
CHAPTER 7

REGULATORY CONCEPTS

Acronyms used in Chapter 7:

BMP	Best Management Practice
CCSMP	Cook County Stormwater Management Plan
CMAP	Chicago Metropolitan Agency for Planning
DWP	Detailed Watershed Plan
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
IEPA	Illinois Environmental Protection Agency
IDNR-OWR	Illinois Department of Natural Resources - Office of Water Resources
IDNR-SWS	Illinois Department of Natural Resources - State Water Survey
NFIP	National Flood Insurance Program
NRCS	Natural Resource Conservation Service
NWI	National Wetlands Inventory
TGM	Technical Guidance Manual
USACE	United States Army Corps of Engineers
WMO	Watershed Management Ordinance
WPC	Watershed Planning Council

CHAPTER 7

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7.1 Introduction

The Cook County Stormwater Management Plan (CCSMP) proposes preparation of a Watershed Management Ordinance (WMO) to apply to all of Cook County, including unincorporated areas. The regulatory program supporting the countywide stormwater management program and the WMO will utilize the existing stormwater management framework in Cook County and draw on the expertise of federal, state and local agencies. The program will establish a countywide uniform baseline from which all activities impacting stormwater will be regulated.

The development of the WMO follows the adoption of the CCSMP. This chapter introduces the regulatory concepts to be considered during the preparation of the WMO. Concepts are presented along with short descriptions. This chapter does not propose how the concepts will be incorporated into the WMO, as these decisions will be made during the WMO preparation process. The chapter also describes common Best Management Practices (BMPs) and site design alternatives which can serve to protect and enhance the water resources of Cook County.

The language of this chapter is intentionally non-committal as the District will solicit advice and input from the Watershed Planning Councils (WPCs), various agencies and other stakeholders prior to reaching a decision as to what will be regulated and to what extent. Once a draft version of the WMO is completed, the District will provide a reasonable period of time for public review of the document. During preparation of the WMO, the District will review the stormwater management ordinances of neighboring counties and solicit input from these entities in order to learn from their experience in administering a countywide regulatory program. In addition, the District will also review model stormwater management ordinances developed by the Chicago Metropolitan Agency for Planning (CMAP).

7.2 Comprehensive Purpose Statement

While almost fully urbanized, Cook County also contains areas of undeveloped open space and farmland. A comprehensive regulatory program is necessary to address the stormwater issues of such a diverse county. Regulations must address a wide spectrum of stormwater issues ranging from redevelopment within older and well-established communities to new development in undeveloped areas.

The regulatory approach directly addresses 9 of the District's 19 stormwater management program goals. The WMO will include a comprehensive purpose statement addressing the goals listed below.

Goal A) Protect existing and new development by minimizing the increase of stormwater runoff volume beyond that experienced under predevelopment conditions and by reducing peak stormwater flows.

Goal D) Promote responsible land use practices in all areas of the watersheds of Cook County, particularly within floodplains and floodways.

Goal E) Establish uniform, minimum, countywide stormwater management regulations while recognizing and coordinating with those stormwater programs effectively operating within Cook County.

Goal J) Protect existing water resources, including lakes, streams, floodplains, wetlands, and groundwater, from detrimental and unnecessary modification so that their beneficial functions are maintained and public expenditures and damages are minimized.

Goal M) Reduce or mitigate the environmentally detrimental effects of existing and future runoff in order to improve and maintain water quality and protect water related environments.

Goal N) Control sediment and erosion in and from any source, such as drainageways, developments, construction sites, and agricultural areas.

Goal O) Consider water quality and habitat protection measures in all stormwater management activities within Cook County.

Goal P) Preserve and enhance existing aquatic and riparian environments and encourage restoration of degraded areas.

Goal Q) Encourage the public to consider stormwater as a resource rather than as a nuisance.

7.3 Floodplain Management

The floodplain management aspects of the regulatory program will be guided by the following five stormwater management program goals:

Goal D) Promote responsible land use practices in all areas of the watersheds of Cook County, particularly within floodplains and floodways.

Goal E) Establish uniform, minimum, countywide stormwater management regulations while recognizing and coordinating with those stormwater programs effectively operating within Cook County.

Goal J) Protect existing water resources, including lakes, streams, floodplains, wetlands, and groundwater, from detrimental and unnecessary modification so that their beneficial functions are maintained and public expenditures and damages are minimized.

Goal O) Consider water quality and habitat protection measures in all stormwater management activities within Cook County.

Goal P) Preserve and enhance existing aquatic and riparian environments and encourage restoration of degraded areas.

Communities that participate in the National Flood Insurance Program (NFIP) must adopt the Federal Emergency Management Agency (FEMA) minimum floodplain protection and building standards that have been incorporated into the model floodplain ordinance developed by the Illinois Department of Natural Resources – Office of Water Resources (IDNR-OWR). This model ordinance includes the additional standards for floodplain management established by IDNR-OWR. Public Act 93-1049 mandates that the rules and regulations of the countywide stormwater management program for floodplain management shall meet the standards for floodplain management established by FEMA and IDNR-OWR. The state and federal requirements, at a minimum, will be incorporated into the WMO. The District recognizes that many Cook County communities have floodplain management requirements more restrictive than IDNR-OWR and FEMA requirements. The WMO will not require such communities to adopt less restrictive floodplain management standards.

The following regulatory concepts related to floodplain management will be considered during the preparation of the WMO. Standards required to maintain eligibility in the NFIP or to meet the regulations of IDNR-OWR are indicated with an asterisk (*) throughout this chapter.

7.3.1 Floodplain Requirement Applicability

The WMO will address drainageways and depressional storage areas through all parts of Cook County including portions of watersheds with drainage areas less than one square mile. This focus fills a void in the current regulatory framework. IDNR-OWR does not regulate streams with drainage areas less than one square mile, *unless a floodway has been defined*, leaving the possibility that development in these areas could lead to significant flood damages, loss of floodplain storage, and increases in flood flows downstream.

7.3.2 Floodplain Requirements and Floodplain Mapping

The floodplain requirements in the WMO will be most effective if based on the most up-to-date mapping and modernized databases. Some of the current FEMA regulatory floodplain maps for Cook County are outdated due to land use and other topographic changes or are inadequate since they do not include water surface elevations. FEMA has initiated a Flood Insurance Rate Map (FIRM) modernization program, and is currently compiling available, updated, existing hydrologic and hydraulic modeling data for selected waterways in Cook County. This data will be incorporated into a countywide modernization of floodplain maps. The WMO will require use of the most recent revisions of regulatory floodplain maps.

7.3.3 Restrict Floodway Development to Appropriate Uses *

IDNR-OWR defines appropriate uses for the floodway in Title 17 Ill. Adm. Code, Ch. I, Sec. 3708.70. Development must be restricted to those appropriate uses to meet minimum state standards. Appropriate uses applicable to the WMO are quoted directly from the regulation:

1. Flood control structures, dikes, dams and other public works or private improvements relating to the control of drainage, flooding or erosion (Section 18g of the Act) or water quality or habitat for fish and wildlife (e.g. Section 3708.80(a)(3) and(4));
2. Structures or facilities relating to the use of, or requiring access to, the water or shoreline, such as pumping and treatment facilities, and facilities and improvements related to recreational boating, commercial shipping and other functionally dependent uses (Section 18g of the Act);
3. Storm and sanitary sewer outfalls;
4. Underground and overhead utilities;
5. Recreational facilities such as playing fields and trail systems including any related fencing built parallel to the direction of flood flows;
6. Detached garages, storage sheds, or other non-habitable accessory structures to existing buildings that will not block flood flows. This does not include the construction or placement of any other new structures, (Section 18g of the Act) fill, building additions, buildings on stilts, fencing (including landscaping or plantings designed to act as a fence) and the storage of materials;
7. Bridges, culverts, roadways, sidewalks, railways, runways and taxiways and any modification thereto;
8. Parking lots built at or below existing grade where either:
 - A) the depth of flooding at the 100-year frequency flood event will not exceed 1.0 foot; or
 - B) the parking lot is for short-term outdoor recreational use facilities where the applicant agrees to restrict access during overbank flooding events and agrees to accept liability for all damage caused by vehicular access during all overbank flooding events;
9. Aircraft parking aprons built at or below ground elevation where the depth of flooding at the 100-year frequency flood event will not exceed 1.0 foot;
10. Regulatory floodway regrading, without fill, to create a positive slope toward a watercourse;
11. Flood proofing activities to protect existing structures such as, but not limited to, constructing water tight window wells, and elevating;
12. The replacement, reconstruction or repair of a damaged building, provided that the outside dimensions of the building are not increased, and provided that, if the building is damaged to 50% or more of the building's market value before it was damaged, the building will be protected from flooding to or above the 100-year frequency flood elevation; and
13. Modifications to an existing building that would not increase the enclosed floor area of the building below the 100-year frequency flood elevation, and which will not block flood flows including but not limited to, fireplaces, bay windows, decks, patios and second story additions.

7.3.4 Mitigate Floodway Construction Activities *

Any activity in the floodway can have a negative impact. Floodway modifications such as those to channel geometry may unintentionally lead to increased conveyance capacity and accelerate downstream flood flows. Channel modifications can create erosion problems as the stream attempts to re-establish its natural course or features including its equilibrium, stream length, slope, and sinuosity. Impoundments placed directly on the stream act as sediment and nutrient traps and can lead to degraded aesthetic conditions such as low water clarity (due to high turbidity) and extensive algae

blooms. Impoundments can impede the natural movement of fish, and periodic dredging may be needed to maintain desired water depths.

Avoidance and mitigation standards for activities in the floodway will be developed to address the potential negative impact from such activities. If permitted properly, construction activities should not create adverse impacts to the flow characteristics of the floodway.

7.3.5 Compensation for Lost Storage in the Flood Fringe

To prevent the loss of watershed storage, which can result in increases in flood flows and stages, hydraulically equivalent, incremental compensatory storage may be required for all fill activities in the flood fringe.

7.3.6 Compensation for Lost Storage in Depressional Storage Areas

The loss of watershed storage can result in increases in flood flows and stages. To prevent those increases, compensatory storage may be required for all fill activities in depressional storage areas.

7.3.7 Require Flood Protection Elevation *

To provide a factor of safety and minimize flood damages to those properties within the floodplain, a flood protection elevation above the base flood elevation will be required for the lowest floor of all structures built after the effective date of the WMO. IDNR-OWR recommends a flood protection elevation of at least one foot above the base flood elevation (called one foot of freeboard). The Chicago Metropolitan Agency for Planning (CMAP) recommends two feet of freeboard and recommends the flood protection elevation for the lowest floor of structures inside and adjacent to the floodplain.

7.3.8 Require that a Map Change be Obtained for Floodplain Modifications *

As land in the floodplain is developed, permitted site grading or flow control may reduce the size or change the shape of the floodplain. Permitted changes in the floodplain will be required to be submitted to FEMA to obtain an official letter of map change. Requiring that an official map change be obtained will provide property owners with proper flood insurance coverage. Flood insurance must be purchased for insurable structures within floodplains if the owners apply for loans and mortgages from federally insured or regulated lenders. A structure that is no longer in a floodplain is not required to purchase flood insurance, but flood insurance is made available at a substantially reduced premium. When filed with FEMA, map changes provide official records for floodplain modifications.

7.4 Stormwater Drainage and Detention

The stormwater drainage and detention aspects of the regulatory program will be guided by the following four stormwater management program goals:

Goal A) Protect existing and new development by minimizing the increase of stormwater runoff volume beyond that experienced under predevelopment conditions and by reducing peak stormwater flows.

Goal E) Establish uniform, minimum, countywide stormwater management regulations while recognizing and coordinating with those stormwater programs effectively operating within Cook County.

Goal M) Reduce or mitigate the environmentally detrimental effects of existing and future runoff in order to improve and maintain water quality and protect water related environments.

Goal O) Consider water quality and habitat protection measures in all stormwater management activities within Cook County.

Goal Q) Encourage the public to consider stormwater as a resource rather than as a nuisance.

The following regulatory concepts related to stormwater drainage and detention will be considered during the preparation of the WMO.

7.4.1 Stormwater Drainage and Detention Requirement Applicability

The stormwater drainage and detention standards of the WMO will apply to all development, regardless of size. As a practical matter, the requirement that a permit be obtained and detention be provided may be limited only to developments exceeding a specified size. The size categories will be based on practicality and, if utilized, will be set during the development of the WMO.

7.4.2 Consider Control of the 100-year Release Rate

Control of the 100-year release rate, by either establishing a uniform release rate or using some other means, will be considered during the preparation of the WMO. As a watershed develops and redevelops, the 100-year discharge rate from development sites should be sufficiently low to prevent increases in instream flood flow rates and the enlargement of 100-year floodplains. As Detailed Watershed Plans (DWPs) are prepared, the onsite release rate for preventing unacceptable increases in instream flow rates may be computed.

7.4.3 Consider Control of Low Flow Release Rate

A low flow release rate will be considered in the WMO to prevent increases in streambank erosion, largely the result of increases in the magnitude of low flow and the frequency of runoff events. A low flow release rate helps to prevent damages in areas prone to flooding by events smaller than the 100-year event.

7.4.4 Detention Design Using Appropriate Hydrologic Methods

The WMO will require detention basin design to use appropriate hydrologic methods. Rainfall data most recently adopted by IDNR-OWR for use in hydrologic modeling, which currently is from the Illinois Department of Natural Resources – State Water Survey (IDNR-SWS) Bulletin 70 and 71 publications, will be required.

7.4.5 Consider Steps to Minimize Increases in Runoff Volumes

Increases in runoff volumes can be minimized through use of a runoff volume reduction hierarchy which specifies the minimization of impervious surfaces and the maximization of infiltration opportunities and natural drainage. Detention is not part of the hierarchy. Even though detention prevents increases in runoff rates, it does not prevent increases

in runoff volumes. The effectiveness of detention has been shown to decrease with increasing watershed size. In large watersheds, the only means for keeping instream flow rates to a minimum is to restrict increases in runoff volumes.

Minimizing increased runoff volume enhances pollutant filtering and decreases the chances for hydrologic impacts to downstream streams, lakes, and wetlands. Infiltration practices, which minimize the potential for the contamination of groundwater resources, will be considered.

7.4.6 Consider Detention Designs which Maximize Water Quality Benefits

The WMO may express a preference for wet bottom basins. Wet bottom detention basins have been shown to be more effective than dry bottom basins in removing pollutants from stormwater. Wet basins landscaped with native wetland and prairie vegetation are particularly effective at removing pollutants and preventing shoreline erosion on the sides of basins.

7.4.7 Preservation of Onsite Depressional Storage

The WMO will consider measures to preserve existing onsite depressional and wetland storage volumes. This concern is reinforced in the goals for floodplain management as noted in Section 7.3. Flood volumes and rates can be significantly increased if watershed depressional storage is lost, even if there is no change in land cover.

7.4.8 Detention in the Flood Fringe

It is difficult to design detention facilities in flood fringe areas so that they will function properly under all flood stage conditions. The WMO will consider whether to allow this practice and will clarify analysis required in application submittals.

7.4.9 Detention in the Floodway

The design of detention facilities placed in the floodway is complex. Detention basins in the floodway could block flood flows and reduce the conveyance capacity of the floodway. Similar to design of facilities in the flood fringe, it is difficult to design such floodway detention facilities so that they will function properly under a range of flood stage conditions. The WMO will consider whether to allow this practice and will clarify the type of analysis required in permit applications.

7.4.10 Onstream Detention

Even more complex, proposed detention which is both in the floodway and onstream is difficult to design so that it functions properly under all flood stage conditions. Onstream detention facilities often have high maintenance costs and require a high level of operational expertise. During preparation of the WMO, a determination of whether to allow onstream detention will be made. The factors to be considered while making this determination include regional flood control benefits, public interest, and the implementation of BMPs in upstream portions of the watershed.

7.4.11 Direct Discharge of Stormwater Runoff to Wetlands

Untreated and uncontrolled stormwater runoff that directly discharges to natural and mitigation wetlands can damage wetlands' environmental functions. Excessive pollutant loads and significant increases in the magnitude and frequency of water-level fluctuations within wetlands can severely stress wetland plants and wildlife communities. While wetlands are able to provide significant pollutant filtering benefits, excessive

pollutant loads can exceed wetlands' assimilation capacity. During the preparation of the WMO, requirements for pre-treatment of stormwater runoff will be considered.

7.4.12 Formal Maintenance Agreements for New Stormwater Facilities

For stormwater infrastructure to function properly, it must be maintained in its design condition. Maintenance agreements should identify responsible parties, maintenance requirements and schedules, and funding arrangements for perpetual maintenance. During the preparation of the WMO, the need for formal maintenance agreements will be considered.

7.4.13 Address Subsurface Tile Systems

Subsurface tile systems were generally designed to drain groundwater under free flow conditions. They were not constructed with maintenance access in mind. Many of the tile systems were installed decades ago and were constructed of lower strength materials than those manufactured today. Surcharging of subsurface drain tiles from increases in surface stormwater runoff can easily rupture these tiles resulting in difficult maintenance and repair. Tiles can easily be disrupted during any construction process and damage can create significant drainage problems both on- and off-site, including basement flooding and septic system failure. Since information on the location of subsurface tiles is very limited, the WMO may require a condition survey for tile systems on developing and adjoining properties.

7.5 Wetland Protection

The wetland protection aspects of the regulatory program will be guided by the following stormwater management program goals:

Goal E) Establish uniform, minimum, countywide stormwater management regulations while recognizing and coordinating with those stormwater programs effectively operating within Cook County.

Goal J) Protect existing water resources, including lakes, streams, floodplains, wetlands, and groundwater, from detrimental and unnecessary modification so that their beneficial functions are maintained and public expenditures and damages are minimized.

Goal M) Reduce or mitigate the environmentally detrimental effects of existing and future runoff in order to improve and maintain water quality and protect water related environments.

Goal N) Control sediment and erosion in and from any source, such as drainageways, developments, construction sites, and agricultural areas.

Goal O) Consider water quality and habitat protection measures in all stormwater management activities within Cook County.

Goal P) Preserve and enhance existing aquatic and riparian environments and encourage restoration of degraded areas.

A useful resource for overview of existing wetlands in Cook County can be found on the National Wetlands Inventory (NWI), prepared by the U.S. Department of the Interior in 2001. The NWI serves only as a large-scale guide and actual wetland locations often vary from the mapped locations.

The following concepts related to wetland protection will be considered during preparation of the WMO:

7.5.1 Protection of All Wetlands from Damaging Modifications

Under its current policy, the United States Army Corps of Engineers (USACE) regulates only those wetlands that are ultimately tributaries to waters of the United States. The USACE protects jurisdictional wetlands and waters of the United States against direct discharge of dredged or fill material. The USACE does not regulate wetlands that are not connected to the hydrology of the surface stream system, commonly known as isolated wetlands.

To cover that gap in protection, the WMO may be written to require protection of all wetlands including isolated wetlands. Impacts to wetlands occur directly, such as through the placement of fill, and indirectly, such as through diversion of tributary runoff. The WMO preparation process will consider protection for wetlands and their associated buffers. In cases where a USACE permit is required, the District will defer to that agency for review of a proposed impact. The District may review wetland impacts not subject to USACE review.

7.5.2 Modification of High Quality Aquatic Resources

Some high quality aquatic resources are essentially impossible to mitigate, if impacted. Therefore modification of such resources may be discouraged under most circumstances. During preparation of the WMO, consideration will be given to the protection of high quality aquatic resources.

7.5.3 Modification of Wetlands for Stormwater Management Purposes

The dual use of an existing wetland as a detention basin and natural habitat can significantly degrade the wetland's functions and values. Modification can present problems unless the wetland is significantly degraded or the change in hydrology anticipated will have a negligible effect on the area. To avoid degradation, runoff that is directed to a wetland for detention should be significantly pre-treated before discharging into the wetland. Such care helps maintain or improve the existing wetland functions. Limits on modification of wetlands for stormwater management purposes will be considered as the WMO is prepared.

7.5.4 Buffers along Lakes and Wetlands

The establishment of buffers of appropriate width along the perimeters of all lakes and wetlands serves to protect natural functions and values. Appropriate buffer widths for individual areas vary based on size and quality.

In most cases, established buffers contain native vegetation. A requirement for native vegetation will be considered in the WMO. Exceptions to the native vegetation requirement could be allowed to facilitate maintenance or water dependent activities such as recreational access (beaches, boat launches, etc.). In some situations, establishing a buffer could be an unfair burden on the applicant, such as requiring a

homeowner to convert mowed lawn to native landscaping. Requirements for buffers will be considered as a part of the WMO. Exemptions to the buffer requirement may be considered for certain activities, such as road crossings.

7.5.5 Minimum Buffer Width and Encroachments

Encroachments upon the buffer zone may be considered for specified purposes. For example, if a lake or wetland has an established buffer width of 50 feet, the following development types may be considered as acceptable encroachments:

- Minor improvements such as pedestrian or bicycle trails and educational signs
- Maintenance access for utilities
- Parks and recreational areas
- Private and public lawns
- Stormwater management facilities

Nonetheless, encroachments may be discouraged within the buffer. A reduced buffer width may be allowed under certain specified circumstances. Exemptions to the minimum buffer width requirement may be considered for certain activities, such as road crossings.

7.5.6 Consider Allowance for Buffer Averaging along Lakes and Wetlands

The complexities of some sites may make minimum buffer widths difficult to achieve. During the preparation of the WMO, consideration will be made to permit buffer averaging, which allows reductions in buffer width or area provided compensations are made up on an equal basis somewhere else along the lake or wetland.

7.5.7 Mitigation for Wetland Modifications

Considerations for wetland mitigation, maintenance and monitoring will be evaluated during the preparation of the WMO. Mitigation can alleviate the losses and impacts resulting from wetland modification. A hierarchy can be established which defines what types of mitigation will be allowed given the particulars of the application.

Maintenance and monitoring are important to the success of constructed mitigation areas. The appropriate monitoring period varies based on the type and size of mitigation proposed and the type of habitat being impacted. The maintenance, management and monitoring periods generally range from three to ten years, with five years being common. Mitigation is often provided through the purchase of wetland mitigation bank credits. Generally a hierarchy is established within regulatory programs related to the purchase of mitigation bank credits. During the preparation of the WMO, consideration will be given related to the allowance of the use of bank credit as mitigation.

7.6 Stream Habitat and Riparian Environment Protection

The stream habitat and riparian environment protection aspects of the regulatory program will be guided by the following stormwater management program goals:

- Goal E) Establish uniform, minimum, countywide stormwater management regulations while recognizing and coordinating with those stormwater programs effectively operating within Cook County.

Goal J) Protect existing water resources, including lakes, streams, floodplains, wetlands, and groundwater, from detrimental and unnecessary modification so that their beneficial functions are maintained and public expenditures and damages are minimized.

Goal M) Reduce or mitigate the environmentally detrimental effects of existing and future runoff in order to improve and maintain water quality and protect water related environments.

Goal P) Preserve and enhance existing aquatic and riparian environments and encourage restoration of degraded areas.

The following concepts related to stream habitat and riparian environment protection will be considered during preparation of the WMO.

7.6.1 Watercourse Relocation or Modification

Relocations or modifications of watercourses can negatively impact stream habitats and riparian environments. Limitations on watercourse relocation or modification will be considered in the WMO. The WMO may contain an exception list to define situations allowing modifications to watercourses. Exemptions may be allowed for projects such as stream restoration or re-meandering projects, regional stormwater management projects, and streambank stabilization projects intended to create or restore environmental benefits.

7.6.2 Mitigation for Unavoidable Stream Modifications

Mitigation requirements will be considered for stream modification projects which achieve a higher public purpose such as a regional flood control project. The environmental mitigation criteria outlined in the preceding floodplain and wetland regulation sections of Chapter 7 will be considered for application to mitigation for stream modification during development of the WMO.

7.6.3 Armoring of Channels and Banks

Bioengineering techniques for stabilizing water body shorelines provide more natural solutions than hard armoring. Hard armoring, which protects the channel or bank with concrete, rip-rap or other non-natural materials, is sometimes necessary when a bioengineered solution will not provide the necessary level of protection or cannot withstand the flow velocities of the project area. During the preparation of the WMO, consideration will be made to allow only the minimum necessary amount of hard armoring. The WMO will consider the use of bioengineering techniques where appropriate. A combination of treatments will likely be suggested to maximize durability.

7.6.4 Culvert Crossings of Streams

Enclosed stream crossings detract from the natural character and values of stream corridors. During the preparation of the WMO, restrictions will be considered regarding the number and extent of culvert crossings to be allowed. Consideration will be made for requiring analyses on the potential for culverts to increase downstream damages, such as scouring. Mitigation requirements will be considered for impacts caused by the installation of unavoidable culverts.

7.6.5 Onstream Impoundments

Impoundments placed directly on streams are detrimental to natural stream functions such as fish passage. The WMO will consider a requirement for analysis of overriding public interest relating to onstream impoundments. The environmental mitigation criteria outlined in the floodplain and wetland regulation sections of the WMO will be considered for application to onstream impoundments.

7.6.6 Buffers along Streams

Similar to buffers along wetlands (Section 7.5.4), buffers of appropriate width along streams protect natural functions and help maintain water quality. Appropriate buffer widths vary along the limit of all streams, based on tributary area and stream quality. Established buffers often contain native vegetation. The appropriate use of native vegetation will be considered during the preparation of the WMO. Exceptions to requirements for native vegetation may be similar to those considered for buffers along lakes and wetlands. The exceptions may apply to activities such as providing access for maintenance and stream-related recreation. The exceptions may be needed to avoid placing unfair burdens on applicants. Certain exemptions, such as road crossings, will be considered if buffers are established by the WMO.

7.6.7 Minimum Buffer Width and Encroachments

Encroachments upon the buffer zone may be considered for specified purposes. For example, if a stream has an established buffer width of 50 feet, the following development types may be considered as acceptable encroachments:

- Minor improvements such as pedestrian or bicycle trails and educational signs
- Maintenance access for utilities
- Parks and recreational areas
- Private and public lawns
- Stormwater management facilities

Nonetheless, encroachments may be discouraged within the buffer. A reduced buffer width may be allowed under certain specified circumstances. Exemptions to the minimum buffer width requirement may be considered for certain activities, such as road crossings.

7.6.8 Consider Allowance for Buffer Averaging along Streams and Riparian Areas

The complexities of some sites may make minimum buffer widths difficult to achieve. For example, space may be limited in a highly developed community when removing culverts to daylight the stream. During the preparation of the WMO, consideration will be made to permit buffer averaging, which allows reductions in buffer width or area provided compensations are made on an equal basis somewhere else along the stream.

7.7 Soil Erosion and Sediment Control

The soil erosion and sediment control aspects of the regulatory program will be guided by the following stormwater management program goals:

Goal E) Establish uniform, minimum, countywide stormwater management regulations while recognizing and coordinating with those stormwater programs effectively operating within Cook County.

Goal J) Protect existing water resources, including lakes, streams, floodplains, wetlands, and groundwater, from detrimental and unnecessary modification so that their beneficial functions are maintained and public expenditures and damages are minimized.

Goal M) Reduce or mitigate the environmentally detrimental effects of existing and future runoff in order to improve and maintain water quality and protect water related environments.

Goal N) Control sediment and erosion in and from any source, such as drainageways, developments, construction sites, and agricultural areas.

Goal O) Consider water quality and habitat protection measures in all stormwater management activities within Cook County.

The following concepts related to soil erosion and sediment control will be considered during preparation of the WMO. These approaches are intended to prevent loss of stormwater capacity in culverts, sewers, channels, and floodplains due to sediment accumulation. The goals of protecting water quality as well as aquatic and riparian habitat are addressed by these approaches through preventing excessive sediment loads.

7.7.1 Soil Erosion and Sediment Control Measure Applicability

Soil erosion and sediment control measures will be considered for land disturbances of all sizes. As a practical matter and for ease of regulation, permits may only be required for activities disturbing soil in a large area of land surface unless adjacent to a water body or wetland. Development adjacent to a wetland may have a lower size threshold.

7.7.2 Comprehensive Principles to Minimize Sediment Transport from the Site

Sediment is one of the most common and most easily recognized of the nonpoint source pollutants. The set of principles considered during the preparation of the WMO will include provisions to minimize sediment transport from sites of soil disturbance. Consideration will be given to minimize the time and area of disturbance, to follow the natural contours of the site and to avoid sensitive areas.

7.7.3 Soil Erosion and Sediment Control Measures Consistent with Established Guidance

Practices related to soil erosion and sediment control are well established in northeastern Illinois due to the widespread use and acceptance of an established set of principles. The accepted practice generally references the latest versions of the Illinois Urban Manual - A Technical Manual Designed for Urban Ecosystem Protection and Enhancement prepared by the Natural Resources Conservation Service (NRCS) for the Illinois Environmental Protection Agency (IEPA). The principles are embodied in the latest amendment of Illinois Procedures and Standards for Urban Soil Erosion and Sedimentation Control (Northeastern Illinois Soil Erosion and Sedimentation Control Steering Committee, 1988). During preparation of the WMO, the accepted practices will be considered along with explicit design and operational recommendations for soil stabilization, sediment control measures, and channel conveyance.

7.7.4 Consider Individual Site Soil Erosion and Sediment Control Plans and Stormwater Pollution Prevention Plans

A plan that provides a project layout with specific erosion and sediment control measures is an important tool in successful erosion control and sediment containment. The plan should indicate measures to be taken before construction and should consider the phasing of installation of other measures during construction. The plan should cover the stabilization of exposed surfaces upon construction completion. The WMO will consider a requirement for a separate soil erosion and sediment control plan for every development.

7.7.5 Installation of Sediment Control Measures Prior to Land Disturbance

Effective sediment control measures, such as sedimentation basins and silt fences, must be installed before significant land disturbance occurs. These preventative measures make sure that sediment generated during site clearing and construction is captured and held on the site. During the preparation of the WMO, a requirement will be considered for the installation of sediment control measures before the land is disturbed.

7.7.6 Early Implementation of Soil Erosion Control Measures

To be effective, soil erosion control measures such as temporary seeding, mulching, and placement of blankets must be in place soon after the end of active disturbance of the land. This includes the stabilization of soil stockpiles. Requirements for early implementation of soil erosion control measures will be considered during the preparation of the WMO.

7.7.7 Routine Inspection and Maintenance of all Soil Erosion and Sediment Control Measures

It is not uncommon for erosion blankets, silt fences, and sediment traps to require maintenance or replacement several times during the construction process. For these and other soil erosion and sediment control measures to be effective, they must be regularly inspected and maintained. Routine inspection and maintenance requirements will be considered during the preparation of the WMO.

7.7.8 Enforcement Tools

Enforcement measures are useful tools so that soil erosion and sediment control measures are implemented and appropriately maintained. Effective enforcement tools include stop-work orders and fines that specify each day and each incident as a separate violation. Procedures for enforcing soil erosion and sediment control regulations will be considered as a part of the WMO.

7.8 Water Quality

The Water Quality aspects of the regulatory program will be guided by the following stormwater management program goals:

Goal E) Establish uniform, minimum, countywide stormwater management regulations while recognizing and coordinating with those stormwater programs effectively operating within Cook County.

Goal J) Protect existing water resources, including lakes, streams, floodplains, wetlands, and groundwater, from detrimental and unnecessary modification so that their beneficial functions are maintained and public expenditures and damages are minimized.

Goal M) Reduce or mitigate the environmentally detrimental effects of existing and future runoff in order to improve and maintain water quality and protect water related environments.

Goal N) Control sediment and erosion in and from any source, such as drainageways, developments, construction sites, and agricultural areas.

Goal O) Consider water quality and habitat protection measures in all stormwater management activities within Cook County.

Goal Q) Encourage the public to consider stormwater as a resource rather than as a nuisance.

The following concepts relating water quality to stormwater drainage and detention will be considered during preparation of the WMO.

7.8.1 Water Quality Protection Applicability

The water quality protection standards will apply to all development, regardless of size.

7.8.2 Preservation of Natural Hydrologic and Pollutant Filtering Functions of Sites

Natural drainage systems provide hydrologic functions such as absorbing runoff or storing floodwaters. They provide pollutant-filtering functions by allowing pollutants to be collected in vegetated areas adjacent to water bodies before they enter the streams, lakes, or wetlands. Preserving natural drainage areas and reducing the impervious area in developments and redevelopments can reduce stormwater runoff volumes and pollutant loads. The effects of impervious areas can be reduced by designing these areas to drain to vegetated, pervious areas for infiltration and filtration of runoff. Preservation of natural features is often less costly than mitigation. During the preparation of the WMO, the protection of natural hydrologic conditions will be considered.

7.8.3 Incorporate Best Management Practices in Site Design

The proper selection, design, construction and maintenance of BMPs aids pollutant capture and runoff infiltration yielding positive impacts on water quality. The WMO may suggest incorporating BMPs into design aspects of new development and redevelopment. WMO sections may recommend or require using key BMPs including compensatory storage for depressional storage, settling basins, wet detention basins, extended detention, infiltration devices, filter strips, media filters, water quality inlets, catch basins, and vegetated swales. BMPs are covered further in Section 7.9.

7.8.4 Consider a Requirement for a Maintenance Plan for Best Management Practices

BMPs, like constructed stormwater management facilities, benefit from regular and ongoing maintenance. The WMO will consider the requirement of a maintenance plan for site features and practices that need regular maintenance to perform as designed.

7.8.5 Minimize Impervious Surfaces

Impervious surfaces are directly related to increased runoff rates, reduced infiltration, and increased water quality degradation. The WMO will consider steps to reduce the amount of impervious land surface. The WMO may encourage development and redevelopment that minimizes the placement of additional impervious surfaces and reduces the amount of existing impervious surfaces.

7.8.6 Encourage Sustainable, Low Maintenance Water Quality Improvement Operations

The ease with which water quality improvements are maintained leads to more successful maintenance over the life of the improvement. The WMO may encourage the use of BMPs which can be served by less-intensive maintenance.

7.9 Best Management Practice Alternatives

BMPs are techniques used to offset the impacts of development and redevelopment, including those impacts on water quality. The following stormwater management goals reinforce the need and utility for incorporating BMPs into the regulatory framework of the stormwater management program:

Goal A) Protect existing and new development by minimizing the increase of stormwater runoff volume beyond that experienced under predevelopment conditions and by reducing peak stormwater flows.

Goal J) Protect existing water resources, including lakes, streams, floodplains, wetlands, and groundwater, from detrimental and unnecessary modification so that their beneficial functions are maintained and public expenditures and damages are minimized.

Goal M) Reduce or mitigate the environmentally detrimental effects of existing and future runoff in order to improve and maintain water quality and protect water related environments.

Goal N) Control sediment and erosion in and from any source, such as drainageways, developments, construction sites, and agricultural areas.

Goal O) Consider water quality and habitat protection measures in all stormwater management activities within Cook County.

Goal P) Preserve and enhance existing aquatic and riparian environments and encourage restoration of degraded areas.

Goal Q) Encourage the public to consider stormwater as a resource rather than as a nuisance.

The task of quantifying the benefits and performance of BMPs has not risen to a level of standard engineering practice. During the preparation of the WMO, the District will collect data on the performance of BMPs. The decision to require or encourage the use

of BMPs will be made after the District receives input from all stakeholders, including municipalities and various agencies. A description of some common BMPs follows.

7.9.1 Natural Drainage Measures

Drainage swales, vegetated filter strips, and other natural drainage approaches (in contrast to storm sewers, lined channels, curbs and gutters) reduce runoff volumes and remove pollutants from runoff water. Site plans that place roads and parking areas higher in the landscape and locate swales along back lot lines within drainage easements help to accomplish this objective. Impervious surfaces should be designed to drain to pervious surfaces rather than the reverse.

7.9.2 Natural Detention Basin Designs

Natural detention basin designs incorporate features of natural wetland and lake systems, such as gradual shoreline slopes, a border of wetland vegetation, and areas of open water. Conventional designs feature dry bottoms or rip-rap edged wet bottom basins that may achieve the storage requirement but do not take advantage of water quality improvement opportunities that exist in natural basin designs. Natural designs are much more effective in removing stormwater pollutants than conventional wet and dry bottom basins.

7.9.3 Infiltration Practices

Where soils are sufficiently permeable, infiltration trenches and basins reduce surface runoff volumes and naturally recharge groundwater.

7.9.4 Natural Landscaping

Natural landscape approaches assist in reducing stormwater runoff and maintenance. Natural landscaping features native plants, particularly wildflowers, prairie grasses, and wetland species, as more effective alternatives to conventional turf grass and ornamental plants. Native prairie plant species have substantially deeper root systems (up to 10 feet) than conventional turf grasses (2 to 6 inches). Although data is limited on the runoff volume impact of native plant species in urban landscapes, available information suggests that infiltration capacity may be increased by a factor of two or more. Natural landscaping can be particularly beneficial when incorporated into drainageways and other areas that receive runoff from impervious surfaces.

7.9.5 Preservation of Natural Depressional Storage

Depressional storage areas have no surface outlet. They drain or evaporate very slowly following a storm event. Traditional development practices eliminate these depressions by filling or draining, thereby eliminating their benefits of reducing surface runoff and trapping pollutants. The volume and release rate characteristics of depressions should be protected in the design of the development site, as discussed in Section 7.4.7. This can be accomplished by avoiding the depression or by incorporating its storage as additional capacity in detention facilities.

7.9.6 Rain Gardens

A rain garden is a natural or constructed depression in the ground that is used as a landscape tool to improve water quality. The rain garden forms a "bioretention area" by collecting water runoff, storing it, and permitting it to be filtered and slowly absorbed by the soil. In order to achieve water quality benefits, the site for the rain garden should be placed to intercept runoff.

7.9.7 Rain Barrels or Cisterns

Rain barrels are aboveground storage containers utilized to manage rooftop runoff from residential, commercial, and industrial facilities. Cisterns are storage tanks that are typically larger than rain barrels and are also utilized to manage rooftop runoff. Cisterns may be stored above or below ground level. Both rain barrels and cisterns provide a means of collecting and reusing stormwater. The collected stormwater is mainly used for lawn and garden watering or other uses such as a supplemental domestic water supply.

7.9.8 Vegetated Roofs

A vegetated roof is a living ecosystem of lightweight soil and self-sustaining vegetation. Vegetated roofs provide another example of a runoff reduction and water quality protection technique. Vegetated roofs provide protective covers on buildings and have been shown to produce long lasting and low maintenance rooftops in some settings. Some older urban communities are planting vegetated roofs as part of new development, redevelopment, and retrofitting of existing development.

7.9.9 Permeable Paving Materials

The use of permeable paving materials can reduce the imperviousness of sites and thereby result in water quality improvements and promote infiltration. Materials such as paving blocks can be considered as alternatives to asphalt and concrete, especially for low-use surfaces such as driveways, overflow parking lots and emergency access roads.

7.10 Implementation of Design Alternatives

Site design considerations vary widely when addressing stormwater management for new development, redevelopment and retrofitting of existing communities. The following goals address the need for flexibility in site design for existing and new development and in restoration of degraded areas:

Goal A) Protect existing and new development by minimizing the increase of stormwater runoff volume beyond that experienced under predevelopment conditions and by reducing peak stormwater flows.

Goal O) Consider water quality and habitat protection measures in all stormwater management activities within Cook County.

Goal P) Preserve and enhance existing aquatic and riparian environments and encourage restoration of degraded areas.

Application of the site design alternatives and techniques presented in this section may be considered among the many tools available to meet the goals of the stormwater management program. The design techniques described here may be applied to new development and redevelopment. In some circumstances, they may also be retrofitted to existing development. Municipal governments and developers may elect to implement some or all of the following techniques.

7.10.1 Sensitive Site Analysis

A number of important features of a site can be identified before preparing a site plan. These include stream corridors, shorelines, wetlands, woodlands, and steep slopes. The first steps in protecting these sensitive features are to identify and map them. Overlay mapping techniques can be used to identify the areas most suited for development activities and those areas that should be avoided.

7.10.2 Cluster Developments

Development and redevelopment of sites can be accomplished in such a way to cluster buildings, driveways and streets onto one portion of a site thereby leaving a remaining portion of the site as open space. Cluster developments can reduce the amount of impervious area for a given number of lots. Cluster developments often yield a savings in street length and development costs.

7.10.3 Reducing Building Setbacks

Reducing building setbacks minimizes the amount of impervious surfaces for a development by reducing the length of driveways and entry walks. The best areas to incorporate reduced setbacks are along low traffic streets where traffic noise is not an issue.

7.11 Development and Redevelopment

The following goals recognize the need for the stormwater management program to address the variety of new and existing development while preparing uniform regulations where feasible:

Goal A) Protect existing and new development by minimizing the increase of stormwater runoff volume beyond that experienced under predevelopment conditions and by reducing peak stormwater flows.

Goal E) Establish uniform, minimum, countywide stormwater management regulations while recognizing and coordinating with those stormwater programs effectively operating within Cook County.

Goal Q) Encourage the public to consider stormwater as a resource rather than as a nuisance.

Redevelopment and infill development is continuously occurring in developed urban communities within Cook County. Redevelopment activities afford opportunities for incorporating recent trends and site design alternatives in stormwater management. Standards must consider the existing site development conditions. In redeveloping communities, it is often very difficult, and sometimes prohibitively expensive, to meet the standards that are applied to new development. For example, space for new detention basins may require removal of existing facilities. It is nonetheless important that the opportunities for improved stormwater management are captured during the redevelopment process. Informed and creative redevelopment of the intensively developed urban areas in Cook County could form part of the solution to watershed problems while helping to revitalize older communities. Design alternatives described in this chapter may be applicable to redevelopment as it occurs across Cook County.

The WMO will be developed considering the host of new development and redevelopment issues and concerns. Redevelopment will be encouraged to accomplish the goals of the countywide stormwater management program. Accommodation of redevelopment will be accomplished by clearly defining how the regulatory standards will be applied to redevelopment. The regulatory standards and the WMO may provide exemptions for older and previously developed sites.

7.12 Summary

The WMO will provide a comprehensive set of rules and regulations that will be prepared by the District with advice from the WPCs. The WMO will set a minimum level of standards that will apply to all portions of Cook County. The standards will meet the IDNR-OWR requirements for floodplain management and the FEMA requirements for participation in the NFIP. Municipalities may enforce standards that are more restrictive within their corporate boundaries. The specific standards for the WMO will be defined during its preparation process and a supporting detailed Technical Guidance Manual will be prepared to support and explain the procedures for permit applications and reviews under the WMO. Implementation of portions of the WMO may be delegated to interested and capable municipalities.