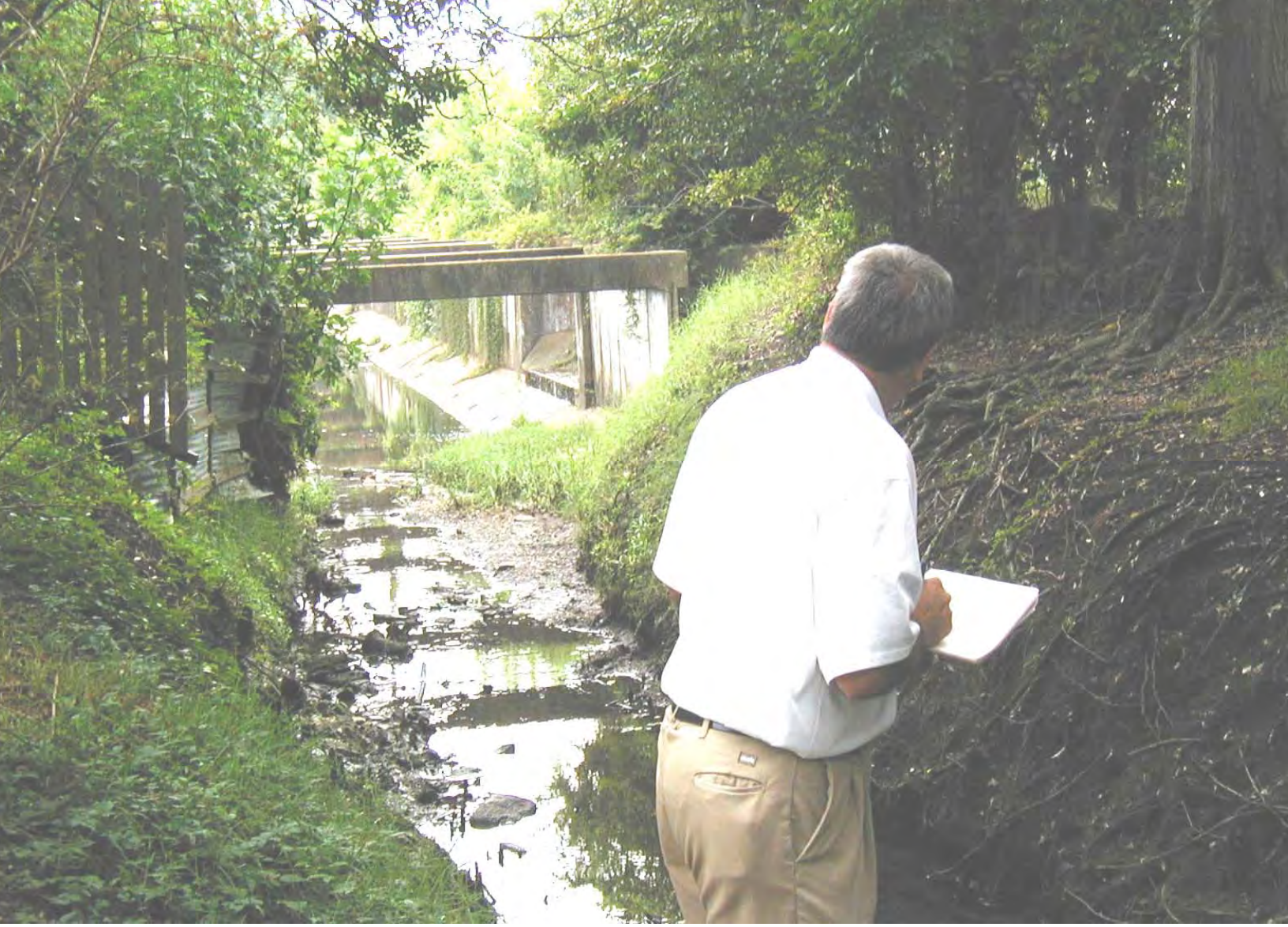

National Flood Insurance Program
Community Rating System

CRS Credit for Drainage System Maintenance

2006

FEMA

Note on this edition: This document was revised to reflect the following changes in the 2006 *CRS Coordinator's Manual*:

- A reminder that a community's drainage maintenance program must be consistent with federal and state environmental protection laws and regulations.
- A clarification of the credits for channel and basin debris removal procedures (CDR).
- Additional guidance on how to calculate the score based on how much of the drainage system is inspected and maintained.

A community interested in more information on obtaining flood insurance premium credits through the Community Rating System (CRS) should have the *CRS Application*. This and other publications on the CRS are available at no cost from

Flood Publications
NFIP/CRS
P.O. Box 501016
Indianapolis, IN 46250-1016
(317) 848-2898
Fax: (317) 848-3578
NFIPCRS@iso.com

They can also be viewed and downloaded from FEMA's CRS website, http://training.fema.gov/EMIWeb/CRS/index.htm

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The following communities provided materials to serve as examples in this publication. Their cooperation is appreciated.

Orland Hills, Illinois
Jefferson Parish, Louisiana
Nags Head, North Carolina
Santa Barbara County, California
Fort Collins, Colorado
Scottsdale, Arizona
Margate, Florida
South Holland, Illinois.

Help provided by the American Fisheries Society is also appreciated.

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Introduction

Objective

When human-made or natural debris is allowed to accumulate, it can create a dam in a channel or fill needed storage areas.
Although a properly maintained channel can carry runoff from most small storms, a blocked or dammed channel can cause more frequent overbank flooding, unexpected erosion, and sedimentation.

Debris in a watercourse can create a dam and flood adjacent properties.

Similarly, a lack of maintenance can result in detention or retention basins being filled with sediment or debris. If these basins are already full of sediment or debris, they cannot store water and flooding can result because the drainage system cannot do its job.

One of the objectives of the Community Rating System (CRS) is to encourage and recognize programs that prevent flooding caused by blockages or reduction in storage resulting from accumulations of debris. The objective of this publication is to explain the CRS credit criteria and provide examples.

The CRS

The CRS is a part of the National Flood Insurance Program (NFIP). When communities go beyond the minimum standards for floodplain management, the CRS can provide discounts up to 45% off flood insurance premiums.

Communities apply for a CRS classification and are given credit points that reflect the impact of their activities on reducing flood losses, insurance rating, and promoting the awareness of flood insurance. The Insurance Services Office's ISO/CRS Specialist reviews the community's program and verifies the CRS credit. This includes a review of the written procedures and records of an activity and, in some cases, a visit to sites in the field.

A community applies using the *CRS Application*. CRS credit criteria, scoring, and documentation requirements are explained in the *CRS Coordinator's Manual*. Copies of these publications are available free from the office listed inside the front cover of this document.

The CRS credit for inspecting the community's drainage system and clearing it of debris is provided in Activity 540 (Drainage System Maintenance) in the *CRS Coordinator's Manual*.

Credited Elements

This activity recognizes three elements of a community's drainage system maintenance program:

- ✓ Channel and basin debris removal. The acronym used in the credit calculation formulae, "CDR," has become a shorthand way to refer to the CRS credit. The credit criteria is explained in Section 541.a of the *CRS Coordinator's Manual.*
- ✓ Stream dumping regulations, "SDR," explained in Section 541.b.
- ✓ Coastal erosion protection maintenance, "EPM," explained in Section 541.c.

This publication reviews the first two elements, CDR and SDR, and explains the prerequisites for recognition by the CRS. Maintenance of coastal erosion protection includes dune or mangrove preservation, bluff stabilization, and beach nourishment programs. This third element is described in more detail in a separate publication, *CRS Credit for Management of Coastal Erosion Hazards*. It can be ordered through the office listed on the inside front cover.

A comprehensive drainage system maintenance program should address both debris and sediment and their sources.

Maintaining channels and basins can be augmented by a program to limit the amount of runoff from new developments and one that controls erosion and sediment leaving construction sites. CRS Activity 450 (Stormwater Management) explains the credit points for regulating construction and other land alteration activities to minimize runoff and sediment-laden stormwater (ESC).

Under Activity 450, if the community wants credit for public maintenance of new stormwater management facilities (PUB), it must have procedures that meet the same requirements as the Activity 540 procedures explained here. It is strongly recommended that these procedures be in the same document, especially because the two maintenance programs are most likely conducted by the same personnel.

A comprehensive community drainage program should include elements from both Activity 540 (Drainage System Maintenance) and Activity 450 (Stormwater Management).

NOTE: *Communities must be aware of all environmental laws and regulations that affect their ability to conduct maintenance operations, including the Endangered Species Act of 1973. Credit will not be approved for any procedures that are not consistent with those requirements.*

Channel and Basin Debris Removal (CDR)

This element is known by its acronym, CDR. Many communities already have programs and procedures for inspecting and clearing streams, ditches, and other channels; inspecting and cleaning retention or detention basins; cleaning storm sewers; stabilizing stream banks; and reconstructing channels. Only the first two of these activities are necessary for CDR credit.

Procedures

A community requesting CDR credit for its program must submit documentation describing its drainage system maintenance procedures. Five items must be included in this documentation:

1. Who is responsible (see Section 544.a.1 of the *CRS Coordinator's Manual*),
2. The area covered by the program (see Section 544.a.2),
3. Inspection procedures (see Section 544.a.3),
4. Maintenance procedures (see Section 544.a.4), and
5. Records (see Section 544.a.5).

These written procedures are essential to CRS credit. Each community will have a different approach to human-made ditches, natural watercourses, drainageways on public vs. private property, etc. In order for the ISO/CRS Specialist to verify whether the drainage system is being properly maintained, there must be locally prepared procedures. Verification is really a job of seeing that the local procedures are being followed.

1. Who is Responsible: The documentation submitted must identify what person or office is responsible for inspections, maintenance, and record keeping. In most cases, the drainage system is inspected and maintained by the community's public works department or a similar agency.

What counts for the CRS is not who does the work but whether it is being done. Although the CRS community must provide the needed documentation, some or all of the actual work could be implemented by other responsible parties, such as

- ✓ Flood control or drainage districts;
- ✓ County, state, or federal agencies;
- ✓ Private companies or engineering firms; and
- ✓ Property owners associations.

In many communities in Florida, for example, the multi-county water management district maintains large canals and the city is responsible for the remaining, smaller ditches and streams.

In many cases, property owners associations, shopping centers, and other owners of large tracts of private property are responsible for maintenance of their own retention or detention basins. The CRS can provide credit for this arrangement only if

- ✓ the community has an inspection program AND the authority to order the owner to perform needed maintenance, OR
- ✓ the association or other owner is required to submit periodic inspection reports signed by a licensed professional engineer.

In both cases, the community (or other public agency) must be willing to assume the ultimate responsibility for maintenance. If the private property owner does not perform the needed maintenance, the community must show that the job will get done according to its inspection and maintenance schedule.

No credit is provided for projects that depend on unsecured outside funding, such as a special appropriation from the state legislature or approval of a Corps of Engineers' clearing and snagging project. Secured outside funding, such as projects financed by an annual state distribution of gasoline tax receipts, is acceptable.

2. Area Covered by the Program: The community must define its "drainage system," preferably on a map. For the purposes of this activity, the drainage system consists of "all natural and human-made watercourses, conduits, and storage basins that must be maintained in order to prevent flood damage to buildings from smaller, more frequent storms." In determining whether a waterway or facility is part of the drainage system for CRS purposes, ask "will buildings be damaged if it is not kept clear?"

A roadside ditch is included in the "drainage system" for CRS purposes if buildings will be flooded if it is not maintained.

Facilities covered: The determination of a community's drainage system is based on what facilities need to be maintained in order to prevent damage to buildings. In some communities, it will be open channels and ditches. In a flat community, especially one protected by a levee, maintaining storm sewers, sewer inlets, canals, and pump stations may be vital to prevent flooding. In some areas of a community, roadside ditches are important conveyors of surface water and must be kept cleaned. In urbanizing watersheds, storage basins may be vital to preventing small storms from flooding buildings.

The drainage system must include watercourses identified on the community's Flood Insurance Rate Map (FIRM) as well as important watercourses not in the floodplain (in B, C, or X Zones). In fact, the CRS is particularly concerned with flood insurance claims paid on properties that are NOT in the floodplain. Most of these claims are due to inadequately sized or maintained drainage facilities.

This channel is on a public right of way, which helps inspections and maintenance.

The community should consider the sites of flood insurance claims and disaster assistance when defining the facilities covered. In communities with repetitive losses, the drainage system MUST cover those areas having repetitive loss properties where the cause of the losses was due to local drainage problems or smaller, more frequent storms.

Facilities not covered: Certain areas do not need to be included in the drainage system maintenance program. Although the following parts of a drainage system should be maintained, they are not necessary for CRS credit.

- ✓ Drainage facilities in undeveloped areas. For CRS credit, a community only needs to maintain those facilities where debris blockages would result in flooded buildings. Therefore, agricultural areas, parks, and areas with less than one building per acre do not need to be covered by the drainage maintenance program.
- ✓ Channels that will not inundate buildings during a flood, such as deeply incised ravines.
- ✓ Natural storage areas. Lakes, ponds, marshes, and wetlands can usually absorb debris without significantly affecting their storage capacities. Because of their natural resource benefits, the CRS encourages communities to maintain their appearance and prevent dumping into them. But the CRS does not advocate maintenance activities that disturb wetlands and other natural areas.
- ✓ Irrigation canals. These do not need to be included unless they are specifically designed to be part of the community's drainage system or they intercept drainageways during high flows, either intentionally or accidentally.

Private property: In many areas of the country, property lines run to the middle of a stream or ditch. Often owners are legally responsible for maintenance of a channel or storage basin on their property. This condition does not exempt the watercourse or facility from the community's "drainage system" if obstructions and debris would cause flood damage to buildings.

Growth and headwall erosion show a lack of maintenance in this private retention basin.

A community must have the legal authority to inspect the channels and basins that it identifies as part of its drainage system. A community without the authority to enter properties to inspect all channels and basins may demonstrate that it has adequate visibility from public property to see them all. On the other hand, a program that only inspects bridges and culverts will not be recognized for credit.

A community must also have the authority to remove debris. This means that it is authorized either to enter the properties to perform maintenance or to order the owner to perform the maintenance. If there are areas where the community does not have these authorities, then the CRS credit points are adjusted to reflect how much of the drainage system it inspects and maintains. This is discussed in the later section on impact adjustments (page 10).

It is important to note that this activity is verified in the field. An ISO/CRS Specialist will check a sample of stream segments and basins in the areas maintained by the community. If the field check shows that maintenance is not being performed according to the written procedures, the credit points will be adjusted. Citations issued to private property owners are not considered maintenance unless they are enforced and bring results.

Single lots: The community's "drainage system" does not have to include facilities that only drain one lot. In order to draw the line between public and private maintenance responsibility, the community may exempt landscaping swales, low ground along property lines, or small drainageways from its program. The general guideline is that the system should include all open channels that drain more than 40 acres.

Altered watercourses: There is no CRS credit for maintaining altered watercourses, because such maintenance is a minimum requirement of the NFIP. In fact, failure to maintain such watercourses may result in a revision to the community's FIRM.

The CRS provides credit for activities that are "above and beyond" the minimum requirements of the NFIP. If a stream is altered after the community's FIRM is published, the NFIP requires the community to ensure that the channel's carrying capacity is not adversely altered. This is required in 44 *CFR* 60.3(b)(7) of the Federal Emergency Management Agency's (FEMA's) NFIP regulations and in most communities' floodplain management ordinances.

3. Inspection Procedures: Periodic inspections of channels and basins in developed areas are needed in every community to prevent the accumulation of debris deposited by storms, dumping, or natural processes.

For CDR credit, inspections must be conducted

- ✓ At least once each year (see Section 541.a.1(a) of the *Coordinator's Manual*),
- ✓ After each storm that could adversely impact the drainage system (see Section 541.a.1(b)), and
- ✓ In response to citizen's complaints (see Section 541.a.1(c)).
- ✓ In addition, action must be taken after an inspection identifies the need for maintenance or cleaning (see Section 541.a.1(d)).

These should be considered minimums. Local conditions may well warrant more frequent regular inspections.

The CRS will not provide credit for a program that only makes inspections when a complaint is filed. Although the program also must respond to complaints, regular inspections are vital. Often complaints are filed after the problem causes a flood. The objective of drainage system maintenance is to prevent such problems.

It should be noted that CRS Activity 330 (Outreach Projects) encourages communities to advise their residents on how to submit complaints, especially if they see illegal dumping (see the discussion on page 52).

ADDED CREDIT—Problem sites: Additional credit is provided if the community's program identifies specific "choke points" or other obstructions to flows, or sites with erosion or sedimentation problems, that are inspected and maintained differently or more frequently than other parts of the drainage system.

Bridges, constrictions, and other known problem sites deserve more frequent inspections.

Problem sites can be channel constrictions, culverts that catch more debris than others, undersized culverts, facilities near schools or other source of vandalism, etc. The written procedures must list these sites (or show them on a map) and describe how they are treated differently, usually through more frequent inspections. Such inspections are in addition to those credited under the annual inspection program described on the previous pages.

4. Maintenance Procedures: A regular maintenance program in conjunction with inspections can prevent big problems. Typical problems found in open channels include trash, shopping carts, tires, plastic containers, branches, and logjams. Typical storage basin problems include clogged inlets and outlets, basin sedimentation, and broken pumps. When found early, they can often be removed or corrected with minimal equipment and expense.

See also the American Fisheries Society's guidelines on pages 44–46 for examples of maintenance procedures for different stream obstruction conditions.

A public works crew or contractor, usually without heavy equipment, normally carries out the maintenance work for the basic CRS credit. The objective is to remove debris that has accumulated, such as shopping carts and log jams. For this CRS credit, the community's program must clearly describe what can and cannot be removed. Simply stating that "all debris will be removed" may not be correct for all areas.

Classifying streams is one way to define what can and cannot be done for different types of drainageways. See the box on the next page for a discussion of this approach.

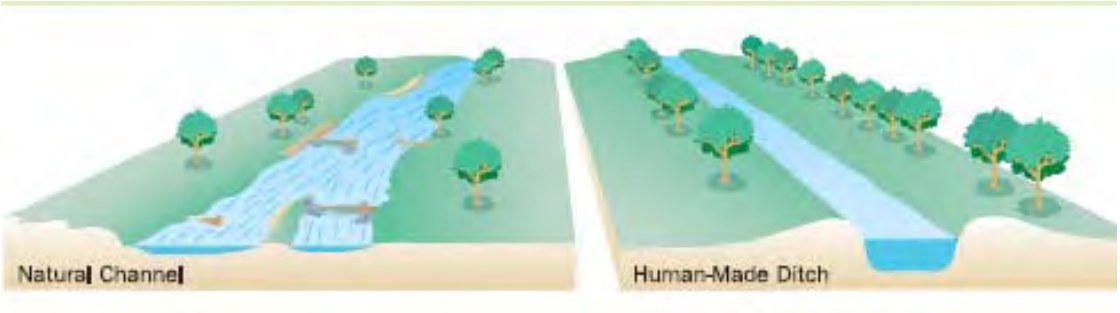
Bank erosion: The CRS does not credit activities dealing with bank erosion unless they are part of an annual capital improvements program. Although houses or bridges may be threatened by the erosion, the erosion usually does not cause a serious obstruction to flood flows. Similarly, bridge and culvert maintenance are only considered if their condition obstructs the flow of water.

State permits: If the community has the right to enter all affected properties to perform maintenance, there should be no legal problems. In some cases, a state permit may be required. Usually a state permit is needed only for major projects, such as channel widening or bank stabilization or for projects in naturally sensitive areas, such as endangered species habitat. If a permit is needed for routine maintenance and debris removal, a general permit can often be obtained for a period of years and that specifies what work can be done. The community's program needs to identify the instances in which a state permit is needed.

CRS CREDIT IS NOT PROVIDED IF LOCAL DRAINAGE MAINTENANCE PROCEDURES VIOLATE FEDERAL OR STATE LAWS. There may be special restrictions on streams or a requirement to obtain a federal or state permit before certain work can proceed. Often a "general" or "statewide" permit or other permission can be granted in advance for projects that are specifically described in the permit. Such laws and regulations usually do not preclude all maintenance work, but they may place restrictions on activities that disturb natural or protected areas. These restrictions must be included in the community's procedures.

Stream Classification

A community's drainage system maintenance procedures must identify what is considered a problem and what happens when a problem is found. This may require classifying streams and storage basins as natural and human-made and treating them differently.



A drainage maintenance program should not treat natural channels and human-made ditches the same. The **natural channel** has a wider area in which to flow. Trees and small log or debris jams can be accommodated by minor diversions of flow without causing any problems. In fact, vegetation and minor obstructions that cause riffles and pools are desired in many natural streams because they improve habitat and water quality. However, large collections of debris that accumulate at a bridge can cause a major obstruction and should be removed.

A **human-made drainage ditch** or canal is designed to use less area to carry more water. These channels need more attention because there is no room to carry overflows caused by blockages. They are not intended to have trees or other vegetation growing in them. In human-made ditches, too much vegetation is considered "debris." Therefore, if an inspection finds trees and brush growing in the channel, they have to be removed. Regular mowing and grubbing ensures that these channels do their job.

Another problem in natural streams is vegetation. Too much vegetation, especially weedy (often non-native) plants, can choke a stream while too little vegetation can lead to serious erosion. Maintenance procedures need to be tailored to each stream. They may include plant removal, replanting, tree trimming, or mowing.

In short, drainage system maintenance programs need to take into account the habitat, recreational uses, and flood control facets of the stream. The community with a multi-objective approach to its river corridors will best be able to handle the competing interests and get the best results from its stream maintenance efforts.

5. Records: A maintenance program needs records. Typically, these include

- ✓ Complaint or inquiry forms for recording reports of problems,
- ✓ Inspection forms that show everything that was checked,
- ✓ Work orders that task an office to clear debris or correct a problem, and
- ✓ Maintenance records that show the work that was done.

In some cases, one or two forms can cover all needs. In the box on the next page is an example "drainage problem report" form. It shows both the maintenance action needed and what was done. These forms need to be included with the procedures that are submitted for CRS credit.

CRS Credit

It is important to note that the CRS credit points are not based on the cost of the program, the source of funding, the amount of debris removed, or similar administrative issues. What counts is that the community inspects and maintains its drainage system on a regular basis or when needed.

There are two levels of credit for Channel and Basin Debris Removal (CDR):

- ✓ Up to 200 points are provided for having and implementing procedures that cover the five items discussed on pages 3–10.
- ✓ An additional credit of up to 50 points is provided if the community's program identifies specific problem sites that are inspected and maintained differently or more frequently than other parts of the drainage system, as discussed on page 7.

Impact Adjustment

Most communities provide the same drainage maintenance service to all residents and therefore their programs cover the entire community. However, there may be cases in which a community can only inspect and maintain part of its drainage system (e.g., only those watercourses on public property). The impact adjustment modifies the credit points to reflect how much of the community's developed areas are covered by its drainage maintenance program. See also the discussion on page 13 on preparing an impact adjustment map.

Full coverage: Full CRS credit is provided if the community inspects and maintains all parts of the drainage system in developed areas. There is no set definition of "developed areas." At a minimum it includes subdivisions with lots of 1 acre or smaller. It does not need to include farms, forests, parks, or preserves unless obstructions in those areas will result in flooding of built-up areas.

The community only needs to demonstrate that there are no buildings threatened in areas not covered. For example, full credit is provided to a county that maintains the drainage system in built-up areas, even though it does not look after every ditch in its rural areas or in parks or preserves.

DRAINAGE PROBLEM REPORT

Date: _____ Inspector: _____

Type of inspection: ☐ Post-storm ☐ Complaint ☐ Routine

Location: (Identify stream or basin name, downstream and upstream streets or reference points, and location of problem. Provide sketch as needed.)

Type of problem: ☐ Trash ☐ Minor ☐ Obstruction ☐ Structural

Recommended maintenance: _____

_____

_____

Is equipment needed? ____ If so, list equipment needed: _____

_____

Date: _____ Right of entry needed? _____

Work order description: _____

_____

_____

_____

State permit needed? _____ Work order number: _____

Date: _____ Crew chief: _____

Maintenance performed: _____

_____

_____

_____

Inspected by: _____

Use other side for additional recommendations for this site.

Indian reservations, lands owned by the state or another community, and federal land, such as national parks and military reservations, are generally beyond a community's jurisdiction. These may be excluded from the drainage system maintenance program. More guidance on excluding these types of properties can be found in Section 403 of the *Coordinator's Manual*.

Partial coverage: There are cases where drainage maintenance programs do not cover all developed areas. For example, a community may not have the legal authority to send inspectors or maintenance crews onto some properties. Some communities are just starting formal maintenance programs and are phasing in streams for regular inspections after major obstructions have been removed or after rights-of-way have been obtained. In some areas, state or federal regulations may prevent disturbing the habitat of an endangered species.

If the community cannot provide inspections and maintenance in all developed areas, the CRS credit points must be adjusted to reflect the impact of the program. This is the "impact adjustment," which is done by multiplying the credit points for CDR by the percentage of the community covered.

To simplify the CRS application process, the impact adjustment is not included in the *CRS Application*. When the ISO/CRS Specialist conducts the verification visit, he or she will help determine the appropriate impact adjustment and will help with any needed calculations.

Impact Adjustment Map: The Impact Adjustment Map is a tool to help the ISO/CRS Specialist calculate what percentage of the drainage system is covered by the program. It should be prepared before the Specialist's verification visit. The map must show

- ✓ All channels and other drainage facilities in the developed portion of the community, and
- ✓ All channels and facilities that are covered by the channel and basin debris removal program.

The ISO/CRS Specialist will use the map to calculate an approximate impact adjustment ratio (the area covered by the program as a percentage of the area of the drainage system in developed portions of the community). The ISO/CRS Specialist can also provide instructions on how the community can calculate a more accurate ratio. A procedure for preparing an Impact Adjustment Map is provided in the box on the next two pages.

Preparing an Impact Adjustment Map

Here are step by step instructions on how to prepare an impact adjustment map for drainage system maintenance credit.

Step 1. Prepare Map #1, a map of the developed areas of your community. Start with a map of the community and mark or exclude the following areas:

- Parks, farms, forests, and other undeveloped areas;
- Lakes, bays, and other bodies of water larger than 10 acres;
- Areas zoned and developed for low density, i.e., lots of one acre or more with a maximum of 10% lot coverage; and
- Other areas where insurable buildings will not be affected due to a lack of maintenance. For example, debris will not cause flooding of buildings subject to coastal flood hazards, on very large rivers, or in steep ravines.

Step 2. The remaining area on Map #1 is considered the area that needs to be inspected and maintained to protect insurable buildings. This map must include those areas that have repetitive loss properties where the cause of the losses was due to local drainage problems or smaller, more frequent storms (see Section 501 of the *CRS Coordinator's Manual*). Note that this activity encourages maintenance of ALL undeveloped areas that should be maintained for any reason (e.g., to keep a road from flooding), but CRS credit is based on the impact of the program on buildings.

Step 3. Prepare an overlay to Map #1 (or a GIS layer): Show all of the surface drainage system in the developed areas on Map #1. Include the following drainage features, regardless whether they are publicly or privately maintained:

- All streams, channels, and other surface drainageways that drain more than 40 acres.
- All ponds, retention basins, and detention basins that store stormwater (either show them on the map or be able to produce a master list of them).
- Any other channels or basins that are known to have maintenance problems that affect developed properties.

This activity focuses on surface drainage features that are more prone to obstructions from debris. It is assumed that storm sewers are public property and that they are publicly maintained. Thus, you do not need to include underground pipes or storm sewers on Map #1 (unless all of your drainage system is in underground pipes).

Step 4. Measure the lengths of the channels and perimeters of the storage basins shown on this layer after step 3. This total (feet, miles, etc.) is the area of your drainage system in the developed portions of the community.

Step 5. Prepare a second overlay (or GIS layer) to Map #1: Show those drainage features that are covered by the inspection and maintenance program. Here are some possible reasons why some areas or drainage features are not covered:

- You do not inspect or maintain channels or detention basins on private property.
- Budget limitations prevent your crews from covering all developed areas.
- You only inspect bridges and culverts on public roads, not the rest of the channels.

Preparing an Impact Adjustment Map (cont.)

Step 6. Measure the lengths of the channels and perimeters of the basins in the areas that are covered. This total (feet, miles, etc.) is the area covered by your program.

Step 7. Divide the result from step 6 by the result from step 4. The result is the "impact adjustment ratio" that reflects the percentage of the drainage features in your community's developed areas that are covered by your drainage maintenance program. It is shown as "rCDR" in the credit calculation formulas. The little "r" stands for "ratio." The ratio is multipliedby 200 to derive your score.

> **Example:** Adding up 6.7 miles of channels and 1.3 miles of basin perimeter totals 8 miles for your community's drainage system . Two miles are in undeveloped areas or along a very large river. Therefore, your map shows 6 miles of channels and basins that need to be maintained to prevent debris from obstructing flows that will flood buildings. Because of budget constraints, your public works department only inspects and maintains 3 miles of these features.
>
> The impact adjustment ratio, rCDR, = 3 ÷ 6 = 0.5. Your score will be 200 x 0.5 = 100 points. You would receive half the maximum credit because your program covers half of the area that needs to be covered.

Credit Calculation

The end result of this work is an initial score for the community's channel and basin debris removal program (CDR). It is the product of the credit points multiplied by the impact adjustment ratio. In the *Coordinator's Manual*, it is shown as the following formula:

cCDR = CDR x rCDR, where

cCDR is the total credit for CDR

CDR is the points for CDR, either 200 or 250, and

rCDR is the impact adjustment ratio, which ranges from 0.2 to 1.0.

cCDR can range from 40 to 250.

Documentation

To receive credit for its channel and basin debris removal program (CDR), the community must provide certain documentation to the ISO/CRS Specialist.

- ✓ The drainage inspection and maintenance procedures are submitted with the application for the credit. Each of the five points on pages 3–10 must be marked. Examples are shown in the sections on Orland Hills and Jefferson Parish procedures, below. Some communities may already have written procedures that include most or all of the five topics, as was the case with Jefferson Parish. In these cases, the community would only need to write a memo explaining the missing information.

- ✓ At the ISO/CRS Specialist's verification visit, the community will need to provide the records that show that the inspections and subsequent maintenance were performed. Examples of these are on pages 11, 23–26, and 42–44.

Verification Visit

During the verification visit, the ISO/CRS Specialist will ask to see the records that demonstrate that the inspections and maintenance were performed. Because the community's credit is partially based on the frequency of inspections, there must be documentation that shows that the inspections were conducted on schedule and that needed maintenance was performed. Records are discussed on page 10.

The ISO/CRS Specialist will also conduct a field survey to verify that the channels and basins are clear. A sample of 10 sites will be examined. If one or more is not maintained in accordance with the community's explanation of its program, the Specialist will look at 10 more sites.

Based on the review of the 20 sites, the value for CDR will be adjusted. If less than 50% of the credit is verified, an additional 10 sites will be reviewed. If the credit for all items in the three samples is less than 50%, no credit is given for CDR.

For example, if the survey finds that five of 20 sites have debris or growth that should have been removed, then the value for CDR will be reduced by 5/20 or 25%. If more than seven of the 15 sites have not been maintained, a third sample of 10 sites will be inspected. If the final result is that more than 50% of the sites have not been maintained, no credit is provided for CDR.

Annual Recertification

Each year, a CRS community must submit an annual recertification to FEMA and the ISO/CRS Specialist. For continued credit for CDR, the recertification must include copies of typical inspection and maintenance records for that year. The recertification is due by October 1. The ISO/CRS Specialist provides the forms with specific instructions.

This debris accumulated where an open channel flows into a small pipe (hidden under the debris). Such sites deserve frequent inspections or correction through a capital improvement project (see page 48).

Orland Hills' CDR Procedures

The Village of Orland Hills, Illinois, is a Chicago suburb that has been particularly concerned with drainage problems. Before the early 1990s it had widespread flooding and drainage problems that affected buildings, yards, and streets throughout town. Heavy rains caused water problems several times each year.

In 1995, the Village prepared a Flood Protection Plan, which reviewed the situation and recommended a series of activities to reduce the damage caused by flooding and drainage problems. One of those activities was a formalized drainage system maintenance program. Another was to join the CRS.

In 1995, drainage maintenance procedures were prepared, modeled on an example provided by the CRS. In 2000, the procedures were updated to receive full credit under the 1999 *CRS Coordinator's Manual*. The updated procedures are shown on pages 17–26. They are marked to show the five items that need to be documented in a CRS submittal.

Responding to drainage problems is only one facet of the Village's efforts. It has a proactive public information program and enforces strict construction regulations. It has a public information program strategy that also qualifies for CRS credit. In 1999, it focused on the slogan "Don't forget your drainage" and used a variety of means to convey that message to property owners. An excerpt from a property owner's booklet is shown on pages 27–28.

Orland Hills has different maintenance procedures for human-made ditches and Lake Lorin, a restored wetland that also serves as a retention basin. See sections 5.b.1) and 2) on page 19.

VILLAGE OF ORLAND HILLS, ILLINOIS

DRAINAGE SYSTEM MAINTENANCE SOP

1. **Objective:** This Standard Operating Procedure (SOP) specifies responsibilities and procedures for inspecting and cleaning the streams, ditches, storm sewers, and storage basins in the Village of Orland Hills.

2. **Responsibilities:**

1. Who is responsible

a. The Director of the Public Works Department is responsible for the administration of this SOP. He shall inspect the streams, ditches, storm sewers, and storage basins and ensure that they are cleaned in accordance with this SOP.

b. The Director of the Recreation and Parks Department is responsible for maintenance of all drainage facilities in Village parks.

c. The Chief of Police and/or the Building Commissioner are responsible for enforcing Section 51.01 of the Village's municipal code and related regulations on dumping or depositing material in the drainage system. The Chief of Police and/or the Building Commissioner are also responsible for serving maintenance notices to private property owners.

d. All work on county property shall be coordinated with the appropriate county offices.

e. Private property owners are responsible for maintaining the streams, ditches, storm sewer inlets, and retention basins on their properties.

3. **Jurisdiction:** This SOP covers the following public and private surface drainage facilities delineated in the drainage system map in Attachment 1.

2. Area covered

a. Tinley Creek from 169th Place (retention area Map #12) to its outlet from the Village at 88th Avenue.

b. Lake Lorin.

c. Ashbourne Lake and its drain to Lake Lorin (Map #18)

d. Highview Ditch from the retention basin at Map #1 to its confluence with Tinley Creek.

e. The drainage facilities to be constructed in the Pepperwood subdivision, north of Lake Lorin (Map #18 and 19).

2. Area covered

f. The Village owned retention areas shown as Map #1–9, 11, 12, and 15 as detailed in the Municipal Owned Property list (Attachment 2).

g. Marley Creek, west of 96th Street.

h. The privately owned retention areas, shown as Map #A–L.

i. All future drainage ways dedicated to the Village in accordance with the Village's subdivision ordinance.

4. Identification of Problems:

3. Inspection procedures

a. The Director of Public Works or his designee shall inspect all the watercourses, sewers and basins listed in Section 3 twice a year. One inspection will be run before the Spring rainy season. The other will be conducted during the middle of the summer storm season.

b. Inspections shall consist of walking the length of Tinley Creek and Highview Ditch and a visual check through all culverts. Inspections of detention basins shall include a check of each inlet and outlet.

c. On the first Monday of each month and within 24 hours after each major storm, the Director of Public Works or his designee shall inspect the following "choke points" where debris has been known to accumulate:

1) The culverts over Tinley Creek on:

- 169th Place
- Hobart Ave
- 93rd Ave
- Haven Ave
- 92nd Ave
- 167th Street
- 88th Ave

2) The dam at Lake Lorin.

More frequent inspection of problem sites

d. The Director of Public Works or his designee shall complete the Drainage Inspection Report (Attachment 3) after each inspection. A copy of the report shall be kept in an appropriate file.

5. Records

e. The Director of Public Works or his designee shall inspect all complaints submitted by residents, Trustees, or other offices. Such complaints and the subsequent action taken by the Village shall be recorded on a Complaint/Inquiry Form (Attachment 4). The Director of Public Works shall ensure that an inspection is conducted and the findings provided to the person submitting the complaint within one week.

f. If a problem is found, a Complaint/Inquiry Form (Attachment 4) shall be completed and forwarded to the appropriate person. The Complaint/Inquiry Forms shall be recorded and maintained in accordance with the Village's Complaint Procedures. If the problem is on private property, a letter shall also be sent to the owner, using the format in Attachment 5.

5. Maintenance:

4. Maintenance procedures

a. There are four types of maintenance problems:

1) Trash: human-made objects, such as garbage, shopping carts, tires, lumber, furniture, and appliances. Animal carcasses are also included as trash.
2) Minor problem: vegetation growth, tree limbs, and other "naturally" occurring debris. Sedimentation in a retention basin is also included.
3) Obstruction: fallen tree, culvert damage, large appliance, etc., that, by itself, obstructs the flow of the ditch, inlet or outlet.
4) Structural project: bridge or culvert replacement, bank stabilization, dredging, or other major project.

b. Maintenance duties:

1) On public property: The Director of Public Works or the Director of Recreation and Parks shall ensure that trash and minor problems are removed at the next convenient time. Obstructions shall be removed within two working days of being reported.

2) Kelly Park and Lake Lorin: These areas of Tinley Creek shall be kept in a condition approximating their natural state. Trash and obstructions shall be removed, but natural growth shall not be cut.

3) On County property: Trash, minor problems, and obstructions shall be reported to the appropriate office by the Director of Public Works. If the County does not remove the problem within seven days, it shall be treated as a problem on private property in accordance with c., below.

4) Structural projects require budget approval by the Village Board of Trustees and, sometimes, a separate permit from the Department of Natural Resources, Office of Water Resources. If necessary, a drainage maintenance easement shall be obtained from all affected property owners. Structural projects shall be advertised for bid and scheduled in the same manner as other contracted public works projects.

4. Maintenance procedures

5) Upon completion of a maintenance project, the responsible person shall complete the Complaint/Inquiry Form and provide it to the Building Department Permit Clerk for filing.

c. Maintenance on private property:

1) Property owners are responsible for maintaining the streams, ditches, swales, storm sewer inlets, and retention basins on their properties.

2) The Village shall publicize the need for maintenance of drainage facilities and encourage residents to correct or report problems before the next storm causes damage.

3) The Director of Public Works shall inspect all drainage facilities listed in Section 3 from streets or other public property or via access on dedicated easements in accordance with the inspection schedule in Section 4. The Director shall inspect all other drainage problems on private property only in response to complaints.

4) Trash, minor problems, and obstructions shall be reported to the owner by the Chief of Police in the format included as Attachment 6.

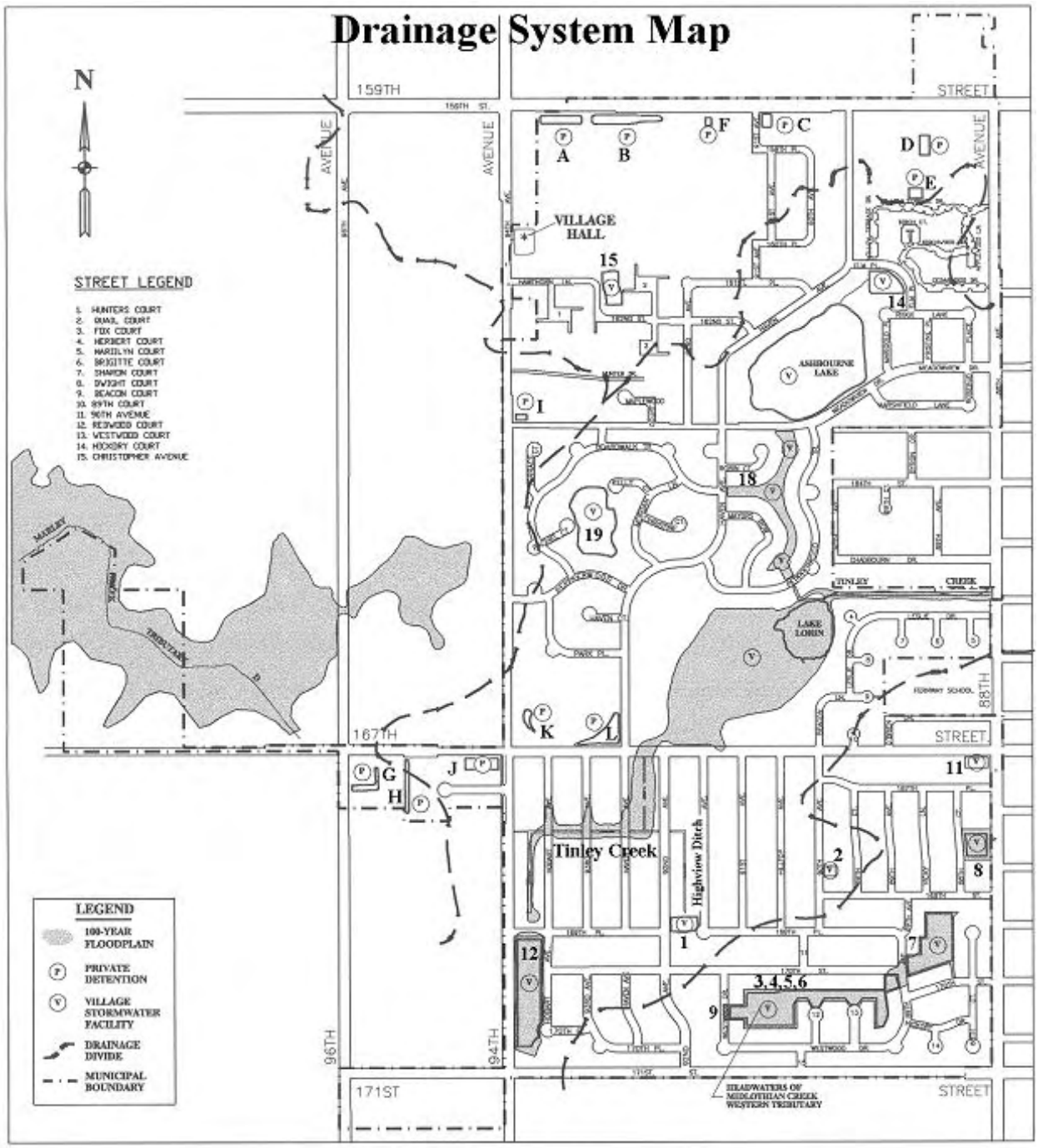
5) If the owner does not remove the problem within ten days, the Village shall assume responsibility for the problem. If the problem is large enough to cause flooding of another property, the Director shall enter the property and remove the problem in accordance with Illinois Compiled Statutes, Chapter 65, Section 11-111.1-1.

6) If the problem does not cause an immediate hazard, the Village Attorney may take action to have the owner remove the problem or pay for the maintenance work performed by the Village.

Attachments:

1. Drainage system map
2. Municipal owned property
3. Drainage Inspection Report forms
4. Complaint/Inquiry Form
5. Private property notice format

Attachment 1.



Attachment 2.

Municipal Owned Property

November 30, 1998

(\O98\TXPROP-R)

P.I.N.	Map Loc.	Acres	Use	Approx. location
27-22-101-019	16	1.15	New Village Complex	16033 S. 94th Ave.
27-22-104-062	15a	1.50	Park/detention	Hawthorne @ 16151
27-22-104-071	15b	0.10	Park/Tot-Lot	Hawthorne @ 9302 W.
27-22-202-003	30	18.12	Ashbourne/wetlnd/detention/path	8980 w. Meadowview
27-22-207-069	14	0.90	Storm Detention/Tot lot	Elm Pl. @ 8901
27-22-301-002p	19	4.55	Future Storm Detention (outlot A)	Pepperwood Outlot A
27-22-302-010	21	4.90	Kelly Park	Haven @ 16675
27-22-302-012	22	2.01	Kelly Park w/Tot Lot	167th @ 9200 w.
27-22-302-015	20	6.93	Kelly Park - Phase II (outlot C)	Haven @ 16595
27-22-302-017	17	0.86	Public Works/PSVS Facility	16533 S. 94th Ave.
27-22-400-004p	18	3.30	Future Storm Detention (outlot B)	Pepperwood Outlot B
27-22-402-010	24	0.23	open access to Lake Lorin	16636 S Beacon Ln.
27-22-402-045	23a	23.00	Kelly Park - Lake Lorin	167th @ 9150 w.
27-22-402-047	23b	4.34	Kelly Park	167th @ 9250-9000 w.
27-22-403-007	25	1.42	Storm Detention outfall	88th Ave @ 16520
27-22-403-008	26	1.58	Storm Detention outfall	88th Ave @ 16520
27-22-413-014	23c	0.05	Kelly Pk-Lake Lorin (25 x 80)	167th @ 9104 w.
27-27-103-053	27	0.15	Old Village Hall (51x125)	16795 S. 94th Ave.
27-27-103-054	28	0.22	Old Police Station (77x125)	16801 S. 94th Ave.
27-27-103-062	13	0.66	Storm Detention	94th Ave @ 16941
27-27-114-005	12	4.13	Storm Detention	94th Ave @ 17001
27-27-201-027	11	0.71	Storm Detention	88th Ave @ 16700
27-27-205-051	29	0.12	Buildable Open Lot (40x125)	91st Ave @ 16720
27-27-208-014	02a	0.11	Storm Detention	90th Ave @16811
27-27-208-015	02b	0.11	Storm Detention	90th Ave @16811
27-27-208-046	02c	0.03	Storm Detention-rear	90th Ave @16811
27-27-208-047	02d	0.03	Storm Detention-rear	90th Ave @16811
27-27-210-024	10a	0.16	Park - Tot lot	167th Pl. @ 8926
27-27-210-025	10b	0.01	Park - Tot lot (sliver)	167th Pl. @ 8926
27-27-214-010	08a	1.35	Storm Detention	88th Ave @ 16840
27-27-214-024	08b	0.66	Dedicated Right-of-way	88th Ave. (west 50')
27-27-214-025	08c	0.34	Dedicated Right-of-way	88th Ave. (west 50')
27-27-215-035	07a	3.25	Storm Detention	89th Ave @ 17001
27-27-215-036	07b	0.34	Storm Detention	89th Ave @ 17001
27-27-219-001	06b	0.35	Storm Detention	SW<8900 w.170th St.
27-27-221-015	06a	2.90	Storm Detention	Westwood - 89th Ave
27-27-222-031	01	0.96	Storm Detention	92nd Ave @ 16901
27-27-223-038	09	1.21	Storm Detention	Westwood @ 17007
27-27-224-006	04	1.24	Storm Detention	Westwood - 89th Ave
27-27-224-012	05	0.83	Storm Detention	Westwood - 89th Ave
27-27-224-013	03	1.24	Storm Detention	Westwood - 89th Ave
		96.05	Total Acreage	

Attachment 3.

Village of Orland Hills, Illinois

Drainage Inspection Report - Public Properties

Date: _____ Inspector: _____

Type of inspection: ❑ Semi-annual ❑ Monthly Choke Point Check ❑ Post-storm

I have inspected the following surface drainage facilities and found them as noted. The numbers and letters refer to locations on the Village's drainage system map. A Complaint/ Inquiry Form has been completed for all problems found on Village property. A notification letter has been sent to the owners of private property where problems were found.

Retention basin, 17001 94th Ave (#12)	❑ No problem	❑ Problem found
Tinley Creek from 169th Place to 167th Street	❑ No problem	❑ Problem found
Retention basin, 16901 92nd Ave (#I)	❑ No problem	❑ Problem found
Highview Ditch	❑ No problem	❑ Problem found
Tinley Creek from 167th Street to Lake Lorin	❑ No problem	❑ Problem found
Lake Lorin and dam	❑ No problem	❑ Problem found
Retention area, 8901 Elm Place (#14)	❑ No problem	❑ Problem found
Ashbourne Lake and drain to Tinley Creek	❑ No problem	❑ Problem found
Tinley Creek from Lake Lorin to 88th Avenue	❑ No problem	❑ Problem found
Retention area, 17007 Westwood (#9)	❑ No problem	❑ Problem found
Retention areas, Westwood and 89th Ave (#3,4,5,6)	❑ No problem	❑ Problem found
Retention area, 17001 89th Ave (#7)	❑ No problem	❑ Problem found
Retention area, 16840 88th Ave (#8a)	❑ No problem	❑ Problem found
Retention area, 16811 90th Ave (#2)	❑ No problem	❑ Problem found
Retention area, 16700 88th Ave (#11)	❑ No problem	❑ Problem found
Retention area, 16151 Hawthorne (#15b)	❑ No problem	❑ Problem found
Pepperwood Outlot A (19)	❑ No problem	❑ Problem found
Pepperwood Outlot B (18)	❑ No problem	❑ Problem found
Marley Creek	❑ No problem	❑ Problem found
_____	❑ No problem	❑ Problem found
_____	❑ No problem	❑ Problem found

Village of Orland Hills, Illinois

Drainage Inspection Report - Private Properties

Date: _____ Inspector: _____

Type of inspection: ❑Semi-annual ❑Monthly Choke Point Check ❑Post-storm

I have inspected the following surface drainage facilities and found them as noted. The numbers and letters refer to locations on the Village's drainage system map. A Complaint/ Inquiry Form has been completed for all problems found on Village property. A notification letter has been sent to the owners of private property where problems were found.

Private retention area A	❑No problem	❑Problem found
Private retention area B	❑No problem	❑Problem found
Private retention area C	❑No problem	❑Problem found
Private retention area D	❑No problem	❑Problem found
Private retention area E	❑No problem	❑Problem found
Private retention area F	❑No problem	❑Problem found
Private retention area G	❑No problem	❑Problem found
Private retention area H	❑No problem	❑Problem found
Private retention area I	❑No problem	❑Problem found
Private retention area J	❑No problem	❑Problem found
Private retention area K	❑No problem	❑Problem found
Private retention area L	❑No problem	❑Problem found
_____	❑No problem	❑Problem found
_____	❑No problem	❑Problem found
_____	❑No problem	❑Problem found
_____	❑No problem	❑Problem found
_____	❑No problem	❑Problem found
_____	❑No problem	❑Problem found

Attachment 4.

VILLAGE OF ORLAND HILLS
COMPLAINT/INQUIRY FORM

TAKEN BY: _____ COMPLAINT #: _____

ROUTED TO: _____ DATE: _____

COPY TO: _____ TIME: ___:___AM/PM

==========

COMPLAINT ADDRESS: _____

COMPLAINT: _____

_____

_____

_____

COMPLAINANT: _____

ADDRESS: _____ COMPLAINANT WANTS A REPORT: _____

HOME NUMBER: _____ CALL: Y OR N SEND COPY: Y OR N

==========

ACTION TAKEN: _____

_____

_____

_____

DATE: _____ INVESTIGATOR: _____

TALKED TO: _____

==========

DATE CLOSED: _____ HANDED NOTICE TO: _____ DATE:_____

DATE FOLLOW UP: _____ DATE POSTED NOTICE: _____

REFERRED TO: _____ DATE SENT NOTICE: _____

==========

DATE COMPLAINANT NOTIFIED OF ACTION TAKEN:_____

CALLED: Y OR N SENT COPY: Y OR N

==========

Misc: _____

Attachment 5. Private property notice format

Date

Name
Address

Certified Mail Receipt No.

Dear Name:

This letter is official notification that property owned by you is in violation of the Municipal Code of the Village of Orland Hills, Illinois. The [stormwater detention facility/stream channel] has not been kept clear of debris as required by Section 95.05 of the Municipal Code. Specifically, the following problems have been found:

_____

_____

_____

_____

To rectify this violation, please remove the debris within ten days of the date of this letter. Failure to meet this deadline can be cause for a fine as well as the cost of abating the violation.

If you have any questions on this notice, please call _____[name]_____, Building Commissioner, at 349-4887.

Sincerely,

[Name]

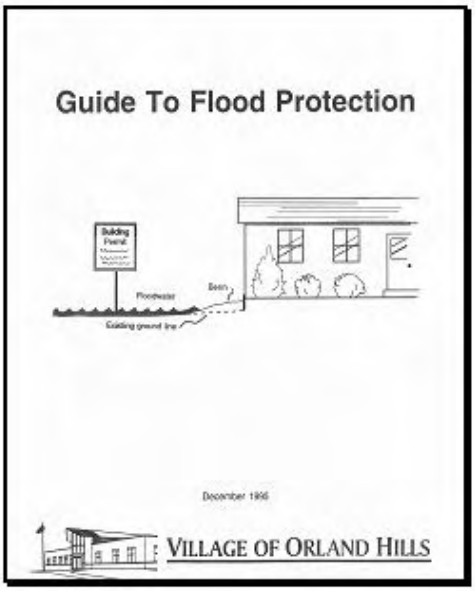
Building Commissioner

cc: [Name] Chief of Police

Excerpts from Orland Hills' *Guide to Flood Protection*

1. Flooding in Orland Hills

Orland Hills' drainage system is subject to three flood problems: yard drainage problems, underdesigned or obstructed storm sewers, and overbank flooding from Tinley Creek and certain detention areas. This guide reviews these problems and what can be done about them.



Yard drainage: When an area is laid out for development, strips along the lot lines are set aside to carry water. Usually a five or ten toot easement is established. This is shown in the figure below. When the lot is built on, there should be no construction in this easement.

Filling on the lot should slope to the easement so drainage will run away from the building. A shallow depression or *swale* is kept along the lot lines. The swale guides stormwater runoff to the front or back yards where it is sent to the street or storm sewer. Downspouts and sump pump discharge pipes should point to the swale so excess water is drained properly.

Over the years, this yard drainage system has been disrupted. Many property owners are not aware of the need to keep their easements and swales open. They installed sheds, planters, railroad ties or swimming pools in the easements. They built fences right on their lot lines to enclose the largest part of their properties. As a result, the water stands in the yards because it cannot go anywhere. Eventually it percolates into the ground.

Storm sewers: Storm sewers have been installed in some areas of town to augment the drainage system. *Inlets* collect water in the streets or gutters. Stormwater flows through the pipe to a larger sewer or a body of water.

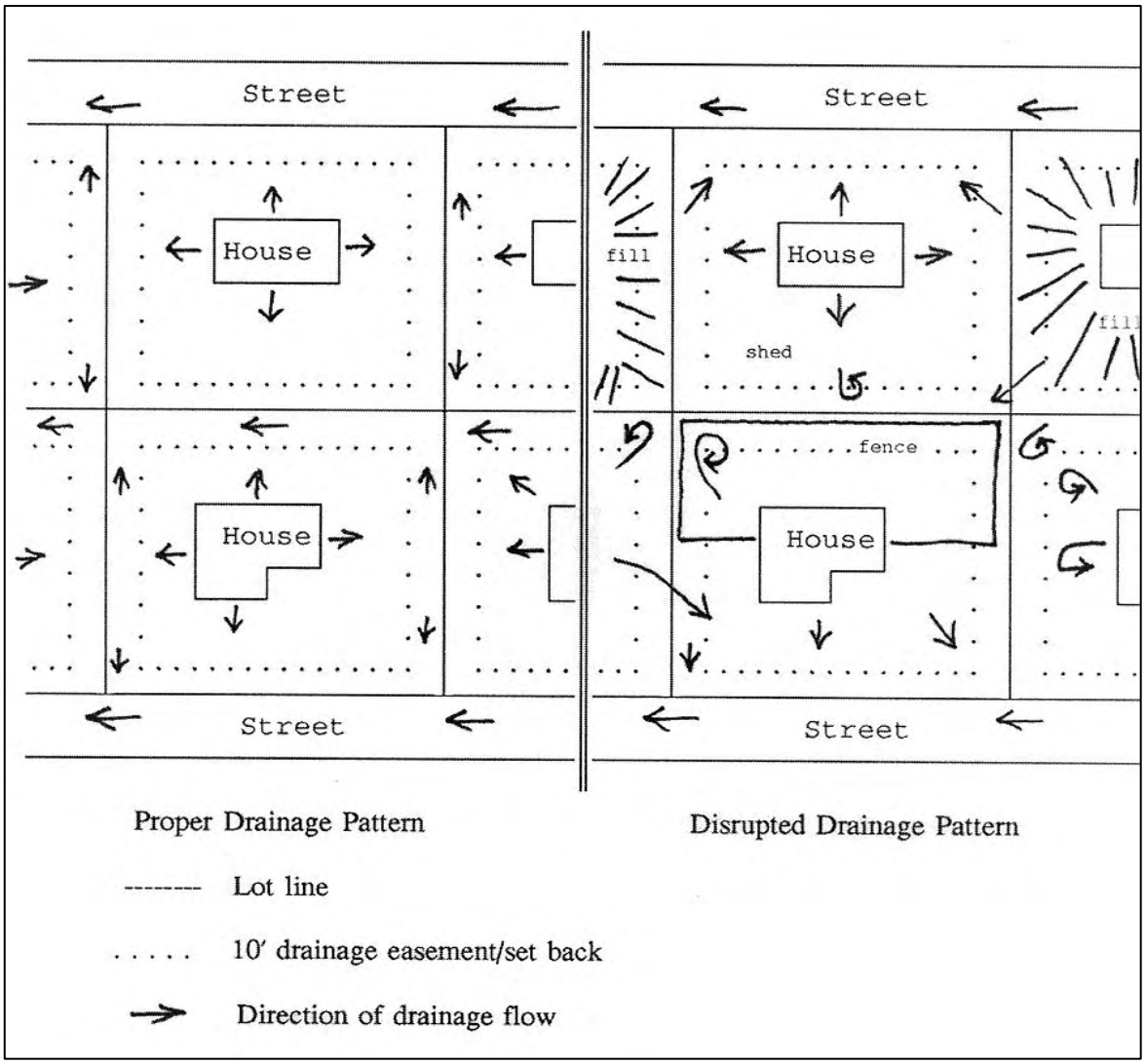
When storm sewers work, the streets and yards are drained quickly. Storm sewers won't work if they are underdesigned or when they are blocked. Blockages can be caused by debris in the inlet, an outlet or *outfall* that is underwater, a broken pipe, or debris or sediment in the pipe.

Overbank flooding: The swales, streets and storm sewers carry water to detention ponds or to Tinley Creek. When these become overloaded, water leaves their banks and floods neighboring properties. The overbank flood problem areas are shown on the map on page 3. The Village's largest problem is flooding from Tinley Creek.

Sometimes, the result of flooding is a nuisance, such as wet streets or a soaked backyard. However, either shallow water on the surface or saturated ground can cause flooding several feet deep on a floor that is below grade. Some houses in Orland Hills do not have finished basements because of chronic flooding.

• • •

3. Flood Protection Regulations



As shown on page 2, every lot was built so water would flow away from the building and along property lines to the street, storm sewer, or ditch. Fences, railroad ties, landscaping and regrading block this flow. So do construction projects in the ditches or the floodplain.

Every piece of trash can contribute to flooding. Even grass clippings and branches can accumulate and plug channels. If your property is next to a ditch or storage basin, please do your part and keep the banks clear of brush and debris.

Do not dump or throw anything into the ditches or basins. Dumping in our ditches and storage basins is a violation of Village Code.

Always check with the Building Department before you build on, fill, alter, or regrade your property. A permit is needed to ensure that such projects do not cause problems on other properties.

If you see dumping or debris in the ditches or basins, filling or construction near property lot lines, or filling or construction in the floodplain shown on page 3 without a permit sign posted, contact the Village at 349-6666. The debris or project may cause flooding on your property.

Jefferson Parish's CDR Procedures

Jefferson Parish covers an extensive area around the City of New Orleans. Much of the Parish lies below the level of the Mississippi River and is protected by an extensive levee system. An effective drainage program is vital to the Parish and its residents. If the canals are clogged or the pumps don't work, even a small storm can cause widespread flooding.

Keeping the canals clear is vital to protecting Jefferson Parish properties from flooding.

Because of this, the Parish has always conducted a drainage maintenance program with frequent inspections. It even has separate Drainage and Drainage Pump Station Departments.

However, the Parish's program was not developed, formalized, or documented just to meet CRS credit. In 1998, formal procedures were prepared to meet the requirements of the National Pollutant Discharge Elimination System (NPDES). These procedures appear on pages 31–41.

The CRS does not require that new procedures be prepared that match the CRS credit criteria. What is needed are written procedures that cover the five items discussed on pages 3–10. Jefferson Parish's NPDES procedures cover most of them.

The remaining were clarified in a memo from the CRS Coordinator in response to questions from the ISO/CRS Specialist. It read as follows:

> *Question:* The procedures note that special inspections are conducted after major events (Section 4.2.1). Does this include after heavy rains? If so, how soon after a storm is an inspection conducted?
>
> > *Answer:* Inspections actually begin during the event. Standby crews (if after hours) are deployed to inspect, clean catch basins and clean and flush drain lines. Other Drainage Department employees from Director, Asst Director, Engineers, Superintendents, Inspectors, etc., are deployed to inspect canals, neighborhoods, etc.. After storm events, when water levels recede, all canals in Jefferson Parish are reinspected within a day or two.
>
> *Question:* Section 4.1.2 shows that inspections are made in response to citizen complaints. How soon after a complaint is an inspection conducted?
>
> > *Answer:* Our goal is to provide at least an interim response within 2 days of receipt of complaint.

Question: How soon after an inspection reveals a problem is a maintenance action taken?

Answer: This is highly dependent on the total number of complaints received and the nature of the complaint. At normal levels, most complaints are addressed within two weeks.

Question: Does your program identify specific problem sites that are inspected and maintained differently or more frequently than other parts of the drainage system? If so, please provide a couple of examples.

Answer: Areas where recent maintenance work has been performed are inspected to determine effectiveness of improvements. Areas of the parish known to be at lower elevations than surrounding areas and areas where complaints have been received are inspected. Also, areas of construction work in-progress are inspected to ensure drainage is not impeded by temporary dams, equipment, sedimentation, etc..

A separate (and very large) map of the drainage system was reviewed by the ISO/CRS Specialist, but is not included in this publication.

Records: On page 10, it is noted that records should cover

- ✓ Complaint or inquiry forms for recording reports of problems,
- ✓ Inspection forms that show everything that was checked,
- ✓ Work orders that task an office to clear debris or correct a problem, and
- ✓ Maintenance records that show the work that was done.

Because the Parish is a large organization, an automated record-keeping system has proven very helpful to keep track of complaints and follow-up work. On page 42 is a copy of a Service Request form that was completed in response to a citizen complaint. On the following page is the work order, which includes notes on when the work was accomplished.

On page 44 is the form used to record inspections. It was developed to organize weed control efforts. The staff members that check the spraying also inspect for debris and other problems. Their findings are noted in the "remarks" column.

Jefferson Parish Drainage Inspector.

SYSTEM MAINTENANCE PROGRAM

FOR

JEFFERSON PARISH

NPDES MS4 PERMIT

December 1998

Prepared For:

The Parish of Jefferson, Louisiana

Prepared By:

MONTGOMERY WATSON
3501 N. Causeway Blvd., Suite 400
Metairie, Louisiana 70002
(504) 835-4252

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NOTE: *Page numbering has been changed from the original to correspond to the page numbers in this document.*

SECTION 1

INTRODUCTION

This System Maintenance Program (SMP) has been prepared in accordance with the National Pollutant Discharge Elimination System (NPDES) Permit requirements. This SMP summarizes Jefferson Parish's operations and maintenance policies and procedures to reduce the discharge of pollutants to waters of the United States. This section provides background information on the regulatory aspects of controlling storm water pollution as well as general requirements on the SMP as determined by the final NPDES Permit issued to the Jefferson Parish Municipal Separate Storm Sewer System (MS4).

1.1 BACKGROUND

A final NPDES Permit, No. LAS000201, was issued to the Parish of Jefferson, Louisiana Department of Transportation and Development—District 02, City of Gretna, City of Harahan, City of Kenner, and City of Westwego to discharge from all portions of the Jefferson Parish MS4 to waters of the United States in accordance with the Storm Water Management Program (SWMP). The final NPDES Permit was issued by the United States Environmental Protection Agency (USEPA) on January 17, 1997, and became effective on March 1, 1997.

The NPDES MS4 Permit requires Jefferson Parish and the incorporated Cities of Gretna, Harahan, Kenner, and Westwego to develop, revise, and implement a comprehensive SWMP. The SWMP shall include administrative, non-structural, and structural practices to reduce the discharge of pollutants from the Municipal Separate Storm Sewer System to the Maximum Extent Practicable (MEP).

One of the requirements of the SWMP is the development and implementation of a System Maintenance Program by each permittee. This document outlines Jefferson Parish's policies and procedures to comply with the SMP portion of the NDPES permit.

Furthermore, Part II—Section A.1 "Structural Controls and Storm Water Collection System Operation" of the permit identifies the criteria for the development of the System Maintenance Program as follows:

"1. Structural Controls and Storm Water Collection System Operation: The Municipal Separate Storm Sewer System and any storm water structural controls shall be operated in a manner to reduce the discharge of pollutants to the Maximum Extent Practicable."

1.2 PURPOSE

This SMP was prepared to summarize Jefferson Parish's operation and maintenance policies and procedures to reduce the discharge of pollutants into waters of the United States.

The practices included in this program include administrative actions such as reporting and ordinance control; non-structural controls such as inspection and open drainage canals maintenance; and structural alternatives such as pump stations bar screens.

1.3 JEFFERSON PARISH JURISDICTION

1. Who is responsible

Jefferson Parish is responsible for the design, construction, and operation and maintenance of all storm water drainage canals and pump stations within the MS4 boundary. The City of Gretna is an exception to this, with the city being responsible for the operation and maintenance of all open drainage canals and ditches within its city limits. Jefferson Parish is not responsible for subsurface drainage lines within the city limits for the incorporated cities of Gretna, Harahan, Kenner, and Westwego.

SECTION 2

JEFFERSON PARISH'S DRAINAGE SYSTEM

2.1 STORM WATER DRAINAGE SYSTEM

2. Area covered

Jefferson Parish's topographical characteristics, below sea level elevations, have necessitated unique facilities such as protective levees, open drainage canals, and pump stations to provide adequate drainage and flood protection. Over the years, Jefferson Parish's separate storm sewer system has evolved into a system of over 280 miles of open drainage canals and ditches for collection and conveyance of storm water runoff.

Jefferson Parish drainage system serves approximately 79,000 acres of industrial, commercial, residential, and unclassified areas. The storm water system's service area is bounded on the north by Lake Pontchartrain, on the west by St. Charles and Lafourche Parishes, on the south by the Gulf of Mexico, and on the east by Orleans and Plaquemines parishes. The system is subdivided into four main basins with boundaries provided by the Mississippi River, Harvey Canal, parish boundaries, and flood protection levees.

In addition to the 280 miles of open canals and ditches, Jefferson Parish maintains approximately 1,370 miles of subsurface drain lines providing local drainage to the urban life style. Storm water runoff from residential, commercial, and industrial land areas are drained via drop inlet. Subsurface drainage lines convey storm water into open drainage canals. Finally, storm water is discharged into waters of the United States through several high capacity pump stations.

2.2 DRAINAGE PUMP STATIONS

Most of the land surface within Jefferson Parish is at or below sea level elevations. This topographical characteristic has created a "saucer" effect in the drainage basin. Therefore, Jefferson Parish has, over the years, designed and constructed several high capacity pump stations to convey collected storm water runoff within the storm water drainage system to waters of the United States.

Jefferson Parish currently owns and operates forty-seven pump stations to minimize local flooding. All pump stations combined have the capacity to pump storm water at a rate of approximately 23 billion gallons of rainfall per day. Thirty-five of these pump stations discharge into water of the United States, while twelve are internal pump stations to lift storm water from low drainage areas.

The Jefferson Parish Drainage Department currently maintains a constant water level in the canals to minimize fluctuating groundwater and to reduce regional subsidence and canal bank slope failures. The operation of the pump stations in this manner renders the open drainage canal system as very long, slender retention basin.

1. Who is responsible

SECTION 3

JEFFERSON PARISH DEPARTMENTS' RESPONSIBILITY

Operation and maintenance of the storm water drainage system is the primary responsibility of the Jefferson Parish Drainage Department. However, additional Jefferson Parish Departments assist the Drainage Department in the maintenance and operation of the storm water collection system.

The following departments are involved, either directly or indirectly, in the maintenance of Jefferson Parish's drainage system:

1. Drainage Department;
2. Drainage Pump Stations Department
3. Streets Department;
4. Parkways Department;
5. Environmental and Development Control Department; and
6. Supervisory Control and Data Acquisition Department.

3.1 DRAINAGE DEPARTMENT

The Jefferson Parish Drainage Department is the leading department for operation and maintenance of the storm water collection system. The Drainage Department's primary responsibility is to operate the drainage system properly throughout the Parish to prevent areas of flooding during rain events. In addition, standard operating and maintenance practices minimize the potential for contaminated storm water runoff to enter receiving water bodies.

3.2 DRAINAGE PUMP STATIONS DEPARTMENT

The Drainage Pump Stations Department's primary responsibility is to maintain and operate all drainage pump stations. The Drainage Pump Stations Department also works in coordination with the Drainage, Streets and Parkways Departments to inspect and clean pump station bar screens.

3.3 STREETS DEPARTMENT

The Streets Department assists Jefferson Parish Drainage Department in the maintenance of the storm water collection system. Such practices include periodic cleaning and flushing of smaller diameter (24-inch and less) subsurface drain lines. Additionally, the Streets Department provides inspection and cleaning of bar screens at selected pump stations during heavy rainfall events to improve storm water removal.

3.4 PARKWAYS DEPARTMENT

The Parkways Department assists the Drainage, Streets and Drainage Pump Stations Departments in the inspection and cleaning of selected pump station bar screens during heavy storm events and emergency situations. This practice serves to maintain the hydraulic capacity of the pump station and, in turn, reduces pollutant loading to the receiving waters.

3.5 ENVIRONMENTAL AND DEVELOPMENT CONTROL DEPARTMENT

The Environmental and Development Control Department (EDCD) is involved with a number of programs that directly and indirectly affect storm water runoff quality. EDCD works with the Drainage Department to investigate illicit discharges to the storm water collection system.

EDCD personnel also respond to incidents involving hazardous materials that pose an exposure risk to any drainage lines. The EDCD works with the Department of Emergency Management and various fire departments to contain spills and protect the environment. Jefferson Parish has a contract with an Environmental Response Contractor to allow for immediate containment and cleanup of spilled material.

In the event a spilled material enters the underground storm water collection system, the Drainage Department assists the EDCD to locate the outfall location within the open

drainage system for containment and cleanup. The design of the drainage system allows for spills to be contained and held in the canals when it is not raining; thereby, preventing the material from reaching the receiving waters. The pump stations operate independently of each other; thus, allowing a pump to be run at a different station, if one station is affected by a spill. These pumps can also be used to move the water to a location where it can easily be removed from the drainage system. Temporary earthen dams can also be constructed to contain the material.

3.6 SUPERVISORY CONTROL AND DATA ACQUISITION DEPARTMENT

The Supervisory Control and Data Acquisition (SCADA) Department works with the Drainage and Drainage Pump Stations Departments to monitor the water levels in canals, rainfall quantities throughout the Parish, and pump station operations for the purpose of optimizing the operation of the drainage system.

SECTION 4

MAINTENANCE PRACTICES AND PROCEDURES

This section addresses Jefferson Parish's operation and maintenance procedures to reduce the discharge of pollutants from the storm water collection system into receiving water bodies.

Jefferson Parish uses many programs to control discharges from its storm water collection system. These programs include structural controls and non-structural controls, such as source controls and controls through ordinance. Structural controls are used to increase the hydraulic capacity of the storm water drainage system. Non-structural controls are primarily through source control and elimination to reduce pollutants entering the storm water drainage system. Non-structural controls include periodic cleaning operations and monitoring programs.

4.1 ADMINISTRATIVE PROCEDURES

Administrative procedures presented herein include preventative actions through management and source control by implementing policies and ordinances that result in prevention of pollutant runoff. In addition, Jefferson Parish responds to citizens' complaints regarding trash, debris, or illicit discharges within the storm drainage system, by cleaning up the materials.

4.1.1 Jefferson Parish Ordinances

Jefferson Parish uses its legal power to create, adopt, and implement ordinances to control discharges into the storm water collection system. Many of the ordinances implemented by Jefferson Parish render it illegal and punishable by law to pollute the storm water collection system. More specifically, Section 16-10 of the Jefferson Parish Code of Ordinances prohibits littering and dumping of any debris, trash, or garbage into any drainage canals, ditches or drainage catch basins.

4.1.2 Citizens Complaints

Public involvement and participation is a critical key to the success of improving storm water runoff quality. The creation of education programs is vital to inform citizens about the impacts that storm water runoff and discharges have on the water quality of the receiving body.

Citizen complaints associated with the storm water collection system are investigated and corrected by the Drainage Department or EDCD. These investigations serve to identify problem areas and facilitate the expedient scheduling and implementation of corrective action.

4.1.3 Spill Prevention Plan

Each Drainage pump station that stores diesel fuel, above threshold quantities, has a Spill Prevention Control and Countermeasure (SPCC) Plan, which has been developed per the provisions of 40 *CFR* Part 112. These plans outline emergency contacts and procedures to follow should a spill occur at a drainage pump station. In addition to the SPCC, drainage pump stations have Storm Water Pollution Prevention Plans (SWPPP) describing Best Management Practices (BMPs) implemented at each pump station to prevent the runoff of pollutants into the drainage system.

4.2 NON-STRUCTURAL CONTROLS

Non-Structural controls are implemented through BMPs that reduce the discharge of pollutant runoff. Jefferson Parish's BMPs include visual inspections, litter control, drainage canal maintenance, and vegetative control.

4.2.1 Drainage Canals Inspections

Parish personnel visually inspect all major drainage canals every two weeks. In addition to the routine biweekly inspection, parish personnel inspect drainage canals following parades and special events (e.g., Mardi Gras, Saint Patrick's Day, etc.). During visual inspection, parish personnel identify canal bank failures due to erosion and nutria damage, accumulated litter, and undesirable vegetation.

4.2.2 Subsurface Drainage System Maintenance

The Drainage Department performs periodic, annually or as needed, cleaning activities at catch basins, drop inlets, and subsurface drainage lines by using vacuum trucks. The primary objective is the removal of accumulated sediment and unwanted litter, such as cans, bottles, and trash. The Streets Department assists the Drainage Department by cleaning and flushing of smaller diameter (24-inch and less) subsurface drain lines. The Drainage Department is responsible for maintenance of larger subsurface drainage lines.

Providing periodic removal of sediment, debris, and vegetation blocking catch basins and ditches improves the hydraulic capacity of the storm water drainage system. Also, this non-structural control reduces the discharge of pollutants (e.g., solids, floatables) to the receiving water body.

4.2.3 Canal Bank Stabilization

During biweekly inspections, parish personnel identify canal bank failures due to shoulder erosion. The Drainage Department normally maintains a 2:1 slope in all canal banks to prevent bank failure. Parish personnel repair collapsed banks with limestone and/or toe retention bulkhead. In addition, canal banks and rights-of-way are seeded to prevent erosion.

4.2.4 Drainage Canals Dredging

Earthen drainage canals are dredged to remove accumulated sediments and to improve the hydraulic flow through the canals. Dredging activities are normally performed with long reach excavators. A private contractor conducts dredging operations at drainage canals exceeding 80 feet in width. As a normal operating procedure, sediment and silt removed from canal bottoms are properly placed within canal shoulders and properly compacted. The private contractor seeds the canal bank and shoulder to control erosion. Any excess material is properly reused or disposed of.

4.2.5 Litter Control

Litter and trash accumulated within the storm water collection system is removed and properly disposed of by parish personnel during standard biweekly inspections.

4.2.6 Vegetation Control

Vegetative cover reduces erosion and serves as a filter for potential pollutants that may otherwise enter the drainage system.

Vegetation control on canal banks is performed through a combination of mowing and herbicide application. The vegetative control method selected for use at a site is dependent upon the site accessibility, the amount of vegetation to be controlled, the

length of the growing season, and available resources and personnel. The Drainage Department uses in-house personnel and private contractors to maintain canal banks within Jefferson Parish. Jefferson Parish selects a private herbicide application contractor to assist the Drainage Department to control vegetation for intervals of two years. The private contractor properly disposes of all collected debris and litter.

4.2.7 Herbicide Management

Jefferson Parish has developed a Pesticide, Herbicide, and Fertilizer Program. Herbicide application is conducted in areas not accessible by mechanical equipment. Jefferson Parish's departments that use herbicides follow all applicable state and federal regulations. Each department has personnel certified in the commercial application of pesticides by the Louisiana Department of Agriculture and Forestry to coordinate all herbicide applications in his/her department.

4.2.8 Drainage Pump Stations Bar Screens Maintenance

The Drainage Department also works in conjunction with the Streets, Parkways, and Drainage Pump Station Departments to inspect and clean pump station bar screens so that the proper hydraulic capacity of the pump stations is maintained. These operation and maintenance practices of the Drainage Department serve to reduce pollutant loading to the receiving waters in addition to their primary purpose of maintaining proper water flow through the drainage system. All material and debris removed is properly disposed of at a permitted solid waste disposal facility.

4.2.9 Storm Water Drain Stenciling

A program where volunteers stencil warnings, such as, "DUMP NO WASTE, DRAIN TO LAKE" for the East Bank drains or "DUMP NO WASTE, DRAIN TO BAYOUS" for the West Bank drains has been implemented. Jefferson Parish provides kits containing stencils, paint, wire brush, and directions to local civic organizations, schools, and youth groups. In addition, EDCD personnel stencil all drains where reports of illicit discharges have occurred. This program increases public awareness of how households contribute to storm water pollution.

4.3 STRUCTURAL CONTROLS

Jefferson Parish's structural controls include catch basin covers and vegetative areas to reduce the discharge of pollutant runoffs.

4.3.1 Drainage Canals

Jefferson Parish Drainage Department currently maintains a constant water level in the canals to stabilize fluctuating groundwater and to reduce regional subsidence and canal bank slope failures. The operation of the storm water collection system in this manner renders the open drainage canal system as very long, slender retention basins. This system enhances settlement of sediment and solids, which are later removed during dredging operations.

Because of protective levees for flood protection, Jefferson Parish utilizes several pump stations to remove storm water from its collection system into waters of the United States. Storm water can be contained within the drainage canals, during emergency situations (e.g., spills), to prevent contaminants from reaching waters of the United States by utilizing spill containment measures described in Section 3.5.

4.3.2 Drainage Pump Stations Bar Screens

Jefferson Parish has, over the years, designed and constructed several high capacity pump stations to convey collected storm water runoff within the storm water drainage system to waters of the United States. Bar screens have been installed at all drainage pump stations to remove floatables and to protect downstream operations and equipment from damage. Bar screens are designed to prevent heavy debris from entering the receiving water body.

JEFFERSON PARISH PUBLIC WORKS
DRAINAGE DEPARTMENT

SERVICE REQUEST

SERVICE REQUEST NO.

SR00-45078

EAST: XXXX

WEST:

DATE REQUESTED

13-NOV-00

TIME REQUESTED

LOCATION

817 MARGUERITE RD
near EDDY
METAIRIE - Council District #5

NATURE of REQUEST

4A4 - CLEAN & FLUSH - COMPLAINTS

TAKEN B

D MENA

SOURCE

CITIZEN

REQUESTED BY

MR. MCGRAW
817 MARGUERITE RD

REMARKS

STORM DRAIN STOPPED UP DM
NIGHT DISPATCHER

INVESTIGATION REPORT: _____

RECOMMENDED ACTION: _____

INSPECTOR: _____ DATE: _____

JEFFERSON PARISH PUBLIC WORKS
DRAINAGE DEPARTMENT

WORKORDER

Workorder No. WO00-37741

Generated By SR00-45078

LOCATION 817 MARGUERITE RD near EDDY

AREA METAIRIE - COUNCIL DISTRICT 5

REQUESTED BY MR. MCGRAW

Foreman	Issue Dat	Start Date	End Date
K. CARSTENS	11/13/2000	11-15-00	11-15-00

Work Completed YES NO

Close Workorder YES NO

Work to be Preformed

Id.	Description
4A4	CLEAN & FLUSH - COMPLAINTS

CL/FL AS NEEDED.

JOB TIME

10 - 7

10 - 8

ENTERED

WORK COMPLETED

CLEANED (2 C/B 150' 12,15")

REMARKS Reffered to Maint.

Superintendents: [illegible]

Date: 11-15-00

ACT

Oct. 16 - 31 2000

INSPECTED BY :
CHRIS DUNN SUPT. I

./DITCH	DATE SCHEDULED/ SPRAYED	DATE OF INSPECTION	TOP COND.	SLOPE COND.	BOTTOM COND.	DATE OF CUT	REMARKS	VISUAL INSPECTION FROM - TO
	10/16/00							ENTIRE LENGTH - 10/19/00
							10/20/00 - PICKED UP TRASH AND DEBRIS ALONG CANAL BANK BY HAND 10/25-26/00 - CUT GRASS BY HAND ALONG CANAL BANK	ENTIRE LENGTH - 10/19/00
	10/13/00	10/25/00			BROWNING WELL		10/17/00 - CLEANED UP TRASH + DEBRIS ALONG SECT. OF CANAL	ENTIRE LENGTH - 10/25/00
						10/27/00 K	10/17/00 - MOWED GRASS ALONG TOP OF CANAL W/BUSHHOG 10/25/00 - CLEANED UP TRASH ALONG CANAL BY HAND 10/30-31/00 - MOWED GRASS ON R.O.W. W/BUSHHOG	ENTIRE LENGTH - 10/25/00
	RESPRAY 10/16/00	10/25/00			BROWNING WELL		10/26/00 - PICKED UP TRASH ALONG CANAL BANK BY HAND 10/27/00 - 10/30/00 -	ENTIRE LENGTH - 10/25/00
								ENTIRE LENGTH - 10/30/00
								ENTIRE LENGTH - 10/18/00

American Fisheries Society Guidelines

The next three pages are from The Wildlife Society and American Fisheries Society's *Stream Obstruction Removal Guidelines*. To order, see page 59.

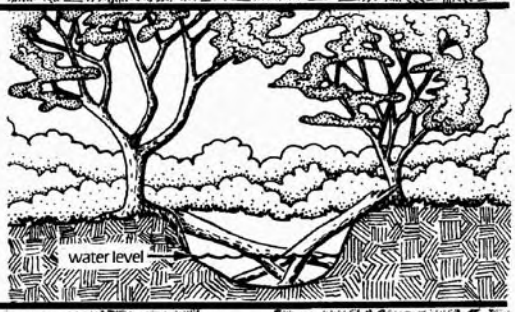
Definition of Stream Obstruction Conditions

Condition One

These stream segments have acceptable flow and no work would be required. They may contain various amounts of instream debris and fine sediment, such as silt, sand, gravel, rubble, boulders, logs and brush. In certain situations flow may be impeded, but due to stream and land classification or adjacent land-use, this is not a problem.

Condition Two

These stream segments currently have no major flow impediments, but existing conditions are such that obstructions are likely to form in the near future, causing unacceptable problems. This condition is generally characterized by small accumulations of logs and/or other debris which occasionally span the entire stream width. Accumulations are isolated, not massive and do not presently cause upstream ponding damages.

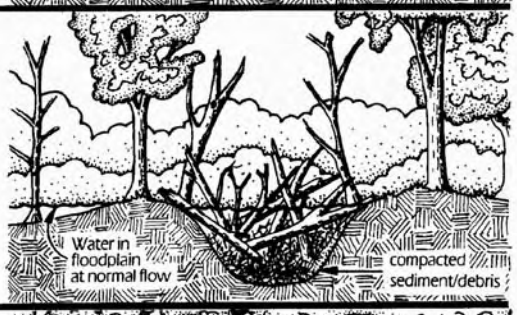


Condition Three

These stream segments have unacceptable flow problems. Obstructions are generally characterized by large accumulations of lodged trees, root wads, and/or other debris that frequently span the entire stream width. Although impeded, some flow moves through the obstruction. Large amounts of fine sediment have not covered or lodged in the obstruction.

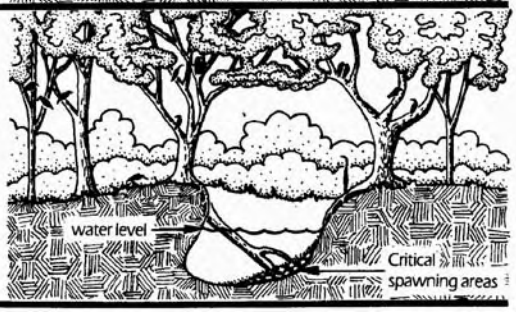
Condition Four

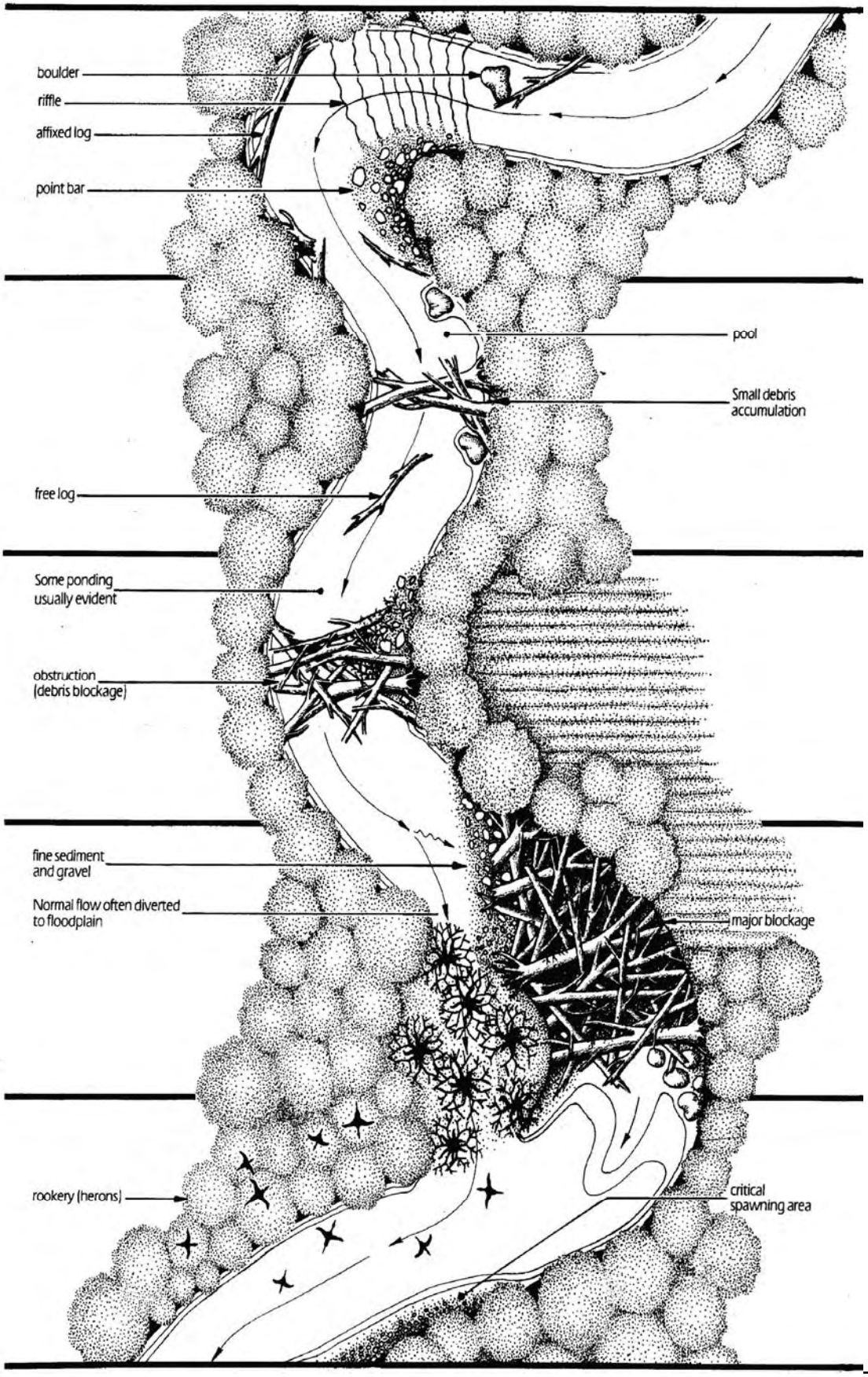
These stream segments are characterized by major blockages causing unacceptable flow problems. Obstructions consist of compacted debris and/or sediment that severely restricts flow.



Condition Five

These stream segments possess unique, sensitive, or especially valuable biotic resources and should be dealt with on a case-by-case basis. Examples include, but are not limited to: Areas harboring rare or endangered species, shellfish beds, fish spawning and rearing areas, and rookeries.




boulder
riffle
affixed log
point bar
pool
Small debris accumulation
free log
Some ponding usually evident
obstruction (debris blockage)
fine sediment and gravel
Normal flow often diverted to floodplain
major blockage
rookery (herons)
critical spawning area

Material Removal

General Criteria

No stream work, including bank clearing, repositioning, or removal of material, should be allowed except at specific locations where unacceptable flow problems occur or may occur in the near future. Where stream work is needed, access routes for equipment should be selected to minimize disturbance to the floodplain and riparian areas (Figure 12). Channel excavation and debris removal also should be accomplished in a manner that minimizes clearing of vegetation. The smallest equipment feasible should be used. If tributaries or distributaries must be disturbed by the project, they shall be restored when the work is completed. All disturbed areas shall be reseeded or replanted with plant species which will stabilize soils and benefit fish and wildlife.

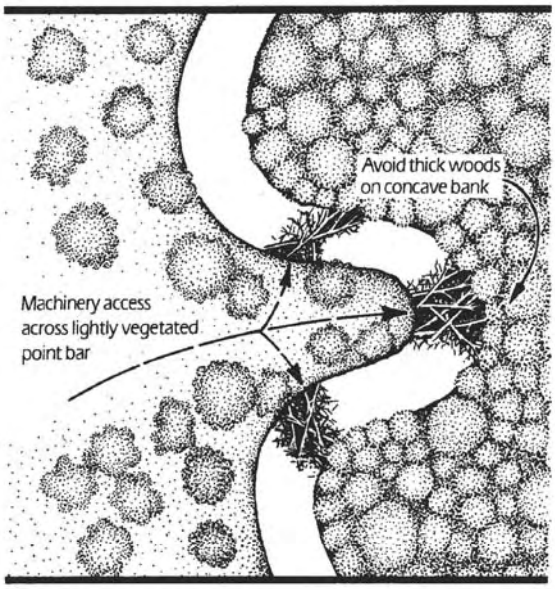


Figure 12. **Schematic plan for machinery access to selected debris blockages designed to protect stream bank vegetation.**

Specific Criteria

Condition One Segments. No work shall be conducted in Condition One Segments.

Condition Two Segments. Equipment that will cause the least damage to the environment shall be selected for performing the work. First consideration will be given to the use of hand operated equipment such as axes, chain saws, and winches to remove accumulations (Figure 13). Boats with motors may be used where needed (Figure 14). When the use of hand operated equipment is not feasible, heavier equipment may be used. Examples include: small tractors, backhoes, bulldozers, log skidders, and low PSI equipment (Figure 15). Equipment shall be operated in a manner that results in the least damage to vegetation and soils of the project area. In some cases explosives may be used resulting in less damage. Debris designated for removal from the stream or floodway should be removed or secured in such a manner as to restrict its re-entry into the channel. Generally, it should be positioned so as to reduce flood flow impediment.

Condition Three Segments. Equipment limitations will be the same as for condition two segments. Work shall be accomplished within the channel or from one side of the channel where possible (Figure 16). Selective tree clearing shall be limited to the minimum clearing necessary for equipment access and efficient operation of equipment on the worked side of the channel. Disposal of material may be accomplished by removing it from the floodplain or by burning, burying, or piling, as appropriate, with the minimum amount of disturbance to vegetation. Piled debris shall be gapped at frequent intervals and at all tributaries and distributaries.

Condition Four Segments. Blockage removal may employ any equipment necessary to accomplish the work in the least damaging manner (Figure 17). Work should be accomplished from one side of the channel, where practical. Material shall be disposed in accordance with guidelines presented above for condition three segments (Figure 18). Spoil piles should be constructed as high as sediment properties allow. The placement of spoil around the bases of mature trees should be avoided.

Condition Five Segments. Special provisions for protecting unique, sensitive, or productive biotic resources shall be developed by appropriate professionals on a case by case basis.

Subsequent Maintenance

Stream conditions shall be monitored on a regular basis and maintenance work shall be conducted in accordance with the guidance contained herein.

Figure 13. **Chainsaw being used to cut log so that it can be pulled with small hand winch and repositioned along stream bank.**

Capital Improvements Program

For the basic credit for CDR, one-time-only projects like channel alterations are not credited. However, additional credit is provided if the community has an ongoing program, such as a capital improvements plan and budget, to eliminate or correct problem sites or to construct new drainage facilities.

Capital Projects

Possible capital improvement projects could include

- ✓ Reconstructing or enlarging bridge openings or culverts
- ✓ Modifying a channel
- ✓ Dredging or removing sedimentation
- ✓ Installing permanent hard or soft bank erosion control measures
- ✓ Reconstructing inlets and outlets
- ✓ Installing grates to catch debris
- ✓ Constructing new storage basins to reduce flows into existing channels
- ✓ Replacing pumps.

A channel modification is an example of a capital project, not annual maintenance.

The community's program must have the following three components to receive credit under the CRS program:

1. A master list of the community's drainage maintenance problem sites.

   - ✓ The project sites must be part of the community's drainage system defined in the drainage maintenance procedures. Projects to improve road drainage or storm sewers can only be credited if the roadside ditches or sewers are identified in the community's CDR procedures and are regularly inspected and maintained.
   - ✓ If the program covers only the one community, the list can be prepared from a master plan, complaints or reports from maintenance crews. Projects do not have to be prioritized or listed in any order. For example, the community may determine which projects will be funded at the beginning of each fiscal year.
   - ✓ If the program covers more than one community, then the list of projects must be prepared from a master plan, not solely on complaints or an ad hoc basis.
   - ✓ The list must be updated at least annually.

2. Recommended correction measures for each problem site. The recommended measures do not need be the result of detailed plans or studies. They may be simple statements such as "enlarge culvert" or "stabilize stream bank."

3. Documentation that funds are spent annually on a project or projects. This may be a multiple year capital improvements budget or a line item in several years' budgets.

Note that infrequent capital expenditures are not credited. However, if the community has a master plan that shows that few or no capital improvements are needed, then a program that funds a project only every few years can be recognized.

Credit for past capital improvements may be provided if a community can demonstrate that past drainage improvement activities have corrected all problem sites. This credit must be documented with a signed and sealed engineer's statement included with the community's annual CRS recertification. The ISO/CRS Specialist will review the latest list of NFIP claims for the community during the verification visit. Credit will not be given if damage can be contributed to a problem that a capital improvement program could have prevented. The following is an example engineer's certification:

> As a result of past work and current regulatory requirements, the drainage system is operating with no problem areas. Regular inspections and maintenance will continue. At this time, I am not aware of any capital improvements needed to correct drainage problems.

Once a capital improvements project is completed, it may qualify for CRS credit under Activity 530 (Flood Protection). Projects that protect repetitive loss properties receive higher credits in Activity 530.

CRS Credit

The capital improvement program is worth 50 points. The points are added to the other points for CDR. If the community does not have a regular maintenance program that receives CDR credit for covering the five items on pages 3–10, there is no credit for a capital improvements program.

Documentation

The documentation must be sufficient to show that there is a capital improvements program. This requires two things:

- ✓ A long term plan, such as a drainage system improvements plan that describes the problems, recommends projects, and estimates annual funding needs for the next several years.
- ✓ An excerpt from the community's annual budget or capital improvements budget, provided it identifies multi-year expenditures. There must be one or more line items that clearly show that the funds are budgeted for drainage system improvements rather than routine maintenance. Excerpts from two capital budgets are on pages 50 and 51. Note that these include an explanation of what will be done and why the project deserves funding. This is very helpful in showing the ISO/CRS Specialist how the project is related to drainage maintenance.

Sometimes these documents can be very large books. All that would be needed would be a copy of the title page and one or two pages from the plan or budget that relate to drainage maintenance.

Verification Visit

This credit is verified by reviewing the documentation, so no special activities are conducted during the verification visit.

Annual Recertification

Each year's recertification must include a copy of one or more pages from that year's capital improvements budget. The pages need to show expenditures planned for drainage improvement work, NOT ROUTINE MAINTENANCE.

Excerpt from the Capital Improvements Plan
Nag's Head, North Carolina, 1995-1996

CAPITAL IMPROVEMENTS PLAN – Continued

Capital improvements Plan - The CIP is a long range plan of proposed capital improvement projects to be undertaken over a five-year period. Each project's estimated costs and funding sources were examined earlier this year by the Board of Commissioners. Below is a list of projects recommended for funding this fiscal year.

SOUNDSIDE ROAD DRAINAGE

Soundside Road presently drains by way of an open ditch from the bypass to the Roanoke Sound. The ditch accumulates trash and causes constant public complaints. This project will lessen the flooding condition caused by the restricted flow. The project will increase flow and provide a smoother conduit for water to pass. Piping the ditch will eliminate the annual maintenance of cleaning the ditch which takes approximately two weeks. – $87,000

DANUBE STREET DRAINAGE

This project would involve the reconstruction of the entrance to the Danube Street Access parking lot to allow stormwater to more easily flow into the parking lot. Additionally, a portion of the parking area will be rebuilt to remove the existing stone base and allow for infiltration. – $8,400

Excerpt from the Five Year Capital Improvement Plan
Santa Barbara County, California, 2000 - 2005

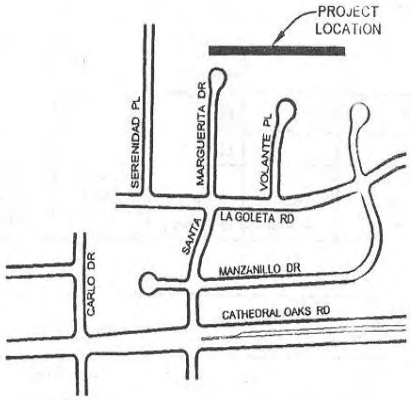
Capital Improvement Projects
($000)

Function: Community Resources & Public Facilities

Department: Public Works

Project: **Channel, Serinidad Interceptor**

StartDate: 02/01/2000 **EndDate:** 12/01/2000



Description

This project consists of the construction of a 6-foot wide concrete interceptor channel and sedimentation basin on a County owned open space parcel behind several homes in the vicinity of Serenidad Place in Goleta. The new channel will replace an existing concrete "v" ditch that has proved inadequate during previous flood events. Mud, rock and debris generated during flood events fill the existing "v" ditch and inundate adjacent residential properties. Debris removal following flood events is done by hand due to the limited accessibility by heavy equipment.

The new channel will provide increased capacity for flood generated debris, and will be wide enough to be cleaned out using a small front-end loader. Construction of the channel and sedimentation basin will reduce the flood hazard to adjacent residential properties, and minimize the maintenance costs associated with debris removal.

The cost of the project will be funded by South Coast Flood Zone benefit assessment revenues. Prior year's expenses include preliminary engineering and final design and acquisition.

Estimated Project Costs

Preliminary	8
Design	3
Acquisition	10
Construction	79
Other	0
Total Cost	100

Impact on Operating Budget

Construction of this project will result in a potential savings to the operating budget due to the reduced debris removal costs. Actual savings amount unknown.

Source of Fund	Fund	Prior Year(s) Expense	Proposed 2000-2001			Projected Requirements				Five Year Total	Future Years	Project Total
			Carry Forward	New Funding	Year 1 Total	Year 2 2001-02	Year 3 2002-03	Year 4 2003-04	Year 5 2004-05			
South Coast Flood Zone	2610	21		79	79					79		100
Totals		21		79	79					79		100

Estimated Operating & Maintenance Costs						

Stream Dumping Regulations (SDR)

Another element of a community's drainage system maintenance program that CRS credits is regulations prohibiting the dumping of trash and debris in streams and storage basins. This element is known by its acronym, "SDR."

Regulatory Language

To receive this credit, the community must have an ordinance or other regulations that meet three criteria.

1. **Prohibit dumping:** The regulations must clearly prohibit dumping any material in a channel or basin that could cause an obstruction to flows.

   An ordinance that prohibits littering in public places or similar general nuisances is not credited. These types of ordinances focus on noxious materials, like garbage. Many non-noxious materials, such as logs, tree limbs, and grass clippings, can obstruct flows. Therefore, the ordinance must specifically address the problem of keeping channels clear of all materials, including brush, fill, and landscape waste, which are normally not covered in a littering ordinance.

2. **Identify who is responsible:** The regulations need to identify an officer or office responsible for monitoring compliance and conducting enforcement actions. It must be clear that if a violation is found, the community or other enforcement agency will pursue it. It is not sufficient to rely on an ordinance that depends on a citizen to initiate a civil suit against a neighbor or other violator.

   Usually the enforcing agency is the police department, environmental control officer, or the building or housing code department. In some states, a state law has qualified for SDR credit. However, those states have field enforcement officers who patrol the streams and have the authority to issue citations.

3. **Address penalties:** Provisions for penalties and abatement of violations are needed. It must be clear that there is a penalty for violating the dumping regulations and that someone has the authority to order the obstruction removed. These provisions do not have to be in the same ordinance – many communities have code books with penalty clauses in different sections.

Regulations, coupled with public information activities, can help prevent pranks, such as filling in this retention basin inlet.

Examples of ordinance or law language are included on pages 56–58. ***NOTE:*** *The example ordinance language provided in this publication comes from actual ordinances used by CRS communities. All ordinance language should be reviewed by local legal counsel before adoption.*

DOUBLE CREDIT—Outreach project. The credit points for SDR are doubled if the community publicizes the regulatory requirements. This can be done by one of four kinds of outreach projects:

1. An outreach project to the community credited under in Activity 330 (Outreach Projects),

2. An outreach project pursuant to the public information strategy (OPS) credited in Activity 330, provided the public information strategy document discusses publicizing drainage system maintenance,

3. An outreach project that advises all residents and businesses in the community about the regulations, but is not credited under Activity 330, OR

4. Posting "no dumping in the stream" signs at key locations in the drainage system, such as frequent problem spots, schools, and public parks.

If alternatives 1, 2 or 3 are used, the annual outreach project must cover the topic of drainage system maintenance. It must inform residents about the regulations and how to report violations. Examples of such projects appear in the box below and on pages 27–28.

Excerpt from Fort Collins, Colorado's newsletter

Drainage System Maintenance

Do not dump or throw anything into the ditches or streams. Obstruction and pollution of our waterways and ditches is in violation of City Code. A plugged channel cannot carry water and when it rains, the water has to go somewhere. Every piece of trash contributes to flooding. Even grass clippings and branches can accumulate and plug channels.

If your property is next to a ditch or stream, please do your part and keep the banks clear of trash and debris. The Utilities has a drainage system maintenance program that inspects the channels regularly and can help you remove major blockages such as downed trees. Please report any debris or dumping in ditches or streams to the Fort Collins Utilities. The debris may increase flooding on your property.

CRS Credit

If the community's regulations meets the three credit criteria specified under "regulatory language" on page 52, then it qualifies for 15 points under SDR. Credit for SDR is separate from credit for CDR.

If the regulations meet the three criteria and the community publicizes the requirements, 30 points are provided.

Documentation

The community's submittal must include a photocopy of the appropriate pages of the ordinance or statute. The acronym "SDR" needs to be marked in the margin and where the three required items of regulatory language appear (see page 52) must be shown. Marked examples of stream dumping ordinances are included on pages 56–58.

It is not necessary to submit a certified copy of each ordinance. The Chief Executive Officer's certification of the community's entire submittal is considered to be a certification that the ordinance or statute has been enacted into law and is being enforced.

If the community is applying for the full 30 points for its stream dumping regulations, the submittal must include a copy of the annual outreach project that explains that there are regulations against dumping and how to report violations. This can be

- ✓ A notation that one of the outreach projects submitted with the documentation for Activity 330 (Outreach Projects) includes the drainage maintenance topic,
- ✓ A photocopy of a notice that is distributed to all residents of the community each year, or
- ✓ A photo or photocopy of a "no dumping" sign.

Verification Visit

The ISO/CRS Specialist will ask questions on how the regulations are enforced. Examples of tickets or other enforcement actions would be useful. If the community is seeking credit based on posting "no dumping" signs, the ISO/CRS Specialist will want to visit some of those sites.

Annual Recertification

In each year's recertification, the CRS Coordinator must initial a statement that the community is still enforcing its regulations. The ISO/CRS Specialist provides the form with the language.

If the community is applying for the full 30 points, a copy of the outreach project needs to be included.

Stream Dumping Ordinances

This section includes three ordinances that were submitted by communities for CRS credit for stream dumping regulations (SDR). Each has been given full credit because they include the three items noted on page 52:

1. A prohibition of dumping ANY material in a channel or basin that could cause an obstruction to flows.
2. The identification of an officer or office responsible for enforcement and monitoring compliance.
3. Provisions for penalties and abatement of violations.

In many cases, items 2 and 3 appear elsewhere in an ordinance or municipal code book. For example, Margate's ordinance on stream dumping does not have an office or officer identified. In this situation, the community must provide an explanation on its enforcement procedures.

NOTE: *The examples of ordinance language provided in this publication come from actual ordinances used by CRS communities. All ordinance language should be carefully reviewed by local legal counsel before adoption.*

The City of Scottsdale's ordinance provides for the removal of obstructions at the expense of the owner.

The following examples also show how the submittal could be marked. It is important for the community to identify where the three required items appear. If the ISO/CRS Specialist cannot find them, there will be no documentation to support the CRS credit.

Publicity

An ordinance is much more effective if people know about it. As a prerequisite for the full 30 points credit for SDR, the community must conduct an outreach project that notes that there are regulations against dumping and how to report violations (see examples on pages 28 and 53.)

The South Holland ordinance on page 58 was distributed to all participants at a floodproofing open house the Village held for floodplain residents. By itself, this does not meet the publicity requirement for CRS credit. To receive credit for its stream dumping regulations, South Holland would have to distribute the flyer to all residents or addresses in the community. In fact, South Holland discusses the ordinance in its Village newsletter each year and posts the signs shown on page 52. The more publicity, the better.

Margate, Florida:

Sec. 10-12. Littering.

No Dumping

(a) *Depositing of litter prohibited.* It shall be unlawful for any person, firm or corporation, in person or by his agent, employee or servant, to cast, throw, sweep, sift or deposit in any manner in or upon any public way or street or other public place in the city or any river, canal, public water, drain, sewer or receiving basin within the jurisdiction of the city, any kind of dirt, rubbish, waste article, thing or substance whatsoever, whether liquid or solid. Nor shall any person, firm or corporation, cast, throw, sweep, sift or deposit any of the aforementioned items anywhere within the jurisdiction of the city in such manner that it may be carried or deposited in whole or in part, by the action of the sun, wind or rain into any of the aforementioned places.

Provided that this section shall not apply to the deposit of material under a permit authorized by any ordinance of the city; or to goods, wares or merchandise deposited upon any public way or other public place temporarily in the necessary course of trade; and removed therefrom within ten (10) hours after being so deposited; or to articles or things deposited in or conducted into the city sewer system through lawful drains in accordance with the ordinances of the city relating thereto.

Provided, further, that this section shall not apply to the deposit of material or other trash placed for normal residential trash pickup and removal within seventy-two (72) hours after being so deposited.

(b) *Vehicles to be covered.* It shall be unlawful for any person, firm or corporation, in person or by his or its agent, employee or servant, to use any vehicle to haul any kind of dirt, rubbish, waste articles or things or substance, whether liquid or solid, unless such vehicle is covered to prevent any part of its load from spilling or dropping at all times while such vehicle is in motion on any street or alley in the municipality; except that while such vehicle is on State Road 441, it shall be covered at all times except while actually being loaded or unloaded. Provided, however, that the requirements herein for covering such vehicles shall not apply to vehicles carrying brush cuttings, tree trimmings, branches, logs and similar waste material, or fill or sand if such matter is securely lashed or loaded on such vehicle to prevent spilling or dropping as aforesaid.

Penalty

(c) *Penalty.* Any person, firm or corporation violating any of the provisions of this section shall be punished as provided by Section 1-8 of this Code; and a separate offense shall be deemed committed on each day during or on which a violation occurs or continues. (Ord. No. 80-26, § 1, 4-9-80)

Section 10-1 states that enforcement is the responsibility of the Building Inspector

Scottsdale, Arizona:

Sec. 37-44. Obstruction of waterway – Prohibited.

1. No dumping

No person in the city shall either obstruct or reduce the capacity of a watercourse by any use or by filling, dumping, or constructing or by any other means, except as provided in this article. (Code 1972, § 5-618(A))

Sec. 37-45. Same – Removal of obstructions.

(a) Any person who owns, occupies, or leases real property within the city and who obstructs or reduces the capacity of a watercourse other than as provided for in this article, shall be deemed to have created a public nuisance. Such persons shall be notified in writing, either personally delivered or by certified or registered mail, return receipt requested, by the floodplain administrator or his authorized representative, to remove the obstructions or the materials creating the reduction of the capacity of a watercourse within ten (10) days after receipt of said written notice. If the owner does not reside on such property, a duplicate shall also be sent to him at his last known address.

2. Officer

(b) If the owner, lessee, or occupant of such real property, after having been given notice as required above, does not comply and abate such conditions which constitute a public nuisance, the floodplain administrator shall be authorized to abate such condition at the expense of such owner, lessee or occupant.

3. Penalty

(c) The floodplain administrator, or his authorized representative, shall prepare a verified statement and account of actual cost of such abatement, including inspection and other incidental costs in connection with such abatement. Said verified statement and account is hereby declared as a debt of such owner, lessee, or occupant. A copy of said statement and account shall be personally delivered or delivered by certified. mail, return receipt requested, to the party served with the original notice. The city attorney may institute an action to collect the debts so created in the superior court of the county at any time after delivery of the statement and account.

(d) Within ten (10) days after receipt of the notice described in subsection (a), any person may appeal the city's request by serving written notice of appeal upon the city clerk and shall be entitled to a hearing before the floodplain board on the appeal. In the event such an appeal is filed, all proceedings shall be stayed pending disposition of the appeal. Any person may also appeal to the floodplain board within ten (10) days after the receipt of the statement and account prepared and served pursuant to subsection (c) the amount of said debt by serving written notice of appeal upon the city clerk which also shall stay all further proceedings pending disposition of the appeal.

3. Penalty

(e) When, in the opinion of the floodplain administrator, there is immediate danger to life or property, constituting an emergency, as the result of any obstruction or reduction of the capacity of a watercourse not authorized under this article, he may order the immediate abatement of said condition notwithstanding the notice provisions provided in subsection (a) of this section. The cost of said abatement shall be collected in the same manner as other debts, as provided for in subsection (c) of this section.

(Code 1972, § 5-618S(B); Ord. No. 1993, 2-29-88)

South Holland, Illinois:

NOTICE TO RESIDENTS

Please be advised of the passage of a new ordinance.

1. No Dumping

SECTION 14-51 Regulation

The deliberate or unintentional disposal of grass clippings, brush, fill, trash, debris, obstructions or unwanted materials into the storm sewers or within or along banks of man-made or natural water courses or in adjacent floodplain areas which may wash into streams and sewers is unlawful.

2. Officer

SECTION 14-52 Powers and Authority of Inspectors

The Code Enforcement Officer and other duly authorized employees of the Village of South Holland shall be permitted to enter upon all properties for the purpose of inspection, observation and measurement, in accordance with the provision of this ordinance.

3. Penalties

SECTION 14-53 Penalties

a. Any person found to be violating the provision of this ordinance shall be served by the Village of South Holland with written notice stating the nature of the violation and providing 10 days for the satisfactory correction thereof. The offender shall, within the period of time stated in such notice, permanently cease all violations.

b. Any person who shall continue any violation beyond the time limit provided for in Section 14-54 shall be guilty of a misdemeanor, and upon conviction thereof shall be fined in an amount not exceeding $500.00 dollars for each violation. Each day shall count as a separate offense.

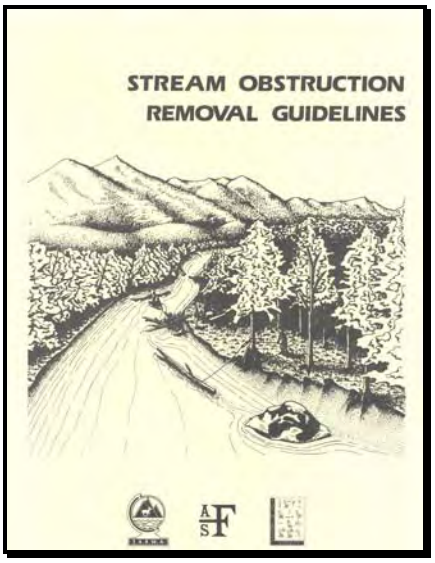
c. A substitution may be made for hours of Community Service in lieu of a cash fine, if the service is devoted to remediation of the impact of dumping in the conveyance system.

For More Information

Some state departments of natural resources, water resources, or environmental protection have regulatory authority over work in channels. Their drainage maintenance expertise can also help.

Communities can request help on this activity from the U.S. Department of Agriculture's Natural Resources Conservation Service. Requests should be submitted to the local soil and water conservation district, which is usually located in the county seat.

Urban communities may be within an urban drainage or sewer district that has drainage maintenance staff.



Stream Obstruction Removal Guidelines, by C. McConnell, published in 1983 by The Wildlife Society and American Fisheries Society, provides simple and easy to understand guidelines for a channel maintenance program that has a minimal impact on habitat. Some excerpts from this publication appear on pages 45–47. It can be ordered for $8 plus shipping from the American Fisheries Society, 5410 Grosvenor Lane, Bethesda, MD 20814.

CRS Credit for Outreach Projects can help with public information activities to advise property owners about drainage maintenance. Order from the office on the inside front cover.

Additional information, reference materials, and examples can be found at the CRS Resource Center at http://training.fema.gov/EMIWeb/CRS/.

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