.

GENERAL OBLIGATION FINANCING

General obligation bonds (GO bonds) are used for general corporate municipal purposes and backed by the municipality's full faith and credit.

Since full area flood risk reduction could require investments that cover both private property and the public realm, and any one block could easily have residential, commercial and public land uses included, a case could be made for issuing GO bonds for flood protection purposes.

"TREE INCREMENT" OR TAX INCREMENT FINANCING

Most towns have permeable parkways, parks, yards and tree canopy that over time have fallen into disrepair. Studies by economists (Wachter 2004) and public interest organizations suggest that over time restoration of green infrastructure features can add substantial value to taxable property. A model for carrying this out was developed for Portland OR (http://www.cnt.org/sites/default/files/publications/CNT_PDXTreeAssetMgmt.pdf) and should be considered for application in the Calumet Corridor communities.

FUTURE OPTIONS FOR FURTHER EXPLORATION

- Property casualty insurers already offer discounts for good driving behavior including less driving, and health insurers lower premiums for increasing physical activity. We suggest that the Calumet Corridor communities collectively approach the Illinois Insurance Commissioner and leading insurers to explore such incentives.
- The Metropolitan Water Reclamation District was designated as Cook County's stormwater management agency by the General Assembly, and is authorized to collect a millage to support flood protection investments. The corridor communities should explore a partnership with the MWRD that would help further lower the local burden of retrofit for stormwater management.
- Existing governmental units should be engaged in exploring these options, including options that are not limited to township government, school and community college districts, the Cook County Forest Preserve District, the Clean Water Revolving Loan Fund of the Illinois Environmental Protection Agency, local park districts, grants administered by the Illinois Dept. of Natural Resources, by the Illinois Department of Transportation, and the Chicago Metropolitan Agency on Planning (for example, the RainReady Midlothian Plan includes steps to partner with RTA and IDOT to provide green infrastructure resources around its Metra station).

For additional resources, consult Appendix C, Implementation Resources.

PARTNERS AND ACKNOWLEDGEMENTS

Creating this RainReady Calumet Corridor Plan was an ambitious undertaking. This plan would not have been possible without the participation, input, critique, and guidance from numerous community leaders and resource experts. Listed below are the various individuals, firms, agencies, and groups that contributed to the development of this plan.

This plan was funded by Cook County with Community Development Block Grant – Disaster Recovery funds (CDBG-DR). Cook County’s support for this plan demonstrates the County’s long-term commitment to building more resilient, economically competitive, and livable communities.

Over 2,100 community residents, municipal employees, elected officials, and regional experts were engaged throughout the fourteen month RainReady planning process.

To ensure that this plan is science-based and regionally-coordinated, the RainReady Community Team at the Center for Neighborhood Technology (CNT) partnered with the U.S. Army Corps of Engineers (USACE) and the South Suburban Mayors and Managers Association (SSMMA) to assist with planning, analysis, and implementation tasks. The RainReady Team also worked with Chicago Metropolitan Agency for Planning (CMAP) to learn from their Local Stormwater Planning Approach—a method CMAP developed to identify areas prone to urban flooding as well as potential locations for solutions—and to identify ways to coordinate stormwater planning efforts at a local and regional level.

Coordination and collaboration with other regional stakeholders—which is an essential ingredient to building community resilience at the regional level—was facilitated through the RainReady Technical Advisory Committee (TAC) and the Calumet Stormwater Collaborative (CSC).

In an effort to collect more targeted, community-specific information and feedback on plan recommendations and to jump start implementation efforts, the RainReady Team also organized a Steering Committee (SC) for each of the six Calumet Corridor municipalities (i.e., Blue Island, Calumet City, Calumet Park, Dolton, Riverdale, and Robbins).

These Steering Committees provided critical community-specific information regarding flooding risks and community priorities, as well as feedback on proposed plan recommendations for their specific municipality. These Committees are composed of community leaders—including people within and outside of local government—who will carry this plan forward.

A multidisciplinary Technical Advisory Committee (TAC) was also created to provide high-level input on plan recommendations and implementation strategies. The TAC included planning, policy, engineering, and community outreach resource experts.



Steering Committees



VILLAGE OF BLUE ISLAND

STEERING COMMITTEE MISSION STATEMENT:

The Blue Island Steering Committee will create residential and commercial maintenance plans which include green infrastructure best practices that are fair and attainable for all Blue Island Residents.

STEERING COMMITTEE MEMBERS:

- | | |
|--------------------------|---|
| • Bridgette Poole Milner | • Marsha Lee |
| • Jeremy Heyboer | • Mary Carvlin |
| • Judith Smith | • Rachel Heyboer |
| • Lili Juskevice | • Tom Hawley, 1 st Ward Alderman |



CITY OF CALUMET CITY

STEERING COMMITTEE MISSION STATEMENT:

The RainReady Calumet City Steering Committee will work with residents, staff and elected representatives, to make Calumet City resilient through the use of green and grey infrastructure improvements in alleys, vacant lots, and the City’s expansive parking lots.

STEERING COMMITTEE MEMBERS:

- | | |
|---|---|
| • Frank Alexander, Emergency Service & Disaster Agency (ESDA) | • Joaquin Vazquez |
| • Jim Meincke, Emergency Service & Disaster Agency (ESDA) | • John Beckman |
| | • Pete Saunders, Economic Development Coordinator |
| | • Shirley Watson |



VILLAGE OF CALUMET PARK

STEERING COMMITTEE MISSION STATEMENT:

Through the efforts of the RainReady Calumet Park Steering Committee, Calumet Park will no longer have homes, businesses, or public areas that flood. The tight knit community will be composed of well-maintained infrastructure, residents educated on flood resilience, and excellent response strategies in the case of an emergency.

STEERING COMMITTEE MEMBERS:

• Alma Earley	• Michelle Austin
• Gailyn Hall	• Ramona Austin
• Helen Reed	• Sandra Brown
• Joyce Shaw	• Shon Bailey, Foreman of Public Works
• Lisa Cowans	• Winnell Jones
• Mary Ryan, Village Administrator, Village of Calumet Park	



VILLAGE OF DOLTON

STEERING COMMITTEE MISSION STATEMENT:

The RainReady Dolton Steering Committee will implement the RainReady Dolton Plan, incorporating green infrastructure installation and sewer maintenance. The Committee will beautify the village, create activities for youth, establish new employment opportunities, educate residents, and advocate for implementation of the new sewer maintenance plan. All of the goals of the Committee will be created with flood mitigation in mind.

STEERING COMMITTEE MEMBERS:

• Barbara Evans	• Jerome Gray
• Barbara Lewis	• Kevin Griffin
• Bobby Evans	• Latonya Nalls
• Donna Gray	• Mary Evans
• Elizabeth Scott, Mayor's Chief of Staff, Village of Dolton	• Pearlie Lemons
	• Terry Lewis

VILLAGE OF ROBBINS

STEERING COMMITTEE MISSION STATEMENT:

The RainReady Robbins Steering Committee seeks to raise the quality of life through economic development, education, and neighborhood beautification. The committee will work to create access to daily amenities by establishing businesses that attract residents to spend their money in Robbins and to attract visitors to do the same. The committee will also create recreational and community garden amenities in vacant and underused areas. A sense of place will be established through communication, beautification improvements, and activity building for youth and seniors.

STEERING COMMITTEE MEMBERS:

- | | |
|--|---------------------------------|
| • Tasha Baker, Village Administrator, Village of Robbins | • David Bryant, Village Trustee |
| • Myrna Ratliff | • Ernest Maxey, Village Trustee |
| • Leota Murphy | • Sheila Jones |
| • David Dyson, Village Trustee | • Kathy Park |
| • Zachary Fulson | • Delean Fuller |
| • Christell A. Jones | • Carrie Smith |
| • Rosie Mitchell | • Leila Ward |
| • Joanna Rhodes | • Juanita Williams |
| • Helen Echols | • Barbara Pillow-Sidbeh |
| • Dave Moore | • Loretta Dowdy |
| • Shirley Howard | • Lula Fulson |
| • Melvin Bruton | • Jacob Carrothers |
| • James C. Collier, Sr. | • Jackie Henry |



VILLAGE OF RIVERDALE

STEERING COMMITTEE MISSION STATEMENT:

The Riverdale Steering Committee will use green infrastructure practices to dry and beautify the village, spurring economic, recreational, and community development.

STEERING COMMITTEE MEMBERS:

- | | |
|--|---|
| • Shana Battle | • Albert Williams |
| • Velinda Simpson | • Timothy Williams, Intergovernmental Affairs Manager, Village of Riverdale |
| • Jerome Russell, Village Trustee | • Loree Washington |
| • Cassandra Riley-Pinkney, Village Trustee | |
| • Marlene Brown | |



Technical Advisory Committee

- Ben Shorofsky, Delta Institute
- Benjamin Cox, Friends of the Forest Preserves
- Dana Ludwig, Robinson Engineering, Ltd
- Diane Banta, National Park Service
- Dominic Tocci, Cook County (Funder)
- Eric Neagu, The Antero Group
- Eric Otto, Cook County
- Hanna Kite, Active Transportation Alliance
- Heather Schady, Active Transportation Alliance
- Gunilla Goulding, Arcadis*
- Jacque Henrikson, Active Transportation Alliance
- Jeff Edstrom, Independent Consultant
- John Quail, Friends of the Chicago River
- John Legge, The Nature Conservancy
- Keith Powell, Clark-Dietz Engineers
- Lisa Cotner, Illinois Department of Natural Resources: Coastal Management Program
- Loree Washington, Faith in Place
- Lynne Westphal, USDA Forest Service
- Marion Kessy, Fluid Clarity
- Melissa Custic, The Morton Arboretum/ Chicago Region Trees Initiative
- Moira Zellner, University of Illinois at Chicago*
- Mollie Dowling, High Bridge Social Enterprise
- Molly Woloszyn, Illinois-Indiana Sea Grant, University of Illinois at Urbana-Champaign
- Ramont Bell, Faith in Place
- Reggie Greenwood, South Suburban Mayors and Managers Association

- Russell Rydin, South Suburban Land Bank and Development Authority
- Ted Haffner, Openlands
- Stacy Meyers, Openlands
- Thomas Burke, Christopher B. Burke Engineering, Ltd.*
- Thomas Nagle, Robinson Engineering, Ltd

Non-TAC Advisors

- Deanna Doohaluk, Hey and Associates
- Matt Bardhol, Geosyntec
- Mason Throneburg, CH2M
- Jennifer Dunn, Argonne National Laboratory
- Tom Price, Conservation Design Forum
- Jeff Wickenkamp, Hey and Associates

*Provided technical review of CNT/RainReady's Community Flooding Risk and Opportunities Tool

NOTE: These lists above do not reflect the full number of people engaged through the planning and outreach efforts (e.g., community meetings, educational workshops, tours, stakeholder interviews).

THE PLANNING PROCESS

Purpose of the RainReady Plan

Developing a plan is just one step on a community’s path towards resilience, but it is an important one.

A plan is an adopted vision for the future that is used to guide public and private actions in achieving that vision.

The purpose of this plan is to articulate a vision for more resilient Calumet Corridor communities (i.e., Blue Island, Calumet City, Calumet Park, Dolton, Riverdale, and Robbins) and to put these six communities on a path towards greater resilience through improved stormwater management, sustainable economic development, and integrated planning.

The RainReady/USACE (U.S. Army Corps of Engineers) project team (referred to as the “project team” hereafter)

and municipal partners began developing this plan in February 2016 with the following objectives in mind:

- Establish a shared understanding of the scope, severity, and type of flooding risks across each community in the Calumet Corridor
- Achieve consensus on priority solutions that provide multiple benefits to the community
- Provide municipal and community leaders with a clear roadmap for plan implementation, including partners, funding and financing strategies, necessary policy changes, and local champions
- Where possible, advance existing planning and development priorities that align with the general principles of a RainReady community

Guiding Principles

The following lists explicitly state the guiding principles that shaped how the RainReady Project Team framed problems, worked with communities, and designed solutions.

10 RainReady Guiding Principles:

1. Easily Implementable, Replicable, and Scalable Solutions

We work to ensure that our projects, programs, and partnerships can be widely and quickly adopted by towns and cities across America.

2. Market-Based Approaches

RainReady solutions meet the needs of individual property owners and renters by leveraging public, private, and public-private investments to ensure the biggest bang for the public's buck.

3. Community-Wide Efforts

We bring efficiency savings by serving the whole community and addressing the multifaceted mix of flooding problems that residents and business-owners face.

4. Evidence Based Plans

The projects, programs, policy-changes, and partnerships we recommend are prioritized based on a robust analysis of the risks and opportunities communities face.

5. Affordable and Fair Programs

RainReady solutions can benefit everyone, wealthy and poor.

6. Multi-Scale Solutions

Flooding problems occur at many scales, and thus action is needed at all scales – from individual homes, to neighborhoods, to municipalities, regions, states, and the nation.

7. No Negative Downstream Impacts

Our solutions are designed to avoid simply displacing flooding problems to neighboring homes and downstream communities.

8. Nature-Based (i.e., “Green Infrastructure”) Solutions

We advocate using green infrastructure solutions as often as possible since they have been shown to bring a wider array of community benefits than large-scale, engineered fixes.

9. Fiscal Fairness and Transparency

All properties generate stormwater runoff, so everyone should help pay for the services and systems necessary for managing it.

10. Preventative Measures

We promote the adoption of local ordinances, permits, incentives, educational programs, and infrastructure projects that anticipate various shocks and stresses and prepare for them.



The RainReady Team has adopted these principles, because they have been shown to be effective at putting communities on a path towards resilience. When put into action through policies, programs and projects, these guiding principles elevate high value projects, strengthen economic vitality and improve equity and quality of life for all community members.

Planning and Outreach Approach

The RainReady Calumet Corridor Plan is a community- and data-driven plan that is based on several guiding principles for building sustainable and equitable communities (See Figure RR-11). These principles and the associated RainReady Community planning process were developed through prior RainReady planning efforts in the Village of Midlothian and several Chicago neighborhoods. They have been shown to deliver innovative, effective, and game-changing solutions for communities struggling with urban flooding.

This plan was developed through a 15-month process that consisted of three phases: 1) Risk and Opportunity Assessment, 2) Solution Mapping, 3) Implementation Support, and 4) Monitor & Adaptation (See Figure RR-13). During each of these phases, project tasks were organized into three main workflows: 1) Data Collection, Analysis, and Visualization, 2) Community Outreach and Education, and 3) Planning Deliverables.

The planning process was *iterative* and *collaborative*. For example, data on known flooding risks was collected and printed on large format maps. These maps were then used in collaborative community meetings that were designed to gather additional input on flooding risk and preferred solutions from local residents, municipal staff, and elected representatives. This community input was fed back into our analytical and mapping tools, which were used to generate draft planning recommendations. These draft planning recommendations were then distributed to each community’s Steering Committees (SC) and the Technical Advisory Committee (TAC). Final recommendations were refined based on input from these two groups and any additional information that came to light through the planning process.

The goal at the outset was to develop a plan that synthesizes and reconciles quantitative data on each



FIGURE RR-11:
Plan Approach

FIGURE RR-12:
Planning Services

Phase	Planning Tasks
1	<ul style="list-style-type: none">• Problem Definition and Scoping• Data Collection and Cleaning• Risk Assessment• Opportunity Assessment• Stakeholder Analysis
2	<ul style="list-style-type: none">• Community Outreach• GIS Mapping• Collaborative and Iterative Solution Design• Cost-Benefit Analysis• Project Prioritization and Program Design• Writing and Design of Plan Deliverables (plan, presentations, briefs, etc.)
3	<ul style="list-style-type: none">• Funding, Financing, and Implementation Strategy Development• Grant Writing and Management• RainReady Home and Neighborhood Services (if appropriate)• Ongoing Community Organizing and Capacity Building Support• Stakeholder Mobilization and Alignment
4	<ul style="list-style-type: none">• Monitoring of Green, Grey, and Green-Grey Infrastructure Systems• RainReady Alert (in development)• Regional Coordination Services• Program Evaluation

community’s existing physical and hydrological conditions with community-driven input, such as what kinds of solutions are preferred and where. The purpose for balancing quantitative data with community input was to ensure that we did not recommend a project that, while physically and hydrologically feasible and cost-effective, is not grounded in what the community actually wants. Conversely, we also wanted to ensure that we did not recommend a project that is neither physically feasible nor cost effective. Either of these two scenarios would result in recommendations that are not implementable.

The Rain Ready Community Team worked with local communities to deliver a full range of community planning services (Figure RR-12).

The timeline and corresponding descriptions below describe the RainReady Calumet Corridor planning process, including the project’s key milestones and deliverables.

PHASE 1: RISK AND OPPORTUNITY ASSESSMENT

This RainReady planning process began with an assessment of urban flooding risks, community concerns, and solution opportunities (See the community-specific chapters for a summary of this information). Given the Calumet Region’s planning-rich context, this initial risk and opportunity assessment built upon previous ongoing regional and local planning efforts. The assessment also incorporated information gathered from stakeholder meetings, maps, and existing data indicating known flooding problem areas.

KEY PHASE 1 MILESTONES AND DELIVERABLES:

- The CNT/USACE project team organized and Project officially kicks off
- All six municipal kickoff meetings completed
- RainReady Community Survey and mailers finalized and distributed to 41,529 homes in the Calumet Corridor
- 100+ plans inventoried, 160+ Resilience Opportunities Assessed, and known flooding risks mapped; Information packaged into *Risk and Opportunity Assessment/ Geodatabase*
- All six *Community Resilience Snapshots* published and distributed to community partners

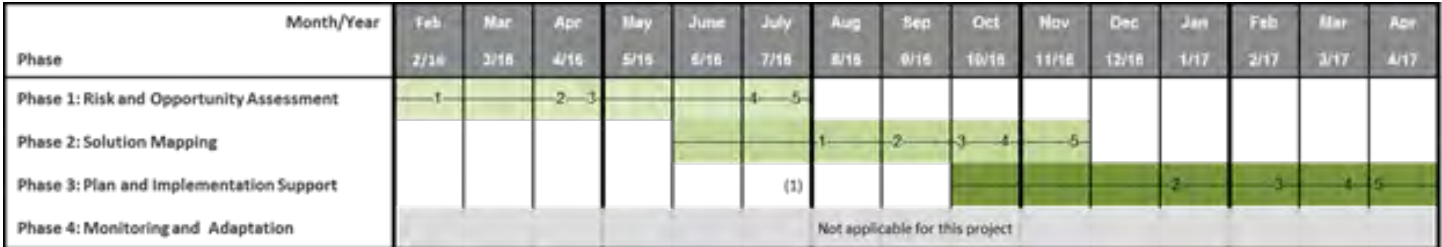


FIGURE RR-13:
RainReady Project Timeline

PHASE 2: SOLUTION MAPPING

Once the existing conditions on flooding risks and resilience opportunities were documented and packaged into the *Risk and Opportunity Assessment/Geodatabase* and the *Community Resilience Snapshots*, the project team used this information to create materials for collaborative *Community Meetings*, *Educational Workshops*, and *City/Village Board Presentations*. The RainReady project team also worked with CNT's Urban Analytics Team to iteratively develop and refine CNT's Resilience Planning Tool (Version 1.0) (Figure RR-14). This tool serves as an assessment and solution mapping resource that: 1) identifies flood-prone areas, 2) maps information related to hydrology, environmental conditions, transportation infrastructure, political jurisdictions, and economic development in the Calumet Corridor, and 3) enables the rapid and iterative testing of different green infrastructure solution alternatives.

KEY PHASE 2 MILESTONES AND DELIVERABLES:

- All six *Community Meetings* completed
- All seven *Educational Workshops* completed
- City/Village Board Meetings initiated to share preliminary findings and recommendations
- Two Steering Committee Workshops held, over 50 Steering Committee members are trained and recruited
- *CNT/RainReady Resilience Mapping Tool Version 1.0* complete

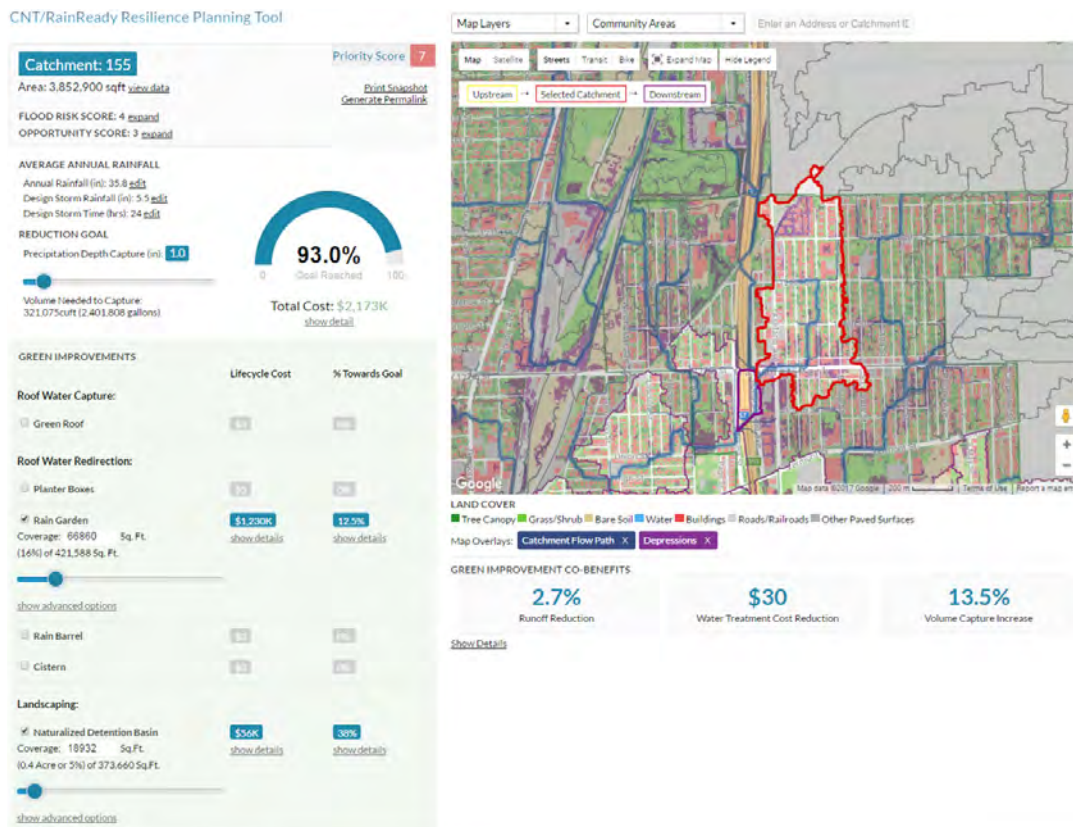


FIGURE RR-14:
CNT/RainReady Resilience Planning Tool™
in Action

PHASE 3: PLAN DEVELOPMENT AND IMPLEMENTATION SUPPORT

In Phase 3, community input, gathered through the various *Community Meetings* and other public engagement events, was fed into the *CNT/RainReady Resilience Mapping Tool*. The project team led *Educational Workshops* to help build local capacity and equip local residents to participate in and contribute to this planning process in meaningful ways. For example, we trained residents in the basics of green infrastructure through presentations and site visits so that they can identify what kind of green infrastructure solutions they would like to see in their communities. Community input gathered from the *Steering Committees*, expert input gathered from the *Technical Advisory Committee*, and outputs from the *CNT/RainReady Resilience Mapping Tool* (i.e., maps, quantitative analysis, data summaries) were used to develop preliminary plan recommendations (e.g., vision statements, mission statements, goals, strategies, and

actions). These preliminary recommendations were then redistributed back to the SCs, the TAC, and other partners and refined. The key deliverable from Phase 3 was the final plan, which was both community-driven and analytically rigorous.

KEY PHASE 3 MILESTONES AND DELIVERABLES:

- Approximately 15 preliminary priority projects identified
- *Draft RainReady Calumet Corridor* plan completed and distributed for internal review
- Draft plan distributed to Steering Committees, Technical Advisory Committee, and other partners
- *Final RainReady Calumet Corridor* completed, planned launch event
- Ongoing implementation support initiated



PHASE 4: MONITORING AND ADAPTATION

Monitoring the performance of projects and programs, evaluating that monitoring data, and adapting municipal management operations and capital improvement implementation efforts based on what you learned are critical steps for building resilient communities. We live in an increasingly uncertain and complex world and no planner can ever anticipate every possible scenario for the future. Plans—although they are often translated into static documents, maps, and graphs—must therefore be living documents that adapt to constantly changing conditions. Community leaders (e.g., residents, municipal staff, elected representatives) must adapt how they implement a plan, whether that occurs through community-driven projects, changes to policy and ongoing municipal operations, or long-term capital improvement projects.

Communities should take Phase 4: Monitoring and Adaption seriously in order to continually improve and move forward on their path towards greater resilience. Given the scope of this project and time constraints, the RainReady project team was unable to offer ongoing monitoring and adaptation support to the Calumet Corridor communities through this planning process. However, the recommendations proposed in this plan embed the processes of monitoring and adaptation.

PLANNING AND OUTREACH ACTIVITIES BY-THE-NUMBERS:

- **Over 2,100** community residents, municipal employees, elected officials, and regional resource experts engaged through the RainReady Planning Process
- **584** RainReady Surveys Completed (NOTE: analysis in this plan was based on 564 surveys)
- **55** Stakeholder Meetings attended by the RainReady project team
- **83** Community Outreach events hosted by the RainReady project team
- **Two mailers** sent to **41,529** homes in the Calumet Corridor
- **Four** Public Service Announcements
- **64** people attended a RainReady Workshop (i.e., Leaders Training and Educational Workshops)
- **237** community members attended a RainReady Community Meeting
- **602** doors knocked in local outreach
- **Five** Calumet Corridor residents hired to conduct outreach
- **26** resource experts engaged in the Technical Advisory Committee (TAC)
- **One** Technical Advisory Committee meetings held
- **Six** Community Steering Committees established with 78 community leaders
- **24** Community Steering Committees held to date
- **One** interactive website created





Ultimately, the main deliverable from this planning process is the document you are reading right now, the RainReady Calumet Corridor Plan. However, this plan is not the only result of everyone’s effort. In fact many projects were well underway even before this plan was finished.

From the start, this program was designed to be an *implementation-focused* planning process. That means, the RainReady project team balanced its intent to create a community-driven and analytically rigorous plan with its efforts to be pragmatic and advance priority projects as opportunities arose. Therefore, activities like participating in project/site planning meetings, advancing existing priorities through the RainReady meetings, submitting grant proposals, and advocating for the implementation of previously-identified priority projects that were aligned with the project team principles, were key components of the planning process.

The decision to take an *implementation-focused* approach to this planning process was informed by the planning context of the Calumet Corridor and broader Calumet and Southland Regions. Put simply, there are many plans that have been completed for the Calumet Corridor communities and region. So many, in fact, that “planning-fatigue” and the perceived lack of implementation efforts was a very real concern among our municipal partners and community residents.

We learned there was a need for: a more complete understanding of flooding challenges and potential solutions, the capacity to plan and implement projects in a coordinated fashion, and the ability to leverage the necessary funding, political, and community resources, and target those resources at the right projects and the right time. In light of these gaps, the project team embraced an *implementation-focused* approach to not only deliver a plan document, but also to help build the local capacity necessary to put the plan into action.

REGIONAL CONTEXT

The Calumet Region is an area shaped by water. Here are just a few examples that illustrate this point:

- The glaciers that receded 16,000 years ago shaped how water flows today by carving a very flat landscape and leaving behind poorly draining soils
- The Region's abundant freshwater resources supported Native American settlement and later, early European settlement, hunting, and trade
- As the country industrialized, the Region's access to "vacant" land and transportation routes (via land and water) supported the manufacturing and transportation of industrial goods, like steel
- As suburban communities developed, they constructed massive infrastructure systems to manage and create value from the Region's vast land and water resources

The growth of communities in the Calumet Region has always been tied to their ability to manage and create value from the region's land and water resources. By extension, creating resilient Calumet communities is dependent on learning how to live with water.

THE CALUMET REGION AND THE CALUMET CORRIDOR

Few places weave together nature, people, and industry as distinctively as the Calumet Region. Glaciers, Native Americans, pioneer settlers, railroaders, industrialists, highway builders, and suburbanization have all left their mark on the landscape. Understanding the Calumet Region's rich history is critical for charting a path forward towards a more resilient future.

LOCATION

The Calumet Corridor is a sub-region within the broader "Calumet" and "Southland" Regions that are comprised of six communities: Blue Island, Calumet City, Calumet Park, Dolton, Riverdale, and Robbins. The Calumet Corridor has served as a major manufacturing and transportation hub for nearly two centuries due to its proximity to the City of Chicago and Northwest Indiana, its land and water resources, and its access to all modes of transportation. The Calumet Corridor's location continues to be one of its most important assets and provides a foundation for future development.



FIGURE RR-15:
The Calumet Corridor in Context

A Brief History of the Calumet Region

- 1500 -1650s** Algonquian tribes inhabit the region
- 1570** Formation of the Iroquois League as Iroquois are pushed westward by European colonization
- 1650s** Algonquian tribes are forced westward as the Iroquois raids become more common place
- 1673** Europeans arrive in the Calumet region
- 1754-1763** The French and Indian War - French defeated, Great Britain gains control over the lands
- 1805** Little and Grand Calumet River become one river due to an overflow of the Grand Calumet banks
- 1818** Illinois becomes a state with a northern boundary set to include the mouths of the Calumet River and Chicago River
- 1830** Extinction of the bison in the Midwest
- 1848** The Illinois-Michigan Canal is completed
- 1848** The 1st railroad shipment of cargo arrives in Chicago
- 1869** The construction of the Calumet Harbor is approved by Congress
- 1871** The Great Chicago Fire
- 1880s** A heavy steel industry starts to dominate the region
- 1901-1908** Construction of the South Shore Line begins, making the dunes and lakeshore area more accessible
- 1913** Lincoln Highway - The first transcontinental highway passes through the Calumet area along the Old Sauk Trail
- 1920s** Ford Motor Company begins construction of its second biggest assembly plant in the U.S. along the Calumet River
- 1922** Calumet Sag-Channel is built as a response to pollution levels in Lake Michigan
- 1940s** Landfills begin to appear in the area
- 1940s-1950s** The Great Migration accelerates
- 1972** The Tunnel and Reservoir Plan (TARP) is adopted to mitigate combined sewer overflows; completion anticipated in 2029
- 1980s-1990s** Major steel plants begin to shut down
- 1985** People for Community Recovery block proposed expansion of Waste Management's CID landfill
- 1992** The fight against the Calumet Lake Airport is won
- 1998** National Park Service releases the Calumet Ecological Park Feasibility Study and recommends the creation of a National Heritage Area
- 2006** Phase I of TARP tunnel systems completed; the tunnel systems were put into service little by little as completed, starting in 1985
- 2012** Millenium Reserve Plan enacted

A TAPESTRY OF PEOPLE, NEIGHBORHOODS, NATURE, AND INDUSTRY

The Calumet Region weaves together neighborhoods, open space and natural areas, shopping and business districts, industrial areas, and transportation corridors like a tapestry. If you take a deep look into the history of any particular place in the Calumet Corridor, you will uncover a complex story marked by cyclical waves of economic growth, conservation, collapse, and revitalization. These economic cycles have resulted in the layering and juxtaposition of old and new features and natural and built environments that are unique to the Calumet Region.

A BRIEF ECONOMIC AND SOCIAL HISTORY OF THE CALUMET CORRIDOR

Historically, the Calumet Region has been closely linked with heavy industry. The abundance of railroads and waterways that traverse the region supported the establishment of steel mills, oil refineries, bulk materials handlers, and other industries (often adjacent to or near waterways). These industries provided a wealth of jobs and community building opportunities for municipalities along the Calumet Corridor, especially in Blue Island, Dolton, and Riverdale.

Over the past 45 years, however, the region's economic base, number of skilled jobs and other opportunities have declined, due to changes in national and international markets and manufacturing technologies. Making matters worse, the Great Recession of 2008 resulted in many homeowners falling "underwater" on their mortgage payments (meaning the amount of a homeowner's mortgage is more than the value of their property), putting them at risk of foreclosure. When chronic flooding issues enter the picture (see The Problem) the financial burden becomes more than many homeowners can shoulder. This has created a situation in which some homeowners feel trapped in their homes or, in some cases, are driven to simply abandon their homes, seeking greener and dryer pastures.

Residents involved in this RainReady planning process have expressed concerns about higher crime rates, and diminishing accessibility to and quality of social services, public education, and public health services. Addressing

	Assets	Description and Examples
ECONOMIC	Transit-Oriented Development (TOD) and Cargo-Oriented Development (COD) opportunities	There are 10 Metra Stations (six in Blue Island, one in Calumet Park, one in Robbins, two in Riverdale. There are five large COD Zones that overlap with Calumet Corridor. Most of these existing TOD/COD existing sites have ample development potential.
	Proximity to Chicago	The Calumet Corridor is approximately 20 miles south of downtown Chicago.
	Access to jobs via transit	On average, 577,491 jobs are accessible within a 30 minute transit commute for households in the Calumet Corridor.
	Community access to transit	On average 35.2% of the people in the Calumet Corridor reside within a half mile of a transit stop.
	Developable land and properties located on commercial streets	All of the Calumet Corridor communities have land and properties available along commercial corridors.
	Funding, financing, and tax incentives programs	There are a variety of tax and funding incentives that are available to catalyze industrial, commercial, residential, and mixed use developments. For example, Tax Increment Financing Districts (TIFs), Special Business Districts, Growth Zones, Brownfield Redevelopment and Intermodal Promotion Act (BRIMPA), New Market Tax Credit Zones, and other incentives can be leveraged by investors and developers.
	Schools and universities with a mission to educate and equip a workforce with the skills needed for an ever-changing economy	There are several nearby colleges, universities, and trade schools within the Southland Region that prepare local residents for jobs in the region (e.g., South Suburban College, Moraine Valley College, Governors State University, Chicago Community Colleges).
	Deep respect for and desire to celebrate cultural and community heritage	Celebrating Robbins' historic African American identity (e.g., Tuskegee Airmen) is a key consideration for residents and Village staff for any planning and development effort.
SOCIAL	Historical neighborhoods that have housed families for generations	Many families have lived in their communities for multiple generations. Community members often cited the aesthetics of older neighborhoods (e.g., "tree-lined streets," and "beautiful and uniformed architecture") as a community strength.
	Engaged community residents and organizations	Community groups like Blue Island's Resident Action Group, Riverdale's Organization for Change (ROC), and numerous other block clubs, church groups, youth groups, and other community organizations are actively engaged in efforts to improve their community's homes, places of worship, and neighborhoods.
ENVIRONMENTAL	An abundance of ecologically-significant natural areas	There are approximately 820 acres of natural areas of statewide significance that are either within or immediately adjacent to the Calumet Corridor communities.
	Access to Lake Michigan, one of the world's largest sources of freshwater	The Great Lakes hold about 21% of the world's fresh water.

FIGURE RR-16:
Key Regional Assets

these community concerns are not within the scope of this plan. However, we feel it is important to acknowledge these broader challenges and, where possible, design flooding solutions that can help communities address them. For example, this plan outlines strategies for investing in infrastructure improvements that create local jobs, and building green school yards that create more youth opportunities for outdoor recreation and environmental education.

Although serious economic and social challenges exist, the Calumet Corridor boasts numerous economic, social, and environmental assets and proactive citizens (residents, municipal staff, and elected representatives) who are committed to improving their communities. Some of the key regional assets identified through this planning effort are listed in Figure RR-16. *Note: Community-specific assets are mapped and discussed in the community-specific chapters.*

In light of the regional assets (Figure RR-16), and many others that are not listed, the RainReady Community Team believes that Blue Island, Calumet City, Calumet Park, Dolton, Riverdale and Robbins are well positioned to take advantage of these tremendous regional strengths and realize a true revitalization of their neighborhoods, business districts, and communities.

SUMMARY OF KEY ACTORS, PLANS, AND POLICIES

The political landscape of the Calumet Corridor is as rich and varied as the region’s physical landscape. Dozens of local, regional, state, and federal organizations, agencies, and firms—each of which has its own jurisdiction and geographies—are actively engaged in shaping the region. Each of these governing bodies, and their staff, brings a unique set of resources (e.g., funds, technical assistance, and administrative know-how) and legal mandates (the responsibility to do something), which can be used to advance a project.

In such a *planning-rich* context, it is critical to begin any effort by learning *what* plans, policies, and ordinances are relevant for a given project and *where* communities can secure the necessary resources for implementation. Therefore, building the capacity of residents, municipal staff, and elected representatives to collectively navigate complicated decision-making processes, mobilize and engage the right stakeholders, and acquire the necessary funding and other resources is key to building stronger, more resilient communities.

To help readers and users of this plan understand and navigate the complex political and economic context of the Calumet Corridor, we created the following four tables:

- **Figure RR-17.** Political Jurisdictions with Cultural and Natural Geographies of the Calumet Region (geographic analysis)
- **Figure RR-18.** Key Actors by Sector (stakeholder analysis)
- **Figure RR-19.** Key Regional Plans (plan review)

FIGURE RR-17:
Political Jurisdictions with Cultural and Natural Geographies of the Calumet Region

Level	Political Jurisdictions	Cultural and Natural Geographies
Local	<ul style="list-style-type: none"> • Wards • Planning Areas • Municipalities 	<ul style="list-style-type: none"> • Blocks • Neighborhoods • Drainage areas
Sub-Regional and County	<ul style="list-style-type: none"> • South Suburban Mayors and Managers Association's (SSMMA) 35-municipality service area • Cook County 	<ul style="list-style-type: none"> • The Calumet Corridor • The Calumet Region • The Millennium Reserve Region • The "Southland" Region • Sewersheds and Watersheds
Regional	<ul style="list-style-type: none"> • Chicago Metropolitan Agency for Planning's (CMAP) seven-county planning area • Metropolitan Water Reclamation District's (MWRD) service area 	<ul style="list-style-type: none"> • "Chicagoland" Region • Chicago Wilderness Region
State	<ul style="list-style-type: none"> • Congressional Districts 	<ul style="list-style-type: none"> • Northeastern Illinois
National	<ul style="list-style-type: none"> • State of Illinois • U.S. Environmental Protection Agency (EPA) Region 5, U.S. Army Corps of Engineers' (USACE) Great Lakes and Ohio River Division • USACE Chicago Division 	<ul style="list-style-type: none"> • The Midwest • Great Lakes and Mississippi Basins

Level	Political	Civic/Academic	Private
Local	<ul style="list-style-type: none"> • Aldermen • Trustees • Mayors 	<ul style="list-style-type: none"> • Block clubs and neighborhood groups • Faith-based organizations • Community-based organizations 	<ul style="list-style-type: none"> • Residents • Local businesses
Sub-Regional and County	<ul style="list-style-type: none"> • Staff at regional agencies • Staff at Council of Governments (COGs) • Staff at County government 	<ul style="list-style-type: none"> • Regional civic organizations and philanthropies • Regional collaboratives, working groups, and networks • Regional land banks • Community colleges and universities (e.g., members of South Metropolitan Higher Education Consortium) 	<ul style="list-style-type: none"> • Contractors • Developers
Regional	<ul style="list-style-type: none"> • Metropolitan Planning Organizations (MPO) 	<ul style="list-style-type: none"> • Regional civic organizations and philanthropies • Regional collaboratives, working groups, and networks • Regional land banks • Community colleges and universities (e.g., members of South Metropolitan Higher Education Consortium) 	<ul style="list-style-type: none"> • Railroad companies • Regionally-focused engineering firms • Utilities companies • Regional industries
State	<ul style="list-style-type: none"> • Staff at state agencies 	<ul style="list-style-type: none"> • State Universities and Extension Programs 	
National	<ul style="list-style-type: none"> • Staff at federal agencies 	<ul style="list-style-type: none"> • National civic organizations and philanthropies • Regional collaboratives, working groups, and networks 	<ul style="list-style-type: none"> • National business chains • National/International Architecture, Engineering and Construction (AEC) firms
This table lists the types of actors in a given sector and governance level. Specific actors (e.g., organizations, agencies, firms, etc.) are listed in the community-specific plans where appropriate.			

FIGURE RR-18:
Key Actors by Sector and Governance Level
(i.e., Stakeholder Analysis)

Through this planning process, RainReady reviewed over 100 plans, policies, and studies, including CMAP's GO TO 2040 Comprehensive Regional Plan (and forthcoming ON TO 2050 plan), the Millennium Reserve Plan, Local Technical Assistance (LTA) plans and the Metropolitan Water Reclamation District of Greater Chicago's (MWRD) Detailed Watershed Plans (DWP) and forthcoming Phase 2 Stormwater Master Plan. The purpose of such an extensive plan review was to avoid "reinventing the wheel" in terms of possible solutions, and to identify opportunities to build on and advance previously proposed ideas and community priorities.

Name	Lead(s)	Year Completed / Status	Focus
ON TO 2050	CMAP	Underway	Comprehensive Regional Plan
Cook County Bureau of Economic Development Sub-Regional Comprehensive Growth Plan	CMAP, Regional Transit Authority (RTA), Cook County	Underway	Economic Development
Chicago Region Trees Initiative Master Plan	The Morton Arboretum, Chicago Region Trees Initiative	Underway	Urban Forest
Calumet Stormwater Collaborative	Metropolitan Plannin Council (MPC) (with various members)	Ongoing	Watershed/Stormwater Management
Millennium Reserve	Various	Ongoing	Various
Floodplain and Stormwater Management Program	Forest Preserve District of Cook County (FPDCC)	Ongoing	Watershed/Stormwater Management
Healthy HotSpot	Cook County Department of Public Health, Active Transportation Alliance (ATA)	Ongoing	Public Health
Stormwater Master Plan for Little Calumet River/Cal-Sag Channel Drainage Area	MWRD	2016	Watershed/Stormwater Management
South Suburban Mayors and Managers Association (SSMMA) / South Council of Mayors: Existing Conditions Report	CMAP, SSMMA	2016	Complete Streets
Planning for Progress in Cook County	CMAP, Cook County	2016	Economic Development
2015 - 2019: Transportation Plan	Cook County Department of Transportation and Highways	2016	Transportation
2017 - 2022: Proposed Highway Improvement Program	Illinois Department of Transportation (IDOT)	2016	Transportation
Connecting Cook County: 2040 Long Range Transportation Plan	Cook County	2016	Transportation
Millennium Reserve Green Infrastructure Project	Chicago Wilderness, SSMMA	2015	Greenways / Green Infrastructure / Conservation
Cook County Multi-Jurisdictional Hazard Mitigation Plan	Cook County	2014	Hazard Mitigation Plan
Next Century Conservation Plan	FPDCC	2014	Greenways / Green Infrastructure / Conservation
Final Capital Improvement Plan 2012 -2016	FPDCC	2012	Capital Improvement Plan
Chicago Southland TOD Corridor Planning Study Phase II Implementation	SSMMA, RTA	2012	Transportation
GO TO 2040	CMAP	2010	Comprehensive Regional Plan
Detailed Watershed Plan for the Little Calumet River	MWRD	2009	Watershed/Stormwater Management
Green River Pattern Book	SSMMA, CNT	2009	Greenways / Green Infrastructure / Conservation
Calumet River Corridor Economic Development Vision and Strategy	CMAP, Business Districts, Inc. (BDI), Vandewalle & Associates, SSMMA	2007	Economic Development

FIGURE RR-19:
Key Regional Plans and
Ongoing Collaboration

This RainReady planning process also coordinated and aligned with these key regional planning and coordination efforts in the Calumet Corridor, where it was appropriate:

THE CALUMET STORMWATER COLLABORATIVE

The Calumet Stormwater Collaborative (CSC) is facilitated by the Metropolitan Planning Council (MPC) and comprised of the key stakeholders managing land, infrastructure, financing tools, or regulatory powers related to stormwater management in the Calumet Region. The CSC began as one of the first priority projects of the Millennium Reserve in light of the need for better communication and coordination around stormwater planning and implementation efforts. The CSC addresses three central problems:

- Stormwater overwhelms current infrastructure
- Green infrastructure’s role in stormwater management is still taking shape
- Coordinated action between government units and other stakeholders controlling land, infrastructure, financing tools and regulatory powers is necessary to solve systemic problems in systemic ways

The CSC has been invaluable in facilitating coordination with stakeholders and partners throughout this planning process. The RainReady educational workshops, hosted throughout the summer of 2016, were a shared product of the CSC.

The CSC, its member organizations, and its work products (e.g., Planning and Policy Resource Repository, educational materials, modeling and data tools, etc.) are all valuable resources for coordinating stormwater planning and implementation efforts in the Calumet Region.

THE CHICAGO METROPOLITAN AGENCY FOR PLANNING’S GO TO 2040 COMPREHENSIVE REGIONAL PLAN

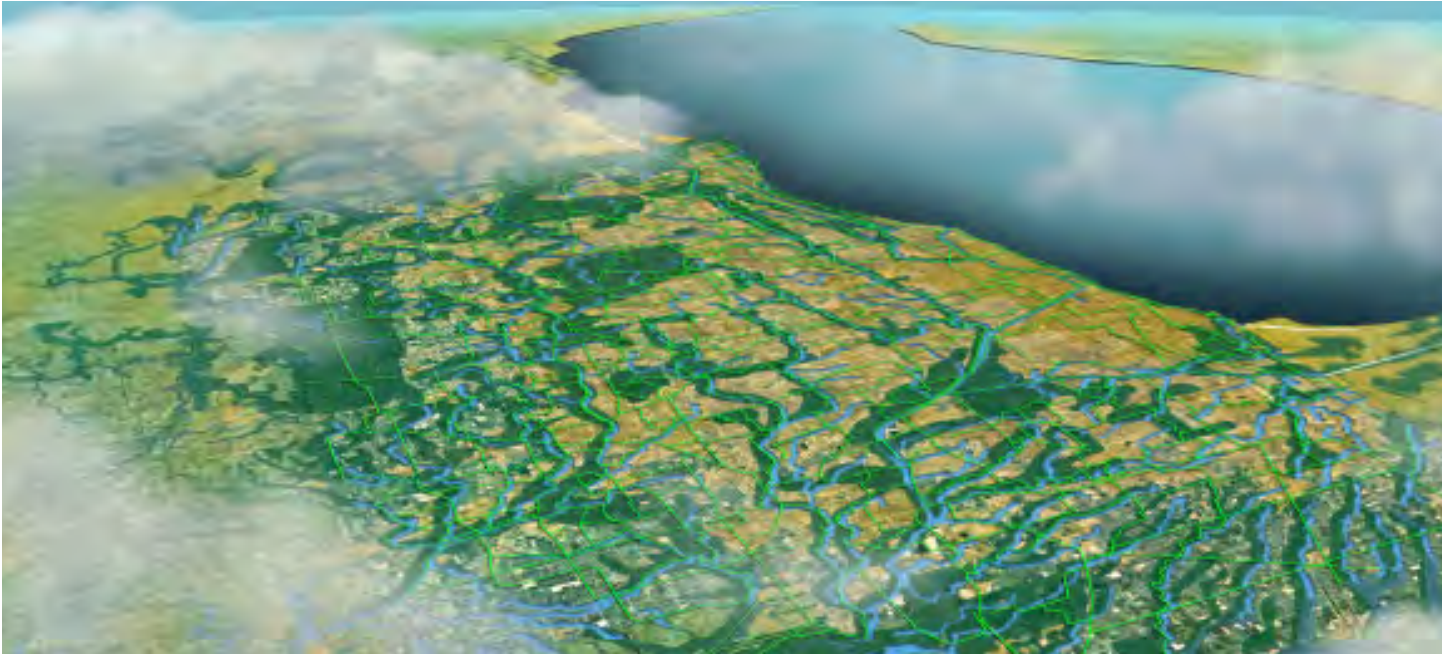
GO TO 2040 is Metropolitan Chicago’s comprehensive regional plan for sustainable prosperity in its seven counties and 284 communities. The Chicago Metropolitan Agency for Planning (CMAP) has begun developing a new comprehensive plan to succeed GO TO 2040. CNT is contributing to this effort on a variety of topics, including stormwater, resilience, green infrastructure, climate mitigation, working in vulnerable communities, and transit-oriented development (TOD).

COOK COUNTY’S APPLICATION TO THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT’S NATIONAL DISASTER RESILIENCE COMPETITION

In 2015, the State of Illinois, Cook County, DuPage County, and the City of Chicago, each applied to the U.S. Department of Housing and Urban Development’s (HUD) National Disaster Resilience Competition (NDRC), a large grant program for resilience initiatives. Though none of the applications were accepted, they provided a foundation for resilience priorities. In fact, many of Cook County’s 2015 project proposals were refined and advanced through RainReady Planning Process.

THE METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO’S PHASE II MASTER PLAN

The Metropolitan Water Reclamation District of Greater Chicago (MWRD) is an independent government and taxing body serving approximately 91 percent of Cook County. Its mission is to protect the health and safety of the public, protect the quality of the water supply source (Lake Michigan), improve the quality of water in watercourses in its service area, protect businesses and homes from flood damages, and manage water as a vital resource for its service area.



The MWRD has finalized a Stormwater Master Plan in the Little Calumet River/Calumet-Sag Channel Drainage Area, which incorporates portions of Blue Island, Calumet Park, Riverdale, and Robbins. The final Plan includes concept memos for known problem areas in four of the six communities in the Calumet Corridor. Where appropriate, the RainReady Calumet Corridor Plan builds on the recommendations put forth in these concept memos. The MWRD also worked closely with Cook County on the aforementioned NDRC application and is the lead agency on several projects within the Calumet Corridor. The RainReady team works closely with the MWRD to coordinate planning efforts and advance stormwater projects in the Calumet Corridor.

MILLENNIUM RESERVE GREEN INFRASTRUCTURE PROJECT

Between 2014 and 2015, Chicago Wilderness undertook a green infrastructure planning process for 36 communities within the Millennium Reserve - Calumet Core. The goal of this process was to increase awareness of natural assets and build a foundation for long-term natural resource protection and stewardship.

Through this process, Chicago Wilderness established:

- a map of the core green infrastructure networks throughout the Millennium Reserve
- a map of key "Opportunity Areas" suitable for localized green infrastructure strategies, which were identified through community workshops over a 12 month period
- increased capacity within local communities to understand the impacts of climate change and implement green infrastructure strategies

The plan established several foundational concepts around which the Cook County NDRC application and this RainReady Calumet Corridor Plan were built.

There is a long and rich history of planning and action in the Calumet Region and, despite reviewing more than 100 documents, this is not exhaustive.

RAINREADY: REGULATORY ENVIRONMENT SUMMARY

The six communities within the Calumet Corridor are subject to a variety of regulations impacting stormwater runoff and water quality. Federal, state, and county regulations apply universally to each of the six communities. Each municipality also has its own set of local codes and ordinances that impact the water within it.

The regulatory environment within which the residents, business owners, and developers of the Calumet Corridor operate will impact the path to RainReadiness. This section provides an overview of the regulations that apply to floodplain and stormwater management, water quality, land use planning, development, site planning, and building codes. Through this review, we can identify the existing regulatory tools that encourage better stormwater management as well as opportunities to improve or instate new regulations that encourage the use of green infrastructure and other water infrastructure best management practices (BMPs).

FEDERAL REGULATIONS

The federal regulations with the most “teeth” (or regulatory power) to manage flooding and stormwater in the Calumet Corridor include the Clean Water Act of 1972, as amended (33 U.S.C. §1251 et seq.), and the National Flood Insurance Act of 1968, as amended (42 U.S.C. 4001 et seq.).

A Note About Language and Definitions

The following section gets a bit technical and uses terms that have very specific definitions. Fear not! We have included a glossary of terms in Appendix B, which you can reference at any time. Terms and concepts that are italicized throughout this plan are defined in this appendix.

THE CLEAN WATER ACT

The Clean Water Act, officially the “Federal Water Pollution Control Act,” was the first federal statute established to protect the natural waters of the United States. It aims to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters” and remains the most important federal statute on water protection.

The Clean Water Act sets guidelines for the release of polluted water into natural waters, and establishes water quality standards for rivers, lakes, and wetlands. Within the Calumet Corridor, the Clean Water Act is responsible for the National Pollutant Discharge Elimination System (NPDES) Program, which dictates that a permit be secured wherever treated effluent and stormwater are released into waterways. The Clean Water Act also regulates the nature of fill material that can be placed in waterways and wetlands.

The United States Environmental Protection Agency (USEPA) administers the majority of the Clean Water Act Regulations. However, the State of Illinois has administered the NPDES program since 1977, and the USACE administers Section 404, which pertains to the placement of fill material into the navigable waters of the U.S. and associated wetlands.

THE NATIONAL FLOOD INSURANCE ACT

The National Flood Insurance Act authorizes the National Flood Insurance Program (NFIP), which is administered by the Federal Emergency Management Agency (FEMA). The NFIP aims to reduce the impact of riverine flooding on private and public structures. It does so by providing affordable insurance to property owners and by encouraging communities to adopt and enforce floodplain management regulations to reduce flooding on new construction.

Although voluntary, most communities participate in the NFIP because municipal participation in the program is required in order for property owners to insure their structure under the NFIP. This insurance is often required to secure a mortgage within the designated Special Flood Hazard Area (SFHA), defined by FEMA. To participate in the program, communities are required to adopt local floodplain management ordinances which ensure that new floodplain development is built to reduce flood risk and does not increase flood risk in other areas. Although the NFIP is administered by FEMA at the national level, individual communities are required to enforce their adopted floodplain ordinances.

FEMA established the voluntary Community Rating System (CRS) Program to encourage communities to go above and beyond the minimum requirements under the NFIP. CRS-participating communities implement actions to reduce flood damage through additional floodplain regulation, educational programs, and taking a comprehensive approach to floodplain management.



When communities opt in to CRS, flood insurance premium rates are discounted within the participating community, reflecting the reduction in risk associated with their actions. Within the Calumet Corridor, all six communities participate in the NFIP, but only Calumet City is currently participating in the CRS program.

Other federal regulations that impact the waterways of the Calumet Corridor are listed below.

-
- **National Environmental Policy Act (NEPA):** Requires federal agencies to assess the environmental effects of their proposed actions prior to implementation. Agencies also provide opportunities for public review and comment on those evaluations.
-
- **Safe Drinking Water Act (SDWA):** Protects the quality of drinking water in the U.S. This law focuses on all waters actually or potentially designed for drinking use, whether from above ground or underground sources, and is administered by the EPA.
-
- **Rivers and Harbors Act of 1899:** Protects navigation and regulates dredging and filling of the nation's waters by requiring a permit for any project that proposes erection of structures or other work in navigable waters. In the Calumet Corridor, the Calumet River, the Little Calumet River, and the Calumet-Sag Channel are listed as "navigable waterways" and are subject to this legislation, which is administered by the USACE.
-
- **Fish and Wildlife Coordination Act:** Protects fish and wildlife when federal actions result in the control or modification of a natural stream or body of water. The act requires a consultation with the U.S. Fish and Wildlife Service (USFWS) and Illinois Department of Natural Resources (IDNR) where any body of water is controlled or modified by any Federal agency.

STATE OF ILLINOIS REGULATIONS

Within the State of Illinois, the most important regulation for managing flooding and stormwater within the Calumet Corridor is the Rivers, Lakes, and Streams Act (RLSA). Under RLSA, the Illinois Department of Natural Resources (IDNR) Office of Water Resources (IDNR/OWR) regulates construction activities in floodplains. This includes regulating activities that may restrict a stream's capacity to carry flood flows and result in channel instability and increased flood damages to neighboring properties. In other words, construction activities must be reviewed for their potential to increase flooding.

IDNR requires permits for any construction within a public body of water and for construction within floodways. Permits are required for construction projects in floodways of 1) streams in urban areas with drainage areas of one square mile or more and 2) streams in rural areas with drainage areas of ten square miles or more. In Cook County, the MWRD reviews permits.

The State of Illinois Environmental Protection Agency (IEPA) administers the NPDES Program, which requires small municipalities with separate sewer systems to secure an ILR40 permit (Phase II MS4 Permit) to oversee the release of stormwater into local waterways. Sewer permits must comply with the current edition of the Illinois Recommended Standards for Sewage Works, Standard Specifications for Water and Sewer Main Construction, local standards and specifications, and Design Criteria for Pressure Sewer Systems, 35 Ill. Adm. Code 374.

Within the Calumet Corridor, Calumet City, Dolton, and Robbins have active NPDES permits. No permit is required for Blue Island, Calumet Park, or Riverdale. NPDES permits require stormwater management programs with the inclusion of six “Minimum Control Measures” under the following categories:

1. Public Education and Outreach on Stormwater Impacts
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater Management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping for Municipal Operations



REGIONAL REGULATIONS

Within Cook County, the MWRD Watershed Management Ordinance (WMO) applies to all developments and qualified sewer construction within its service area. The WMO regulates the following:

- **Qualified sewer construction.** Defined based on the project's location, size, type, and ultimate sewer outlet location. Generally, any construction or modification of storm sewers in a combined sewer area and construction of storm sewers in a separate sewer area that discharge to a MWRD District facility are considered qualified sewer construction and require a *Watershed Management Permit*.
- **Drainage and detention and volume control.** The WMO includes several site development and stormwater management standards to restrict developments from increasing flood elevations, decreasing flood conveyance, or causing any increases in flood velocity within streams. The most significant requirements established to meet these goals include runoff volume control and storage requirements for developments. Figure RR-20 includes a summary of site stormwater management permit requirements.

- **Floodplain management, isolated wetland protection, and riparian environment protection.** Resource protection areas include floodplains, wetlands, wetland buffers, and riparian environments. The WMO requires that development in the floodplain cannot increase flood elevations or decrease conveyance capacity on other property.
- **Soil erosion and sediment control.** Erosion control includes measures to prevent soil from being removed from the earth's surface – planting vegetation, mulching, hydro-mulching, and installing geotextile fabrics. Sediment control measures – silt fences, fiber rolls, sediment traps, and wattles – prevent the transport of soil once it has been removed. The WMO requires that erosion and sediment control practices be included in the initial site plan of a development.

As part of the WMO, the MWRD also implements an *Infiltration and Inflow Control Program (ICAP2)* with which all municipalities in the MWRD's service area must comply. The program aims to limit the amount of infiltration and inflow (I&I) entering into sanitary sewer systems. Excessive I&I can overwhelm sanitary

FIGURE RR-20:
Summary of Site Stormwater Management Requirements

Development Type	Runoff Requirements	Volume Control Requirements	Storage Requirements
Single-Family Home	Exempt	Exempt	Exempt
Residential Subdivision	Parcels ≥ 1 acre	Parcels ≥ 1 acre	Parcels ≥ 5 acres
Multi-Family Residential	Parcels ≥ 0.5 acre	Parcels ≥ 0.5 acre	Parcels ≥ 3 acres †
Non-Residential	Parcels ≥ 0.5 acre	Parcels ≥ 0.5 acre	Parcels ≥ 3 acres †
Right-of-Way	New Impervious Area ≥ 1 acre	New Impervious Area ≥ 1 acre †	New Impervious Area ≥ 1 acre †
Open Space	Parcels ≥ 0.5 acre	Not Applicable	Not Applicable

* Site stormwater management requirements are not required for maintenance activities as defined in Appendix A.

† Where practicable.

‡ Starting the effective date of the ordinance, any new development on the parcel that equals, either individually or in the aggregates, more than one-half (0.5) acre.

Source, MWRD: note for reference https://www.mwrdr.org/iri/go/km/docs/documents/MWRD/Internet/protecting_the_environment/Stormwater_Management/htm/WMO/WMO_Summary.htm

systems with stormwater. Since sanitary systems are designed to hold only sewage, not stormwater, they are easily overwhelmed by big storms, leading to sanitary sewer overflows and basement backups. ICAP2 requires communities within MWRD's service area to identify and address I&I sources within public and private sewer systems. As of November 2015, Calumet City, Dolton, Riverdale, and Robbins all have completed and approved rehabilitations programs.

LOCAL CODES AND ORDINANCES

Local zoning, building codes, and ordinances can either promote or be a barrier to better stormwater management. For example, excessive requirements for on-site parking spaces promote unnecessary increases of impervious surfaces. Laws prohibiting flat roofs restrict green roof installations. Codes requiring that grass be trimmed to less than 10 inches high prevents the use of native grasses that could promote infiltration and improve local habitat.

Comprehensive plans, zoning codes, and building standards are just a few examples of regulations that intentionally or unintentionally regulate the way water is transported, collected and absorbed. Regulations that promote sprawling development or large amounts of impervious cover, for example, can impair stream water quality, worsen flooding, and reduce the recharge of aquifers. Local development codes should be reviewed to limit instances of these types of unintended consequences on local water management.

As is common in many communities, the municipalities in this area have adopted state, county, and international standards into their respective local ordinances. The International Building Code (IBC) developed by the International Code Council (ICC) sets out a series of codes relevant to all buildings except one- and two-family dwellings and is typically adopted in conjunction with the International Plumbing Code, International Mechanical Code, International Residential Code, International Property Maintenance Code, International Energy Conservation Code, etc. These codes are periodically updated, so it is important to note the year in which the adopted code was written. Blue Island is currently using the 2012 version, while Dolton is using 2009. Riverdale is operating under a similar, but different prescribed code from the Council of American Building Officials (CABO) One and Two Family Dwelling Code, 1995 edition, and Building Officials and Code Administrators (BOCA) National Building Code, 1996 edition.

Some notable additions to local ordinances in this area include Blue Island's guidance on "Plant Materials" which suggests, "inclusion of native plant material wherever possible" and promotes "adaptability of proposed plant material to the particular microclimate (sun, shade, dry or wet soils and the like) in which it is to be located" (Blue Island, Illinois Code of Ordinances § 163.05). Blue Island also specifies the inclusion of landscaping in parking lots and "streetscapes" (Blue Island, Illinois Code of Ordinances § 163.08 and 163.09).

RAINREADY SOLUTIONS: GOALS, STRATEGIES, AND ACTIONS



A RainReady Future is Possible!

Communities around the country (and right next door in Midlothian) are realizing that real impact is possible when residents, municipal staff, elected representatives, and regional stakeholders work together towards a shared vision.

Reducing flooding is a key priority for residents and local governments alike throughout the Calumet Corridor and is the focus of this plan. However, reducing flooding is not the only priority. Creating new jobs, educational and recreational opportunities for youth, and a sense-of-place and local ownership also ranked highly amongst those we heard from in this RainReady planning process.

Good news.

There are practical steps that communities can take that will reduce their flooding risk AND support other community priorities.

Creating resilient and thriving communities, however, will require working together across boundaries and borders that are generally not crossed. Just as rain water flows across public and private property, different land uses, and different spatial scales, so too must the strategies and actions that communities implement to reduce flooding.

Creating resilient communities will require that residents, municipal staff, elected representatives, and regional experts work collaboratively in defining problems and designing, determining, implementing, and maintaining solutions. Building community resilience also requires that communities develop infrastructure projects and programs (and financing strategies) that cut across public and private lines.

Such projects and programs (and the partnerships necessary to bring them to fruition) should deliver multiple functions and benefits, be planned in a coordinated manner, foster sustainable and long-term economic development (as opposed to short-term economic growth), and improve the quality of life for all.

RainReady solutions are resilient solutions. The solutions put forth in this plan aim to reduce flooding in a way simultaneously strengthens homes, beautifies neighborhoods, improves transportation, revitalizes commercial areas, and restores natural areas.

These solutions are organized into goals, strategies, and actions.

RAINREADY GOALS

The Three R's: Reorient, Repair, Retrofit

RainReady solutions encompass a wide range of policies, projects, programs, and partnerships that have a role to play in setting communities on a path towards resilience. The proposed solutions for each community take into account each community's strengths, concerns, priorities, and goals, as well as infrastructure projects and programs that are already on-the-books or active on-the-ground.

To help readers of this plan navigate the various proposed policies, projects, programs, and partnerships and understand who is responsible for a given action, we packaged these RainReady solutions into an easy-to-digest concept: **The Three R's**. Each 'R' represents a high-level goal that can guide communities along the paths towards resilience (see below).

Each goal has a corresponding set of **strategies**. Some of these strategies may look familiar, if you have been involved with other planning processes. This is

intentional, as building on prior planning efforts and supporting existing community priorities through stormwater projects was an objective of this planning process from the outset.

Each strategy has a corresponding set of **actions**. These actions were identified through interviews with experts, the RainReady Technical Advisory Committee, and an extensive review of best practices in building community resilience.

In each community plan, these goals, strategies, and actions are tailored so that they fit each community's unique vision for the future, strengths, concerns, and priorities.

This chapter will help readers understand the various goals, strategies, and actions that are proposed in the community action plans.

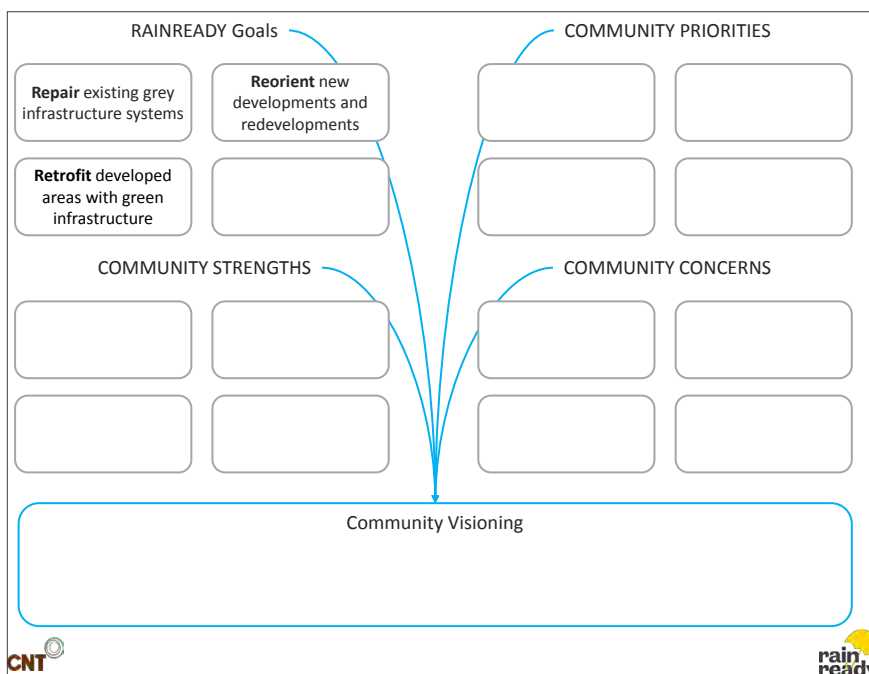
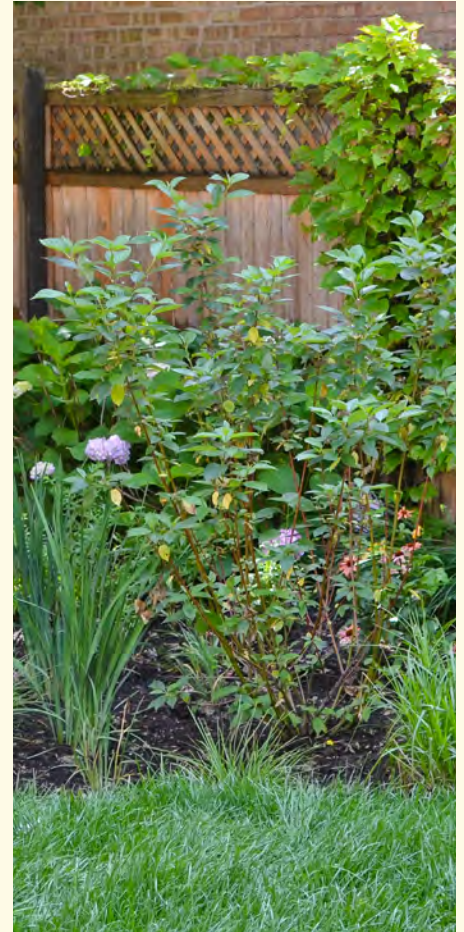
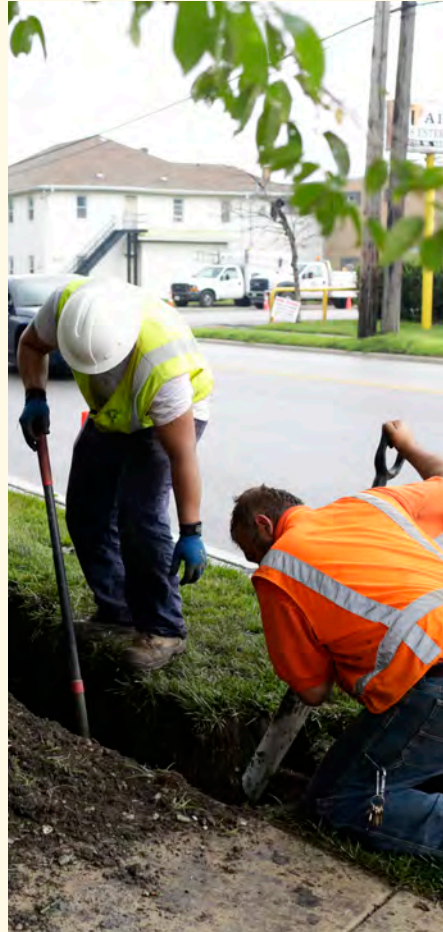


FIGURE RR20:
Synthesizing Community Input
and RainReady Goals



REORIENT STRATEGIES

- **Strategy 1.** Build capacity to make well-informed decisions and execute them
- **Strategy 2.** Plan and implement projects collaboratively
- **Strategy 3.** Promote smart, equitable, and resilient land development
- **Strategy 4.** Prepare your community for future shocks and stresses



REPAIR STRATEGIES

- **Strategy 1.** Document your municipal sewer and stormwater drainage system
- **Strategy 2.** Inspect and evaluate your municipal sewer and stormwater drainage system
- **Strategy 3.** Rehabilitate your municipal sewer and stormwater drainage system
- **Strategy 4.** Maintain your municipal sewer and stormwater drainage system



RETROFIT STRATEGIES

- **Strategy 1.** Retrofit your homes and neighborhoods
- **Strategy 2.** Retrofit your shopping areas, business districts, and downtown areas
- **Strategy 3.** Retrofit your industrial centers and railroad corridors
- **Strategy 4.** Retrofit (restore) your open space and natural areas

Visions, Goals, and Strategies, Oh My!

Several specific terms are used to describe the various components of this plan. The following definitions will help readers of this plan keep these terms and definitions straight:



TERM: VISION STATEMENTS

DEFINITION:

A vision statement articulates the collective understanding of the ideal future of a community. One vision statement was created for the Calumet Corridor area and each Steering Committee.

Visions statements were created by synthesizing the community input collected through the process and were iteratively refined with the community steering committees.

EXAMPLE FROM PLAN:

A RainReady Calumet City will be a community that works. It will be known a place where residents, city staff, and elected representatives work together and achieve real results. Through strategic and coordinated investments in green, grey, and green-grey infrastructure improvements, Calumet City's aging infrastructure, crumbling alleys, vacant lots, and expansive parking lots will be transformed from liabilities into community assets.



TERM: MISSION STATEMENTS

DEFINITION:

A mission statement summarizes the big-picture goals and values of an organization. One mission statement was developed for each of the six Calumet Corridor Steering Committees.

Mission statements were drafted by community steering committees, refined by the ReadyReady team, and then accepted by the community steering committees.

EXAMPLE FROM PLAN:

The RainReady Calumet City Steering Committee will work with residents, staff and elected representatives, to make Calumet City resilient by way of green and grey infrastructure improvements in alleys, vacant lots and expansive parking lots.



TERM: PRIORITY

DEFINITION:

A priority is an idea or recommendation (project, program, policy change) that a community especially wants to see accomplished or enacted.

Priorities were identified by:

- Educating residents on existing flooding risks and resilience opportunities and
- Having the steering committee define which recommendations are most important.

EXAMPLE FROM PLAN:

Ensure that all municipal planting projects in municipality use native plant species.

TERM: GOALS

DEFINITION:

Goals articulate ideal outcomes in a RainReady community. The Three RainReady goals (i.e., Reorient, Repair, and Retrofit) goals were applied to each community.

The RainReady goals were developed through an assessment of the primary planning problem to be addressed (chronic urban flooding) as well as broader factors (i.e., structural roadblocks, capacity potholes).

EXAMPLE FROM PLAN:

- **Reorient** Calumet City so that the community is on a path towards resilience
- **Repair** Calumet City's municipal sewer and stormwater drainage systems
- **Retrofit** the built landscapes throughout Calumet City with green, grey, and green-grey infrastructure improvements, and restore natural landscapes.



Photo: MARCXC, Flickr/Creative Commons

TERM: STRATEGIES

DEFINITION:

Strategies describe a way to achieve a RainReady goal.

A broad suite of potential strategies was developed through reviewing previous plans, inventorying best practices and case studies, and working collaboratively with community residents, staff, and elected representatives. Strategies were applied to communities based on each community's unique risks and resilience opportunities.

EXAMPLE FROM PLAN:

Strategy 1. Implement a residential resilience program .

TERM: ACTIONS

DEFINITION:

Recommended actions are specific projects, programs, policies, and partnerships that comprise a strategy.

Specific actions (e.g., what is proposed, where it goes, who leads, when does it happen, etc.) were developed by synthesizing outputs from analytical flood and solution mapping tools with input gathered through a collaborative and iterative community engagement process.

EXAMPLE FROM PLAN:

Adopt/Accept the RainReady Calumet City Action Plan; update the plan every 2-5 years; incorporate the plan's recommendations into forthcoming capital improvement planning efforts and decision-making efforts.

THE THREE R'S

The following goals are intended to help guide communities along the path towards greater resilience.

CNT/RainReady does not claim to have an exact blueprint for building a resilient community. In fact, this is something that each community needs to envision (and continually re-envision) for itself. CNT/RainReady, however, does have almost 40 years of experience in helping communities envision a more sustainable and equitable future and equipping people with the tools, insights, and know-how with which to realize that future.

Community leaders should acknowledge that the future is uncertain and develop the capacity of their communities (e.g., individuals, families, governments, infrastructure systems) to continually learn, improve, and adapt to change. The Three R's, therefore, are not a rigid step-by-step set of instructions, but rather a set of recommendations to guide how communities (re)orient towards a resilient future, repair and maintain existing infrastructure, and retrofit the natural and built landscapes.

RAINREADY GOALS:

- **Reorient communities.** Put communities on a path towards greater resilience by reorienting day-to-day-operations and long-term planning.
- **Repair existing infrastructure.** Establish modernized infrastructure systems that allow communities to survive and thrive no matter what shocks and stresses they face.
- **Retrofit the landscape.** Create beautiful communities by converting impervious surfaces into natural landscapes, installing new green, grey, and green-grey infrastructure, and restoring natural areas.

Reality Check



The path towards resilience is inherently uncertain (see The Path Forward). Communities will never know—with 100% certainty—what shocks and stresses lay ahead and what roadblocks and potholes may arise in the future. Consequently, there is no “one best way” to build your community’s resilience. Each community has a unique set of challenges and opportunities that they must navigate. This does not mean, however, that communities cannot take strategic and intentional steps to thrive today and prepare for tomorrow.

GOALS, STRATEGIES, AND ACTIONS

These goals, strategies, and actions will be implemented at multiple spatial scales



HOME

Strong communities are made up of strong and resilient homes. Reducing your individual flooding risk starts at home. Whether you are suffering from two feet of water in your basement or a constantly soggy lawn, there are simple, well-tested solutions available to homeowners and renters such as: regrading yards, televising and cleaning lateral lines, diverting water from gutters away from a house or into a rain gardens, and the careful placement or relocation of fences, garden, sheds, or anything that can block stormwater.



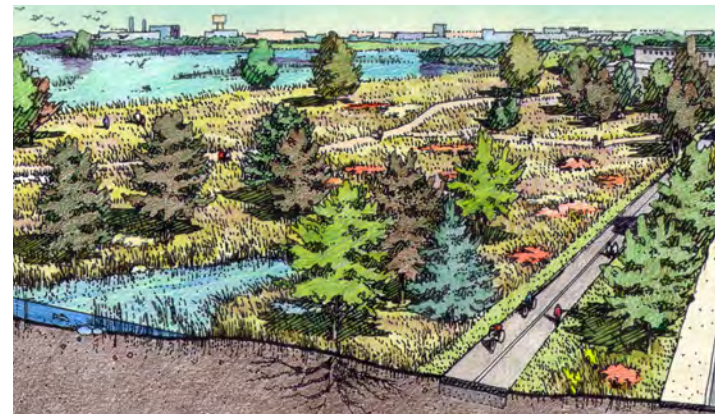
NEIGHBORHOOD

Stormwater may flow from one neighbor's property to another's, or pool in streets and alleys. Such local flooding issues can often be resolved through neighborhood-scale green infrastructure improvements, such as: bioswales along streets, green schoolyards and churches, green alleys, tree plantings, small-scale stormwater parks, and constructing storm sewers to collect runoff from roads and yards.



COMMUNITY

Some flooding and stormwater issues need to be addressed at the community-wide scale. For example, restoring a stream segment that flows through town, improving streetscapes, large sewer projects, revitalizing commercial corridors, and de-paving large impervious areas all require the marshalling of economic resources and political capital at the community level.



REGION

The communities of the Calumet Corridor are part of a broader region (see Regional Context). Waterways traverse the region and stormwater flows across municipal lines with no regard for political jurisdictions. Therefore, implementing large-scale projects like restoring a stream that crosses through multiple towns, constructing a regional trail, and developing a regional stormwater detention facilities, will require planning and implementation efforts at the regional level.

This plan also outlines actions that apply to different areas within your community. These different areas, or “land uses,” include the places where you live, work, play, and travel. To keep it simple, we organized the various land uses present throughout the Calumet Corridor into four primary categories:



YOUR HOMES AND NEIGHBORHOODS

The Calumet Corridor boasts many historic neighborhoods, each of which have their own unique character. Many of these neighborhoods, however, are in need of stabilization and restoration. This plan includes a variety of strategies and actions aimed at strengthening existing homes, beautifying the residential right-of-way (e.g., streets, parkways, sidewalks, alleys), and bringing new life to underutilized and vacant parcels.



YOUR INDUSTRIAL CENTERS AND TRANSPORTATION CORRIDORS

The large industrial areas, railroads, and highways that traverse the Calumet Corridor have supported previous eras of economic growth and will have a key role to play in the resilient revitalization of the broader Calumet Region. Although these legacy assets may present some challenges to residents of the Calumet Corridor (e.g., congestion due to automobiles and freight trains, air pollutions, brownfields), they can be redeveloped and revitalized in a way that reduces flooding in surrounding neighborhoods and promotes sustainable economic development.



YOUR SHOPPING AREAS AND BUSINESS DISTRICTS

Just as there are historic residential neighborhoods in need of repair, there are also historic (and newer) commercial corridors that—with just a bit of help—can once again be charming and pleasant places to shop and work (as opposed to traffic-ridden and stressful places that raise your blood pressure). This plan includes a variety of strategies and actions aimed at strengthening existing businesses, attracting new businesses, improving the commercial right-of-way (e.g., streets, parkways, sidewalks, alleys), and bringing new life to underutilized and vacant parcels.



YOUR OPEN SPACE AND NATURAL AREA

The natural land and water resources of the Calumet region (e.g., freshwater, rivers and streams, forest, prairies, wetlands) gave rise to the communities that occupy the landscape today. Sadly, only small remnants remain of these pre-settlement habitats and communities. Restoring these natural assets and re-connecting people to them—both physically and metaphorically—will be critical to creating a more resilient Calumet Corridor.

Goal 1: Reorient

REORIENT COMMUNITIES

PUT COMMUNITIES ON A PATH TOWARDS RESILIENCE BY REORIENTING DAY TO DAY OPERATIONS AND LONG-TERM PLANNING.

This goal will be achieved through strategic actions to improve local decision-making, ensure collaborative planning, promote equitable and resilient development, and prepare communities for future storms.

REORIENT STRATEGIES

- **Strategy 1. Build capacity to make well-informed decisions and execute them.** Adopt a long-term, adaptive, and integrated approach to managing day-to-day municipal operations, engaging in planning efforts, and making investment and development decisions.
- **Strategy 2. Plan and implement projects collaboratively.** Ensure that ongoing planning and decision-making processes are transparent, well-coordinated, and broadly participatory.
- **Strategy 3. Promote smart, equitable, and resilient land development.** Incentivize smart, equitable, and more resilient land development at all levels—from the home to the region.
- **Strategy 4. Prepare your community for future shocks and stresses.** Equip your residents, businesses, municipal staff, elected representatives, and regional partners with the knowledge and resources they need to prepare for, mitigate, respond to, and recover (stronger) from future storms—both large and small.



REORIENT ACTIONS

- **Strategy 1. Build capacity to make good decisions**
 - Build trust with your peers, your staff, and your constituents
 - Monitor and evaluate the performance of projects and programs
 - Improve the flow of information between departments and with your constituents
 - Cultivate a culture where it is okay to experiment, make mistakes, and learn
 - Continually seek to improve



• **Strategy 2. Plan and implement projects collaboratively**

- Engage a diversity of stakeholders early and often
- Listen, listen, and then listen some more
- Design outreach activities so that they match with the schedules, priorities, and expertise of the stakeholder group(s) you are seeking to engage
- Accomplish and celebrate the small victories (they add up)
- Don't take it personally
- Work together and recruit your neighbors
- See out creative ways to implement projects

• **Strategy 3. Promote smart, equitable, and resilient land development**

- Conduct a local ordinance audit
- Update building codes, zoning, and ordinances
- Public and Private Space Retrofit Programs
- Green Infrastructure and Flood Management Training

• **Strategy 4. Prepare your community**

- Know your risk: review the RainReady Plan: Calumet Corridor and Cook County's Hazard Mitigation Plan and implement their recommendations
- Agree on the path forward: work with RainReady and others to identify priorities for preparedness; and develop an emergency response plan
- Develop and implement an emergency alert system that alerts residents and visitors of an impending flood and other hazards or threats
- Educate the community on flood preparedness through school programs and other public forums (e.g., workshops, newsletters, websites, social media)
- Partner with American Red Cross, FEMA, and other organizations to provide disaster preparedness training
- Organize trainees into Community Emergency Response Teams (CERT)
- Educate homeowners, renters, and businesses about steps to reduce flood risk in homes and businesses and how to choose the right insurance so that they can quickly clean up, repair qualified damages, and strengthen the community following a storm
- Use tools like the Flood Vulnerability Assessment for Critical Facilities to assess the vulnerability of critical facilities and plan accordingly

Goal 2: Repair

REPAIR EXISTING INFRASTRUCTURE

ESTABLISH MODERNIZED INFRASTRUCTURE SYSTEMS THAT ALLOW COMMUNITIES TO SURVIVE AND THRIVE NO MATTER WHAT SHOCKS AND STRESSES THEY FACE.

Bringing aging and limited sewer systems up to a state of good repair will take strategic and ongoing efforts to document, inspect, maintain, and rehabilitate your existing sewer systems and residential lateral lines.

REPAIR STRATEGIES

- **Strategy 1. Document your municipal sewer and stormwater drainage system.** Gather information about the location, age, and extent of community infrastructure assets. Develop a system to record information about the various components of your overall system.
- **Strategy 2. Inspect and evaluate your municipal sewer and stormwater drainage system.** Regularly inspect your system so you know its condition and can identify problem areas.
- **Strategy 3. Rehabilitate your municipal sewer and stormwater drainage system.** When necessary, rehabilitate parts of the system to bring them up to a state of good repair.
- **Strategy 4. Maintain your municipal and sewer and stormwater drainage system.** Regularly clean and maintain your sewer system to keep small problems from turning into big ones.



REPAIR ACTIONS

- **Strategy 1. Document your municipal sewer system**
 - Update your sewer atlas information
 - Create a system (e.g., a Geographic Information System) for managing information on your municipal sewer system
 - Share your updated sewer atlas information through the Southland Suburban Mayor’s and Managers Association (SSMMA) to enable cross-jurisdictional stormwater planning
- **Strategy 2. Inspect your municipal sewer system**
 - Create a sewer inspection plan and schedule
 - Continually inspect your municipal sewer system on a cyclical basis (e.g., using both visual and closed circuit television inspection techniques)
 - Sewer televising and lining (inspection and maintenance task)
- **Strategy 3. Maintain your municipal sewer system**
 - Create a maintenance plan for green and grey infrastructure
 - Catch basin cleaning
 - Crack sealing
 - Sewer televising and lining (inspection and maintenance task)
 - Clean sewers and manholes
 - Street sweeping
- **Strategy 4. Rehabilitate your municipal sewer system**
 - Sewer point repairs
 - Roadway resurfacing (which improves gutters and other stormwater infrastructure)

Goal 3: Retrofit

RETROFIT THE LANDSCAPE

CREATE BEAUTIFUL, RAINREADY COMMUNITIES BY CONVERTING IMPERVIOUS SURFACES INTO NATURAL LANDSCAPES AND INSTALLING NEW GREEN AND GREY INFRASTRUCTURE.

Bringing aging and limited sewer systems up to a state of good repair will take strategic and ongoing efforts to document, inspect, maintain, and rehabilitate your existing sewer systems and residential lateral lines.

RETROFIT STRATEGIES

- **Strategy 1. Retrofit your homes and neighborhoods.** Retrofit homes and neighborhoods in a way that meets basic housing needs, supports public health, and creates more vibrant, connected, and livable places.
- **Strategy 2. Retrofit your shopping areas, business districts, and downtown areas.** Retrofit shopping areas, business districts, and downtown areas in a way that fosters economic prosperity, supports livelihoods and employment, and creates more walkable and attractive places.
- **Strategy 3. Retrofit your industrial centers and railroad corridors.** Retrofit industrial centers and railroad corridors in a way that creates new jobs, beautifies neighborhoods, and provides reliable transportation options.
- **Strategy 4. Retrofit (restore) your open space and natural areas.** Retrofit and restore your open space and natural areas in a way that preserves, protects, and enhances land and water resources, and connects these natural assets to your community.

RETROFIT ACTIONS

- **Strategy 1. Retrofit your homes and neighborhoods**
 - Implement a residential resilience program
 - Bring new life to vacant residential land
 - Create green schoolyards and churches
 - Create a network of residential green streets and complete streets
 - Create green alleys
- **Strategy 2. Retrofit your shopping areas, business districts, and downtown areas**
 - Enhance public facilities (e.g., schools and government buildings)
 - Bring new life to vacant and underutilized commercial land
 - Bring new life to underutilized parking lots
 - Create a network of commercial green streets and complete streets
- **Strategy 3. Retrofit your industrial centers and railroad corridors**
 - Improve the edges of large industrial sites and railroad corridors
 - Create a network of industrial green streets
 - Redevelop industrial sites in a way that reduces nearby flooding
- **Strategy 4. Retrofit (restore) your open land and natural areas**
 - Expand existing and create new open space and outdoor recreation amenities
 - Expand existing and create new urban agriculture sites
 - Integrate green infrastructure in municipal park systems

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RainReady Calumet Corridor

Plan for Blue Island, IL

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A CITIZEN'S GUIDE TO A **RAINREADY BLUE ISLAND**



A RainReady Blue Island would be a community that continues to find innovative and effective ways to strengthen its homes and businesses and create new opportunities for sustainable economic development. It would be a community where residents, businesses, and local officials work together to implement and maintain community projects that create jobs, reduce flooding, beautify and connect neighborhoods in a way that is fair and transparent.

In order to better understand Blue Island's flooding risk, the Center for Neighborhood Technology (CNT), the U.S. Army Corps of Engineers, the RainReady Blue Island Steering Committee, and the City of Blue Island joined together in February 2016. Throughout the year, this group met regularly, hosted community meetings, went door-to-door in the neighborhoods, held seven educational workshops and multiple Steering Committee meetings, and reviewed hundreds of plans and studies. 72 Blue Island residents filled out our flooding survey.

Together, we have established a shared vision and a path toward a flood-resilient Blue Island: The RainReady Blue Island Plan. This Citizen's Guide to a RainReady Blue Island covers the highlights of the plan, for more information visit www.rainready.org/calumet-corridor.

A Path Forward

Blue Island is a regional leader in adopting innovative approaches to stormwater management and economic development. The Mayor likes to think BIGG (Blue Island Going Green), and his administration has certainly walked the talk in this regard. The City was an early adopter of "green infrastructure" and began installing rain gardens and distributing rain barrels in 2013 to reduce flooding in its northeast neighborhood. The City now has a foundation of green infrastructure projects from which to learn, improve, and expand projects that reduce flooding and spur economic development.

Equipped with this RainReady Plan, the City now has a roadmap for reducing local flooding issues in a way that strengthens neighborhoods and business districts, bringing new life and vibrancy to vacant areas of town. In many instances, the City is already proactively engaged in many of the recommendations of this plan. This plan includes new project recommendations as well as creative ways to coordinate and accelerate various public and private projects that deliver flood relief and other community benefits.

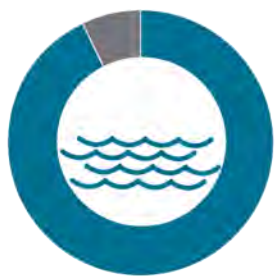
**KEEP READING FOR MORE INFORMATION ON THE
PATH AHEAD FOR BLUE ISLAND!**



**US Army Corps
of Engineers®**

Understanding the Problem

Like many of its neighbors, Blue Island has long been plagued by chronic flooding. In recent years, the scope and severity of the floods have become significantly worse. A combination of increased impervious surfaces, aging and limited infrastructure, and changes in regional climate have left Blue Island residents vulnerable across the city. From 2007 to 2011, 469 flood-related insurance claims were filed in the 60406 zip code, with more than \$1.2 million paid out in damages. In 2015, the broader Calumet Corridor in which Blue Island is located was identified by Cook County as the area that was “most impacted and distressed” by the April 2013 storms (DR-4116). Strategic policy changes and coordinated investment in green and grey infrastructure capital projects and ongoing maintenance will be part of the mix of solutions necessary to mitigate chronic flooding issues and large storms.



*Respondents experiencing flooding problems**

71 survey respondents

\$2,242 is the average amount spent on stormwater-related repairs

\$9,314 is the average amount residents are willing to invest to reduce risk of future damage

How does water enter properties?



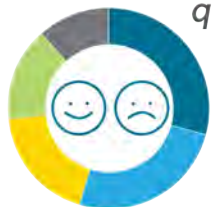
- 24 Backing up through drains
- 28 Seeping through walls
- 10 Flowing through doors/windows
- 17 Pooling/ponding in yard
- 11 Overflow from street, creek, nearby body of water
- 2 Other
- 2 Don't know

What is the level of worry about flooding's impact on property value?



- Extremely worried 30%
- Very worried 11%
- Moderately worried 22%
- Slightly worried 19%
- Not at all worried 19%

How much do heavy rains impact quality of life?



- 33% A great deal
- 29% A lot
- 21% A moderate amount
- 17% A little
- 13% Not at all

How much do heavy rains impact commute or other travel?



- A great deal 11%
- A lot 15%
- A moderate amount 19%
- A little 41%
- Not at all 15%

What is the preparedness of the community to work together to find a solution?



- 11% Extremely prepared
- 18% Very prepared
- 11% Moderately prepared
- 25% Slightly prepared
- 36% Not at all prepared

*Respondents who answered "Yes, I experience problems" and "I do not experience problems anymore" were grouped into the "Yes" category because both sets of respondents experience ongoing flooding problems or have experienced problems in the past, respectively.

Data Source: CNT Survey, 2016

Planning the Solutions

Blue Island's path toward flood resilience will require coordinated action at multiple levels—from the individual home to the broader region. Fortunately, community residents, municipal staff, and elected representatives are aligned in their desire for a more beautiful, flood-resilient community. This RainReady Plan recommends the following priority projects, which were taken from a comprehensive list of recommendations:

RESIDENTIAL PROGRAM

Renew and expand Blue Island's residential cost-sharing program to help homeowners recover from past storms and prepare for future storms. Under this program, residents would receive financial support for a complete home inspection and improvements targeted to reduce risk, like check valves, overhead sewers, and a rain garden.

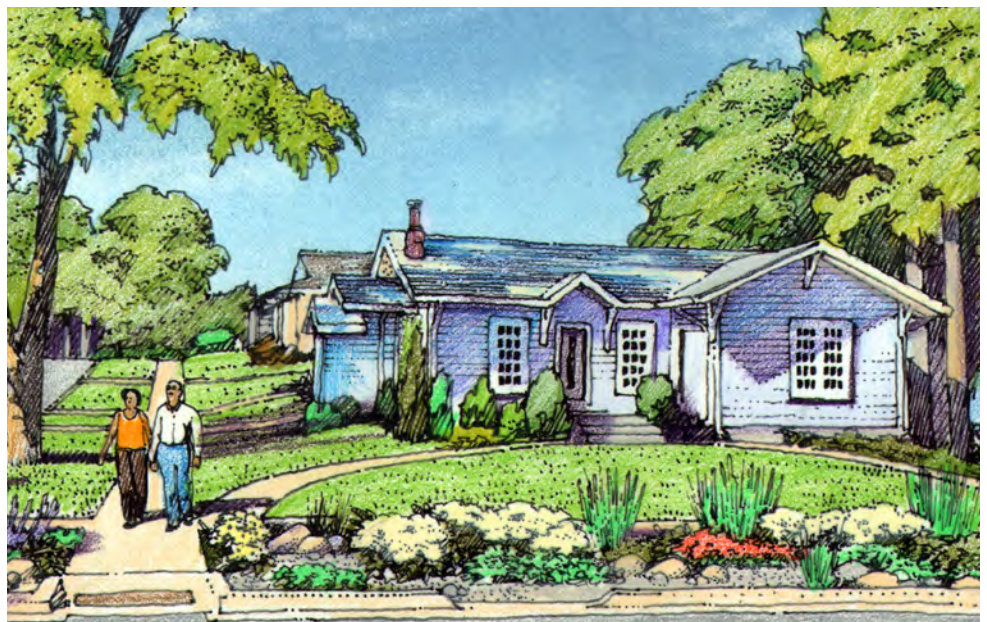
WESTERN AVENUE BEAUTIFICATION

Western Avenue is slated for improvements thanks to local leadership setting up the Business Development District. The City should continue its practice of incorporating green infrastructure (planter boxes, tree plantings, and bioswales) into planned improvements such as streetscapes and the public right-of-way. These types of improvements will beautify the corridor while reducing stormwater runoff into the local sewers.



NORTHEAST NEIGHBORHOOD

The northeast neighborhood of Blue Island, "the bowl," has been known to flood for many years. The City of Blue Island has succeeded in securing numerous grants and partnerships that are dedicated to reducing flooding and beautifying the neighborhood. With support from MWRD, a coordinated investment in green and grey infrastructure is expected to occur in 2017. The City should continue to coordinate with the MWRD and other partners to implement and maintain concentrated and integrated green and grey infrastructure projects.



Quick Steps

We know that residents experience flooding every summer, and the need for help is urgent. Here are 7 solutions that homeowners should consider to reduce their risk today:

- **ASSESS YOUR PROPERTY.**

The first step to solving your flood problem is to understand how water falls on your property and flows through your pipes. If you have significant problems, you may need the help of an engineer, plumber, electrician, or landscape designer.

- **MAKE YARD IMPROVEMENTS.**

In order to reduce flooding, capture stormwater runoff using rain gardens, swales, dry wells, permeable paving, rain barrels, or cisterns.

- **ELEVATE YOUR APPLIANCES.**

If water regularly enters your home, place appliances, furnaces, hot water heaters, and electrical panels above the typical flood level on wood or concrete blocks.

- **HAVE YOUR BUILDING SEWERS CHECKED.**

Faulty pipes connecting your home to the municipal sewer system can exacerbate foundation damage and flooding in your home. Ensure that grease, waste, or tree roots are not obstructing the pipe and preventing wastewater from leaving the house.

- **RECLAIM YOUR PARKWAY.**

The strips between sidewalks and streets can be transformed into attractive green spaces that absorb stormwater runoff, reduce municipal maintenance costs, and beautify streets. Be sure to check your municipal code for which plants are permitted.

- **GET INSURED.**

There are several options available to protect you against the risk of water damage, including home insurance policies, flood insurance riders, and the National Flood Insurance Program (NFIP), established by FEMA and administered by your local insurance companies.

- **ADVOCATE FOR THE RAINREADY PLAN.**

This plan outlines solutions to community wide flooding. Get involved in your local Steering Committee to make sure the plan is implemented!



GET INVOLVED!

Blue Island has a RainReady Blue Island Steering Committee that meets monthly!

For more information contact Rebecca Raines at rraines@cnt.org or 773.269.2217.

CITY OF BLUE ISLAND

COMMUNITY SNAPSHOT

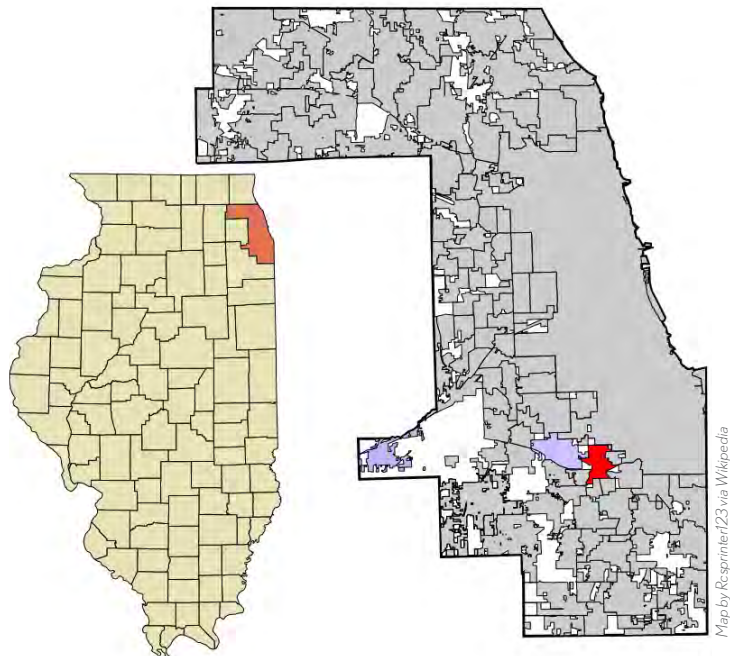
Located 16 miles south of downtown Chicago and situated along the Cal-Sag Channel, Blue Island, Illinois holds a unique place in south suburban Cook County. Blue Island's easy access to waterways made it highly suitable for industrial and commercial growth. Over time, Blue Island's regional and local assets transformed the community from a settlement in Chicago's outskirts to a regional hub for industry and commerce. It is a vibrant and entrepreneurial community with considerable growth potential.

Like many of its neighbors, Blue Island has long been plagued by chronic floods. From 2007 to 2011, 469 flood-related insurance claims were filed in the 60406 zip code, with more than \$1.2 million paid out in damages (CNT, 2014). In 2013, Blue Island became a leader in addressing local flooding issues when local leaders brought attention and resources to bear on its flood-prone northeast neighborhood.

More investment is needed to bring additional flood-resilience to residents in the northeast neighborhood and other parts of town. Fortunately, Blue Island is well positioned to continue to learn from, expand, and improve their earlier efforts. Building on Blue Island's prior and ongoing efforts, this plan provides a roadmap for reducing local flooding issues in a way that strengthens neighborhoods and business districts, and brings new life vibrancy to vacant areas of town.

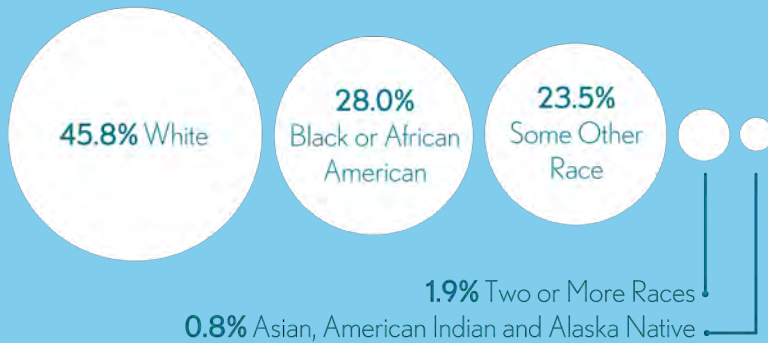


FIGURE BI-1:
Location of Blue Island within Cook County

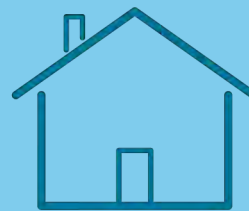


Blue Island, IL AT A GLANCE

racial composition



23,453
total population

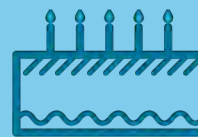


9,591
total number of households



78% of residents hold high school diploma

15% of residents hold college diploma



34
median age

Cook County \$54,828

Blue Island \$39,023

Cook County \$30,468

Blue Island \$18,867

median
per capita income

median
household income



22%
people below poverty level



16%
unemployment rate
(people age 16+)

Data Source: US Census

Flooding Risks and Resilience Opportunities

Residents and business owners in Blue Island experience several types of flooding:

- **Basement backup** from the local sewer system and damaged private lateral lines, impacting several parts of town
- **Street and yard flooding** which occurs when local drainage systems are overwhelmed with stormwater and sewage
- **Foundation seepage** in several areas of Blue Island, causing rot and mold in basement walls

Areas with higher flooding risk are shown in Figure BI-4 (the darker the blue the higher the risk of flooding). Proposed flooding solutions are also shown on this map. These “green-grey” solutions were identified through a community-driven and analytically-rigorous process. The result is a plan that works, both in terms of its community support and physical and economic feasibility.

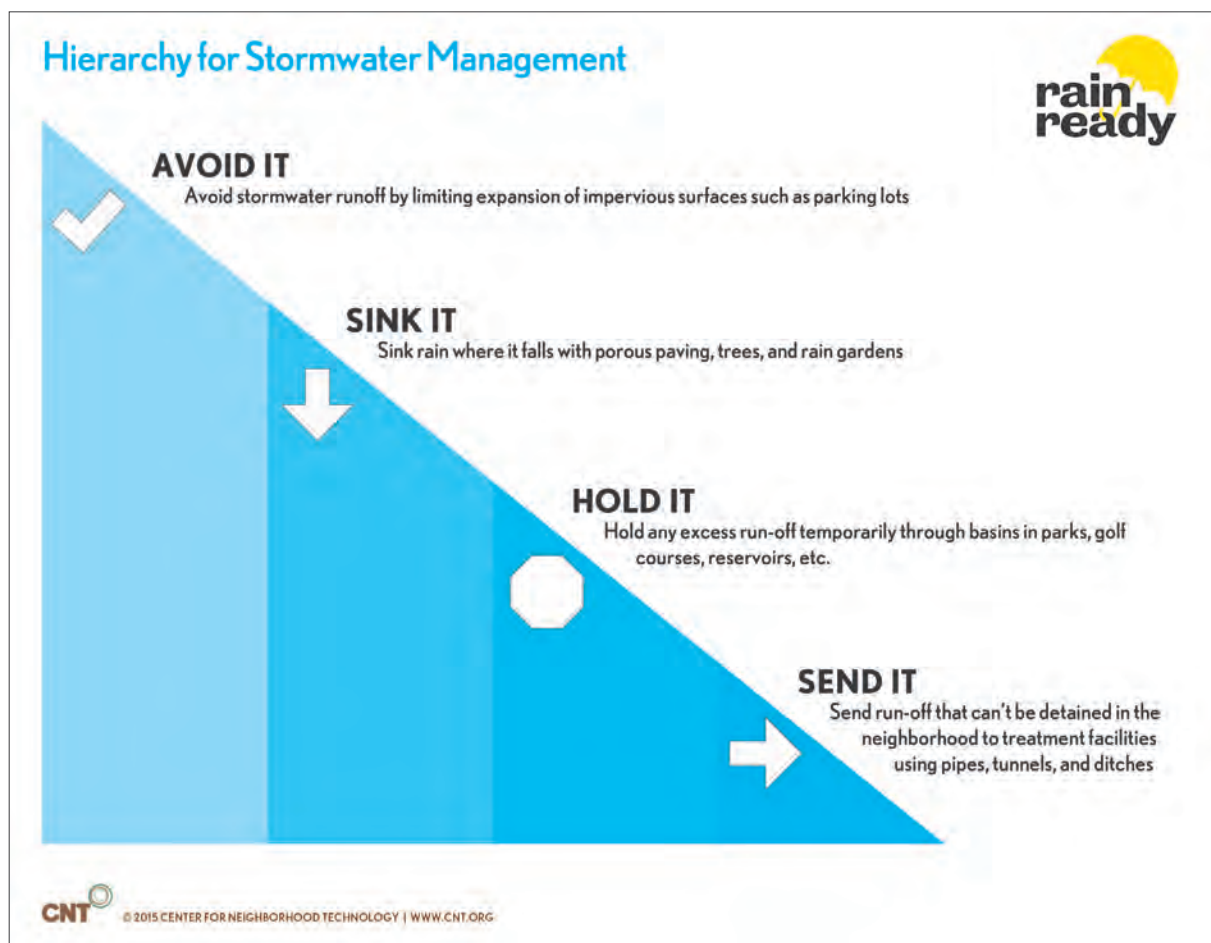


FIGURE BI-2:
Hierarchy for Stormwater
Management

Key findings from this Flooding Risk and Resilience Opportunity assessment are presented here. This risk and opportunity assessment provided the foundation for the strategies and recommendations presented in the RainReady Action Plan for Blue Island.

Four main factors contribute to flooding in Blue Island:

INCREASING IMPERVIOUS SURFACES

As Blue Island developed over time, natural lands were converted to buildings, parking lots, streets, and other impervious surfaces. The increase in impervious surfaces resulted in fewer open areas for rainwater to sink into the ground. As Blue Island takes steps to redevelop certain commercial and downtown areas (e.g., Western Ave, Old Western Ave, its TOD areas), efforts should be made to manage any additional stormwater runoff from any new impervious surfaces as well as reduce runoff from existing impervious surfaces.

AGING AND LIMITED INFRASTRUCTURE

Blue Island has a varied array of storm sewer and combined sewer systems. There is a small network of sewer lines in the northwest that drains into the golf courses bordering 123rd Street. Another small network is in the southwest near 139th Street and Kedzie Avenue, draining into Midlothian Creek. The largest network is a system that travels down Western Avenue starting with a 15" diameter ultimately growing to 60". The 1.7 mile line bisects Blue Island from the northern border at 119th Street in the north to an outfall into the Cal-Sag Channel in the south. There are five TARP drop shafts along the Cal-Sag Channel servicing the combined sewer system. However, placement of drainage outlets and sewer conditions may be preventing stormwater from being efficiently routed to the robust outfalls. Additionally, as municipal sewer systems age, pipes may collapse causing local drainage issues. Blue Island should continue its exemplary practices of documenting, inspecting, maintaining, and rehabilitating its municipal sewer system so as to bring it up to a state of good repair and keep it in good condition.

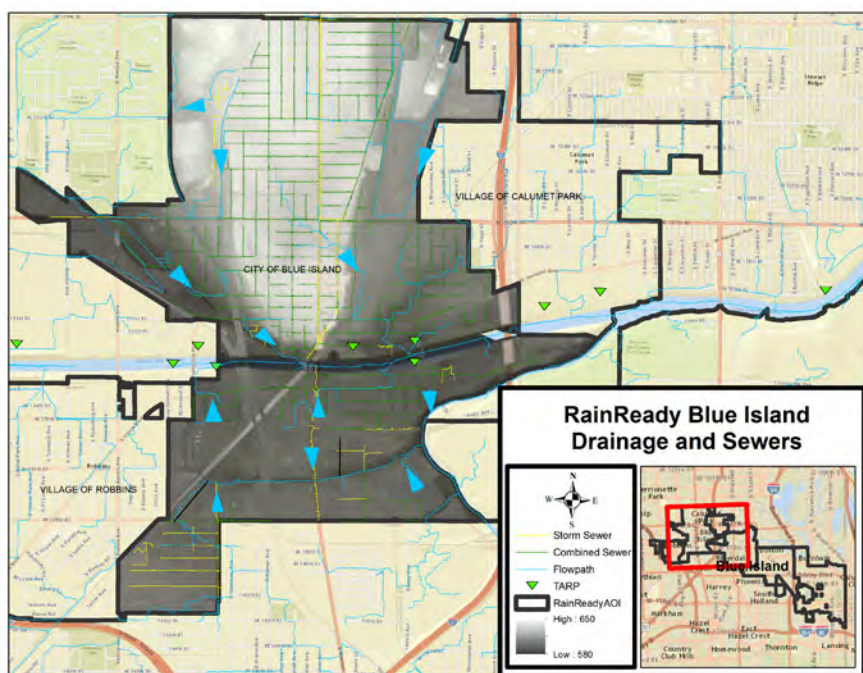


FIGURE BI-3:
Blue Island Drainage
and Sewers

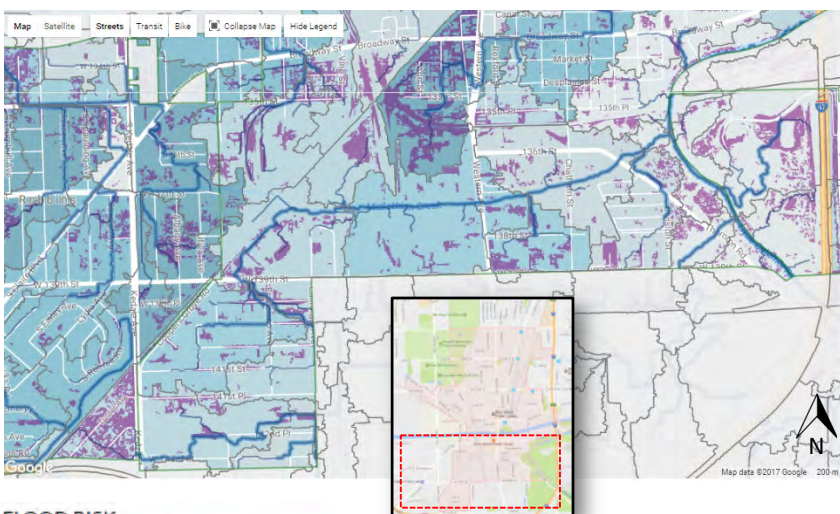
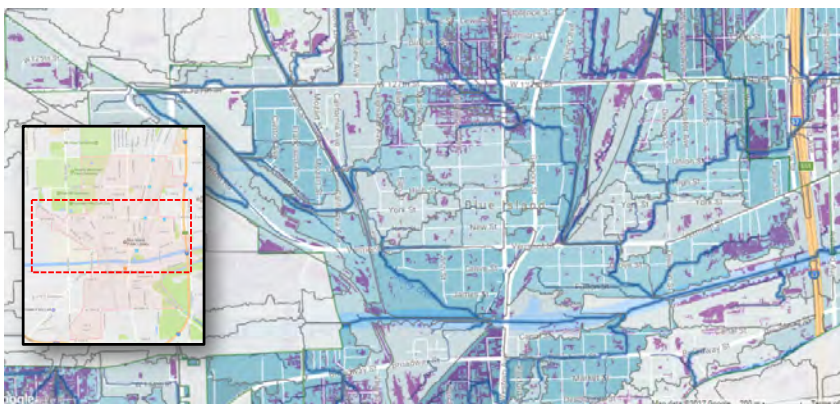
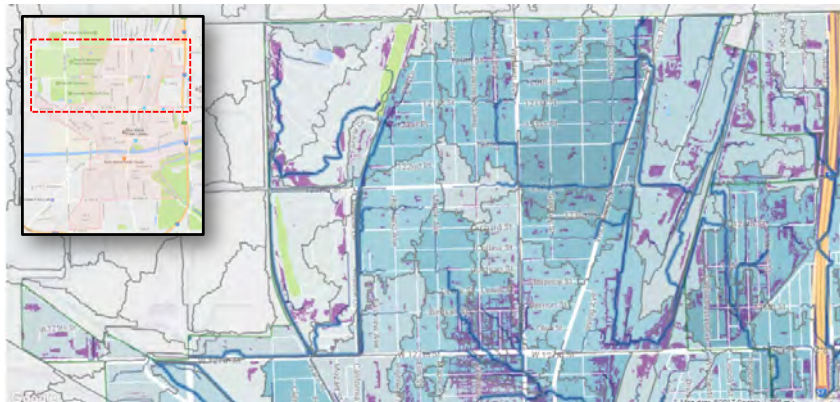


MORE SEVERE STORMS

Climate change is bringing more frequent high-intensity storms to the region. In light of this, Blue Island should not only prepare for past storms like the one that occurred in April 2013, but also prepare for larger, more frequent storms, with more variable weather (e.g., intense storms followed by long droughts, more freeze/thaw cycles). Residents, municipal staff, and elected officials should be equipped with the knowledge and resources needed to prepare for, mitigate, and recover from future storms—both large and small.

TOPOGRAPHY

Blue Island is generally flat except for the glacial “island” that gives Blue Island its name. The approximately 1.5 mile by 0.5 mile glacial feature sticks out in the relatively flat Calumet Corridor. The western slope is only 1.5%, but on the eastern ridge, the general slope is greater than 6%. Stormwater runoff flows quickly down the eastern ridge and pools in the low-lying areas of northeast Blue Island (“the bowl”). The rest of Northern Blue Island is quite flat, with a slope of less than 1% draining toward the Cal-Sag Channel. The drainage area south of the channel is split in half by rail lines between 135th Place and 136th Street. To the north it drains toward the Cal-Sag Channel. The area south of the rail lines drains toward Midlothian Creek. Again, the natural slope is less than 1% -- very flat. Both Blue Island’s general flatness and the ridge in the northeast neighborhood contribute to flooding issues.



FLOOD RISK

low 1 2 3 4 5 high

Map Overlays: ☒ Catchment Flow Path ☒ Depressions

FIGURE BI-4:
Blue Island Urban Flood Risk Assessment

These overland flow path and depression area maps show where stormwater is likely to flow and accumulate, or pool, in Blue Island. These maps are based on high-resolution digital elevation models (DEMs) derived from Light Detection and Ranging (LiDAR) technology.

Although LiDAR provides very detailed information on land cover and topography, there are several factors that may result in discrepancies between these maps and how stormwater actually flows through a community (e.g., small landscape features like gutters, curbs, small hills that route water, which may not have been picked up in our flow path analysis). Also, each community has a sewer and drainage system that is designed to intercept and manage stormwater. Our team modeled the flow of stormwater over the landscape as if local sewer systems are at full capacity and could not handle any additional flows. In other words these maps only show the overland flow paths and accumulation of stormwater and do not factor in the underlying sewer network.

In spite of these limitations and assumptions, these maps represent a good approximation of how stormwater is likely to flow and accumulate in the Calumet Corridor. These maps were used alongside other information on flooding risk and solution opportunities to determine where green infrastructure retrofits could alleviate local flooding issues. This information informed the community's action plan.

FIGURE BI-5:
Key Plans Reviewed for Blue Island

Name	Lead(s)	Year Completed / Status	Focus
Stormwater Master Plan Project for the Little Calumet River/Cal-Sag Channel Drainage Area: Problem Area #52 (California Gardens), Concept Memo (NOTE: two other concept memos were also created for Blue Island, but these were not complete by the time that RainReady reviewed prior plans)	MWRD, Arcadis	2016	Watershed/Stormwater Management
Blue Island Capital Improvement Priorities Report	CMAP	2016	Capital Improvement Plan
Blue Island Developer Discussion Panel	RTA, ULI, City of Blue Island	2013	Economic Development
A Comprehensive Plan for Blue Island	CMAP	2012	Comprehensive Plan
Blue Island, Blue Water (Program)	City of Blue Island	2012	Green Infrastructure
Blue Island TOD Zoning Code Update	RTA, City of Blue Island	2011	Transportation
Blue Island Plan for Economic Development	City of Blue Island, CNT	2005	Economic Development

Source: *Prevalence and Cost of Urban Flooding, Center for Neighborhood Technology 2013*

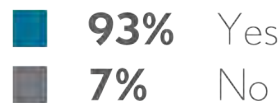
The following section summarizes what we heard from Blue Island residents, municipal staff, and elected representatives through the RainReady planning process as well as what we gathered from previous plans completed for the City (see Figure BI-5). To make this information easier to digest, we organized it into community strengths, concerns, and land-based opportunities (i.e., planning priorities and capital projects) that apply to: 1) your homes and neighborhoods; 2) your business districts and shopping centers; 3) your industrial centers and railroad corridors; and 4) your open space and natural areas. We also created a community asset map to prompt ideas about how Blue Island’s RainReady Action Plan can strengthen and build on existing community assets.



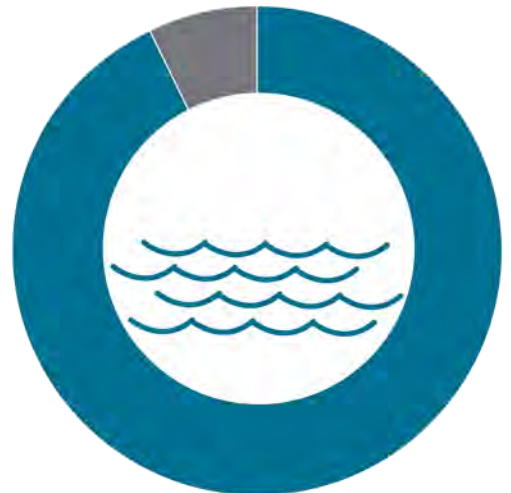
RainReady Blue Island COMMUNITY SURVEY

Respondents experiencing flooding problems

Respondents who answered "Yes, I experience problems" and "I do not experience problems anymore" were grouped into the "Yes" category because both sets of respondents experience ongoing flooding problems or have experienced problems in the past, respectively.



71 survey
respondents

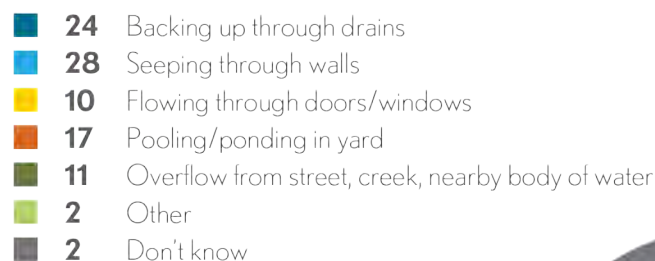


\$2,242 is the average amount spent on stormwater-related repairs

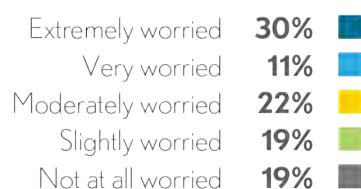
\$9,314 is the average amount residents are willing to invest to reduce risk of future damage

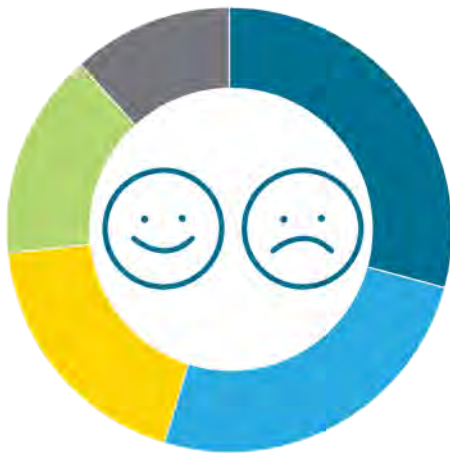


How does water enters properties?



What is the level of worry about flooding's impact on property value?



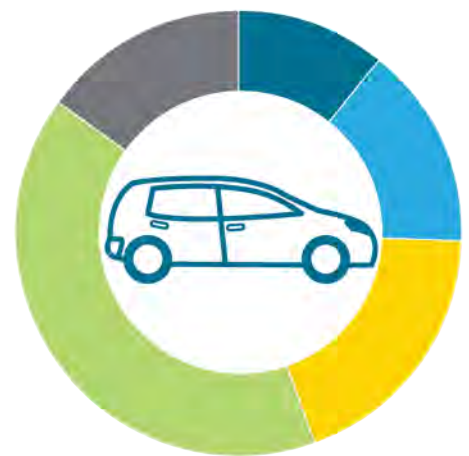


How much do heavy rains impact quality of life?

33%	A great deal
29%	A lot
21%	A moderate amount
17%	A little
13%	Not at all

How much do heavy rains impact commute or other travel?

A great deal	11%
A lot	15%
A moderate amount	19%
A little	41%
Not at all	15%



What is the preparedness of the community to work together to find a solution?

11%	Extremely prepared
18%	Very prepared
11%	Moderately prepared
25%	Slightly prepared
36%	Not at all prepared



YOUR HOMES AND NEIGHBORHOODS

Photo: David Wilson, Flickr/Creative Commons



COMMUNITY STRENGTHS

- The Blue Island Public Library
- The Blue Island Park District (parks, programs)
- Weekly emails from the Alderman
- The Historical District attracts customers and patrons from the broader Chicagoland region
- Blue Island's sense of community is highly valued by residents and municipal staff alike
- Excellent transportation access to Chicago by all modes of transportation
- Blue Island has a rich and celebrated history that the City and community organizations promote through public art, displays, and signage
- Western Avenue is a key commercial corridor
- Low crime rates
- Blue Island is a racially and socio-economically diverse community
- Blue Island is considered a leader—not only in the Southland

region, but throughout the Chicagoland region in promoting sustainable economic development

- Residents support local businesses and the City's efforts to bring vitality to the community through urban agriculture, public art installations, and community events
- Blue Island's tree-lined streets give the community a unique sense-of-place; Blue Island has been recognized as a Tree City USA community for more than six years
- See Community Asset Map (Figure BI-6)

COMMUNITY CONCERNS

- Flooding!
- Undersized and degraded sewers
- Need for regular street repair and cleaning
- The two-way communication between the City and residents can be improved



- Some streets and curbs are in poor condition (e.g., grass can be seen growing through curbs in some parts of town)
- Abandoned properties, vacant lots, and absentee landlords contribute to blight in certain parts of town
- Blue Island has approximately 23 miles of alleys that are generally in poor condition
- Some of the rain gardens in the Northeast neighborhood are “too wild looking” (e.g., plantings grow to the curb, they are not well maintained, they attract pests)
- See Urban Flooding Risk Assessment (Figure BI-4)

LAND-BASED OPPORTUNITIES (PLANNING PRIORITIES AND CAPITAL PROJECTS)

Here are some ideas that were uncovered through the RainReady planning process:

- Various urban flooding mitigation projects have been recently completed or are planned or underway in the

Northeast neighborhood (see Blue Island Capital Improvement Priorities Report for a list, accessible on CMAP’s website)

- Repair bridges over the Cal-Sag Channel to improve pedestrian access to neighborhoods and parks
- Create educational signs about local history and natural ecosystem
- Incentivize and enable residents and business to make improvements to their property. When necessary, enforce local codes and ordinances in a way that is fair and transparent; Blue Island could coordinate roadway resurfacing and improvement projects with sewer and water main improvements; CMAP recommended considering the following factors when identifying which roads or road segments to improve each year: road condition, cost of repair, TIF and/or external funding availability, related improvement projects (e.g., sewer and water main improvements, green and grey stormwater infrastructure investments) ward, average daily traffic, city economic development priorities

YOUR BUSINESS DISTRICTS AND SHOPPING CENTERS



COMMUNITY STRENGTHS

- The Olde Western Historic District
- Blue Island's Business Development District (BDD) has been generating funds that it can leverage to reinvest in the district
- New businesses are opening up in Blue Island
- See Community Asset Map (Figure BI-6)

COMMUNITY CONCERNS

- Flooding!
- Western Avenue is in need of streetscape and façade improvements
- Building facades along Western Avenue vary in style and size, some residents expressed preference for a more uniform architectural style
- Lack of wayfinding signage (e.g., between Metra stations and points of interest)
- Difficult to access the Metra stations from nearby neighborhoods and Western Avenue
- See Urban Flooding Risk Assessment (Figure BI-4)



Photo: MPC, Flickr/Creative Commons

LAND-BASED OPPORTUNITIES (PLANNING PRIORITIES AND CAPITAL PROJECTS)

Here are some ideas that were uncovered through the RainReady planning process:

- Reconfigure Western Avenue and Gregory Street as two-way commercial “Complete Street”
- Proposed parking improvements: Olde Western Parking Expansion, parking lots along Western Avenue, and Metra Parking; improvements may include: additional landscaping, green infrastructure (e.g., permeable pavement and bioswales), lighting, and newer parking payment technology
- Bicycle and pedestrian improvements (See Blue Island’s Active Transportation Plan) and sidewalk and curb repair projects (See Blue Island’s Capital Improvement Plan) should

be coordinated with the Blue Island’s Urban Flooding Risk Assessment

- Improve connections and pedestrian access between Blue Island Metra stations with sidewalk improvements, public art (under bridges), and signs to help people find their way
- Continue to invest in historic preservation efforts in the Olde Western Avenue Historic District and other parts of town
- Continue to leverage Blue Island’s historic character to draw in tourism and new businesses

YOUR INDUSTRIAL CENTERS AND TRANSPORTATION CORRIDORS

Photo: David Wilson, Flickr/Creative Commons



Photo: vicki, Flickr/Creative Commons

COMMUNITY STRENGTHS

- Blue Island has seven Metra stations that provide unparalleled transit access (amongst other Southland municipalities) to Chicago and the south suburbs
- Close proximity to Chicago (via all modes of transportation)
- Available land near transit stations and railroad that the City can use to support Transit-Oriented Development (TOD) and Cargo-Oriented Development (COD)
- The City's continued efforts to improve pedestrian access, shopping, and housing near the Vermont Street station (TOD)
- Two major corridors that lead into the City of Chicago: 127th Street and Western Avenue
- The Cal-Sag Channel can support more water-based travel (e.g., shipping of industrial materials, outdoor recreation, commuting)
- See Community Asset Map (Figure BI-6)

COMMUNITY CONCERNS

- Vacant and underutilized industrial land
- Environmental pollutants and brownfields present barriers to the redevelopment of some industrial areas
- See Urban Flooding Risk Assessment (Figure BI-4)



Photo: MJC, Flickr/Creative Commons

LAND-BASED OPPORTUNITIES (PLANNING PRIORITIES AND CAPITAL PROJECTS)

- The City, the SSMMA, Antero Group, and OAI, Inc./ High Bridge, L3C is implementing a green infrastructure infiltration basin in Blue Island's Northeast Industrial Site (Phase I Design completed in November, 2015)
- The MWRD completed concept memos for the California Gardens neighborhood (Problem Area #52) in Southeast Blue Island, Old Western Row area (Problem Area #4), and the residential neighborhood along Division near Union and High Streets (Problem Area #47/48)
- Blue Island's Capital Improvement Priorities Report (May 2016) outlined recommendations for: sewer improvements,

catchment basin and manhole improvements, water main improvements, roadway resurfacing, parking improvements, sidewalk and curb repair, alley improvements, and more; the RainReady Blue Island Action Plan can be used in conjunction with this report to prioritize projects and programs

YOUR OPEN SPACE AND NATURAL AREAS

Photo MPC, Flickr/Creative Commons



COMMUNITY STRENGTHS

- Multiple municipal parks, natural areas, and waterway access points
- Blue Island has been a Tree City USA for more than six years and has formally endorsed the Metropolitan Mayor's Caucus' Greenest Region Compact
- Access to regional greenways (e.g., the Cal-Sag Trail) and blueways (the Calumet Water Trails)
- See Community Asset Map (Figure BI-6)

COMMUNITY CONCERNS

- Residents have concerns that rain gardens are bringing snakes, bees, and other "pests" to their neighborhood and yards
- Poor water quality and trash in the Cal-Sag Channel
- Poor water quality in Stony Creek and Midlothian Creek
- See Urban Flooding Risk Assessment (Figure BI-4)



LAND-BASED OPPORTUNITIES (PLANNING PRIORITIES AND CAPITAL PROJECTS)

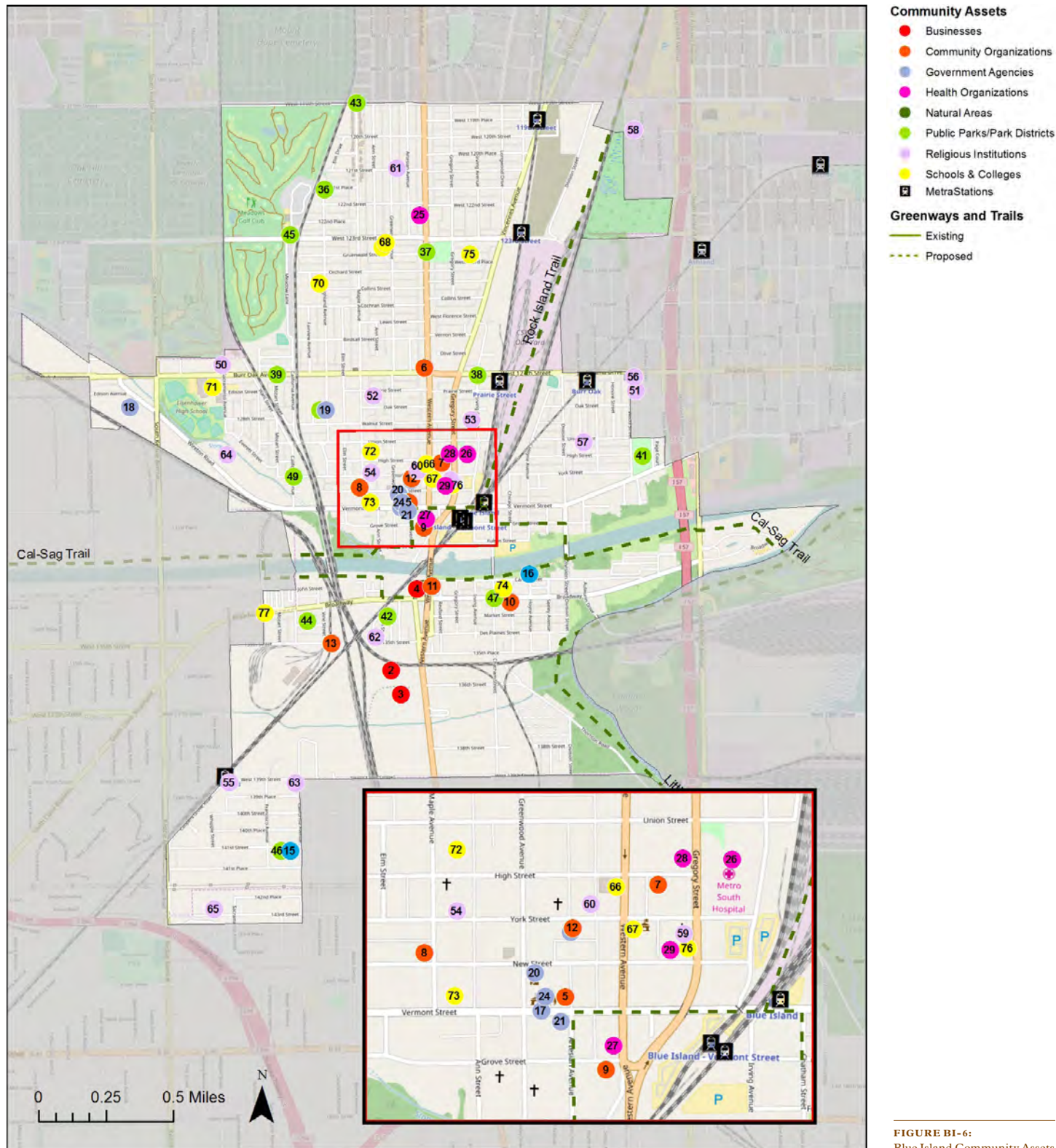
Here are some ideas that were uncovered through the RainReady planning process:

- Ecological restoration at Stan's Park, on the vacant land between the Cal-Sag Channel and Stony Creek, as well as the strip of vacant land between Old Western Avenue and Western Avenue
- There is a strong interest in creating community gardens on vacant land
- Expand open space along waterways including the Cal-Sag

Channel, Midlothian Creek, Stony Creek, and Little Calumet River in order to improve water quality and create additional opportunities for recreation and bicycling

- The City recently passed a resolution approving the Phase III construction of the Cal-Sag Trail Project (Blue Island East Segment) and committed the necessary matching funds in October 2016
- There are opportunities for pursuing waterfront development that aligns with the "Our Great Rivers" vision

COMMUNITY ASSETS



BUSINESSES

- 1 Insomniac Studios
- 2 Metro Recycling
- 3 Namaste Laboratories
- 4 Jebens Hardware Store

COMMUNITY ORGANIZATIONS

- 5 Blue Island Area Chamber of Commerce
- 6 Blue Island Farmers Market
- 7 Progress Center for Independent Living
- 8 Blue Island Historical Society
- 9 Metropolitan Family Services
- 10 Blue Cap
- 11 Guildhaus
- 12 Blue Island Urban Forestry Board
- 13 Rotary Club

GARDENS AND FARMS

- 14 Memorial Park Community Garden
- 15 California Gardens Community Garden
- 16 Blue Island Organic Sustainable (Bios) Farm

GOVERNMENT AGENCIES

- 17 Blue Island Fire Department
- 18 Illinois Department of Human Services
- 19 Blue Island Park District
- 20 Blue Island Police Department
- 21 Blue Island Post Office
- 22 Blue Island Public Library
- 23 Blue Island Public Works
- 24 Blue Island Mayor's Office

HEALTH ORGANIZATIONS

- 25 Fresenius Kidney Care
- 26 MetroSouth Medical Center
- 27 PTSIR Physical Therapy
- 28 Pronger Smith MedicalCare
- 29 Heart Care Center of Illinois

METRA STATIONS

- 30 Blue Island Metra Station
- 31 119th St Metra Station
- 32 123rd St Metra Station
- 33 Blue Island-Vermont Street Metra Station
- 34 Burr Oak Metra Station
- 35 Prairie St Metra Station

PUBLIC PARKS/ PARK DISTRICTS

- 36 Kiddie Korral
- 37 Hart Park
- 38 Stan's Park
- 39 Schultz Park
- 40 Memorial Park
- 41 Centennial Park
- 42 Disabato Park
- 43 Bark Park
- 44 Perillo Park
- 45 Meadows Golf Club of Blue Island
- 46 Tommy A. Brown Sports Association
- 47 Portland Park
- 48 Tot Lot
- 49 Lombardo Park

RELIGIOUS INSTITUTIONS

- 50 Calvary Chapel
- 51 St. Isadore Social Center
- 52 Grace United Methodist Church
- 53 Iglesia Del Nazareno (Church of the Nazarene)
- 54 Salem Lutheran Church
- 55 California Gardens Christian
- 56 St. Isidore Church
- 57 St. Donatus Parish
- 58 Evangelical Community Church
- 59 St. Benedict
- 60 Christ Memorial United Church
- 61 Harvest Faith Church International
- 62 Christian Life Center
- 63 Life changing Ministry Pentecostal
- 64 Chapel Gating's
- 65 First Emmanuel Missionary Baptist Church

SCHOOLS AND COLLEGES

- 66 Moraine Valley Community College
- 67 Medical Academy of Businesses
- 68 Greenbriar School
- 69 Veterans Memorial Middle School
- 70 Greenwood Elementary School
- 71 Dwight D. Eisenhower High School
- 72 Everett F Kerr Middle School
- 73 Whittier School
- 74 Lincoln Elementary School
- 75 Paul Revere Primary School
- 76 St. Benedict School
- 77 Horace Mann School

COMMUNITY PRIORITIES

Listed below are the community priorities we heard from Blue Island residents, municipal staff, and elected representatives through the RainReady Planning Process (e.g., RainReady Community Meetings and Blue Island Steering Committee Meetings). These community priorities were synthesized with the flooding risk and resilience opportunities assessment to develop the RainReady Blue Island Action Plan.

REORIENT

- Develop and implement a community education program focused on flooding risk and mitigation strategies for public and private property as well as residential properties
- Increase resident engagement in flood-related and other planning efforts
- Increase communications and awareness by creating a two-way flow of information between the City and residents
- Ensure that future developments and redevelopments are context appropriate; for example, consider adopting and enforcing two types of commercial zones: Downtown Commercial and Neighborhood Commercial
- Create more mixed-use developments, especially along Western Avenue
- Ensure that youth, seniors, and vulnerable residents receive the help they need during heat waves and storms
- Ensure that code enforcement and the provision of municipal services is equitable and transparent
- Provide assistance for flood mitigation and resilience improvements to residences

REPAIR (AND MAINTAIN)

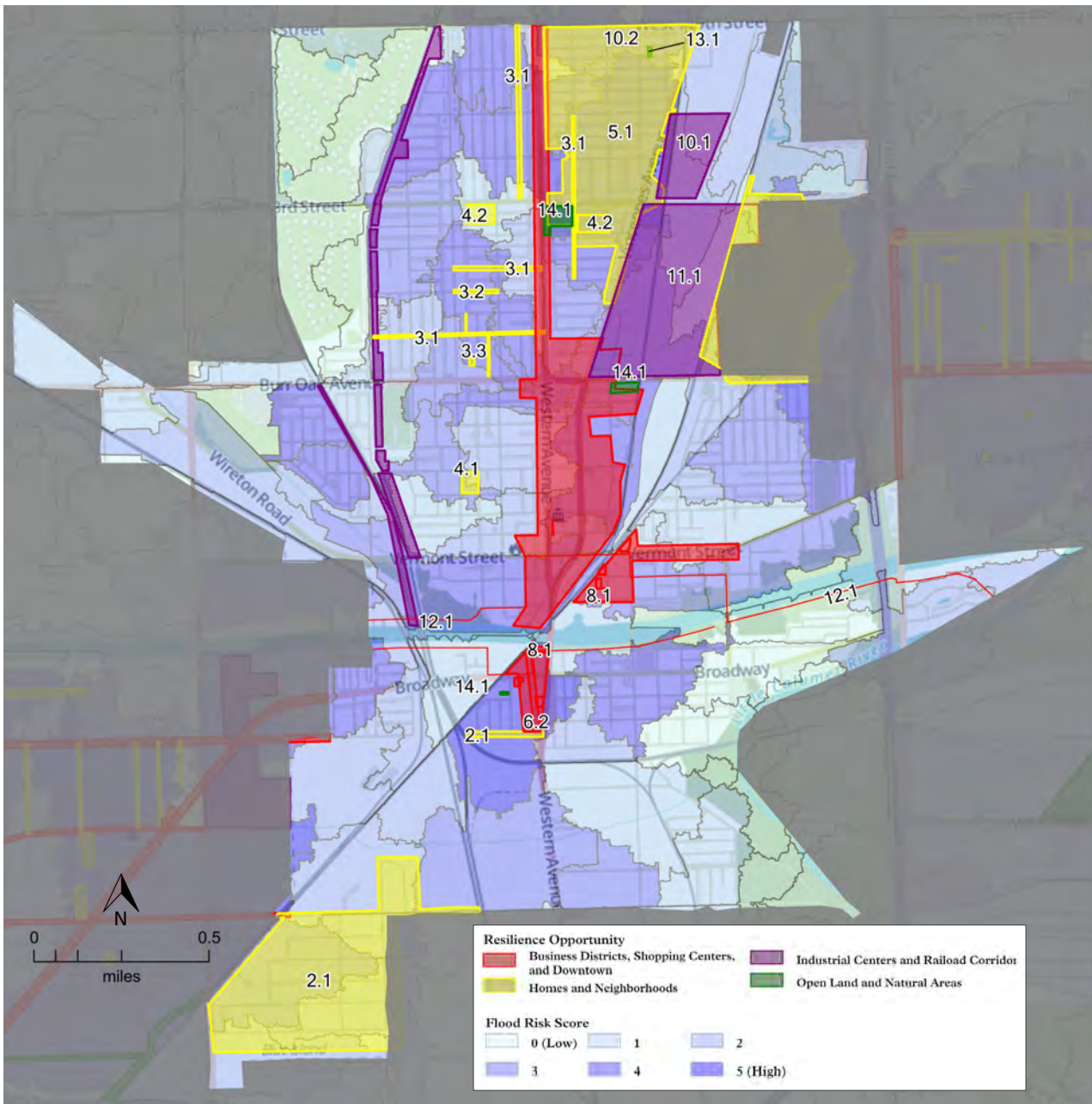
- Create a green/grey infrastructure maintenance plan that is transparent and followed citywide
- Ensure that all new green infrastructure installations are well-maintained
- Maintenance should be updated to include regular sewer cleaning and public way maintenance, specifically targeted at rain gardens
- Encourage greater adoption of native plants on private property (and reduce the chances of an incorrect citation) by amending (or clarifying) local weed ordinances and/or training code enforcers in native plant identification
- Repair and replace aging stormwater and wastewater infrastructure systems, use green infrastructure to the greatest extent possible
- Coordinate road repairs with stormwater projects

- Encourage homeowners and business owners to maintain their private property

RETROFIT

- Incorporate native plants, trees, rain gardens, and other green infrastructure solutions into the City's alleys, public right-of-ways, and private lands to beautify neighborhoods and mitigate flooding
- Engage residents in the design of green infrastructure installations; understand resident preferences for plant species, level of maintenance, appearance, etc.
- Attract organizations that provide basics services (youth center, social services agency, etc.)
- Replace certain lots along Western Avenue with new multi-family housing development
- Enhance the Historic District on Olde Western Avenue and protect architecturally significant properties
- Bring new life to the old "Chevy Lot" (e.g., reuse and repurpose vacant buildings, host music events, food trucks, movies in the parks, benches and places to mingle); Take advantage of its proximity to the Metra station, attract tourism) and other vacant lots
- Beautify the gateways into Blue Island
- Leverage Blue Island's numerous railroad connections and remediate vacant industrial lands to create opportunities for new jobs and to attract new business and industries
- Bring new life to vacant lots (e.g., rain gardens, grow food for the homeless, construct a pergola or place to gather, "green and beautify them")
- Finish Blue Island's portion of the Cal-Sag Trail and develop trail-supporting amenities (e.g., rest stations, new businesses) to connect Blue Island to neighboring communities
- Create new parks, open space, and outdoor recreation amenities (e.g., outdoor event spaces, on-road/off-road trails, boat launches, boat houses, and liveries for kayaking, rowing and other water sports) throughout the City, along the Cal-Sag Trail, and along the City's waterways
- Improve water quality of the Cal-Sag Channel

FIGURE BI-7:
Flood Risk
and Resilience
Opportunity in
Blue Island



The map above overlays flooding risk with proposed “Retrofit” recommendations. The colors correspond to the part of town where the recommendation is to be applied and the numbers correspond with the Retrofit recommendations in the Action Plan. Some recommendations in the Action Plan apply community-wide and are not shown on the map.

This map identifies locations where various green infrastructure projects could be integrated into Blue Island’s community fabric (e.g., green streets along residential streets, commercial complete streets along commercial corridors, green schools, etc.). These locations were identified through a thorough assessment

of flooding risk (e.g., known problem areas, survey results, overland flowpaths, depression areas, and impervious coverage) and resilience opportunities (e.g., planning priorities, community assets, capital improvement projects) in Blue Island.

Blue Island should reference this map and the Action Plan to identify opportunities where green infrastructure retrofit projects could be integrated into forthcoming roadway improvements, planned developments, and other capital improvement efforts. This would ensure that future projects deliver multiple benefits, such as improved transportation and flood mitigation.

RAINREADY **ACTION PLAN**



Vision Statement

A RainReady Blue Island will be a national leader in promoting sustainable and equitable development in suburban communities. The City will continue to find creative means to strengthen its neighborhoods and business districts and to revitalize underutilized parts of town. Instead of a liability, rain water will be treated as a vital resource that supports the City's growing community of farmers and gardeners, its waterfront amenities, and new water-sensitive business. The installation and maintenance of new green, grey, and green-grey infrastructure systems will relieve physical stresses and build social equity for all people and all neighborhoods in Blue Island. The City's numerous restaurants and bars, tree-lined streets, historic districts, and land and water trails will make Blue Island a great place to live or visit for a weekend excursion.

RainReady Goals



Reorient Blue Island so that the community is on a path toward resilience



Repair Blue Island's municipal sewer and stormwater drainage systems



Retrofit the built landscapes throughout Blue Island with green, grey, and green-grey infrastructure improvements, and restore natural landscapes

NOTE: This plan outlines a path forward toward a more resilient Calumet Corridor, but implementation of specific recommendations will have to occur at the local level. Adopting this plan demonstrates a local community's commitment to considering these recommendations during capital planning and decision-making efforts and implementing these recommendations as necessary resources become available. In many cases, the City of Blue Island is already actively engaged in a given project or program recommendation. In other cases, additional resources (e.g., external grant funds, dedicated revenue, partnerships, etc.) will be necessary to advance a project or program. The following action plan outlines the actions and associated implementation steps, implementation priority, estimated timeline, and identified potential project leads and resources needed. Further analysis is needed to estimate the costs of most recommendations. The specific details may change as communities take action to advance a recommendation and as new information and opportunities emerge.



REORIENT

COMMUNITY-WIDE STRATEGIES FOR BLUE ISLAND

- **Strategy 1.** Build capacity to make well-informed decisions and execute them
- **Strategy 2.** Plan and implement projects collaboratively
- **Strategy 3.** Promote equitable and resilient development at all levels
- **Strategy 4.** Prepare your community for future shocks and stresses



REPAIR

COMMUNITY-WIDE STRATEGIES FOR BLUE ISLAND

- **Strategy 1.** Map and document your municipal sewer and stormwater drainage system
- **Strategy 2.** Inspect and evaluate your municipal sewer and stormwater drainage system
- **Strategy 3.** Rehabilitate your municipal sewer and stormwater drainage system
- **Strategy 4.** Maintain your municipal sewer and stormwater drainage system



RETROFIT

RETROFIT STRATEGIES FOR YOUR HOMES AND NEIGHBORHOODS

- **Strategy 1.** Implement a residential resilience program
- **Strategy 2.** Bring new life to vacant residential land
- **Strategy 3.** Create a network of residential green streets, green alleys, and complete streets

- **Strategy 4.** Create more green schools and churches and expand existing structures

- **Strategy 5.** Reduce widespread flooding in the northeast neighborhood through coordinated green and grey infrastructure investments

RETROFIT STRATEGIES FOR YOUR SHOPPING CENTERS AND BUSINESS DISTRICTS

- **Strategy 6.** Bring new life to Blue Island's Business Development District
- **Strategy 7.** Improve the areas around Blue Island's six Metra stations
- **Strategy 8.** Bring new life to underutilized parking lots
- **Strategy 9.** Expand Blue Island's network of commercial complete streets

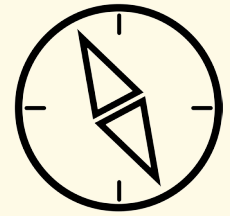
RETROFIT STRATEGIES FOR YOUR INDUSTRIAL CENTERS AND RAILROAD CORRIDORS

- **Strategy 10.** Redevelop and improve industrial sites in a way that reduces flooding in surrounding areas
- **Strategy 11.** Improve the edges of large industrial sites and railroad corridors

RETROFIT (RESTORE) STRATEGIES FOR YOUR OPEN LAND AND NATURAL AREAS

- **Strategy 12.** Develop the Cal-Sag Trail and other open space and outdoor recreation amenities
- **Strategy 13.** Expand urban agriculture in Blue Island
- **Strategy 14.** Integrate green infrastructure into Blue Island's park system

GOAL 1: REORIENT



COMMUNITY-WIDE RECOMMENDATIONS

STRATEGY 1:

BUILD CAPACITY TO MAKE WELL-INFORMED DECISIONS AND EXECUTE THEM

RECOMMENDATION 1.1

Adopt/accept the RainReady Blue Island Plan; update the plan every 2-5 years; incorporate the plan's recommendations into forthcoming capital improvement planning efforts and decision-making efforts.

Where: Community-wide

How: Participate in the RainReady community planning process (completed); convene a steering committee consisting of residents, municipal staff, and elected representatives (completed); propose and adopt the plan at a City Board Meeting in early 2017

How much: \$104,000 (this cost has already been paid for by Cook County)

Who leads: CNT/RainReady (for initial plan); City of Blue Island (for adoption and plan updates)

Resources needed: Internal and/or external funding and technical assistance for plan updates

PRIORITY: 

PHASING: 

RECOMMENDATION 1.2

Engage in regional and local planning and coordination efforts (e.g., the Calumet Stormwater Collaborative, Millennium Reserve, CMAP's Comprehensive Regional Plans, SSMMA's various committees).

Where: Community-wide

How: Read and continually reference stormwater-related resources; align local strategies with regional initiatives to increase access to funding and technical assistance

How much: Varies

Who leads: The City of Blue Island and regional organizations/coalitions like CMAP, SSMMA, CSC, CHP

Resources needed: Internal: the City assigns this task to a staff person; External: the SSMMA could hire a stormwater/resilience-focused staff person to serve this role for all communities in their service area (proposed)

PRIORITY: 

PHASING: 

RECOMMENDATION 1.3

Continue to utilize Blue Island's GIS database to document flooding issues; incorporate best practices in data management and stormwater planning for local governments (e.g., continual process improvement, performance management, program evaluation, monitoring, ongoing collection and dissemination of useful data, open data and civic hacking).

Where: Community-wide

How: Use Blue Island’s GIS system to collect, manage, and analyze data on water-related complaints and adopted solutions (e.g., type and source of flooding, damage costs, improvements made to property); partner with research institutions to install sensors that will monitor the performance of green infrastructure installations

How much: There will be initial costs to set up these systems, but these improvements could pay for themselves over time through increased operational efficiencies and improved outcomes

Who leads: City of Blue Island, regional 311 Call Center/Service (proposed-this does not exist yet), SSMMA

Resources needed: Internal: General Fund; External: IDNR Coastal Management Program Grants, partnerships with research institutions (e.g., colleges/universities, Argonne National Labs, CNT, UI Labs)

PRIORITY: 

PHASING: 

STRATEGY 2: PLAN AND IMPLEMENT PROJECTS COLLABORATIVELY

RECOMMENDATION 2.1

Sustain the RainReady Blue Island Steering Committee (SC) and engage these groups in the ongoing planning and implementation efforts.

Where: Community-wide

How: Continue to work with the RainReady team in early 2017 to get the Steering Committee off the ground; clearly define the mission and roles of the Blue Island’s Steering Committee;

consider consolidating these groups into one entity

How much: SC: Approximately 3-5 hours per month; Steering Committee: varies

Who leads: CNT/RainReady, City of Blue Island (e.g., community leaders, municipal staff, elected representatives)

Resources needed: CNT/RainReady (to start); ongoing volunteer collaboration

PRIORITY: 

PHASING: 

RECOMMENDATION 2.2

Incorporate updates on stormwater projects and other resilience-related topics into the City’s various communication channels (e.g., The Forum, official city websites and social media).

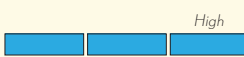
Where: Community-wide

How: Include a section on “Stormwater Projects” or “Resilience Updates” in official City communications

How much: Approximately 5-15 hours per month of staff time

Who leads: The City of Blue Island, local media outlets

Resources needed: The City of Blue Island (staff time)

PRIORITY: 

PHASING: 

RECOMMENDATION 2.3

Coordinate with neighboring municipalities on stormwater-related planning and development projects, and the sharing of equipment and services; such cross-jurisdictional coordination has been shown to reduce costs and maximize benefits of projects, increase operational efficiencies, and improve/expand service delivery.

Where: Community-wide and throughout the Calumet region

How: Where appropriate, pursue Intergovernmental Agreements (IGAs) with municipalities and other government agencies (e.g., MWRD, Cook County)

How much: The benefits of improved coordination far outweigh the costs (e.g., approximately 5-15 hours per month of staff time devoted to collaborative efforts)

Who leads: The City of Blue Island, neighboring municipalities, MWRD, CSC, SSMMA, CMAP, United Way Neighborhood Network: Blue Island/Robbins

Resources needed: Internal: the City of Blue Island, or share costs (i.e., time) of participation with neighboring communities; External: the SSMMA or another regional organization could hire a stormwater/resilience-focused staff person to serve this function for all communities in their service area

PRIORITY: 

PHASING: 

STRATEGY 3:
PROMOTE EQUITABLE AND RESILIENT DEVELOPMENT AT ALL LEVELS

RECOMMENDATION 3.1

Adopt (and comply with) current stormwater management requirements. Where feasible, improve local ordinances and building codes to promote resilient and equitable development.

Where: Community-wide

How: Conduct an audit of your local ordinances to evaluate areas for improvement; pass common-sense policy changes/updates; adopt an incremental and adaptive approach to implementing green infrastructure and other resilience-building projects (e.g., the *Green Infrastructure Portfolio Standard*)

How much: N/A

Who leads: The City of Blue Island

Resources needed: The City of Blue Island (staff time)

PRIORITY: 

PHASING: 

STRATEGY 4:
PREPARE YOUR COMMUNITY FOR FUTURE SHOCKS AND STRESSES

RECOMMENDATION 4.1

Educate the public on flooding risks. Ensure that there is a group of residents trained in disaster response and recovery.

Where: Community-wide

How: Implement a public education program; partner with American Red Cross, FEMA, and other organizations that can provide disaster preparedness training; develop a Blue Island Community Emergency Response Team (CERT)

How much: N/A

Who leads: The City of Blue Island; RainReady Steering Committee

Resources needed: Many of these trainings are free and participation is voluntary

PRIORITY:  ^{High}

PHASING:  ^{Short}

RECOMMENDATION 4.2

Implement an Emergency Alert System (e.g., RainReady Alert) that lets homeowners, businesses, and visitors know when a flood will likely occur.

Where: Community-wide

How: Establish a text-based system that alerts residents of flooding and other hazards

How much: N/A

Who leads: The City of Blue Island

Resources needed: Internal: General Fund; External: Grants targeted for emergency alert systems and capacity-building (e.g. IDNR Coastal Management Program Grants U.S. Economic Development Administration funding opportunities)

PRIORITY:  ^{High}

PHASING:  ^{Ongoing}

RECOMMENDATION 4.3

Ensure that at least one City staff person has one or more of the following certifications: Certified Floodplain Manager (CFM), National Green Infrastructure Certification Program (NGICP), LEED-ND.

Where: Community-wide

How: Incentivize the appropriate staff person (e.g., reimburse the costs) to earn and maintain certifications or require that City contractors and consultants involved with land development have these certifications

How much: Varies depending on certification(s)

Who leads: The City Engineer

Resources needed: Internal: The General Fund

PRIORITY:  ^{Medium}

PHASING:  ^{Short}

GOAL 2: REPAIR



COMMUNITY-WIDE RECOMMENDATIONS

STRATEGY 1:

MAP AND DOCUMENT YOUR MUNICIPAL SEWER AND STORMWATER DRAINAGE SYSTEM

RECOMMENDATION 1.1

Ensure that Blue Island has up-to-date sewer atlas information and a system for documenting information on the conditions of the overall system, specific elements (e.g., catch basins, curbs), and flooding problem areas.

Where: Community-wide

How: Continue to update this information and share it through SSMMA's GIS consortium (and other regional data-sharing portals) to facilitate more streamlined inter-jurisdictional stormwater planning efforts

How much: N/A

Who leads: The City Engineer

Resources needed: Internal: the General Fund, Water Fund; External: IDNR Coastal Management Program Grants

PRIORITY: 

PHASING: 

STRATEGY 2:

INSPECT AND EVALUATE YOUR MUNICIPAL SEWER AND STORMWATER DRAINAGE SYSTEM

RECOMMENDATION 2.1

Develop and implement a comprehensive inspection and cleaning program (e.g., visual inspection, closed circuit television inspection) to regularly assess the condition Blue Island's municipal sewer system (e.g., manholes, catch basins, sewers). CMAP's *Capital Improvement Priorities Report* (2016) called for inspecting and cleaning the entire system on a ten-year cycle to ensure optimal function.

Where: Community-wide (inspect known problem areas first)

How: Establish a feasible, continuous, and cyclical inspection schedule (e.g., televise 10% of the sewers for 10 years, then repeat); use Blue Island's Urban Flooding Risk Assessment (Figure BI-4) to identify and prioritize known flooding problem areas); inspect the City's sewer main infrastructure to observe deteriorating pipes, heavy debris, roots, and voids in the system

How much: 1-Year Costs: \$120,000; 5-Year Costs (\$600,000) (Source: CMAP, 2016)

Who leads: The City Engineer

Resources needed: Internal: the General Fund, Water Fund, TIF Funds (where appropriate), External: CDBG, DCEO, IEPA State Revolving Loan Fund, USACE Section 219

PRIORITY: 

PHASING: 

STRATEGY 3:
**REHABILITATE YOUR MUNICIPAL SEWER
AND STORMWATER DRAINAGE SYSTEM**

RECOMMENDATION 3.1

Improve the drainage and conveyance of the stormwater drainage system in residential areas south of the Cal-Sag Channel.

Where: The Olde Western District (south of the Cal-Sag Channel, east of the railroad tracks, west of Western Avenue, and north of 135th Street) and the residential neighborhood south of the Cal-Sag Channel, east of Western Avenue and north of Des Plaines Street

How: Attain planning-level designs for this project; apply for external grant funds and/or incorporate this project into Blue Island's capital improvement plan; complete preliminary engineering designs and other necessary studies, and implement construction

How much: TBD

Who leads: The City Engineer, USACE

Resources needed: Internal: the General Fund, Water Fund, TIF Funds (where appropriate), External: CDBG, DCEO, IEPA State Revolving Loan Fund, USACE Section 219

PRIORITY:  Medium

PHASING:  Short

RECOMMENDATION 3.2

Repair major sewer defects, such as collapsed sewers, that were identified through the inspection program (see Recommendation 2.1).

Where: Targeted repairs in known problem areas

How: Complete +/- 5 sewer point repairs per year

How much: 1-Year Cost = \$75,000; 5-Year Cost = \$375,000 (Source: CMAP, 2016)

Who leads: The City Engineer, Public Works

Resources needed: Internal: the General Fund, Water Fund, TIF Funds; External: CDBG, DCEO, IEPA State Revolving Loan Fund, USACE Section 219

PRIORITY:  High

PHASING:  Ongoing

RECOMMENDATION 3.3

Line deteriorated sanitary sewer mains observed by the inspection program (see Recommendation 2.1). Sewer lining serves many purposes such as maintaining the structural integrity of the sewer, sealing cracks, covering voids of missing pipe, eliminating infiltration, discouraging tree root penetration through cracks and voids, and maintaining proper flow (Source: CMAP, 2016).

Where: Community-wide (inspect known problem areas first)

How: Line sewers in known problem areas; aim to line 3% of the sewers per year

How much: 1-Year Cost = \$450,000; 5-Year Cost = \$2,250,000 (Source: CMAP, 2016)

Who leads: The City Engineer and Public Works

Resources needed: Internal: the General Fund, Water Fund, TIF Funds (where appropriate), External: CDBG, DCEO, IEPA State Revolving Loan Fund, USACE Section 219

PRIORITY: 

PHASING: 

STRATEGY 4: MAINTAIN YOUR MUNICIPAL SEWER AND STORMWATER DRAINAGE SYSTEM

RECOMMENDATION 4.1

Develop and implement a comprehensive maintenance plan that describes how all green, grey, and green-grey infrastructure systems will be maintained.

Where: Community-wide

How: Apply for planning and technical assistance grants to develop this maintenance plan

How much: Approximately \$20,000 to \$25,000

Who leads: The City Engineer, Public Works

Resources needed: Internal: the General Fund, Water Fund, TIF Funds; External: CMAP's LTA program, HUD CDBG, IDNR Coastal Management Program Grants

PRIORITY: 

PHASING: 

RECOMMENDATION 4.2

Implement the comprehensive Green/Grey Infrastructure Maintenance Plan program in tandem with inspection program (See Recommendation 2.1). The entire sewer system should be cleaned on a ten-year cycle to ensure optimal function.

Where: Community-wide (inspect known flooding problem areas first)

How: Televisive and clean 10% of Blue Island's sewers every year. Prioritize the most flood-prone areas

How much: 1-Year Cost = \$120,000; 5-Year Cost = \$600,000 (Source: CMAP, 2016)

Who leads: The City Engineer, Public Works

Resources needed: Internal: the General Fund, Water Fund, TIF Funds (where appropriate); External: CDBG, DCEO, IEPA State Revolving Loan Fund, USACE Section 219

PRIORITY: 

PHASING: 

GOAL 3: RETROFIT



RECOMMENDATIONS FOR YOUR HOMES AND NEIGHBORHOODS



How much: Varies – communities often provide a 50/50 cost-share; Up to \$25,000 in assistance is available to eligible applicants through Cook County’s Residential Resilience Program

Who leads: Cook County, RainReady, CEDA

Resources needed: Internal: General Fund for the municipal cost-share program; External: Cook County’s Residential Resilience Program (CDBG-DR), MWRD, DOE Weatherization and Intergovernmental Program Office grants, CEDA program and services

PRIORITY:  High

PHASING:  Short

STRATEGY 1: IMPLEMENT A RESIDENTIAL RESILIENCE PROGRAM

RECOMMENDATION 1.1

Establish a residential cost-sharing program in Blue Island to help residents recover from past storms and prepare for future storms. Under this program, residents would receive financial support for a complete home inspection and improvements targeted to reduce risk, like check valves, overhead sewers, and a rain garden.

Where: Community-wide

How: Partner with the delegate agencies/organizations (e.g., RainReady) tasked with implementing such programs in your region; design and manage a similar, but scaled-down program that can be extended to residents (e.g., those not eligible for Cook County’s program)

STRATEGY 2: BRING NEW LIFE TO VACANT RESIDENTIAL LAND

RECOMMENDATION 2.1

Bring new life to vacant residential land with native plants, tree planting, urban agriculture, and strategies to beautify neighborhoods.

Where: Site (41.663384, -87.683508), Catchment #304 (vacant land south of Cal-Sag Channel), 2121 119th Place

How: Create programs that incentivize residents and community groups to improve nearby vacant properties (via temporary use rights or permanent land ownership); such programs could be: Adopt-A-Lot, Side Yard/Large Lot programs, land banking, temporary transfer of use rights to a community group, community greening, and award programs

How much: Example: the City of Chicago’s “Large Lot Program”

enables adjacent property owners, block clubs, and non-profit groups in select neighborhoods to purchase City-owned land for \$1 per parcel

Who leads: Current homeowners, community organizations (e.g., Blue Island Urban Forestry Board, Steering Committee, master gardeners), SSLBA

Resources needed: The City would effectively absorb the costs in terms of lost future property tax revenue on these particular parcels; however, the benefits of neighborhood stabilization, reduced flooding, reduced crime, and economic spillover effects (e.g., increased property values due to greening vacant lots) would likely offset these costs; residents and community groups could attain property at a very affordable price (e.g., \$1)

PRIORITY:

High

PHASING:

Short



STRATEGY 3:
CREATE A NETWORK OF RESIDENTIAL GREEN STREETS, GREEN ALLEYS, AND COMPLETE STREETS

RECOMMENDATION 3.1

Create a network of residential green streets that incorporate green infrastructure improvements (e.g., roadside swales, rain gardens, permeable pavement, tree plantings) along flood-prone residential streets.

Where: Figure BI-7 identifies streets that would be suitable for green streets based on overland flow, topography, and potential flood reduction benefits; the City should consider these locations as they make Capital Improvement planning and implementation decisions

How: Use this RainReady Plan to identify potential locations where green streets can be piloted; where appropriate, incorporate green infrastructure BMPs into planned roadway improvements; monitor the performance of select green infrastructure installations; adjust the future implementation of green infrastructure projects based on monitoring data and community feedback

How much: TBD

Who leads: The City of Blue Island, Public Works

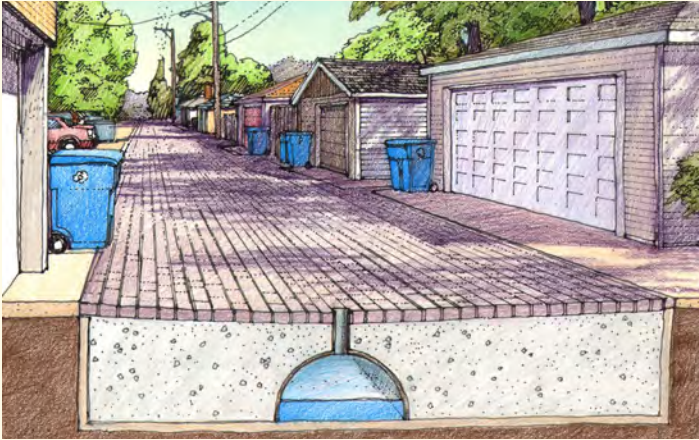
Resources needed: Internal: the General Fund, the Water Fund, TIF funds (where appropriate); External: CDBG, DCEO, IEPA State Revolving Loan Fund, USACE Section 219; STP funds

PRIORITY:

High

PHASING:

Long



RECOMMENDATION 3.2

Install green alleys that reduce wear-and-tear on cars (via re-grading and filling potholes) and manage stormwater runoff with permeable pavement and end-of-alley stormwater bulbouts.

Where: Figure BI-7 identifies alleyways that would be suitable for green alleys based on overland flow, topography, and potential flood reduction benefits; the City should consider these locations as they make Capital Improvement planning and implementation decisions

How: Continue to work with the MWRD to implement the Phase II green alleyway project(s) in the northeast neighborhood; monitor these projects to see what works; expand green alleyways into to other flood-prone alleys

How much: TBD

Who leads: The City of Blue Island, MWRD, Public Works

Resources needed: Internal: the General Fund; External: CDBG, DCEO, IEPA State Revolving Loan Fund, MWRD, USACE Section 219

PRIORITY: High

PHASING: Medium



RECOMMENDATION 3.3

Create a network of residential complete streets that incorporate green infrastructure improvements (see Recommendation 3.1), bikeway improvements, traffic-calming road features, and place-making amenities (e.g., benches, people spots).

Where: Community-wide (reference: Blue Island Capital Improvement Priorities Report)

How: Use this RainReady Plan to prioritize related sidewalk and curb repair, roadway resurfacing, and streetscaping improvements recommended in Blue Island Capital Improvement Priorities Report; given the additional traffic engineering involved, creating complete streets is more intensive than green streets

How much: TBD

Who leads: The City of Blue Island

Resources needed: Internal: the General Fund, the Water Fund, TIF funds (where appropriate); External: CDBG, DCEO, IEPA State Revolving Loan Fund, USACE Section 219; STP funds

PRIORITY: High

PHASING: Medium

STRATEGY 4:

CREATE MORE GREEN SCHOOLS AND CHURCHES AND EXPANDEXISTING STRUCTURES

RECOMMENDATION 4.1

Create green schoolyards that: manage stormwater with green infrastructure (e.g., rain gardens, permeable pavement, urban agriculture, rain barrels, cisterns); Produce healthy foods; Create spaces for more active play, physical education, and outdoor learning.

Where: Multiple: Everett F Kerr MS (2521 Grove Street); Veterans Memorial MS (12320 Greenwood Avenue); The Paul Revere Schools (2300 123rd Place) (build on the GI that's already installed)

How: Explore the feasibility constructing and maintaining multi-use schoolyards that incorporates elements of the Space to Grow program in Chicago (e.g., MWRD, City of Chicago Department of Planning and Development, Openlands, Healthy Schools Campaign); if feasible, pursue a public-private partnership model to initiate and manage this program

How much: TBD

Who leads: The City of Blue Island, the MWRD, Cook County, local school districts and schools (e.g., administrators, faculty, students, families)

Resources needed: Internal: School district funds, General Fund; External: MWRD capital improvement funds, Cook County CDBG-DR funds; Internal/External: Blue Island should develop a public-public private partnership in which funds from multiple sources are leveraged and costs are shared

PRIORITY:  ^{Medium}

PHASING:  ^{Medium}

RECOMMENDATION 4.2

Create green churches that manage stormwater with green roofs, depaving impervious surfaces (where feasible), rain gardens, parking lot bioswales, permeable pavement, and cisterns to capture water from roofs. In other communities, church grounds and facility managers are incorporating these green improvements into the church's mission (e.g., prayer trails, outdoor space for congregation gatherings).

Where: TBD

How: Educate church leaders, congregations, parishioners, etc. on the benefits of green infrastructure; streamline the permitting process for churches seeking to make green infrastructure improvements to their property; connect churches to the organizations/agencies that can provide financial and technical assistance

How much: TBD

Who leads: Individual churches and their congregations/ parishioners

Resources needed: Internal: church capital funds and endowments; External: IDNR Coastal Management Grants, Chi-Cal Rivers Fund grants, Trinity Christian College student assistance, AmeriCorps State grants, private foundation grants (e.g., the Kresge Foundation, Grand Victoria Foundation)

PRIORITY:  ^{High}

PHASING:  ^{Short}

STRATEGY 5:

REDUCE WIDESPREAD FLOODING IN THE NORTHEAST NEIGHBORHOOD THROUGH COORDINATED GREEN AND GREY INFRASTRUCTURE INVESTMENTS

RECOMMENDATION 5.1

The City of Blue Island has succeeded in securing numerous grants and partnerships (e.g., Great Lakes Restoration Initiative, Chi-Cal Rivers Green Infrastructure Grants, MWRD Phase II projects) that are dedicated to mitigating urban flooding in the Northeast neighborhood. The City should build on these early successes and continue to work with the MWRD and other partners to install, maintain, and monitor concentrated and integrated green-grey infrastructure.

Where: Northeast neighborhood (area south of 119th Street, east of Western Avenue, north of 127th Street, and west of City border with Calumet Park)

How: Continue to collaborate with regional partners (e.g., MWRD, SSMMA, MPC, CNT, OAI, Inc./High Bridge, L3C) to implement well-designed green-grey infrastructure projects; monitor the performance of installations; maintain GI installations (see Repair Recommendation 4.1); educate residents on the benefits of green infrastructure and native plants; coordinate the installation of green infrastructure with forthcoming sidewalk/roadway improvements; expand the use green infrastructure where it is likely to be effective

How much: N/A

Who leads: The City of Blue Island, MWRD, SSMMA, many other local and regional NGOs

Resources needed: Internal: the General Fund, the Water Fund, TIF funds (where appropriate); External: CDBG, DCEO, IEPA State Revolving Loan Fund, USACE Section 219; STP funds; Chi-Cal Rivers Funds, Great Lakes Restoration Initiative

PRIORITY: High

PHASING: Medium

RECOMMENDATIONS FOR YOUR SHOPPING AREAS, BUSINESS DISTRICTS, AND DOWNTOWNS



STRATEGY 6:

BRING NEW LIFE TO BLUE ISLAND'S BUSINESS DEVELOPMENT DISTRICT

RECOMMENDATION 6.1

Continue to invest in and bring new life to the Western Avenue Business Development District (BDD). Incorporate green infrastructure (e.g., planter boxes, tree planting, cisterns, roadside bioswales, parking lot bioswales, permeable pavement) in order to reduce runoff into the local sewers and mitigate urban flooding; incorporate bike lanes, traffic calming, and place making features to create a vibrant and walkable downtown.

Where: Western Avenue BDD

How: Use the City’s existing Business Development Grant Program to provide the match for State/Federal grants; coordinate transportation and stormwater projects to develop concentrated and integrated green and grey infrastructure improvements; consider residents’ preferences for mixed use development, façade enhancements, architectural style, and wayfinding signage when reviewing developer proposals

How much: N/A

Who leads: City of Blue Island, IDOT, MWRD, SSMMA

Resources needed: Internal: the General Fund, the Water Fund, TIF funds (where appropriate); External: CDBG, DCEO, IEPA State Revolving Loan Fund, USACE Section 219; STP funds; Chi-Cal Rivers Funds, Great Lakes Restoration Initiative

PRIORITY: 

PHASING: 



RECOMMENDATION 6.2

Continue to invest in the Olde Western Avenue Historic District in a way that beautifies the area, increases retail activity and reduces flooding. Where feasible, incorporate green infrastructure BMPs like planter boxes, tree planting, cisterns, green roof, roadside bioswales, parking lot bioswales, and

permeable pavement, which can help create a more pedestrian-friendly environment.

Where: Olde Western Avenue Historic District

How: Use the City’s existing Business Development Grant Program to provide the match for State/Federal grants; coordinate transportation and stormwater projects to develop concentrated and integrated green and grey infrastructure improvements; explore local businesses willingness to make improvements on their property

How much: TBD

Who leads: City of Blue Island, Blue Island Chamber of Commerce and Industry, Blue Island Arts Alliance

Resources needed: Internal: the General Fund, the Water Fund, TIF funds (where appropriate); External: CDBG, DCEO, IEPA State Revolving Loan Fund, USACE Section 219; STP funds; Chi-Cal Rivers Funds, Great Lakes Restoration Initiative

PRIORITY: 

PHASING: 

STRATEGY 7: IMPROVE THE AREAS AROUND BLUE ISLAND’S SIX METRA STATIONS

RECOMMENDATION 7.1

Incorporate green infrastructure BMPs (e.g., permeable parking lots, bioswales, tree planting, planter boxes), wayfinding signage, sidewalk improvements, and place making amenities.

Where: The TOD Zones around each of Blue Island’s Metra

stations (a “TOD Zone” generally refers to the land area that falls within a .25 or .5 mile radius originating from a transit station)

How: Residents engaged in the RainReady planning process frequently shared a desire to see Blue Island’s Metra stations beautified and the connections between the stations and surrounding neighborhoods improved through wayfinding signage, sidewalk improvements, and public art displays; given that Blue Island’s TOD Zones overlap with flood-prone neighborhoods in some areas, any efforts to improve these TOD Zones and neighborhood connections should incorporate GI BMPs (where appropriate)

How much: TBD

Who leads: City of Blue Island, MWRD, Metra, RTA, Blue Island Chamber of Commerce and Industry, Blue Island Arts Alliance

Resources needed: Internal: the General Fund, the Water Fund, TIF funds (where appropriate); External: CDBG, DCEO, IEPA State Revolving Loan Fund, USACE Section 219, STP funds; Chi-Cal Rivers Funds, Great Lakes Restoration Initiative

PRIORITY: Medium

PHASING: Medium



STRATEGY 8: BRING NEW LIFE TO UNDERUTILIZED PARKING LOTS

RECOMMENDATION 8.1

Access to safe, sufficient, and convenient parking improves commuter safety and increases revenues for the City (due to increased utilization of City-owned lots). However, too much (underutilized) parking can cause an area to appear empty and blighted, generate polluted stormwater runoff, and reduce the overall walkability of an area. Therefore, the City’s efforts to expand, replace, and maintain its parking lots should recognize the impacts that large impervious areas have on water quality and urban flooding, and incorporate green infrastructure BMPs wherever possible.

Where: Multiple: Olde Western Parking Expansion, Metra Parking Lots, parking lots along Western Avenue (CMAP, 2016)

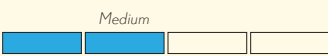
How: Blue Island could bring new life to its existing parking lots, and ensure that any future parking development does not diminish neighborhood vibrancy by: 1) retrofitting existing parking lots with green infrastructure BMPs (e.g., permeable pavement, rain gardens, bioswales), 2) implementing infill redevelopment and/or de-paving parking lots where appropriate, and 3) removing minimum parking requirements and making other policy changes that insure that new developments do not construct excessive parking

How much: TBD

Who leads: The City of Blue Island, parking lot owners (e.g., Metra, local businesses, parking lot owners)

Resources needed: Funding for improvements to public and private parking lots

PRIORITY: 

PHASING: 

STRATEGY 9: EXPAND BLUE ISLAND'S NETWORK OF COMMERCIAL COMPLETE STREETS

RECOMMENDATION 9.1

Create commercial complete streets that facilitate all modes of transportation. Revitalize commercial corridors. Reduce urban flooding with green infrastructure BMPs (e.g., bioswales, permeable pavement, planter boxes, tree planting).

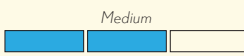
Where: See the City's Active Transportation Plan and Capital Improvement Priorities Report

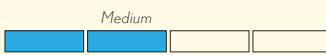
How: Continue to implement the complete streets and transportation (e.g., sidewalk and curb repair, bicycle improvements, streetscaping) recommendations from the City's Active Transportation Plan and Capital Improvement Priorities report, respectively; use Blue Island's Urban Flooding Risk and Opportunity Assessment (Figure BI-4); to identify (at a planning level) where GI BMPs can be integrated into the City's growing network of complete streets

How much: N/A

Who leads: The City of Blue Island, IDOT, ATA, CMAP

Resources needed: Internal: the MFT, General Fund, TIF Funds (where appropriate), External: CDBG, special grants from DCEO, IDOT, STP

PRIORITY: 

PHASING: 

RECOMMENDATIONS FOR YOUR INDUSTRIAL CENTERS AND RAILROAD CORRIDORS

STRATEGY 10: REDEVELOP AND IMPROVE INDUSTRIAL SITES IN A WAY THAT REDUCES FLOODING IN SURROUNDING AREAS

RECOMMENDATION 10.1

Implement, maintain, and monitor the green infrastructure improvements (i.e., infiltration basin, removal of invasive plant species) at the northeast industrial site to mitigate flooding in the surrounding catchment area.

Where: Northeast Industrial Site (northeast of 123rd Street and Metra tracks)

How: Document the process through which the City was able to improve this challenging and complex site; demonstrate the flood reduction benefits of this project; leverage this information to secure additional funding to implement similar industrial redevelopment and improvement projects elsewhere in Blue Island; tie this project back to "Blue Island-Calumet Park 'Complete Communities' concept proposed in Cook County's the NDRC proposal

How much: N/A

Who leads: The City of Blue Island, SSMMA, Antero Group, OAI Inc./High Bridge, L3C

Resources needed: Project has been completed, additional resources are needed to monitor the performance of the installation

PRIORITY: 

PHASING: 

RECOMMENDATION 10.2

Implement a mixed-use development in Northeast Blue Island; Incorporate roadside bioswales, naturalized detention ponds, grey infrastructure improvements (sewer and road improvements), and strategies to beautify the landscape and activate the space for broader community use.

Where: 119th Street to the north, Vincennes Rd/Metra Tracks to the west, 123rd street to the south, Railroad tracks to the east

How: Build on the “Blue Island-Calumet Park ‘Complete Communities’ concept proposed in Cook County’s National Disaster Resilience Competition application; continue to prepare and assemble the land; complete the necessary studies and designs, and convene the partners necessary to implement this project: use Growth Zone incentives to implement stormwater improvements at industrial centers and railroad corridors

How much: N/A

Who leads: City of Blue Island, SSMMA, Master developer (TBD)

Resources needed: Funding and technical assistance for developing and implementing a mixed use development in

Northeast Blue Island

PRIORITY: 

PHASING: 

STRATEGY 11:

IMPROVE THE EDGES OF LARGE INDUSTRIAL SITES AND RAILROAD CORRIDORS

RECOMMENDATION 11.1

Improve the edges of large industrial sites and railroad corridors by repairing ditches (e.g., increase storage/conveyance capacity, remove invasive species like phragmites), installing bioswales along railroad tracks, and constructing mixed-use recreational trails where it is appropriate and feasible

Where: Railroad tracks (the railroad that is just east of The Meadows Golf Club) from 119th Street to Vermont Street; railroad tracks that run parallel to Wahl Street from 127th Street to Cal Sag; west/south/east edges of railroad site between 123rd Street to the north, 127th Street to the south, Metra tracks to the west, Calumet Park to the east; northeast corner of 139th Street and railroad tracks (there is flow path along the western edge)

How: Identify industrial sites and railroad corridors that may contribute to flooding in surrounding neighborhoods; establish a public-private partnership (P3) with railroad companies and industrial site owners; use Growth Zone funds and/or other incentives to implement stormwater improvements at industrial centers and railroad corridors; where feasible, create off-road trails in tandem with edge improvements

How much: TBD

Who leads: The City of Blue Island, railroad companies, SSMMA, regional environmental organizations

Resources needed: Costs can be shared between public (e.g., City of Blue Island) and private partners (e.g., railroad companies and industrial site owners)

PRIORITY: ☐ ☐ ☒ High

PHASING: ☐ ☐ ☒ ☐ Long

RECOMMENDATIONS FOR YOUR OPEN LAND AND NATURAL AREAS



STRATEGY 12: DEVELOP THE CAL-SAG TRAIL AND OTHER OPEN SPACE AND OUTDOOR RECREATION AMENITIES

RECOMMENDATION 12.1

Incorporate green infrastructure features (e.g., roadside bioswales, permeable pavement, tree planting) and beautiful places to walk, rest, and gather (e.g., rest areas and gathering places, signage to help walkers find their way, historical and educational signage) into Blue Island's segments of the Cal-Sag Trail.

Where: Cal-Sag Trail alignment in Blue Island (stormwater projects would have the most flood reduction impact if installed on the trail segments along Vermont Street)

How: Continue to capitalize on Blue Island access to regional

greenways and blueways to support commercial activity and tourism in the City

How much: TBD

Who leads: City of Blue Island, Cal-Sag Trail Coalition

Resources needed: Dedicated funding and/or grants for implementing trail projects and neighborhood-scale green infrastructure projects

PRIORITY: ☐ ☐ ☒ High

PHASING: ☒ ☐ ☐ ☐ Short

STRATEGY 13: EXPAND URBAN AGRICULTURE IN BLUE ISLAND

RECOMMENDATION 13.1

Just as Blue Island is a leader in adopting green infrastructure practices, the City is also a leader in leveraging the urban farming movement to improve the community's quality of life. Urban agriculture (e.g., community gardens and urban farms) increase access to fresh, local, and healthy foods, create jobs, support a local ethic of land stewardship, and can reduce stormwater runoff. The City should therefore support efforts to expand urban agriculture sites in the City and incorporate green infrastructure BMPs (bioswales, vegetated filter strips) at these sites.

Where: Community-wide (the vacant lot at 2121 119th Place is possibly a suitable location based on community input)

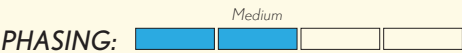
How: Promote the expansion of urban agriculture citywide through policies and incentive programs that support local farmers and community organizations; use the following criteria

to select specific sites: 1) whether or not there is community interest in developing and sustaining a garden/farm, 2) proximity/access to a supply of potable water (e.g., water line connections, ability to capture rain water), 3) presence of vacant and/or city-owned land, and 4) site's relation to a depression area and/or overland flow path (i.e., prioritize gardens where they will reduce downstream flooding)

How much: TBD

Who leads: The City of Blue Island, BIOS, local community organizations (e.g., Blue Island Urban Forestry Board, Master Gardeners, Blue Island Steering Committee)

Resources needed: Dedicated funding and/or grants to expand incentive programs for urban farmers



STRATEGY 14:
**INTEGRATE GREEN INFRASTRUCTURE
INTO BLUE ISLAND'S PARK SYSTEM**

RECOMMENDATION 14.1

The Blue Island Park District should continue to improve the City's parks in a way that restores and connects people to the outdoors, restores natural ecosystems, manages stormwater, and expands outdoor recreation opportunities. Green infrastructure features like naturalized detention ponds, rain gardens, permeable pavement, bioswales, and native plants could be incorporated into parks.

Where: Hart Park (permeable pavement, rain gardens); park at southeast corner of Irving Avenue and 127th Street (a bioswale on southern edge of park could benefit homes to south); Chris

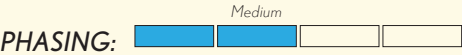
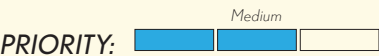
Disabato Play Lot; Tot Lot (re-install the native plant rain garden)

How: Incorporate a green infrastructure/native plant policy in the Blue Island Park District's policies for planning and operations and maintenance (adopt a policy that encourages the conversion of underutilized lawns into native plant gardens); include green infrastructure improvement project(s) in ongoing capital improvement planning and implementation efforts; apply for grants as opportunities arise; partner with community organizations to help maintain native plant gardens

How much: TBD

Who leads: The Blue Island Park District

Resources needed: The City of Blue Island and/or the Blue Island Park District can pay for the initial capital costs (with internal funds and/or external grant funds) and the costs of maintenance can be minimized by partnering with local community organizations to assist with the maintenance of specific green infrastructure installations



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