Chapter 5. Preventive Measures

The objective of preventive measures is to protect new construction from hazards and see that future development does not increase potential losses. Building, zoning, planning, and/or code enforcement offices usually administer preventive measures. They include:

- Planning and zoning
- Subdivision regulations
- Building codes
- Manufactured housing regulations
- Floodplain management
- Stormwater management
- Water use management

One measure of the effectiveness of these activities is their scoring under the Community Rating System (CRS). While the CRS score may not account for special local conditions, it does provide a good measuring stick to compare local programs with national models. At the end of the discussion on each measure is a "CRS credit" section that explains the likely scores for a Kankakee County community.

Development in Kankakee County: One reason preventive measures are important is because Kankakee County is growing. Between the 2000 and 2010 Censuses, the County's population increased by 9%. According to the comprehensive plan for the County, recent growth is largely due to south suburban Chicago's economic expansion. If the proposed third Chicago area airport or the Illiana Expressway are constructed in southern Will County, even more growth can be expected.

Most recent growth has taken place within the municipalities, especially those along the Interstate 57 corridor. Nonresidential development is staying close to highway access and areas such as enterprise zones and the Illinois Diversatech Industrial Park (east of Manteno, on former state hospital property).

Residential development is also concentrating in and around Bradley, Bourbonnais, and Manteno. However, more subdivisions are springing up in the unincorporated areas of the County. The largest amount of growth has occurred in Bourbonnais and Limestone Townships, north and west of Kankakee. These two townships accounted for 40% of the building permits issued in the County between 1980 and 2003. In fact, in the 2000 Census, Bourbonnais Township passed Kankakee Township as having the most population in the County.

The fastest growing communities, 2000 – 2010, were (in order) Manteno, Bradley, and Bourbonnais. Small town resources can be strained to serve this growth, although the extension of water and sewer services to many areas in recent decades has greatly helped.

New subdivision in rural Kankakee County

In addition to new development, there has been a substantial amount of redevelopment. A prime concern in hazard mitigation has been conversion of riverfront summer cabins to year-round residences.

In sum, there is growth in the urban fringe and in rural areas and redevelopment in floodplains. Now is the time to ensure that such development is protected from natural hazards and does not increase the threat of the hazards to other properties.

5.1. Planning and Zoning

Planning and zoning activities direct development away from problem areas, especially floodplains and naturally sensitive areas. They do this by allowing land uses that are more compatible to the natural conditions of the land. Use of the land can be tailored to match the land's hazards, typically by reserving hazardous areas for parks, greenways, golf courses, backyards, wildlife refuges, natural areas, or similar activities with a low potential for damage from flooding.

Comprehensive Plans: These plans are the primary tools used by communities to address future development. They can reduce future damage by indicating open space or low density development within floodplains and other hazardous areas. Unfortunately, natural hazards are not always emphasized or considered in the specific land use recommendations.

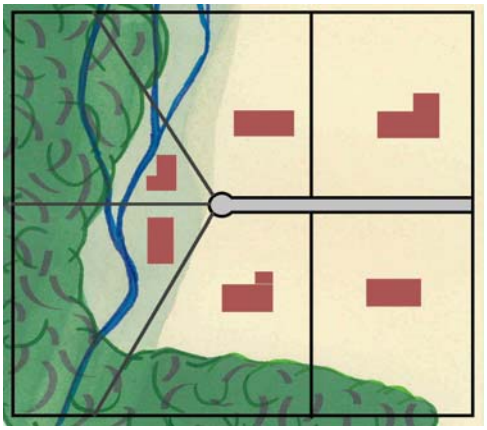
Generally, a plan has limited authority. It reflects what the community would *like to see* happen. Its utility is that it guides other local measures, such as capital improvement programs, zoning ordinances, and subdivision regulations.

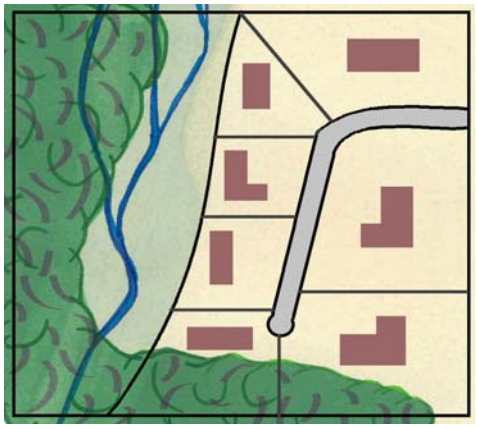
Zoning: A zoning ordinance regulates development by dividing a community into zones or districts and setting development criteria for each zone or district. Zoning codes are considered the primary tool to implement a comprehensive plan's guidelines for how land should be developed.

Zoning ordinances usually set minimum lot sizes for each zoning district. Often, developers will produce a standard grid layout, such as that shown in the R-1 district to the right. The ordinance and the community can allow flexibility in lot sizes and location so developers can avoid hazardous areas.

A zoning ordinance should designate flood-prone lands for agricultural, conservation, or other uses that suffer minimal damage from a flood.

One way to encourage such flexibility is to use the planned unit development (PUD) approach. The PUD approach allows the developer to easily incorporate hazard mitigation measures into the project. Open space and/or floodplain preservation can be facilitated as site designs standards and land use densities can be adjusted, as in the example below.





In the standard zoning approach (left), the developer considers six equally-sized lots without regard for the flood hazard. Two properties are subject to flooding and the natural stream is disrupted. An alternative, flexible, PUD approach is shown on the right. The floodplain is dedicated as public open space. There are seven smaller lots, but those abutting the floodplain have the advantage of a larger open area. Four lots have riverfront views instead of two. These amenities compensate for the smaller lot sizes, so the parcels are valued the same. The developer makes the same or more income and the future residents are safer.

Capital improvements: Another planning activity relates to public expenditures. For example, a community can discourage development in hazardous areas by not extending water and sewer services there. Capital improvement plans could designate wetlands and floodplains as priorities for acquisition or set aside for public parks and recreation areas.

Keeping this floodplain area as open space paid off in reduced flood damage and enhanced recreational opportunities.

Aroma Park park, January 2005

Kankakee County Planning Department,

Local implementation: The table below summarizes the findings of a review of plans and zoning ordinances adopted by the County and the municipalities. They were reviewed for five concerns:

1. Does the community have a comprehensive or land use plan? If so, when was it adopted?
2. Does the plan address natural hazards?
3. Does the plan's future land use map reflect floodprone areas?
4. Does the community have a zoning ordinance? If so, when was it adopted?
5. Does the zoning district map reflect floodprone areas?

Planning and Zoning Regulations

	Date of Comprehensive Plan	Plan Addresses Natural Hazards?	Future Land Use Map Reflect Floodplain?	Date of Zoning Ordinance	District Map Reflect Floodplain?
Aroma Park	1974	Yes	Yes	2003	Yes
Bourbonnais	2006	No	Yes	2001	No
Bradley	2007	No	Yes	2004	No
Kankakee	1997[1]	No	Yes	1995	No
Manteno	2007	No	Yes	1999	Yes
Momence	2011	No	Yes	1986	No
Sun River Terrace	None	N/A	N/A	1980	No
Uninc. County	2005	Yes	No	1996	No

Municipalities not participating in the mitigation plan are not included

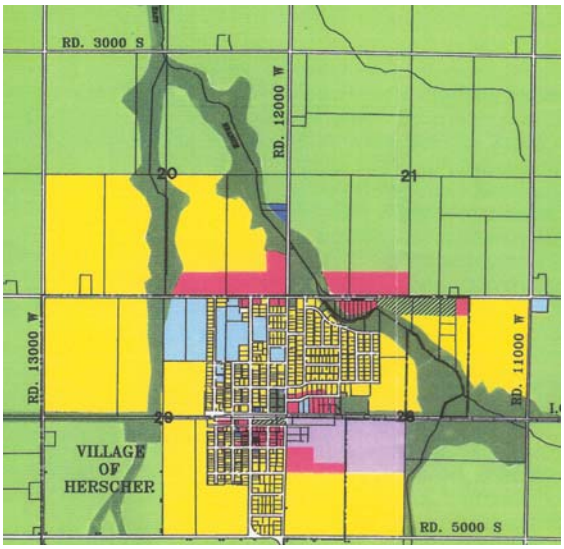
"N/A" means that the community does not have a plan, a zoning ordinance, or a floodplain map.

Note 1: the community is preparing or revising its plan or zoning ordinance.

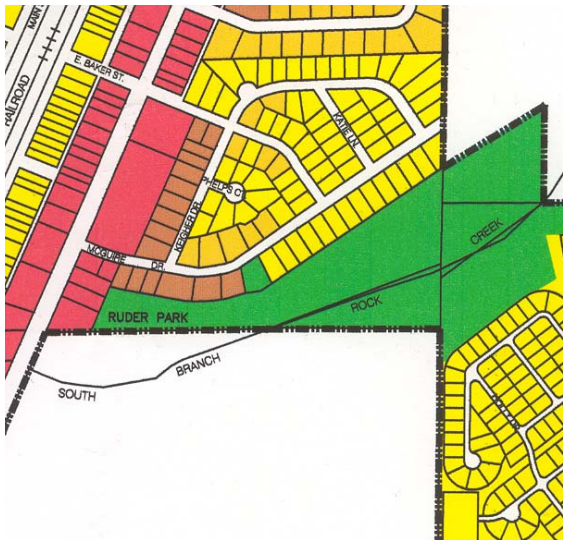
Plans: Some of the smaller towns' plans were prepared in the late 1980's and early 1990's by the County planning department. These recognize mapped and unmapped floodprone areas and areas with problem soils. Their future land use maps call for these areas to be set aside as parks or open space. A good example of this is Herscher's 1993 comprehensive plan (see below) which also called for a greenway along Horse Creek.

Zoning: As seen by the table on the previous page, most of the zoning ordinances have no special district for the floodplain areas. Often, zoning ordinances reflect existing development patterns, so if the floodplain had already been built up, the map does not show any special protection measures for future development.

An exception to this is Manteno's zoning ordinance which has designated much of its floodplains as an open space district. Because both its land use plan and its zoning ordinance have recognized the hazardous area and set standards to limit development there, the Village will prevent future flood problems.



Herscher's future land use plan sets aside the stream corridors as open space



Manteno's zoning ordinance designates floodplains as an OS 1 open space district

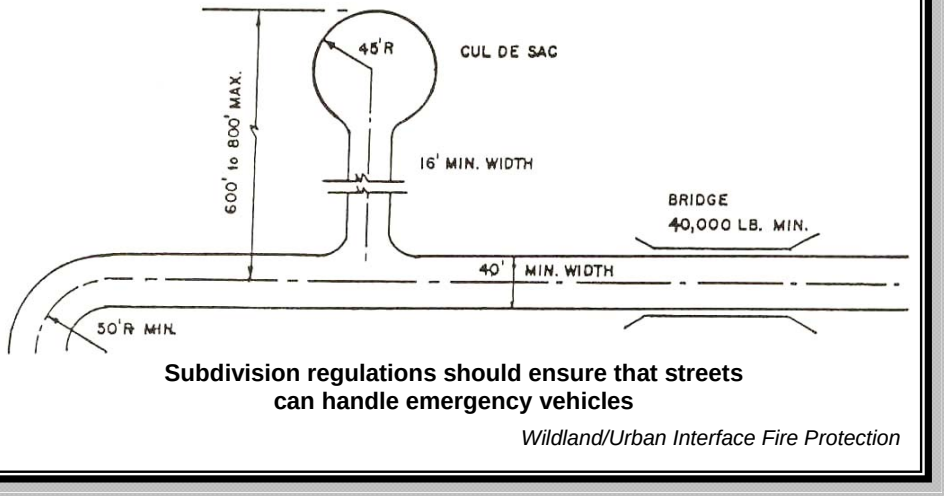
CRS credit: There is no credit for a plan, only for the enforceable regulations that are adopted pursuant to a plan. Up to 100 points are provided for regulations that encourage developers to preserve floodplains or other hazardous areas from development. There is also considerable credit for having open space or low density zoning in the floodplain. Aroma Park, Manteno, and the County would qualify for some of this credit.

5.2. Subdivision Regulations

Subdivision regulations come into effect where the land use plan and zoning ordinance have identified where various land uses are appropriate. They govern the development of large vacant areas that the developer intends to subdivide into individual lots. If the zoning for a site allows buildings, subdivision regulations set the construction standards for the streets, utility lines, drainage, and other infrastructure.

Subdivision regulations can include the following hazard protection standards:

- Requiring that the final plat show all hazardous areas (see example, page 9-5),
- Setting road standards for passage of fire fighting equipment and snow plows,
- Requiring power or phone lines to be buried,
- Establishing minimum water pressures needed for fire fighting,
- Requiring that each lot be provided with a building site above the flood level, and
- Requiring that all roadways be no more than one foot below the flood elevation.



Subdivision regulations should ensure that streets can handle emergency vehicles

Wildland/Urban Interface Fire Protection

Local implementation: The table on the next page summarizes a review of the County's and municipalities' subdivision regulations. For the communities with such regulations, three indicators of attention to natural hazards were looked for:

1. If there are street width and cul de sac dimensions similar to those illustrated above.

2. Whether new developments are required to set aside drainage ways as public easements to facilitate maintenance that will prevent local drainage problems. An example of such a requirement appears on the next page.

3. Whether utility lines have to be buried, which will protect them from damage by wind and winter and ice storms. In some cases, the regulations state that utilities be placed underground "whenever applicable."

Grant Park's subdivision regulations provide a good example of the typical drainage easement provision:

> 4.5.2 Drainage easements. When a subdivision is traversed by an established stream, established drainageway, or channel, there shall be provided a stormwater easement or drainage right-of-way conforming substantially to the course of such stream, established drainage way, or channel. The location, width, alignment, and improvement of such easement shall be subject to the approval of the plan commission provided that such easement shall be not less than 20 feet in width. Where ditch drainage is used in lieu of storm sewers, as may be permitted in this chapter, the easement shall be of sufficient width to allow future construction of a storm sewer main adequate to carry the ultimate runoff of the watershed as determined by current hydrological records…

Subdivision Regulations				
	Date of Ordinance	Street Standards	Drainage Easements	Utilities Buried
Aroma Park	1972	VI.1	VI.3.(B)	VI.8
Bourbonnais	1995	30-8.(a)	30-8.c	30-9.b19
Bradley	`973 [1]	18-58	18-59	None [1]
Kankakee	2002	5.34.A.11	5.4.C	5.39.A
Manteno	1994	10-8-4	10-5-5	None
Momence	1997	10-4-2	10-4-6	None
Sun River Terrace	None	N/A	N/A	N/A
Uninc. County	2009	17-38	17-37-3	17-37-2

The numbers refer to the ordinance section numbers.

Note 1. Community is working on new subdivision regulations
Note 2. Village adopted the County's regulations.

The table shows that every ordinance has street and cul de sac standards that facilitate access by emergency vehicles. Such standards have been around a long time due to the traditional attention to fire protection. Most, but not all, communities require easements adjacent to drainage ways and buried utility lines.

CRS credit: Up to 25 points are provided for requiring that new streets in a floodplain be elevated to no more than one foot below the flood elevation. There are no CRS credits for requirements for hazards other than flooding.

5.3. Building Codes

Building codes provide one of the best methods of addressing all the hazards in this plan. They are the prime measure to protect new property from damage by earthquakes, tornadoes, high winds, and snow storms. When properly designed and constructed according to code, the average building can withstand the impacts of most of these forces.

Hazard protection standards for all new and improved or repaired buildings can be incorporated into the local building code. Provisions that should be included are:

- Making sure roofing systems will handle high winds and expected snow loads,
- Providing special standards for tying the roof, walls and foundation together to resist the effects of wind (see illustration) and shaking caused by earthquakes,
- Requiring new buildings to have tornado "safe rooms,"
- Including insulation standards that ensure protection from extreme heat and cold as well as energy efficiency,
- Regulating overhanging masonry elements that can fall during a quake,
- Ensuring that foundations are strong enough for earth movement and that all structural elements are properly connected to the foundation, and
- Mandating overhead sewers for all new basements to prevent sewer backup.

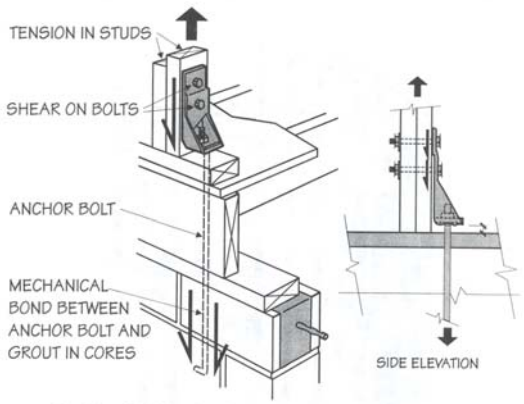
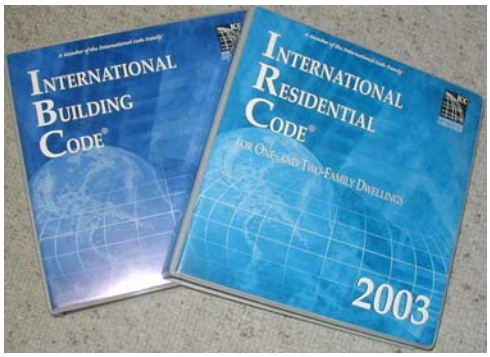


Fig. 14 - TYPICAL TIE-DOWN DETAIL TO FOUNDATION

Both builders and inspectors need to know the details of proper anchoring to protect new buildings from high winds.

Windstorm Mitigation Manual for Light Frame Construction, page 95.

Model Building Codes: Most communities in Illinois have used versions of the National Building Code of the Building Officials and Code Administrators (BOCA) and/or the One and Two Family Dwelling Unit Code published by the Council of American Building Officials (CABO). These standard building codes provide the basis for good building safety programs, especially protection from fire and electrical hazards. However, the BOCA and CABO codes are not "state of the art" when it comes to addressing natural hazards. They are being replaced by the new International Code series.



BOCA's building code has been replaced by the International Series

The International Codes have a section on flood protection that communities must adopt separately. However, these building code standards are not as stringent as the minimum floodplain management requirements of the State or many local ordinances.

Code Administration: Just as important as the code standards is the enforcement of the code. There were many reports of buildings that lost their roofs during Hurricane Andrew because sloppy construction practices did not put enough nails in them and some nails missed penetrating roof rafters. Adequate inspections are needed during the course of

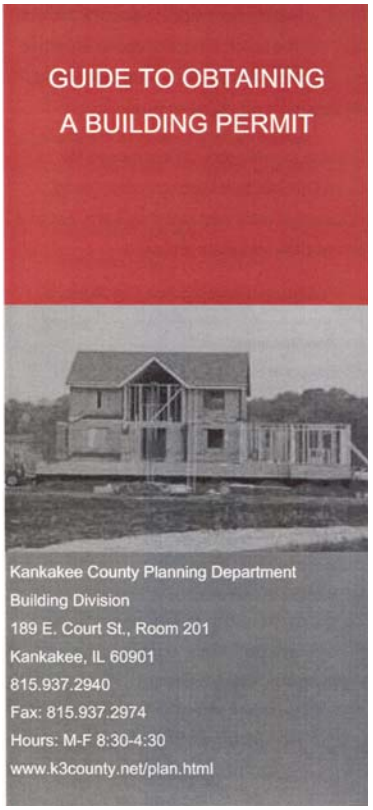
construction to ensure that the builder understands the requirements and is following them. Making sure a structure is properly anchored requires site inspections at each step.

There is a national program that measures local building code natural hazard protection standards and code administration. The Building Code Effectiveness Grading Schedule (BCEGS) is used by the insurance industry to determine how well new construction is protected from wind, earthquake and other non-flood hazards. It is similar to the 10-year old Community Rating System and the century-old fire insurance rating scheme: building permit programs are reviewed and scored, a class 1 community is the best, and a class 10 community has little or no program.

Local implementation: The table on the next page lists the building codes in use in Kankakee County and the BCEGS rating for each community. The latter provides summary data on the status of administration of the building codes.

The table shows that some communities have both current building codes and good enforcement. It must be noted that a community with 15.00 points under "Adopted Code" will lose that score at the next 5 year cycle visit if it does not adopt the current International series of codes. Other communities have codes that are now outdated, or will be outdated if they are not revised before the next BCEGS review. The County intends to do this. Those communities that are listed as using the County's code would also have to adopt the new version to maintain their BCEGS classification.

As a government agency, Kankakee Community College is somewhat exempt from local building codes. Its larger projects must be approved by the Illinois Capital Development Board. Its construction specifications for smaller projects reference the 1999 BOCA code.



An informed public helps building code administration

Building Codes and BCEGS Scores				
Community	Building Code	BCEGS Scores		BCEGS Class
		Adopted Code	Code Administration	
Aroma Park	BOCA	15.00[1]	38.45[2]	9/9
Bourbonnais	International – 2006	15.00[1]	56.87[2]	4/4
Bradley	International – 2003	Did not participate in BCEGS survey		
Hopkins Park	International – 2006	No Report		
Kankakee	International – 2003	8.00[3]	29.09[4]	4/4
Manteno	International – 2006	8.00[3]	28.25[4]	6/6
Momence	"Kankakee County's"	8.00[3]	16.67[4]	7/99
Sun River Terrace	"Kankakee County's"	5.51[1]	8.40[2]	9/9
Uninc. County	International - 2003	8.00[3]	35.66[4]	4/4

Note 1. Score is out of a maximum of 15 points for adopting the latest building code. A community using BOCA or "Kankakee County's" code will lose its score at the next cycle visit if it does not adopt the current International series of codes.

Note 2. Score for administration, inspections, staff training, etc., is out of a max of 85 points.

Note 3. Score is out of a maximum of 8.

Note 4. Score is out of a maximum of 54.50 for residential administration, inspections, staff training, etc.

Summer 2013 Survey of municipalities, Insurance Services Office, Inc.

CRS credit: The Community Rating System encourages strong building codes. It provides credit in two ways: points are awarded based on the community's BCEGS classification and points are awarded for adopting the International Code series. Up to 100 points are possible. For example, based on the data in the table, Bourbonnais would receive 90 points, but Momence would receive no credit.

The CRS also has a prerequisite for a community to attain a CRS Class 8 or better: the community must have a BCEGS class of 6 or better. To attain a CRS Class 4 or better, the community must have a BCEGS class of 5 or better. In other words, a strong building code program is a must to do well in the Community Rating System.

5.4. Manufactured Housing Regulations

Manufactured or "mobile" homes are usually not regulated by local building codes. They are built in a factory in another state and are shipped to a site. They do have to meet construction standards set by the US Department of Housing and Urban Development. All mobile type homes constructed after June 15, 1976 must comply with HUD's National Manufactured Home Construction and Safety Standards. These standards apply uniformly across the country and it is illegal for a local unit of government to require additional construction requirements. Local jurisdictions may regulate the location to these structures and their on-site installation.

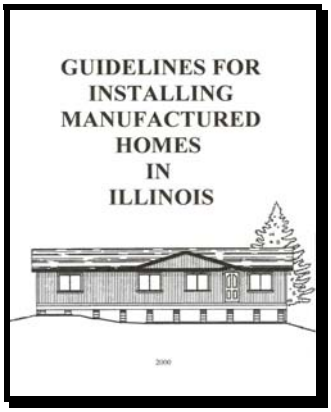
As noted in Chapter 3, the greatest mitigation concern with mobile homes and manufactured housing is protection from damage by wind. The key to local mitigation of wind damage to manufactured housing is their installation.

Tornado damage to a manufactured housing community

FEMA

Following tornadoes in Oklahoma and Kansas, FEMA's Building Performance Assistance Team found that newer manufactured housing that had been anchored to permanent foundations performed better. They also found that newer homes are designed to better transmit wind up-lift and overturning forces to the foundation. Unfortunately, they also found that building officials were often unaware of the manufacturer's installation guidelines.

The Illinois Mobile Home Act and Manufactured Home Tiedown Code are enforced by the Illinois Department of Public Health. The State code includes equipment and installation standards. Installation must be done in accordance with manufacturers' specifications. There is a voluntary program for installers to be trained and certified.



The State sets minimum standards for installation of manufactured homes

Following the installation of a manufactured home, installers must send the state a certification that they have complied with the State's tiedown code. The Department of Public Health conducts inspections only if complaints are made regarding an installation. The Department also regulates manufactured housing parks, but not in home rule communities.

In addition to code standards to protect the home from high winds is the need to protect the occupants. There are no state or federal requirements for storm shelters in manufactured housing communities.

Local implementation: As noted in Section 3.1, there are over 3,000 manufactured homes in Kankakee County. The County has the second highest number of such homes per capita in the state.

Kankakee County manufactured housing community

Local governments have relied on the State program to ensure that these are properly protected from wind. Communities with floodplain regulations must require manufactured homes, including those in parks or communities, to meet the flood protection regulations. For example, Manteno and Kankakee do not inspect for tie downs, but do ensure that sheds, garages, and decks in their manufactured housing communities meet all applicable codes. Kankakee County requires permanent foundations for these structures under County jurisdiction.

CRS credit: Up to 15 points are provided for enforcing the floodplain management requirements in existing manufactured housing parks. Additional points are possible for other special regulations, such as prohibiting manufactured housing in the floodway. There are no CRS credits for manufactured housing standards for hazards other than flooding.

5.5. Floodplain Management

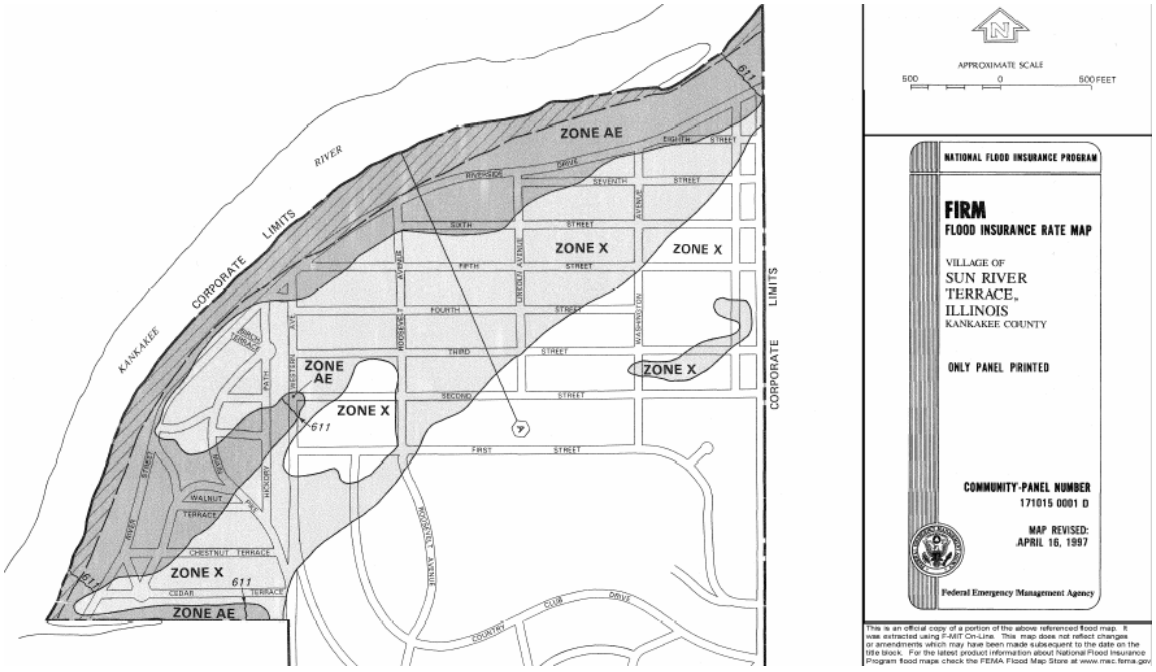
Development in floodplains is development in harm's way. New construction in the floodplain increases the amount of development exposed to damage and can aggravate flooding on neighboring properties. A floodplain management program has two major components: a floodplain map and development regulations.

Floodplain map: The official map for floodplain management regulations is the FEMA Flood Insurance Rate Map (FIRM). Each community is given a FIRM and a Flood Insurance Study text that explains the technical study that prepared the map. FIRMs prepared before 1986 were accompanied by a Flood Boundary Floodway Map that shows the regulatory floodway, where IDNR permits are required. Since 1986, the floodway has been delineated on the FIRM.

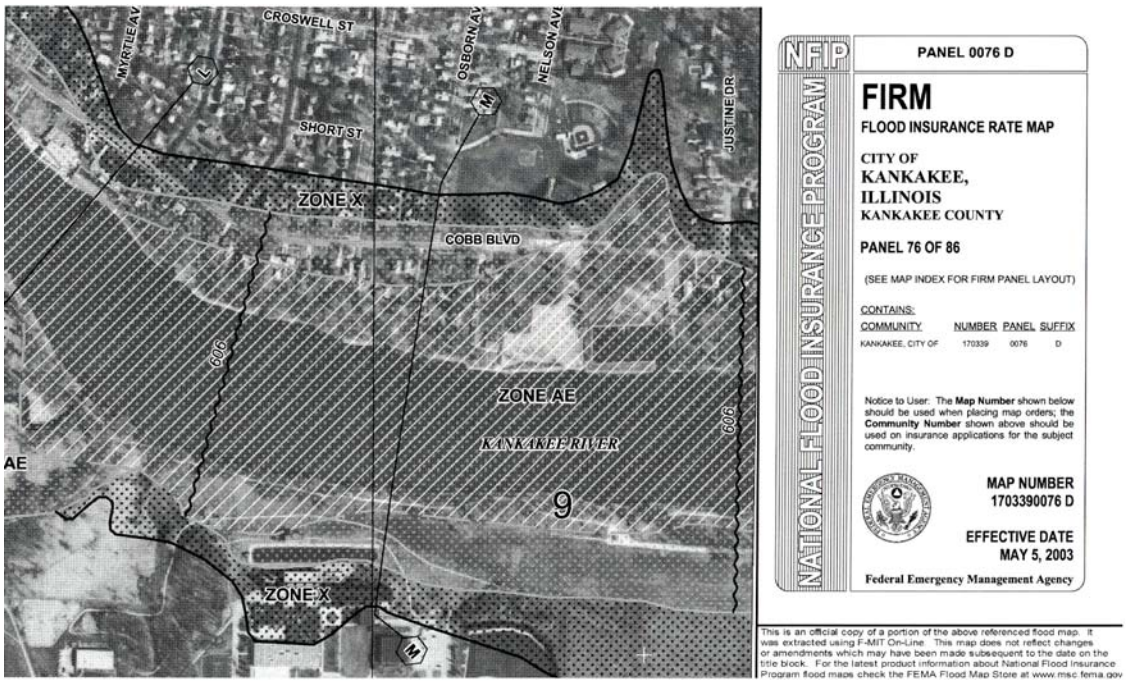
An example of an older FIRM is shown at the top of the next page. It illustrates some of the problems people have using the FEMA maps. Concerns have included:

- They are for individual communities, so areas outside a municipality's corporate limits are shown on the county's map. This makes regulating areas to be annexed difficult and sometimes the data on the two different maps may disagree.
- The maps for counties and larger communities need multiple panels, so a user must shuffle from an index to different panels to locate a site.

Old and New FIRM Formats



Older FIRM: the information on Sun River Terrace's FIRM stops at the Village limits



New FIRM: Kankakee's FIRM is on an aerial photo base map, making it easier to locate buildings

- Older maps show only streets, stream channels, and railroads. It can be difficult to determine whether individual buildings are in or out of the regulatory floodplain or floodway.
- Maps are based on the rainfall data, flood information, and study techniques in effect at the time of the study. Such data and techniques have greatly improved in the last 10 – 20 years, but are not reflected on the official maps in effect.
- It is expensive to keep paper maps up to date to reflect new subdivisions, corporate limits changes, or new flood data. FEMA's budgets have not allowed it to restudy or remap areas as frequently as many map users would like.

As shown at the bottom of the previous page, newer FIRMs provide more detail, but they still have the other shortcomings of paper maps that are not kept up to date with changing ground features and flood data. In 2010, FEMA adopted a new Flood Insurance Study for Kankakee County and along with the study a new set of modernized FIRMs were created. These FIRMs are available as paper maps as well as digital, online versions. The County has included the new FIRMs in their Geographic Information System.

Development regulations: FEMA's National Flood Insurance Program (NFIP) and the Illinois Department of Natural Resources set minimum requirements for regulating development in the floodplain. These are summarized on the following page.

On both the Sun River Terrace and Kankakee maps, the floodway is shown with slanted lines. The floodway is the central part of the floodplain, including the channel, which must be reserved to carry flood flows. Floodwaters are deeper and move faster in the floodway. If the floodway is obstructed by development, such as fill or a small bridge opening, floodwaters will back up or be diverted onto other properties. State permits are required for floodway development projects to ensure that this does not happen.

Local implementation: While there is a state permit program, IDNR depends on local code enforcement offices to advise developers when and where a state permit is needed. Therefore, local programs are the key to good floodplain management.

There are eight communities in Kankakee County that have flood hazard areas mapped by FEMA. They have all joined the National Flood Insurance Program. A ninth community, Chebanse, has also joined, even though it does not have a mapped floodplain.

Floodplain map: The areas covered by FEMA's Flood Insurance Rate Maps are shown in the map on page 2-2. One prominent shortcoming of these maps is that the western half of the County was never included. These smaller streams have flooded (see photo of Horse Creek, page 2-3), but there is no public map of the hazard and therefore no regulatory requirements for new development.

The FEMA mapping standard has been to only map a floodplain in a rural area if the stream drains 10 square miles or more. Since the original 1970's maps, the urban fringe has expanded into areas once considered rural. As a result, much development occurs in

floodprone areas that were not mapped. A good example of this is shown in the FIRM excerpt on page 5-16.

National and State Floodplain Management Requirements

The National Flood Insurance Program (NFIP) is administered by the Department of Homeland Security's Federal Emergency Management Agency (FEMA). As a condition of making flood insurance available for their residents, communities that participate in the NFIP agree to regulate new construction in the area subject to inundation by the 100-year (base) flood. The floodplain subject to these requirements is shown as an A Zone on the Flood Insurance Rate Map (FIRM) (see the map on page 2-2).

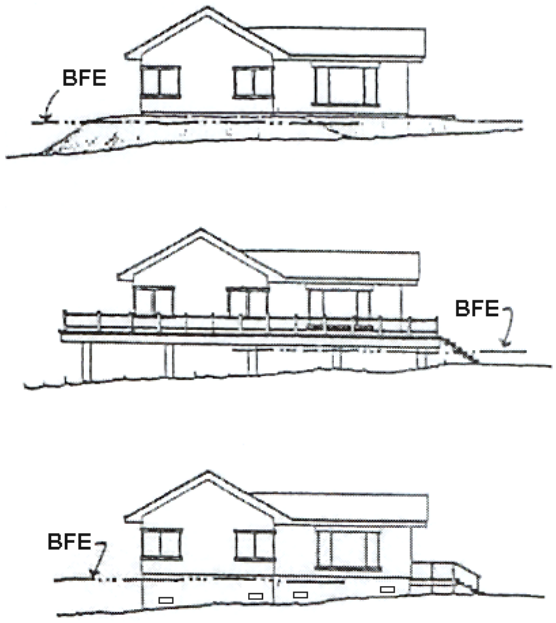
The Illinois Department of Natural Resources (IDNR), Office of Water Resources, has authority to prevent development projects from adversely affecting other properties. Additional floodplain regulatory requirements may be set by local law.

1. All development in the A Zone must have a permit from the community. "Development" is defined as any manmade change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

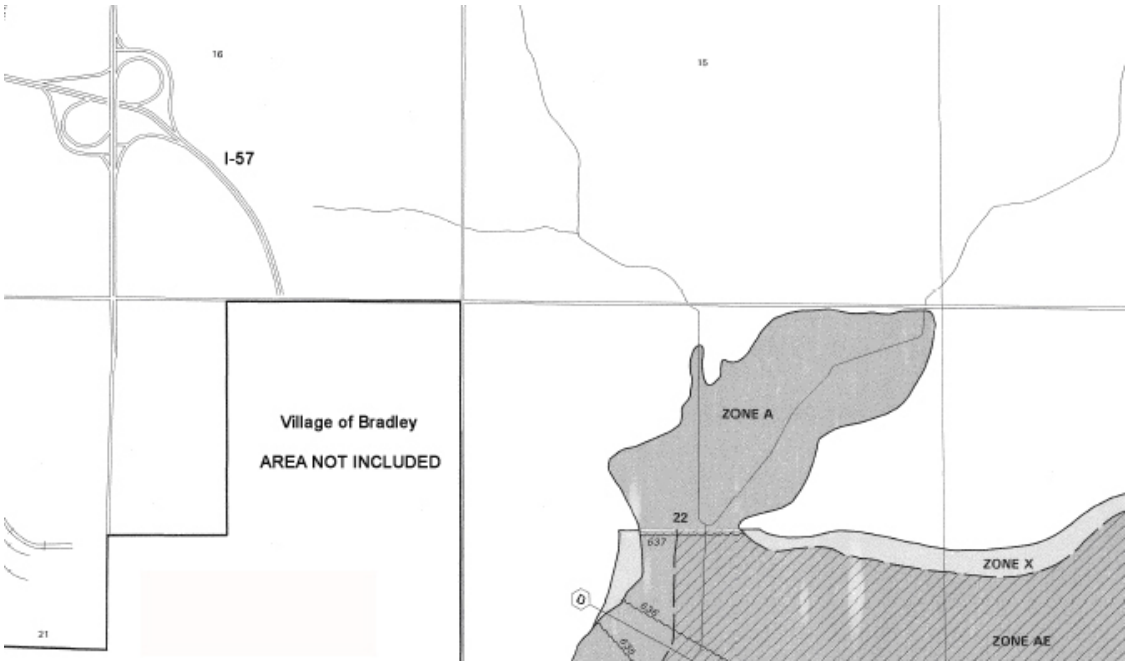
2. Development along a river or other channel cannot obstruct flows so as to cause an increase in flooding on other properties. To ensure this, an analysis must be conducted to measure the cumulative effect of the proposed development, when combined with all other existing and anticipated development. The analysis is submitted to IDNR as part of an application for a state floodway permit.

3. New buildings may be built in the floodplain, but they must be protected from damage by the base flood. The lowest floor of residential buildings must be elevated to or above the base flood elevation (BFE). The illustrations to the right show three typical ways this is done: on fill, on piers, or on a flow-through crawlspace. Nonresidential buildings must be either elevated or floodproofed.

4. A "substantially improved" building is treated as a new building. The regulations define "substantial improvement" as any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the start of construction of the improvement." This requirement also applies to buildings that are substantially damaged.



Communities are encouraged to adopt local ordinances that are more comprehensive or provide more protection than the NFIP or IDNR criteria. The NFIP's Community Rating System provides insurance premium credits to recognize the additional flood protection benefit of higher regulatory standards.



Example of previous problems with Kankakee County Flood Insurance Rate Maps

- Roads and floodplains disappear beyond the corporate limits ("area not included").
- Recent features are not shown, such as changes in corporate limits, new roads and streets around the I-57 interchange, and the Northfield Square shopping mall.
- The 10 square mile drainage area standard for rural areas means that floodplains on the urban fringe are not mapped.

All seven mapped communities received their first FIRM in the 1970's. A new study of the Kankakee and Iroquois Rivers was published in a 1996 Flood Insurance Study and was the basis for FIRMs for the communities on those two rivers. It is important to note that the 1996 study assumed there would be no ice jams. The County's Flood Insurance Study states:

> The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail. (page 8)

Because of this approach, the regulatory flood elevations for the Kankakee and Iroquois Rivers do not state the true flood hazard. For example, the official base flood elevation at the Chebanse gage on the Iroquois River is 617 feet above sea level. Floods went higher than this in 1913 and 1979 and came within a foot in 1933. As noted on page 2-6, recorded floods have gone higher than 614 feet ten times. Half of those, including the 1979 flood, were due to ice jams. It should be noted that the new 2010 Flood Insurance Study does not take ice jams into consideration.

Since the previous plan's adoption, Kankakee County has adopted a new set of Digital-FIRMs that are countywide and overlaid on aerial photography. However, the current system is not perfect and improvements could be made. In short, the regulatory floodplain maps and data for Kankakee County communities:

- Do not include the western third of the County,
- Do not include smaller drainage areas in the urban fringe, and
- Understate the flood hazard because ice jams are ignored.

Development regulations: All eight communities have an obligation to FEMA to enforce the floodplain management requirements within their jurisdictions. Periodic visits by IDNR or FEMA ensure that the regulations are kept current.

Having good regulations on the books is one thing, but it is even more important that local officials are properly administering them. Failure to fully enforce the floodplain development regulations is cause for probation or suspension from the NFIP.

FEMA and the Department of Natural Resources periodically conduct Community Assistance Visits (CAV) to verify that staff understand and are enforcing the floodplain regulations. The table on the next page shows the status of the most recent CAVs. It can be seen that most communities were found to be generally OK, that is, only a few minor problems were found in their administration or enforcement and they were subsequently corrected.

The Community Assistance Visit reports recommended that most of the communities coordinate their floodplain regulations closer with their building code programs. Several communities needed to update their ordinances to include some new requirements. No new development was found in Momence's floodplain and the State CAV staff was "impressed with the County's administration."

In 2000, the Illinois Association for Floodplain and Stormwater Management initiated a Certified Floodplain Manager program. To be a CFM®, a local permit official must pass an extensive test and meet certain continuing education requirements. Communities with CFMs have been shown to have better floodplain management programs. Currently, Bourbonnais and Manteno have Certified Floodplain Managers on their regulatory staffs and Bradley's consulting engineer is a CFM. Until recently, the County had two CFM's on staff but was forced to reduce that number to one due to budgetary constraints.

CRS credit: CRS credit is provided for higher mapping and regulatory standards. Credit is based on how those standards exceed the minimum NFIP requirements. State mapping standards mean that most communities could receive 100 – 150 points for the way their floodways were mapped.

Floodplain Management Programs							
	FIRM Date	Date of CAV	Major problems	Minor problems	Procedures OK?	Ordinance OK?	Problems corrected?
Aroma Park	2010	2000	9	1	No	No	No
Bourbonnais	2010	2000	3	2	No	No	Yes
Bradley	2010	2000	1	4	No	No	Yes
Kankakee	2010	2002	0	2	Yes	Yes	Yes
Manteno	2010	2000	1	1	No	No	Yes
Momence	2010	2000	0	0	No	Yes	Yes
Sun River Terrace	2010	No recent CAV					
Uninc. County	2010	2001	0	3	Yes	Yes	Yes

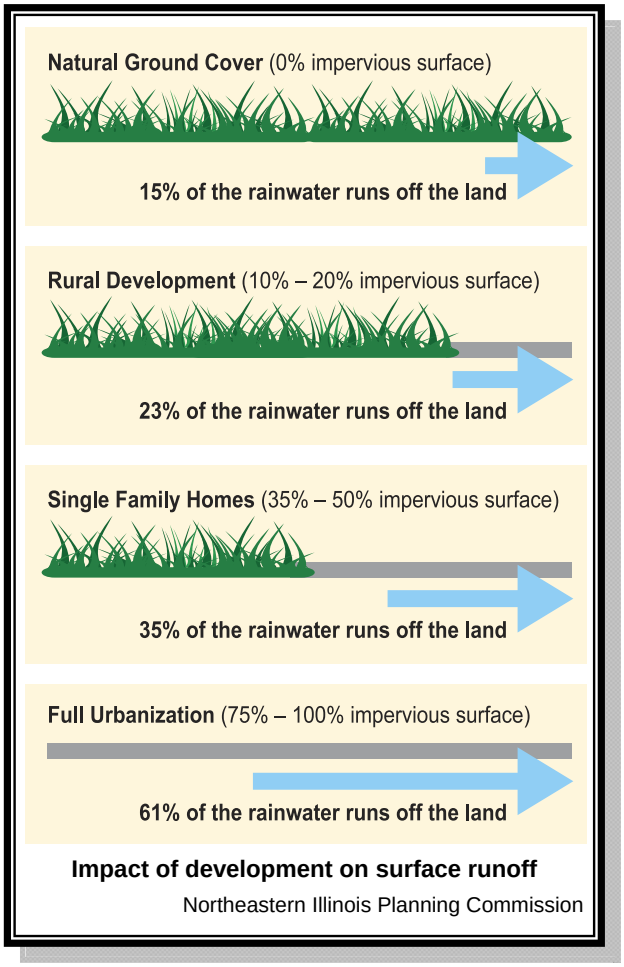
The seven mapped NFIP communities' regulations are based on an IDNR model ordinance. These have several requirements that exceed the national minimums:

- Buildings must be elevated to a level one foot above the base (100-year) flood elevation.
- Fill must meet certain standards to protect it from erosion and scour,
- Hazardous materials may not be stored in the floodplain, and
- Under certain circumstances, building additions must be protected from flooding, even if they are not substantial improvements.

The County and the six mapped municipalities would receive at least 300 points for their floodway maps and regulatory provisions and up to 50 points for having a Certified Floodplain Manager administering their floodplain management ordinances.

5.6. Stormwater Management

Development outside a floodplain can also contribute to flooding problems. Stormwater runoff is increased when natural ground cover is replaced by urban development (see graphic). Impervious surfaces, such as streets and rooftops, shed more water than natural ground cover. This runoff is speeded to the receiving streams by storm sewers and drainage ditches. As a result, there is more water reaching the streams and getting there faster. This can aggravate downstream flooding, overload the community's drainage system, cause erosion, and impair water quality.



Impact of development on surface runoff
Northeastern Illinois Planning Commission

Retention/detention: Stormwater management regulations require developments to ensure that the post-development peak runoff will not be greater than under pre-development conditions. To meet this requirement, developers build retention or detention basins to minimize the increases in the runoff rate caused by their development. Stormwater management requirements for storage basins are generally found in ordinances governing subdivisions and larger new developments. Many developments utilize wet or dry basins as landscaping amenities. Larger detention basins are more effective than smaller ones, which drain relatively quickly. In some cases, advance community planning identifies the most effective location for a basin and requires developers to contribute funds for it in lieu of constructing on-site detention.

Wet bottom storage pond, Bradley

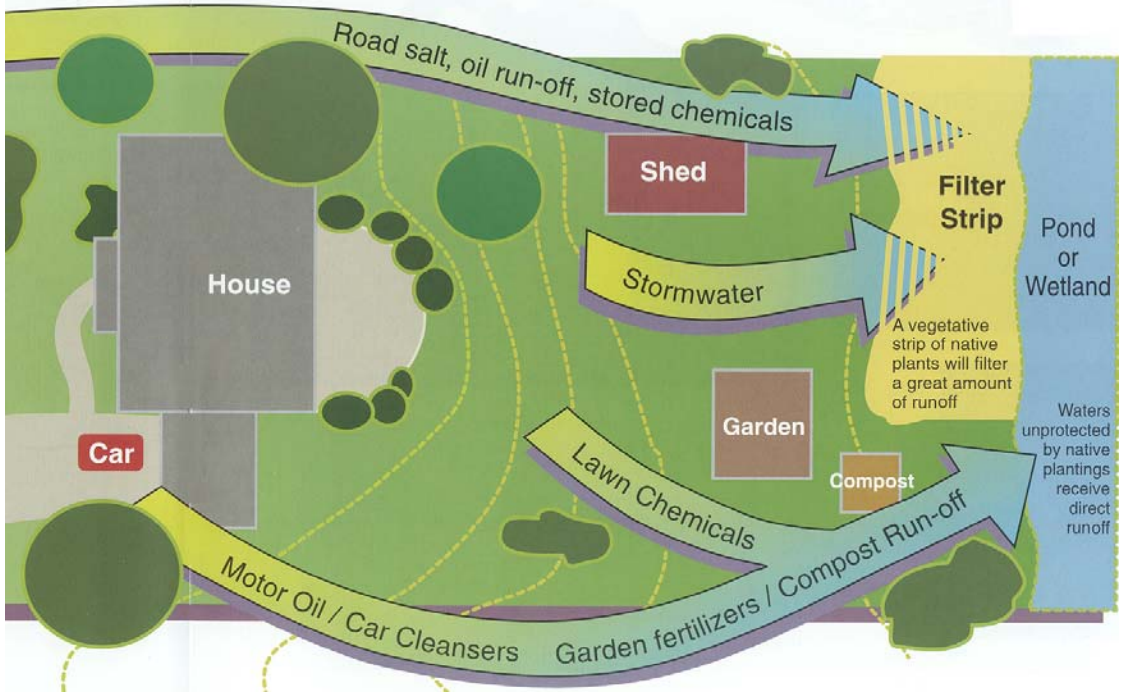
Water quality: There is a second aspect to stormwater management: protecting or improving the quality of the stormwater runoff that flows to the rivers. Non-point source pollutants are carried by stormwater into the receiving streams (point source pollution comes from municipal and industrial wastewater systems). Non-point source pollutants include sediment, lawn fertilizers, pesticides, farm chemicals, and oils from street surfaces and industrial areas.

Stormwater management water quality measures are known as "best management practices" or BMPs. BMPs are technologies or engineering approaches that can be incorporated into retention and detention basins, drainageways, and other parts of new developments. They hold and clean stormwater runoff by filtering it or letting pollutants settle to the bottom of a basin before it is drained (see graphic below).

Erosion and sedimentation control: One of the largest sources of water pollution is sedimentation. Because farmland and construction sites are usually bare, stormwater runoff can erode soil, sending sediment into downstream waterways. Sediment tends to settle where the river slows down, such as where it enters a lake. Sedimentation will gradually fill in channels and lakes, reducing their ability to carry or store floodwaters. Not only are the drainage channels less able to carry flood flows, but the sedimentation in the water reduces light, oxygen, and water quality.

BMPs to reduce erosion and sedimentation have two principal components: minimize erosion with vegetation and capture sediment before it leaves the site. Slowing runoff on the way to a drainage channel increases infiltration into the soil and controls the loss of topsoil from erosion and the resulting sedimentation. Runoff can be slowed down by BMPs such as vegetation, terraces, sediment fences, ditch checks, and impoundments such as sediment basins and wetlands.

Ditch check catch sediment



BMPs slow stormwater runoff and improve water quality.

Living With Wetlands, A Handbook for Homeowners in Northeastern Illinois

Under the National Pollution Discharge Elimination System (NPDES), municipalities located "in urban areas as defined by the Census Bureau" are required to obtain NPDES permit coverage for discharges from their municipal separate storm sewer systems. The NPDES requirements are explained in the box, below. They encourage communities to require developers to implement BMPs and to incorporate them into their own activities, such as street sweeping.

NPDES Stormwater Management Water Quality Requirements

Section 402 of the Clean Water Act directed the U.S. Environmental Protection Agency to develop and implement a program to prevent harmful pollutants from being released into the nation's surface water from sources such as wastewater treatment plants, agricultural operations, and stormwater drainage. The program (the National Pollutant Discharge Elimination System or NPDES) is administered by the Illinois Environmental Protection Agency.

Affected communities that operate a storm drainage system must obtain a permit to discharge their stormwater drainage into a local water body. To get the permit, the community must have a local stormwater management program that includes these components, most of which are also important to good floodplain management practices.

1. Public education and outreach on stormwater impacts.
2. Public involvement and participation.
3. Identification and elimination of illicit discharges to storm sewers.
4. Control of construction site runoff.
5. Control of stormwater runoff from development.
6. Reduction of pollutant runoff from local government operations.

The NPDES permit specifies what can be discharged, how the level and type of pollutants in the water are to be monitored and reported, and other provisions.

Wetlands: Wetlands are natural features that provide both stormwater quantity and quality benefits. They receive and store floodwaters, thus slowing and reducing downstream flows. A 1993 study by the Illinois State Water Survey concluded that for every one percent increase in protected wetlands along a stream corridor, peak stream flows decreased by 3.7 percent. They also serve as a natural filter, which helps to improve water quality, and provide habitat for many species of fish, wildlife, and plants.

Local implementation: Most Kankakee County communities have had stormwater management requirements in their subdivision ordinances for some time. However, each has had different criteria and their standards are somewhat out of date. To rectify this, the metropolitan communities and the County formed a Stormwater Technical Advisory Committee which developed a model stormwater management ordinance. This ordinance meets or exceeds the NPDES water quality requirements. It requires:

- A grading and drainage permit for all construction projects, except single family homes and most land disturbing activities that affect less than 5,000 square feet (Section 2.II.A and B)

- Soil erosion and sedimentation control for construction sites, Section 2.I.D
- Retention and detention basins to manage the 2- and 100-year storms, Section 3.II.A
- Encouragement to incorporate measures to remove pollutants in retention and detention basins (Sections 3.III.G and I)

The ordinance sets the following hierarchy of BMPs for site and drainage plans:

A. Preserving Regulatory Floodplains, Flood Prone and Wetland Areas
B. Minimizing Impervious Surfaces on the Property
C. Utilizing Storm Water Wetlands, Grassed Swales and Vegetated Filter Strips
D. Infiltrating Runoff On-Site
E. Providing Stormwater Retention Facilities
F. Providing Wet Bottom or Wetland Detention Facilities
G. Providing Dry Detention Facilities
H. Constructing Storm Sewers
I. Protecting Water Quality Through Multiple Uses

The NPDES requirements explained on the previous page affect five municipalities, five townships, and the County. Here is the status of their compliance as of April 2013:

Filed plan, program permitted: Aroma Township, Bourbonnais, Bourbonnais Township, Bradley, Kankakee, Kankakee Township, Kankakee County, Kankakee River Metropolitan Agency, Limestone Township

No permit required: Aroma Park

Have not filed: Otto Township, Manteno

It can be seen that all the major metropolitan communities have complied with the NPDES requirements and are administering their stormwater management water quality programs.

Large areas of the Kankakee and Iroquois Rivers' watersheds are preserved as wetlands and wildlife habitat, especially in Indiana. Wetlands are protected by IDNR and Corps of Engineer regulations, but there are no special local requirements. However, the County has begun a watershed planning effort to identify appropriate water quality activities for individual areas. The first plan was completed for the Trim Creek watershed in northeastern Kankakee County and southeastern Will County.

CRS credit: CRS credit is provided for the following stormwater management regulations:

- Design standards for retention and detention basins,
- Requirements for erosion and sedimentation control,
- The requirement to incorporate best management practices into plans for stormwater management facilities, and
- Requiring the community to accept responsibility to inspect retention and detention basins and ensure that needed maintenance is done.

The County and all municipalities that adopt the new model ordinance should receive credit for all but the last regulation. Up to 380 points are could be awarded.

5.7. Water Use Management

Floodplain and stormwater management focus on activities that prevent human development from increasing the danger and damage caused by too much water. Water use management includes similar activities to prevent human development from aggravating problems that occur when there is too little water, i.e., during a drought.

There are three kinds of water use management approaches: ensure that new development has a minimal impact on water supplies, regulate water use, and manage the water supplies themselves. New development measures include requiring water saving plumbing fixtures in new buildings, encouraging landscaping and trees that do not need a lot of water, and providing incentives for developments like golf courses to use recycled water. Land use plans and zoning ordinances can limit the amount of impervious surfaces in aquifer recharge areas, such as floodplains.

The use of water can be regulated by each local government. In times of drought, many communities enforce sprinkler bans or limit lawn watering to alternate days. Setting water rates so that large users are charged proportionally more can also encourage conservation.

Water supplies include lakes, reservoirs, ground water aquifers, and larger rivers. State or local regulations can restrict how much water is taken from these supplies to ensure that there is enough for all users. This is especially important for groundwater supplies that take a long time to recharge.

The use of Lake Michigan as a water supply is strictly regulated by the Illinois Department of Natural Resources pursuant to a US Supreme Court order designed to limit diverting too much water from the Great Lakes. Western states, where water is in shorter supply, have extensive regulations governing how much water can be removed from the ground and rivers. Some states require a minimum lot size before a well permit is issued.

 **Local implementation:** Other than the standard building code requirements and sprinkler bans, there are no special municipal or County water use regulations. While laws regulating groundwater withdrawals and maintaining minimum river flows have been recommended for Illinois, they have not been enacted.

One reason for the lack of water use management measures in the area is that there is no perception of an immediate threat or clear understanding of the possible measures that could be applied. On the other hand, being on Chicago's urban fringe, there is a growing concern that Kankakee River water supply may be diverted to supply areas such as Joliet, Third Airport, and urban centers outside the Kankakee River watershed resulting in a shortage for area homes and farms and adverse impact on river habitat and recreation. More information on the long range threat and alternative solutions is needed.

5.8. Conclusions

1. The communities with the greatest amount of growth potential would benefit the most from these preventive activities, i.e., Kankakee, Bradley, Bourbonnais, Aroma Park, Manteno, and the County (for unincorporated areas).

2. Only a few of the land use plans and zoning ordinances address floodplains and the need to preserve hazardous areas from intensive development.

3. Most communities have appropriate hazard protection provisions in their subdivision regulations.

4. Building codes are the prime preventive measure for earthquakes, tornadoes, high winds, and snow storms. The majority of the communities within the County have building codes that will provide some protection of future buildings from these hazards.

5. The County, many communities, and Kankakee Community College have older building codes and have not adopted the International Code series, which provides better protection from natural hazards.

6. Based on the national Building Code Effectiveness Grading Schedule (BCEGS), administration of building codes by the County and several municipalities could be improved.

7. State administration of installation of manufactured homes does not guarantee that they will be adequately tied down or protected from flooding and other hazards.

8. Protecting future development from flood damage is dependent on an accurate and useful map of flood hazard areas. Even with Map Modernization, the Flood Insurance Rate Maps in Kankakee County have the following shortcomings:

   - They do not include the western third of the County,
   - They do not include smaller drainage areas in the urban fringe, and
   - They understate the flood hazard because ice jams are ignored.

9. Most communities are doing a good job of administering their floodplain management obligations but having Certified Floodplain Managers on staff would improve their programs.

10. A good stormwater management program will help prevent increased flooding and drainage problems caused by new development and will improve water quality. The new model stormwater management ordinance will greatly help.

11. More information on water use management measures and their applicability to Kankakee County is needed.

5.9. Recommendations

1. Municipal comprehensive plans, land use plans and zoning ordinances should incorporate open space provisions that will protect properties from flooding and preserve wetlands.

2. As they are being reviewed and revised, subdivision regulations should include language that requires new developments to have buried utility lines and storm shelters in new manufactured housing communities.

3. All communities should adopt the latest International series of building codes, the new national standard that is being adopted throughout the country. If they don't, they will lose their current classification under the Building Code Effectiveness Grading Schedule (BCEGS).

4. All communities should work to improve their BCEGS rating. Class 7, 8, and 9 communities should reach at least a Class of 6 or better in time for their next cycle visit by the Insurance Services Office. This is the level recognized by FEMA's Community Rating System as a minimum requirement for better CRS classes. Class 6 or better communities should strive to improve by one class.

5. The public, developers, builders, and decision makers should be informed about the hazard mitigation benefits of these preventive measures and the procedures that should be followed to ensure that new developments do not create new problems.

6. Local code administration offices should make sure that manufactured homes are being properly installed to protect them from wind damage and that all provisions of their floodplain management regulations are being enforced.

7. All shortcomings of the current Flood Insurance Rate Maps should be corrected.

8. The eight mapped communities in the National Flood Insurance Program should investigate the costs and advantages of having Certified Floodplain Managers administer their programs.

9. All communities, but especially the ones subject to the most growth, should adopt the new Kankakee County model stormwater management ordinance.

10. A study should be conducted of the potential and realistic threat to area water supplies and appropriate measures that would prevent a drought from becoming a disaster.

5.10. References

1. *CRS Coordinator's Manual*, FEMA, 2002.

2. *Guidelines for Installing Manufactured Homes in Illinois*, Illinois Department of Public Health, 2000.

3. *Midwest Tornadoes of 1999, Observations, Recommendations and Technical Guidance,* FEMA, Building Performance Assessment Report, Preliminary Report, July 13, 1999

4. *Multi-Hazard Identification and Risk Assessment*, Federal Emergency Management Agency, 1997.

5. Survey of municipalities' comprehensive plans, zoning ordinances, subdivision regulations, BCEGS reports, and floodplain management ordinances, Spring, 2005.

6. *Regulation of Factory Built Structures in Illinois,* Illinois Department of Public Health, 2000.

7. *Subdivision Design in Flood Hazard Areas*, American Planning Association and FEMA, PAS Report 473, 1997.

8. *Windstorm Mitigation Manual for Light Frame Construction*, Illinois Emergency Management Agency, 1997

9. *Best Management Practice Guidebook for Urban Development*, Northeastern Illinois Planning Commission, 1992

10. *Living With Wetlands, A Handbook for Homeowners in Northeastern Illinois*, The Wetlands Initiative, 1998

11. *Stormwater Management – The Benefits of Alternative Approaches*, South Suburban Mayors and Managers Association, 2000.

12. *Model Stormwater Ordinance for Kankakee County, Illinois*, Stormwater Technical Advisory Committee (STAC) and Kankakee County Planning Department, 2005

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